CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

A Statement from the Editors

Welcome to our third issue of *Choices*. We want to make you aware of several things.

- *Choices* is a good place to get your work out. During the period November 1, 2004 to January 31, 2005, our *Choices* website has had about 216,000 total hits, which represent the total number of requests made to our server. Most of these hits came from the United States, but many are also from countries around the world.
- We need outreach partners. Please help us reach more people with mailing lists who can join in our outreach partner campaign. See our plea and forms to nominate or agree to be a partner on http://www.choicesmagazine.org/outreach.htm. In this regard, we are pleased to welcome several new outreach partners, including CattleNetwork.com, that will consider redistributing our web page and email announcements to their 15,000 subscribers.
- We are trying to get issues out on time. After this issue, we will strive to publish at the end of each quarter of the year.
- Please send us content. High-quality issues require high-quality content; we would like to see the profession help us by contributing more content. We would really like to see a significant pickup in the number of thematic submissions and an enhancement in the stream of grab bag submissions. For submission requirements, see http://www.choicesmagazine.org/submissions.htm.

Contents of Vol. 20, No. 1:

Washington Scene 3

***Theme:* The Changing Face of Agricultural Lending**

Changing Face of Agricultural Lending 5
Growing Complexity of Agricultural Lending Decisions 7
History and Unique Features of the Farm Credit System . . 11
Restructuring of the Ag Lending Markets: The FCS Dilemma15
Selling a Piece of the Farm Credit System. 19
Are Rural Credit Markets Competitive? Is There Room for Competition in Rural Credit Markets? 25
FCSA Sale to Rabobank: Selling What? On Whose Authority? And For Whose Benefit? 31
The New Basel Capital Accord: Implications for US Agricultural Lenders 39
Agri-lending Vision 2020: When Vision and Reality Meet . 43

***Theme:* 2005 Markets for Environmental Goods and Emissions**

Markets for the Environment 49
Lessons Learned from SO2 Allowance Trading 53
The Evolving Western Water Markets 59
The Future of Wetlands Mitigation Banking 65
Crunch Time for Water Quality Trading 71

Grab Bag

Are E-Grocers Serving the Right Markets?. 77
The Farmapine Model: A Cooperative Marketing Strategy and a Market-Based Development Approach in Sub-Saharan Africa. 81

Comment and Reply 87
Coming Attractions 89

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1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Washington Scene

New Proposal for Market-Based Programs—The Clear Skies Act. One of the centerpieces of President Bush's current environmental program is the Clear Skies Act, which is currently before Congress. The Act includes cap-and-trade programs for three of the main pollutants from electric power generation: sulfur dioxide, nitrous oxide, and mercury. Trading is a central component of the proposed program as a way to achieve these environmental targets at the lowest possible costs. Critics of the program point to the fact that trading can lead to locally high concentrations; in the case of mercury, this would have serious health consequences.

Market-based Trading for Carbon Dioxide Erupting in Europe. Climate change-related greenhouse gas trading is on the rise in Europe. With the recent ratification of the Kyoto Protocol, the per-tonne CO2 trading price in Europe has increased from €6.85 on January 17, 2005 to €10.75 on March 9, 2005—a 57% increase. Volume traded in 2005 has increased dramatically from almost 3 million tonnes per month for October, November, and December of 2004 to about 7 million tonnes in January 2005 and 8 million tonnes in February 2005. Through the 9th, 4.69 million tonnes have already traded in March 2005. Additionally, the Chicago Climate Exchange is starting a European carbon futures market, the European Climate Exchange (ECX), based on the EU Emissions Trading Scheme and traded on the International Petroleum Exchange in London. There is also the European Energy Exchange (EEX) that allows trades and which held its first daily spot auction on March 9, 2005 with 20,000 tonnes traded.

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Changing Face of Agricultural Lending

David M. Kohl and John B. Penson, Jr.

The structure and conduct of agricultural lending has been changing rather dramatically over the past two decades. However, it took the attempted sale of a large Midwestern agricultural credit association in the Farm Credit System to a foreign bank to refocus attention on the implications of these changes.

Some of the forces causing change have been occurring at the farm level, where farmers and ranchers are changing the way they do business. Other changes have been occurring in global markets for agricultural and value added food and fiber products. Rapidly changing dynamics are occurring in technology embodied in inputs and management of resources and the environment. Finally, evolution is occurring in the credit market serving agriculture and the regulations that govern institutional behavior.

In this issue of *Choices*, we examine a broad range of issues changing the face of agricultural lending. The agricultural lending decision making process is becoming much more complex as a result of contractual and ownership arrangement issues, locational issues, and management quality and risk management issues. The Farm Credit System, with its unique structure, faces a number of issues as it attempts to maintain its competitive position in light of the evolving farm customer base and activities of competitors providing loans and services in this market. The degree of competition in agricultural lending will influence quantity and quality of loans made.

Particular attention in this theme is placed on examining the recent attempted purchase of Farm Credit Services of America headquartered in Omaha, Nebraska by Rabobank, an international financial services lender headquartered in the Netherlands. Already active in other regions of the United States, Rabobank offered $750 million to purchase this component of the Farm Credit Service last summer. Although this deal ultimately was called off, it raises a number of policy and structural issues that will be debated in the coming months.

Articles in this Theme:

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Growing Complexity of Agricultural Lending Decisions 7
History and Unique Features of the Farm Credit System .. 11
Restructuring of the Ag Lending Markets: The FCS Dilemma15
Selling a Piece of the Farm Credit System 19
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The Basel II Capital Accords, scheduled to be implemented by the end of 2006, has implications for setting capital requirements, supervisory review, and market discipline at banking institutions. The measurement and management of credit risk, operational risk, and market risk lie at the heart of Basel II. While implementation will begin at the nation's largest banks, the more advanced approaches to calculating capital requirements and other management practices will have implications for other banks and nonbank lending institutions as well.

With the many forces changing the face of agricultural lending, this is a good time to examine shifting paradigms impacting agricultural lending as it evolves over the next 15 years from both the customer side of the market as well as from the lender perspective. Other contributors to this theme include Danny Klinefelter, Neil Harl, Michael Boehlje, Allan Gray, Robert Jolly, Josh Roe, Maureen Kilkenny, Roger Ginder, Ani Katchova, Peter Barry, and Alicia Morris. Any remaining omissions or errors are the sole responsibility of the contributors and editors.

David M. Kohl is a professor emeritus in Agricultural and Applied Economics at Virginia Tech. Choices co-editor John B. Penson, Jr. is Regents Professor and Stiles Professor of Agriculture in the Department of Agricultural Economics at Texas A&M University.

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Growing Complexity of Agricultural Lending Decisions

Danny A. Klinefelter and John B. Penson, Jr.

The face of agricultural lending has changed dramatically over the last several decades from both a demand and supply perspective. Farm numbers are down, but size is up. The distribution of farms is increasingly bimodal; 2% of farms today produce over one half of total sales. Large-sized operations are capital intensive, utilizing the latest technologies embodied in variable and fixed inputs to expand productivity and lower costs. The use of debt capital in agriculture has reached an all-time high. Total farm debt outstanding today is up almost 50% from 1990 and now exceeds the peak debt outstanding before the farm financial crisis in the mid-1980s. These borrowers are increasingly sophisticated in their marketing strategies, alliances, and use of available information technology.

There has also been considerable change in the lenders providing loans to farmers. The Farm Credit System (FCS), which accounts for 38% of real estate farm debt and 22% of non-real estate farm debt, has transformed itself from 12 farm credit districts down to just four Farm Credit Banks (FCBs) and CoBank, which serves cooperatives nationwide in addition to its affiliation with major agricultural credit associations (ACAs) on both coasts. The recent failed attempt by the Dutch banking conglomerate Rabobank International to purchase one of the larger ACAs in the FCS raised a number of policy issues addressed by other papers in this theme. Commercial banks, the largest commercial lender to farmers, account for 33% of real estate farm debt and 49% of non-real estate farm debt outstanding. The credit delivery system at both lenders has changed considerably in recent years, with credit scoring and information technology playing a major role in credit decisions and resulting in efficiency gains in terms of decision turnaround and cost of operations. Other lenders to farmers and ranchers are undergoing change as well.

This paper focuses on the drivers of change at the farm level and emerging credit analysis issues. The remaining papers in this theme provide background on and discuss the implications of the attempted Rabobank purchase of an ACA, the implications that the Basel II Accords have for lending and portfolio decisions by agricultural lenders, and a look at where agricultural lending may be headed over the next several decades.

Drivers of Change at the Farm Level

There are a number of forces that will drive further change in agricultural lending in the next few years. These drivers in turn will influence credit analyses and portfolio management decisions at agricultural lending institutions.

For starters, the next farm bill will likely see several changes that will affect agricultural lending. This includes the potential de-emphasis on commodity safety nets (loan deficiency payments and countercyclical payments) as well as direct payments and increased emphasis on revenue insurance for a broad range of crop and livestock commodities. Continued programs may involve payment limitations and needs testing. Other policy-related drivers include issues related to water rights, zoning, and other regulations dealing with odor, dust, chemicals, and noise in agricultural production. Finally, macroeconomic policies affecting the general economic health of the domestic and global economies will also affect farm profit margins and debt repayment capacity.

Environmental, food safety, and bioterrorism concerns will also drive changes in production at the farm level. Regulations governing input use such as fertilizer and chemicals can affect both yields and the cost of production. Traceability in production processes and other Environmental Protection Agency (EPA), Federal Drug Administration (FDA), and Homeland Security regulations can also affect the cost of production but could have

positive effects on demand if these regulations give consumers greater confidence in finished goods.

International competition and globalization will affect trade flows and market shares for agricultural products and hence affect the prices received by farmers. Supply and demand conditions in China alone can have a substantial impact in the global marketplace. Brazil may also surpass the United States in terms of production of major commodities in the foreseeable future. These trends were happening before NAFTA and recent WTO rulings. The ultimate impact on US farmers will depend upon the relative efficiency and comparative advantage of competitor nations, including the United States. Although commodity prices may be global, production costs are local. Avocado production in Mexico, for example, requires no irrigation, whereas irrigated water represents California avocado growers' single largest input cost. This makes Mexico growers extremely competitive with California growers. Absent of quality differences between Mexican and Californian avocados, one would expect declining prices for avocados in US markets as Mexican growers gain broader access to markets in the United States. The general competitiveness of US farmers in global markets will also depend on exchange rates, trade agreements, and the agricultural policies of competitor nations.

Farm involvement in integrated supply chains will also influence the stability and profitability of farm borrowers. By enhancing the predictability of quality and supply to institutional buyers, these relationships ensure a market, and hence the stability of sales by farmers. Alliances, joint ventures in input use and production, and new forms of business relationships will also lead to changes at the farm level.

Finally, other potential drivers of change at the farm level include the cost and availability of water, the cost and availability of capital, the Internet and the availability of decision tools online, biotechnology and its affects on the cost and productivity of crop and livestock production, and farm operations producing nontraditional differentiated products such as specialty grains.

Lenders will need the expertise to understand these drivers of change. Forming expectations of future debt repayment capacity requires lenders to understand the business relationships and environment in which their borrowers make decisions.

Emerging Credit Analysis Issues

As farms become larger and more complex, a number of issues are beginning to arise that will challenge traditional agricultural lenders. The measurement and assessment of risk evolving from the Basel II Capital Accords described in the paper by Katchova and Barry (in this issue) implies the need for using more sophisticated probability-of-default analysis tools for large exposures. Furthermore, the growing complexity of loan approval and portfolio management means the skills and knowledge lenders need to possess is going to change significantly. The remainder of this article identifies some of more significant issues we see emerging in credit analysis.

Alliances, contractual relationships, joint ventures, and interlocking ownership arrangements are becoming increasingly common as the food and fiber system moves toward coordinated supply chains. The analysis process will have to consider the terms and conditions of these arrangements and how risks are shared between the parties involved. Sorting out how costs and returns are allocated and accounted for will also present a challenge. These arrangements will also raise questions concerning ownership interests, liability, and the methods of legal recourse underpinning them.

Multiple entities, multiple owners, and the various interlocking ownership and contractual arrangements will also magnify the importance of relationship risks. In addition to the previously mentioned financial and legal aspects, equally important are issues related to the commitment to the arrangement by the parties involved, compatibility and complementarities of management styles and philosophies, in addition to potentially different goals and objectives. Relationship risks are also not limited to interfirm arrangements. The interpersonal relationships within the closely held multiple-owner businesses are just as significant. Family business specialists frequently refer to preparing for the four D's: death, disability, divorce, and departure. The attributes of and need for buy-sell agreements between the parties, including their spouses, to address how different events will be handled will be an increasingly important factor in assessing business continuity and viability.

Many of the multiple entity relationships will be between agriculturally oriented businesses and businesses for which agriculture is only a minor part of their business portfolio. Many current agricultural lenders do not have the training or experience to assess the credit risks associated with these firms' nonagricultural business activities.

Evaluating the creditworthiness and business performance of hori-

zontally and vertically integrated firms will be far more challenging than traditional agricultural lending. The diverse and unique combinations of assets found in these firms are going to involve unique credit underwriting standards.

Although technical knowledge of farm operations has been a prerequisite for success of lenders in the past, the successful loan officer of the future will need to evaluate the economic value of alliances, information sources, and coordination methods.

Historically, farmers have operated in a limited geographic area, which allowed lenders to not only become familiar with the production practices, but also to have the ability to physically monitor performance and conditions. But that is changing rapidly. Geographic diversification is no longer limited to farming in different counties. Many farm operations are now spread over several states, and some are even multinational in scope. A significant number of US farmers are already operating in Argentina, Brazil, and Mexico. Not only are the production and market risks different, but the issues of coordination and control, as well as different economic, political, and legal risks, will also need to be considered.

Since the mid-1980s, agricultural lenders have placed much greater emphasis on cash flows and profitability; however, most farm loans are still asset-based transactions. One of the major changes occurring in agriculture that will challenge traditional lenders is the shift from hard to soft assets as the underlying strength in the borrower's business. In addition to the human resources of the business (which we will focus on next), contracts, brands, patents, leases, alliances, buy-sell agreements, and franchise arrangements are important to the overall performance and viability of the business. These "soft assets" will represent challenges from the standpoint of both risk assessment and business valuation.

The implications of this trend will be profound for agricultural lenders. First, the financial performance of farm operations will become increasingly dependent on management and returns to management, rather than the ownership of and returns on assets. Management will entail not only operations and marketing skills internal to the firm, but also successful negotiation of linkages with suppliers and processors or distributors and having the proper external partners.

The human/management factor has always been recognized as a key to the success of any business or lending relationship. But the assessment has largely been subjective or based on measures associated with past performance. In the future, the primary basis for a business being able to maintain a sustainable competitive advantage will be management's ability to learn and adapt faster than its competition. Assessing management's ability and willingness to innovate and adapt, as well as whether the business is structured in a way as to permit sufficient flexibility, will be a major challenge. This is particularly true because managers go through lifecycles in which their attitude toward adapting to change and taking on new risks tends to change over time. A key element here will be assessing the breadth and depth of the management team, how decisions are made, and whether there is a clear succession plan and basis for successor selection. Another emerging issue that will complicate management assessment is the trend toward outsourcing and pooling of specific management services and decisions. In these situations, the evaluation of management quality will not be limited to the business's internal capacity.

The increasing emphasis on risk management by lenders, regulators, and business owners is also spurring the development of new risk management products and strategies. Some are and will be insurance products; others will be various forms of derivatives. New futures and options markets and different forms of risk-mitigating contractual arrangements are appearing or being proposed in almost every market. Unfortunately, most risk management tools can increase risk as much as they can reduce it, if the tools are misunderstood or not used properly. There will also be issues related to how these tools and markets are underwritten and regulated. The ability to assess and become knowledgeable about these emerging developments will challenge both farmers and their lenders.

Historically, most agricultural products have been sold in open commodity markets. Much of the remainder has been produced under some form of production or marketing contract. Developments in biotechnology are just beginning to create what will eventually become significant markets in specific attribute raw materials for both consumer and industrial products. While homogeneous commodity inventories represent a fairly definable level of inventory risk, these new products will add a new dimension in terms of potential attribute quality deterioration and technical obsolescence. Just as clothing fashions, computer hardware, and pharmaceutical products can experience rapid devaluation in light of the development of new sub-

stitutes, the same will be true for these agricultural inventories.

Most lenders recognize the importance of evaluating trends and cycles when analyzing agricultural loans. The increasing emphasis on value-added business activities and niche marketing is going to require even greater emphasis on the need to evaluate market entry and exit strategies. This will be true for both lenders and borrowers. Historically, most analysis has focused on trends as if they were linear. The acceleration in the speed of information transfer, globalization, and changes in consumer tastes and preferences and technological developments have resulted in some trends becoming exponential. Timing has always been important, but the early identification of tipping points, in terms of both getting into or out of a market, is becoming critical. The need for closer monitoring and recognizing that much of the impetus for change will come from outside the business will be increasingly important in the analysis process, the design of information systems, and the identification of leading indicators.

Related to the previous point is the ability of lenders to evaluate strategic risks when assessing both individual loans and portfolio risk. The importance of environmental scanning is going to become more important. Although significant changes and events can be envisioned, their probability of occurrence is often extremely low and frequently will be the result of events or developments outside the borrower's industry. The scope of the scanning process, the understanding of interrelationships, and the identification of leading indicators in markets largely unfamiliar to traditional agricultural lenders will present new challenges.

Most agricultural lenders are knowledgeable about the details of the various farm programs and the rules and regulations associated with environmental programs. However, as a result of increasing concerns and regulations associated with bioterrorism, food safety, and developments in biotechnology, compliance with Homeland Security Administration and FDA regulations may be associated with greater liabilities than traditional farm programs. These programs not only will present the need to be knowledgeable about a wider range of regulations, but monitoring compliance may often be more difficult and more costly.

Summary and Theme Overview

There have been major changes to the face of agricultural lending over the past several decades. Many of the forces driving these changes have occurred at the farm level. Lenders have adapted to these changes in addition to changes in technology that permit greater efficiency in their operations. Lenders will have to continue to adapt to the increasingly complex and uncertain environment in which their clientele operate. In short, the future promises continued change to the face of agricultural lending.

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History and Unique Features of the Farm Credit System

Neil E. Harl

The proposed buyout of Farm Credit Services of America (FCSA) by Rabobank in late July 2004, and the subsequent rejection of the offer by the FCSA board in late October 2004, focused attention on the uniqueness of the Farm Credit System as a national cooperative lender to agriculture, on congressional expectations for the system (inasmuch as the system was created by successive congressional acts), and on the very unusual tax status of the Farm Credit System, especially the Federal Land Bank segment. The proposed Rabobank buyout posed the policy question of whether a buyout of a component of the Farm Credit System was inconsistent with the statutory and regulatory framework of the system.

The matter of expectations of the stockholders of the buyout target was also highly relevant but the proposed buyout did not progress to the point of assessing stockholder positions on the matter.

History of the Farm Credit System

Early History

By 1912, politicians found it universally popular to promise that strong measures to deal with the farm credit problem would be taken by government. In that year, all three political parties (Republican, Democratic, and Progressive) adopted platform planks calling for strong rural credit legislation. As early as 1908, President Theodore Roosevelt's Country Life Commission had recommended a cooperative credit system that would provide agricultural credit to farmers and ranchers on fair terms.

Compromises or reconciliation of such polarized concepts—the one system private, the other public—proved difficult. Congress tied both plans together and adopted them into a single enactment as the Farm Loan Act of 1916.

Thus, the Land Banks and their affiliated associations came into being in 1916, because farmers had an urgent need for more and better long-term mortgage financing. Money was scarce in most rural areas, and when lenders could be found, costs usually were high. Every few years, mortgages had to be renewed or refinanced. There was the ever-present danger that renewals or a new lender would not be available.

After the wartime prosperity of 1918–1920, American agriculture fell into a deep depression, and the Federal land program and its private counterpart, the joint stock land banks, were unable to provide the needed credit.

In the early 1920s, the War Finance Corporation endeavored to establish a program for short-term agricultural credit. Congress, responding to the nation's depressed rural economy, enacted the Agricultural Credit Act of 1923, which established the Federal Intermediate Credit Banks to finance and discount the paper of agricultural credit organizations, commercial banks, savings institutions, and cooperatives, in order to channel funds to individual farmers for their operating needs.

The Great Depression

The nationwide depression that deepened in 1929 and continued into the 1930s accelerated the problems of rural America. Upon assuming office, President Roosevelt acted quickly to establish a means to revive financially the farm economy. By Executive Order, the President created the Farm Credit Administration, thereby concentrating the supervision and authority over the foundering rural assistance programs.

Thereafter, Congress enacted the Farm Credit Act of 1933, establishing a system of production credit corporations and associations, with financing from the Federal Intermediate Credit Banks, to provide operating loans to farmers on a short-term credit basis. That legislation also

brought into the Farm Credit Administration the banks for cooperatives. In the same year, the Emergency Farm Mortgage Act provided for refunding and revising the operations of the Federal Land Bank associations to meet the problems of farm foreclosures and debt defaults.

In the late 1960s, it became increasingly apparent that the system, which was based on several underlying statutes, should be recodified, updated, and made ready for the years ahead.

In 1985, in the midst of a deepening farm debt crisis characterized by low commodity prices, high farm debt-to-asset ratios, and steeply falling land values, the Farm Credit System banks held some $6 billion in loans in which the face amount exceeded the value of the collateral. Increasing amounts of nonaccrual and other high-risk loans ($10 billion in September 1985), record losses, and increasing acquisition of property through foreclosure or liquidation severely strained the resources of the system, with individual banks and associations in danger of collapse. In response to the growing crisis, Congress passed the Farm Credit Act Amendments of 1985 which (a) reorganized the central administration of the system to make the Farm Credit Administration a more independent, arm's-length regulator of the System; (b) increased the FCA's enforcement powers; and (c) created the Farm Credit System Capital Corporation to assist the system as a ready source of financial assistance. Although the act did not appropriate additional funds for the FCA, it did provide the Department of the Treasury with discretionary authority to provide financial assistance after certification of need from the FCA.

The Agricultural Credit Act of 1987 provided for reorganization of the Farm Credit System in terms of powers and capitalization. Federal Land Banks and Federal Intermediate Credit Banks within each district were merged.

Under the Agricultural Credit Act of 1987, on consolidated or system-wide obligations, each bank was responsible for obligations issued on its own behalf and jointly and severally liable on other obligations as called upon by the Farm Credit Administration. After five years, the FCSIC fund was to be exhausted before a bank was asked to be liable for other banks' obligations.

The Agricultural Credit Act of 1987 created an FDIC-type fund for the Farm Credit System. The new fund was designated the Farm Credit System Insurance Corporation (FCSIC). The 1987 legislation also created the Farm Credit System Financial Assistance Corporation (FCSFAC) to provide capital to FCS institutions experiencing financial difficulty.

The Exit Fee

The payment of the exit fee in the proposed Rabobank buyout in 2004 was of importance because (a) much of the capital involved, which was held as unallocated earnings, would flow out of FCSA and, in large measure, outside the four-state area to benefit other FCS borrowers in other states; (b) payment of the fee would diminish the amount to which stockholders would be entitled; and (c) the expected income tax consequences meant that the US government and the respective states would be major beneficiaries of the payment of the exit fee.

Payment of the exit fee, estimated to total nearly $900,000,000, was to be paid by FCSAmerica out of unallocated surplus—not by Rabobank.

The exit fee is based on the average daily balances of assets and liabilities for the 12-month period preceding the termination date with adjustments. To calculate the fee, assets are multiplied by 6%, and that amount is subtracted from total capital. Thus, the exit fee is all capital above 6% of assets.

The exit fee is paid to the Farm Credit System Insurance Fund. The exit fee could have been avoided if a buyout or merger were to occur with another Farm Credit System unit with the full amount of the fee retained within the system.

Income Tax Implications

The income tax implications are important because of the impact on the purchase price (the greater the negative income tax consequences, the lower the purchase price) and the potential effect on the amount available for distribution to stockholders.

History of Exemptions from Income Tax

Income earned by the Federal Land Banks (FLB) and the Federal Land Bank Associations (FLBA) is exempt from federal, state, municipal, and local taxation. The exempt status was provided for in the original act creating the Federal Land Banks in 1916 (the Federal Farm Loan Act) and has been continued in subsequent legislation.

Bonds, debentures, and other obligations issued by Federal Land Banks are exempt from all taxes other than federal income tax. This makes Federal Land Bank bonds more attractive to the investing public. The exemption benefits security holders and also allows securities to be priced more favorably.

Effect of the Agricultural Credit Act of 1987 on FLB

The FLB and FLBA exemptions were called into question by the IRS following the enactment of authority in the Agricultural Credit Act of 1987, allowing the merger of Federal Land Banks into an Agricultural Credit Association (ACA). The Internal Revenue Service ruled on three occasions that Agricultural Credit Associations (created upon the merger of Federal Land Banks and Production Credit Associations under the Agricultural Credit Act of 1987) were not exempt from income tax from long-term lending activities previously carried on by a predecessor Federal Land Bank or Federal Land Bank Association.

FCSA is listed as an Agricultural Credit Association. However, a federal district court in Fargo, North Dakota held that the Federal Land Bank exemption from income tax could continue after 1987. In that case, an ACA was formed by the merger of an exempt FLBA (offering long-term land loans) and a nonexempt Production Credit Association (PCA) offering short- and intermediate-term loans. The income from the ACA's long-term land loans was held to be exempt. The court said that to conclude that Congress intended to deny the continuance of the exemption would be "illogical and absurd." The court said that no specific language was needed for the long-term land loan income exemption because it already existed and was incorporated by reference. Thus, FCSA has continued to enjoy an exemption of income from long-term land lending.

Taxation of Other Units of FCSA

The production credit lending of FCSA has continued to be subject to cooperative taxation rules.

The special tax status of cooperatives involves patronage refunds whereby a percentage of the patronage earnings (80%) is retained by the cooperative, with 20% of the earnings paid out to the member as patronage. The income tax on the entire amount is paid by the patron. For earnings not classified as patronage, the cooperative (other than those earning exempt income) pays income tax on the earnings at the corporate rate.

Treatment of the Exit Fee

The proposed buyout of FCSA by Rabobank also raised a question about the income tax consequences of payment by FCSA of the exit fee that was expected to total nearly $900,000,000. Inasmuch as earnings from the Federal Land Bank (and Federal Land Bank Associations) are exempt from income taxes, payment of the exit fee out of tax-exempt funds raises a question of whether the payment would subject tax-exempt earnings used to pay the fee to federal (and state) income tax. That is the case under well-established tax principles.

Because of a 1992 US Supreme Court case, which held that fees and costs associated with a merger or acquisition were not deductible but had to be amortized over a lengthy time period, there would have been no offsetting deduction.

Taxation of Other Exempt Earnings

It was also unclear how the remaining tax-exempt earnings in FCSA would be taxed and to whom (FCSA or Rabobank) upon completion of the transaction or at a later time.

The United States Supreme Court has long held the view that when a new corporation succeeds to the rights and powers of an old corporation, the new corporation is not entitled to the old corporation's special statutory exemptions, including exemptions from taxation, in the absence of an express provision in a statute.

Therefore, it appeared that Rabobank would not have succeeded to the tax-exempt status enjoyed by FCSA for long-term land loans. Thus, the remaining tax-exempt earnings would have been subjected to tax, probably upon takeover.

No Guidance Requested from IRS

Apparently, a private letter ruling had not been requested from the Internal Revenue Service on the exit fee issue, the issue of tax reporting by stockholders of the purchase price (which was payment for the interest of the stockholders in FCSAmerica), and the issue of taxation of the remaining tax-exempt earnings inside FCSA.

Policy Implications

The question still remains (and will persist until the Congress revisits the issue) of whether it was the intent of Congress from 1916 to the present to allow a buyout of part or all of the Farm Credit System by a private-sector lender. This is an important policy issue that deserves a full-dress debate in Congress with an opportunity for all points of view to be heard. If that is not done, the stage will be set for another buyout proposal at some future time, which will likely proceed under the assumption that inaction by Congress indicates acquiescence in the idea of a private-sector buyout. The public interest in this issue goes well beyond the public resources that have been invested in the system over nearly 90 years.

At a minimum, if Congress decides to allow private sector buyouts, a clear legislative roadmap should be enacted showing the

income tax consequences, when those consequences are triggered, and who bears liability for the tax.

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Restructuring of the Ag Lending Markets: The FCS Dilemma

Michael Boehlje and Allan Gray

The recent initiative by Rabobank to expand their business in agricultural production lending in the United States through the acquisition of Farm Credit Services of America surfaced considerable debate about the appropriateness and desirability of that acquisition. But in reality, the question is much more fundamental: Given the dramatic restructuring of the agricultural capital markets with respect to both the changing customer base and the changing competitors, how can the cooperative Farm Credit System (FCS) maintain its competitive position?

The Changing Customer Base

Farm and agribusiness firms are becoming increasingly complex in their size, structure, organization, and interdependent relationships. The financing needs and uses of funds by these more complex agribusinesses are challenging traditional lenders to consider new lending policies and procedures.

For example, many farms operate farming businesses not only in different counties than their home base, but even in different states or different countries. This broader geographic domain challenges the delivery system of a funding organization that does not match that domain. Likewise, more farmers are entering value-added businesses and new ventures beyond the farm gate. Some of these new ventures include such business arrangements as value-added production systems in the livestock industry, ethanol and biodiesel plants, and other downstream activity. Farmers are also acquiring assets in the input supply sector of the agricultural industry and even in nonagricultural sectors. This increased scope of business activity by farmers challenges a lender who has limited capacity to offer financial products and services in other industries. Farmers are also increasing their financial product/service demands, including cash management services, asset management services, risk management services, payroll services, and so forth; a lender must offer a broader product/service bundle to serve this increasingly demanding customer base.

An additional change in the agricultural credit market is how farmers may access their lender. Increasingly, food companies and processors are developing qualified supplier or franchise grower arrangements with a limited number of preferred producers. These processors are serving as value chain coordinators and in many cases are facilitating their franchise growers' acquisition of price discounts and preferred customer relationships in the feed, chemical, and equipment businesses. It is not illogical that similar arrangements would be developed with credit or financial providers. Thus, a value chain coordinator may facilitate access on the part of their franchise growers to a national or global lender who can provide the broader set of products and services their growers need. In essence, the traditional lenders to agriculture—commercial banks and the Farm Credit System—may need to compete and collaborate with value chain integrators to provide total systems solutions including inputs, product merchandising, risk management, and financial products and services to growers participating in vertically aligned value chains.

In essence, the farm customer base is changing profoundly in terms of the traditional domain and boundaries with respect to geography, line of business, product/service needs, business model, asset control, and utilization and buying behavior.

The Changing Competitor Landscape

The US agricultural credit market has been dominated in the past by domestic commercial banks and the Cooperative Farm Credit System, but that dominance is increasingly being challenged in a number of important dimensions. The recent entry of Rabobank into the US farm production lending market has resulted in a global ag

lender that is one of the highest credit-rated banks in the world challenging US-based agricultural lenders. Agriculture has suddenly become a sector attracting global and international bankers and is no longer the exclusive domain of US-based lending institutions.

Noninstitutional lenders are also important to the farm sector, accounting for almost 25% of the non-real estate and real estate credit in agriculture (Ryan & Koenig, 1999). Captive finance companies, in particular, have become much more permanent in recent years with loan volumes growing rapidly; it is estimated that manufacturers and dealers now have a 25% market share of the intermediate-term non-real estate debt market for commercial farmers (Dodson, 1997). The recent expansion of captive finance companies appears to be driven more by perceived profit opportunities in finance rather than marketing strategies to sell excess inventories, suggesting that these companies are more likely to be permanent participants in the market than in the past.

Financial leasing arrangements are also growing rapidly—estimates are that one fifth of commercial crop farmers lease machinery and equipment (Dodson, 1997). In the machinery, equipment, and facility market in particular, leasing companies affiliated with manufacturers (as well as independent leasing companies) are expanding volume at double-digit rates. The unique financing that captive financing and leasing companies emphasize—along with relatively efficient origination, servicing, and collection procedures—frequently enables them to provide credit services at an equal or lower cost and with more convenience than traditional institutional lenders.

The FCS Challenges

The aforementioned changes in the customer base and competitors present challenges to lenders who can not or do not respond in maintaining their market position and presence. It is essential for any lender to anticipate and respond to changing customer needs and expectations, to offer products and services that are preferred in pricing, service, and other features to that of the expanded offerings of their competitors, and to deliver that product/service efficiently and effectively. Regulations or business policies that limit a lender's responses to changes in the marketplace clearly put it at a competitive disadvantage.

The Regulatory/Policy Challenge

A fundamental challenge that will be faced by the Farm Credit System is that of the regulatory and policy regime that shapes its business focus and activities. This challenge in reality involves two interrelated issues: (a) regulations that define the domain of the Farm Credit System with respect to customer and line of business focus, geographic boundaries, and product/service offering; and (b) Government Sponsored Enterprise (GSE) status.

The first issue of focus and domain of the Farm Credit System is possibly the most straightforward to assess. If the characteristics of both the customers and the competitors evolve as discussed earlier, the Farm Credit System will be increasingly at a competitive disadvantage in serving that changing customer base. Deregulation with respect to a broader set of loan products and financial services that would be attractive to both current and future grower and agribusiness customers, as well as other businesses in rural communities, would allow the Farm Credit System to serve its current and prospective future customers more effectively. Furthermore, as will be discussed shortly, a more diversified customer base would allow the system to more efficiently allocate its risk capital, thus increasing its competitiveness with other global financial institutions.

However, broadening the scope of lending and provision of financial services does not come without a cost. First, one of the benefits of being a specialized lender is that of understanding the industry and tailoring the product/service offering to that industry. If broadening the focus of the Farm Credit System results in less effective and efficient delivery of credit and other financial products to its current customer base, FCS will not be fulfilling its legislatively mandated mission, and the cost may offset the benefits. Furthermore, attempts to expand lending authority of the Farm Credit System will likely be met with resistance from other lenders—commercial bankers in particular. It is highly likely that the quid pro quo required by commercial bankers, if the Farm Credit System were to obtain expanded lending and financial service authority, would be the elimination of GSE status and favorable tax treatment received by certain Farm Credit System entities.

The critical issue, then, is how much the cost of sourcing funds would increase without GSE status compared to the cost reduction that would occur if FCS were a more diversified lender due to reduced equity capital requirements per dollar of loan funds. The costs and benefits of GSE status can not be adequately analyzed without taking into account the prospects of a more risk-efficient use of capital if the portfolio were more diversified.

The Capital Market Challenge

An increasingly important challenge that must be faced by all financial institutions (including the Farm Credit System) is that imposed by the capital markets to efficiently allocate and utilize risk capital. This challenge will be intensified with the phased-in implementation of the New Basel Accord concerning allocation of risk capital for all financial institutions worldwide. The increasingly competitive market conditions all institutions (including cooperatives) will face in sourcing equity capital and compensating providers of equity capital at competitive rates of return on their investment will require financial firms to be more prudent with the use of their equity capital.

A fundamental tenet of risk management and efficient equity capital allocation in any financial institution is that of diversification: Risk can be mitigated and equity capital most efficiently allocated when the institution has a diversified (in contrast to a specialized) portfolio of assets. This tenet is in direct conflict with the specialized focus of FCS lending that, as a function of regulatory policy and business practice, has very explicit boundaries concerning its geographic, line of business, product/service offering, and market segment domains. In essence, the Farm Credit System has been and continues to be a specialized lender that cannot take advantage of diversification to manage risk. System members are thus forced to maintain a higher equity capital position to manage that risk compared to a more diversified financial institution. The system may need to maintain its current high level of equity capital—almost double that of other financial institutions—if it remains as a specialized agricultural lender that cannot diversify. However, it is clearly overcapitalized compared to a diversified lender like Rabobank that can loan to many different industries in many geographic locations in the world. Moreover, from the perspective of current borrowers, this equity capital is "locked up," and consequently has limited current value.

The "excess" equity capital concern is very fundamental—one could argue that if the Farm Credit System operated without current geographic, line of business, product/service offering, and customer segmentation boundaries, the equity capital required would be reduced without increasing the financial risk and potential loss exposure of the system. This concern was in fact acknowledged by FCS of America when the board reconsidered and rejected the Rabobank offer, indicating it would implement policies to more rapidly redeem or repay its patron retains, thus allocating retained equity capital back to the shareholders.

But, a partial redemption of the equity capital may not solve the fundamental problem of efficient risk capital utilization—a specialized lender by definition must maintain a higher equity capital position to manage the higher level of risk it faces. Even further consolidation of the current FCS entities would not generate the risk mitigation advantages of more line of business diversification. Over time, if capital market investors, including those who provide equity capital to financial cooperatives such as the Farm Credit System, recognize that they are not and can not receive a competitive return on that capital as long as the institution maintains its specialized focus, they will move their capital elsewhere or support the transition to more diversification, unless that institution is clearly providing other benefits not available in the market place.

With the significant changes in customers and competitors noted earlier, it is likely to become increasingly difficult for the Farm Credit System to maintain its competitive position under the current regulatory environment that limits its scope. An expanded scope could provide for a system that is more responsive to today's competitive environment. In addition, a broader scope for the system may allow for a more risk efficient allocation of equity capital that would continue to attract investors. However, an increase in scope would require substantial changes in the current regulatory environment of the system, which may lead to the loss of GSE status. In addition, a broadening of scope and reduction in regulatory requirements may lead to further consolidation of the system. These costs will need to be weighed against the benefits of broader scope as the system determines its competitive strategy moving forward.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Selling a Piece of the Farm Credit System

Robert W. Jolly and Josh D. Roe

On July 30, 2004, the Directors of Farm Credit Services of America (FCSA), an association of the farmer-owned cooperative Farm Credit System (FCS), announced that they had agreed to a purchase offer from Rabobank, an international financial services company headquartered in the Netherlands. This announcement set off howls of protest from within the FCS and from some FCSA members and public officials. It was also greeted with restrained glee by some bankers and other FCSA members. Three months later, the FCSA Board terminated the sale negotiation. Shortly thereafter, their CEO resigned and the board followed up with several full-page ads in local newspapers pledging their (and management's) commitment to members and to the principles of cooperation. In demonstration of their renewed commitment, the Board recently announced patronage programs for 2004 and 2005—the first ever by this association.

Unexpected and unprecedented events are generally interesting in their own right. But they also give us an opportunity to examine long-held views and plumb what lies beneath the surface in markets, institutions and public policy. The Rabobank/FCSA deal is one of those seismic events.

The Players in Brief

Sometimes you do need a scorecard to tell the players apart. Here are thumbnail sketches of the major players involved in the Rabobank/FCSA deal.

The Farm Credit System (FCS) is a nationwide farmer-owned and -governed financial cooperative. It currently provides $95 billion in short- and long-term loans to farmers, ranchers, fishermen, rural home owners, agricultural processing and marketing operations, farm-related businesses, farmer-owned cooperatives, rural utilities, and certain foreign and domestic entities engaged in international agricultural trade. Loans are funded not by deposits but rather through the sale of FCS securities in global money markets. The FCS was chartered and initially capitalized by the federal government following passage of the Federal Farm Loan Act in 1916. The motivation for creating the FCS was to provide a source of credit for agricultural mortgages at rates and terms that banks would not or could not meet—whether due to cost or inadequate competition. Although the FCS now provides a wide range of financial services to its designated customer base, slightly more than 50% of its business still comes from agricultural real estate lending. Since the FCS is a creation of the federal government, it is both a business and an instrument of public policy. It is privately owned (all public equity had been repaid by the 1960s) and governed by its members. But it is considered an instrumentality of the federal government when it sells securities. All income from agricultural real estate loans is tax-exempt. The size of the FCS, its collective liability for its debt, and its historical ties to the federal government result in an "implied guarantee" on its securities if the assets of the Farm Credit System Insurance Corporation were to be exhausted. This permits the FCS to borrow funds at a cost only slightly above the federal government. In exchange for these benefits, the FCS is required to serve exclusively rural and agricultural credit markets. The rationale for this bargain has been to ensure that credit is available to rural markets that might be abandoned by banks or other commercial lenders.

The FCS is organized into five regional banks. The regional banks fund a variety of associations serving smaller geographic markets. Farm Credit Services of America is an association of the FCS. It is funded by Agribank, FCB, located in St. Paul, Minnesota. FCSA provides approximately $7.7 billion in loans to farmers and rural home owners in Iowa, Nebraska, South Dakota, and Wyoming. The FCSA is owned and governed by about 53,000 members. (45,000 have voting rights.) The members are represented by a 17-member board. Following cooperative principles, FCSA is owned by those who use it and is governed on a one member, one vote basis.

Rabobank Group is a century-old member-owned bank based in the Netherlands. Its historical roots resemble those of the Farm Credit System. It was started in response to rural credit problems in the Netherlands. Farm and agribusiness lending constitute a long-standing core competency. Rabobank operates in 38 countries with an asset base (at the end of 2003) of approximately $500 billion. Rabobank has operated in the United States for the past 23 years specializing in agribusiness lending. However, in 2002 Rabobank began to implement their "country banking" strategy with a broader focus on production agriculture and rural credit markets. In fairly rapid succession, they acquired Valley Independent Bank in California, Lendlease Agribusiness Division in Missouri, and Ag Services of America in Iowa. These acquisitions gave them toeholds in rural community banking, agricultural real estate, and agricultural input financing, respectively. Rabobank's country banking strategy has been successfully implemented in a number of countries. For example, in 1994 Rabobank acquired the Primary Industry Bank of Australia (PIBA), an established lender with a comfortable loan portfolio. Since acquisition, Rabobank has significantly expanded its lending activities more broadly throughout the country and the agricultural and agribusiness sector. Rabobank continues to finance food and agribusiness firms in Australia as well. A similar pattern of acquisition and growth in rural, food, and agribusiness financial markets has been implemented recently in New Zealand and Ireland. Rabobank has fostered a reputation as a committed agricultural lender with exceptional safety and soundness ratings.

The Farm Credit Administration (FCA) is the regulatory agency for the FCS. Its primary role in overseeing the Rabobank/FCSA transaction was to ensure adherence to the legal process required for an FCS bank or association to leave the FCS and to approve or disapprove the proposal. If approved by FCA, the proposal would then be submitted to the FCSA stockholders for vote.

The Offer

So, here is the deal. Initially, Rabobank offered current FCSA members a $600 million cash buyout for the assets of the association—loans, personnel, customer base, and facilities. The payment would be allocated based on current patronage or outstanding loan balances. This cash offer was eventually increased to $750 million. An exit fee of approximately $800 million would be paid to the FCS Insurance Corporation from FCSA surplus. The calculation of the exit fee is specified in the 1987 Farm Credit Act and is based on an association's capital relative to its assets. It can be viewed as a payment for the benefits received by the association for being part of the system. In addition, Rabobank would need to pay off the $6.2 billion credit line from Agribank funding FCSA's existing loan portfolio.

Good Deal or Not?

At the time the deal was announced, the directors identified a number of benefits for FCSA members:

- a broader set of financial services, including access to international markets;
- competitive cost of funds due to Rabobank's AAA credit rating and size;
- a cash payout from FCSA capital surplus; and
- an opportunity to slip the bonds of the FCS and to serve a broader array of rural households and businesses.

Opponents to the sale also expressed concern that:

- Most of the financial services that Rabobank could offer were or could be offered by FCSA.
- The FCSA could develop a patronage program—as most FCS associations have already done. Patronage programs would serve as an alternative means for member/borrowers to share in the earnings of their cooperative.
- The cash offer was too low, given FCSA's assets and earnings.
- The current members would obtain the cash from the sale, but because it wasn't clear how much of the cooperative's capital was due to the patronage of former members, the former members would be out of luck.
- The exiting association would leave a significant hole in the FCS that the FCA would be required to fill either by expanding the territory of existing associations or chartering a new association. Resources for either option might have to partially come from equity contributions of other FCS banks and associations.
- If FCSA were allowed to secede, a mass exodus of other associations could follow.
- Rabobank, although ostensibly committed to agriculture, would be free to follow profit opportunities in any market. This commitment to rural finance would be much more flexible than the legislation governing the FCS.
- Finally, many FCSA members were concerned about the loss of control over an organization that

they had built and relied on for nearly 80 years.

Why Sell When You Can Merge?

Shortly after the Rabobank/FCSA deal was announced, AgStar, another Agricultural Credit Association serving parts of Minnesota and Wisconsin, presented the FCSA directors with a merger proposal. The merger offer included a cash payout to FCSA members of $650 million and consolidation of administrative offices. Further, because this was a merger and not an exit, the exit fee would be avoided. However, the FCSA board rejected the AgStar offer at the same time as the termination proposal.

What Were They Thinking?

The Rabobank and FCSA folks are no dummies. Yet, this deal is vaguely reminiscent of the introduction of New Coke. The negative reaction from many members, as well as parts of the agricultural community, was quick and strong and seemed to catch the proponents of the sale off guard. Rabobank's stated objective in purchasing the FCSA was to enter a new rural credit market. This strategy of enter, transform, and expand has played out reasonably well in other markets. In singling out the FCSA, was Rabobank attracted to the market? The firm? Or was it an opportunity for a bargain? The answer, it seems, is all of the above.

Figure 1 traces the current value of farm operator assets and debt in the FCSA trade area. Note that since the end of the 1980s, nominal credit volume has grown steadily but slowly—around 3% annually. Also note that outstanding non-real estate debt is nearly equal to real estate debt in this market. And because the value of farm assets has increased at a much greater rate than debt, nominal net worth (and hence potential collateral) has grown significantly.

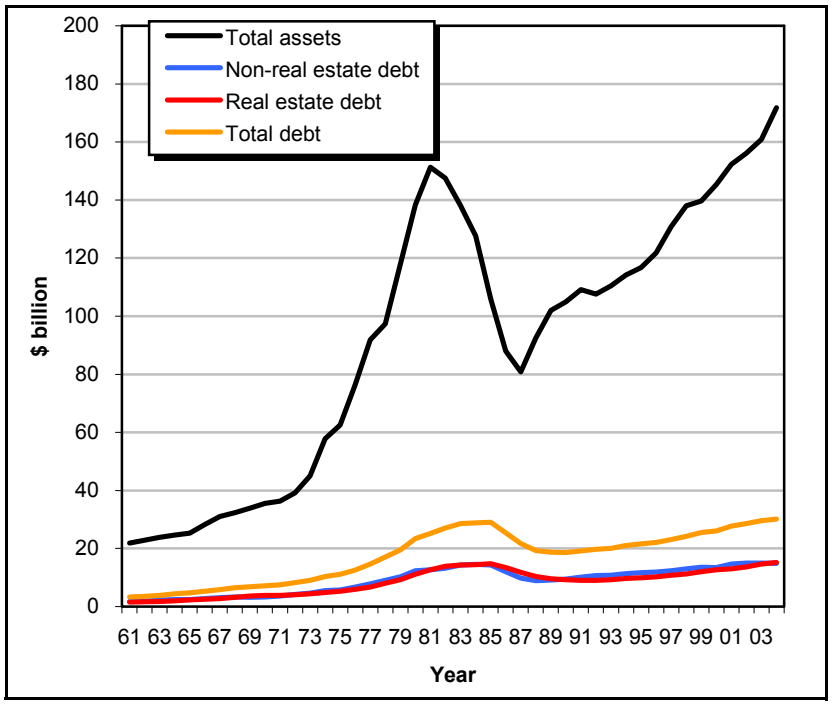

Figure 1. FCSA trade area farm assets and liabilities—1961–2004.

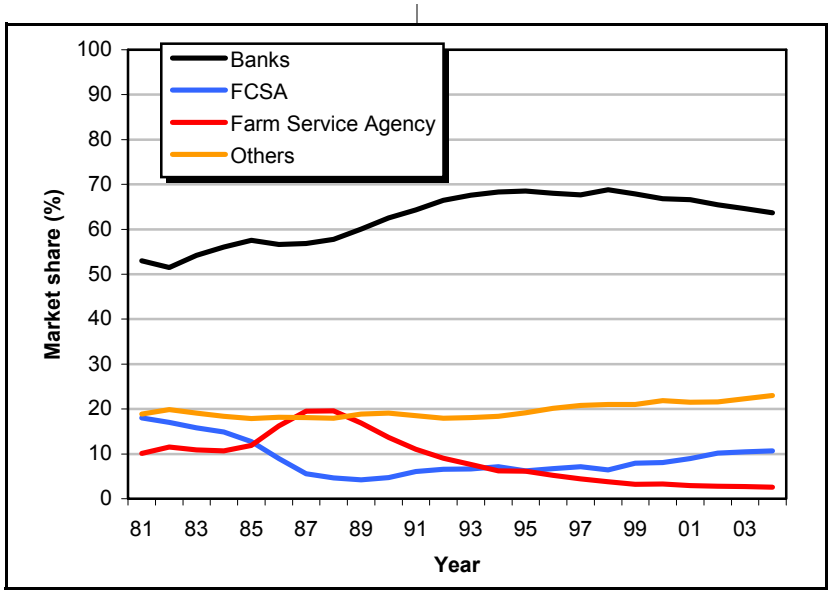

Figure 2. FCSA trade area non-real estate farm debt market share by lender—1981–2004.

Figures 2 and 3 show the changes in market share for major lenders serving the short- and long-term markets in the FCSA trade area. Commercial banks are clearly the dominant non-real estate lender. The FCS and other (mostly nontraditional) lenders have made some inroads in recent years. One of the most striking features of the real estate market is the gain in market share achieved by commercial banks—from dead last in the early 1980s to the top of the heap 15 years later.

A quick perusal of this information reveals a mature market—slow

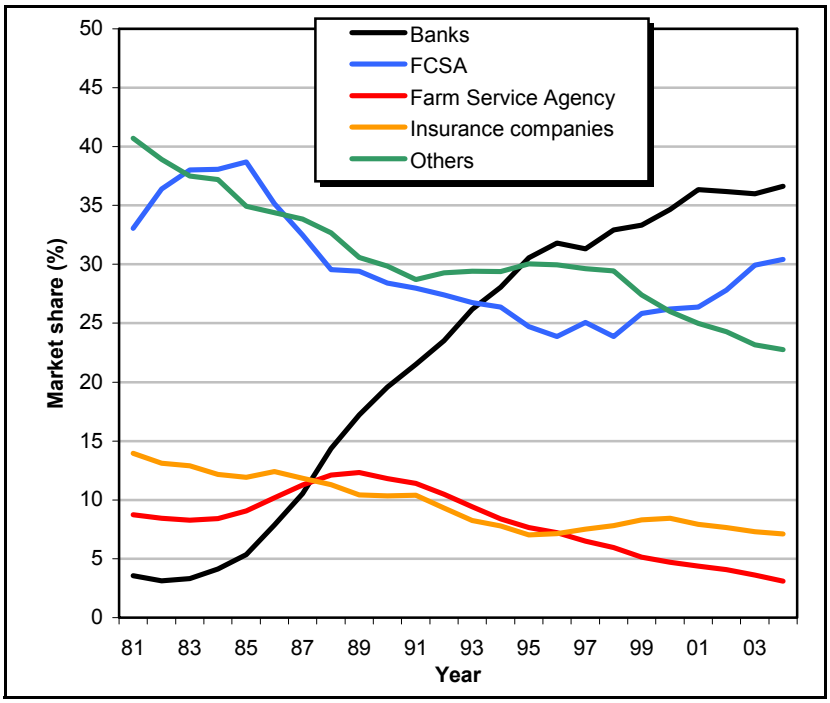

Figure 3. FCSA trade area real estate farm debt market share by lender—1981–2004.

growth in credit volume with existing firms battling for market share. The apparent winners of this zero-sum game are the banks. FCSA's total farm debt market penetration is relatively low—less than 22% in the four-state area compared with about 50% for banks in 2004. This contrasts with FCS penetration nationally of 30% and more than 40% in some markets such as Michigan or Ohio. Keep in mind, too, that many of the commercial banks serving this market are small closely held businesses. Small size imparts higher costs, loan limits, and a reliance on local deposits—hardly strategic assets for a mature market.

Was FCSA a plum to be picked? In Table 1 we compare financial characteristics of FCSA with two other associations. Farm Credit Services of Mid-America serves farmers in the eastern Corn Belt and is roughly the same size as FCSA. AgStar is smaller, but has had a patronage program in place for the past few years. Again, a quick look suggests that FCSA's performance measures are generally weaker than the other two associations. In particular, note that FSCA earned a lower return on its assets and member capital. The lower charge-off rates, while admirable for being low, may indicate a rather conservative lending philosophy. This is supported by the fact that FCSA tended to favor real estate lending. Non-interest expense is higher, despite the fact that real estate lending is usually a lower cost business compared to short-term lending. And, FCSA is certainly sitting on a pile of capital.

Finally, FCSA could have been attractive because it was offered at a favorable price. Space doesn't permit a complete discussion of this topic. However, capitalizing earnings can suggest a value. In Table 2 we show capitalized values for a range of incomes and required rates of return. As a reference point, we use $115 million (the average income for

Table 1. Average financial measures, 2001-2003 for selected farm credit associations.

	FCS America	FCS Mid-America	AgStar
Average assets ($ billion)	$6.99	$7.26	$2.23
Return on average assets	1.77%	2.07%	2.20%
Return on average total capital	10.78%	12.78%	16.30%
Net interest income/earning assets	2.83%	2.27%	3.07%
Net charge-offs/ average loans	0.09%	0.20%	0.17%
Real estate loans/total loans	70.2%	35.2%	40.7%
Average loan interest rate	6.06%	6.28%	6.25%
Permanent capital ratio	14.23%	14.90%	12.63%
Retained earnings/assets	16.10%	15.08%	10.68%
Non-interest income/assets	0.74%	0.47%	0.47%
Non-interest expense/assets	1.60%	0.62%	1.06%
Wages/assets	0.85%	0.39%	1.14%

FCSA for the past three years) and a nominal return of 12%. The analysis is very simple—but it does suggest that a $600 or $750 million offer might have been a tad low.

Seismology

There is no question that the Rabobank/FCSA deal shook up farmers, lenders, and public officials. A number of questions stemming from this transaction merit consideration and answers:

If FCSA is attractive to a private firm, are the various legislative and tax preferences granted to the FCS justified? Or have changes in farm

Table 2. Estimated bank value ($ million).

Required rate of return (%)		Income ($ million)		
Nominal	Real	110	115	120
9	5.8	1,897	1,983	2,069
12	8.7	1,264	1,322	1,379
15	11.6	948	991	1,034

structure and information technology moved us to a point where the traditional problems of rural credit markets—distance and information—no longer require unique institutions or policies? The same questions arise simply from the growth in real estate backed lending by banks. If deposit-based lenders can profitably make agricultural land loans, is government-sponsored enterprise status still needed for the FCS?

Do rural credit markets need increased competition? Most lenders, particularly community bankers, would argue that they have to work hard enough as it is to attract deposits and originate loans. Nonetheless, agricultural lending remains a fragmented industry, and fragmented industries frequently leave money on the table. Rabobank's interest in this market suggests there could be some gains from further consolidation.

Organizations generally don't spend much time working on procedures for events that they don't think will occur. The FCA regulations and the FCSA's bylaws that govern exit from the FCS appear to be incomplete. Two major stumbling blocks arose as a result of the FCSA purchase. The statutorily required exit fee did not appear to reflect the full value of the benefits an association derives from being part of the FCS. And, because the association had not had an earnings patronage program in the past, there was no way to link property rights of former members to the capital surplus and the earning potential of the association.

Some financial cooperatives such as the FCS (or credit unions, for that matter) do not pay patronage (two thirds of FCS associations do pay patronage). The benefits to members in lieu of patronage may appear in other forms—lower loan rates, more office locations, or better-trained personnel, for example. But an unwillingness to pay patronage dividends can create an unaccountable cash flow that may result in expense preferences and other managerial mischief. In fairness, following the 1987 bailout of the FCS, a growing capital surplus was a goal of the system so that government assistance could be repaid and the FCA could be assured that none would be required in the future. If some capital is good, perhaps more is better. However, patronage allocation of at least some earnings can be accomplished along with goals for capital growth. It is clear that management of FCS capital and patronage needs a careful look.

Effective governance is critical in both cooperatives and investor-owned firms—as the stockholders of Enron will surely attest. When directors and their hired managers take actions that produce an uproar on the part of members or investors, both the governance process, as well as its performance, need to be carefully reviewed and strengthened. Cooperative boards, in particular, must work to overcome an inherent conflict of interest, because they are members who represent members.

Finally, perhaps the time has come to take FCS off its leash. The FCS might trade off its tax preferences and instrumentality status for the freedom to seek opportunities in a broader market. The FCS is unique because it is a financially strong cooperative with a national infrastructure and reach, 80 years of rural lending experience, and an enviable ability to source loanable funds. With those assets and a rural credit market that appears to offer some opportunities, the FCS may be ideally suited to compete on a leveled playing field to the benefit of rural America. Such a bold stroke, however, should only be considered if the historical mission that underlies the creation of the FCS could be assured—the dependable and permanent supply of credit for all segments of the agricultural sector.

Links

- Farm Credit Services: http://www.farmcredit.com
- Farm Credit Services of America: http://www.fcsamerica.com
- Rabobank: http://www.rabobank.com
- AgStar: http://www.agstar.com
- AgriBank: http://www.agribank.com
- Farm Credit Services of Mid-America: http://www.e-farmcredit.com/Default.aspx?2-18
- Farm Credit Administration: http://www.fca.gov/FCA-HomePage.htm

Acknowledgments

The authors would like to thank John Moore, Farm Credit Administration, Roger Ginder and Neil Harl, Iowa State University, and John Penson, Texas A&M, for valuable suggestions.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Are Rural Credit Markets Competitive? Is There Room for Competition in Rural Credit Markets?

Maureen Kilkenny and Robert W. Jolly

Talk to a country banker these days and the first subject will likely be competition—cherry picking by the Farm Credit System, sneaky tax-free credit unions, captive finance companies hawking credit as a loss leader, investment houses siphoning off deposits, and so on. It's a long list and an old refrain. But it reveals an important question: How hot is the competition in rural credit markets? If it's not hot enough, we could expect credit rationing that limits economic growth. If it is too hot, there is a risk of declining credit quality and failure of financial institutions, which would also limit growth.

Our interest in this topic is motivated, to some extent, by the recent bid by Rabobank into the Western Corn Belt. That event suggested that profit opportunities might exist in rural credit markets. But there is a broader issue as well. Rural credit markets are often fraught with inefficiencies. Remoteness—frequently in association with poorly defined property rights, rule of law, and poverty—can make it difficult to extend credit to rural households, farms, or firms. This problem is widespread in developing and transitional economies. And, historically, it has been a problem in rural areas in the United States—one that has been dealt with by creating unique rural lending institutions, public policies, and other interventions.

In this paper we attempt to take the temperature of the competitive forces in rural credit markets in 12 Midwestern states. A recent review by economists at the USDA's Economic Research Service pointed out that the average rate of return on rural-headquartered bank assets has been systematically higher than the return on urban bank assets. The review presented a number of indicators suggesting that rural credit markets may be less than perfectly competitive. Rural banks charge higher interest rates on loans, pay lower interest rates on deposits, and take fewer risks. The authors argued, however, that the small size of rural communities and the low number of rural borrowers might limit the number of lenders that can profitably compete in rural counties. And, since 1997, the number of bank firms has continued to decline.

Bank market structure has changed in recent decades, consolidating from a peak of 14,000 firms in 1983–4 to about 7,800 today, according to the FDIC. In his review of the structural changes in the nonmetro financial service sector, Lence concluded that the decline in the number of bank firms has been driven by bank stockholders' search for return on equity (Lence, 1997). Bank consolidation has been made possible by the relaxation of policy restrictions against branch banking over the past 20 years. Mergers of smaller banks have been driven by the opportunity to achieve economies of size and geographic and market portfolio diversification. But at the same time we have observed new bank branches opening in rural credit markets, along with a host of nonbank lenders. The fact that the number of bank offices has *increased* since the 1980s from 55,300 to more than 75,000 in 2004 may suggest that rural citizens have more access to bank credit than ever. Let's take a look at the landscape in rural credit markets.

Table 1 reports numbers and types of bank offices in the urban and rural counties in 12 Midwestern states. The types of banks that operate in rural areas are more often unit banks (banks with no branch offices outside the headquarter county) or small community banks with a few branch offices all in the same county. On average, there are five or fewer bank firms operating in strictly rural counties. There are twice that many competitors in larger nonmetro counties and more than 30 bank firms competing in the average central metro county in the US Midwest.

Table 1. Average banks and bank offices by county type (US Midwest, June 2001).

	County type[a]	Code	# firms	% unit bank	% below $100m	# offices	% community bank offices
Metro HQ ("urban")	Central metro	0	33	16%	7%	161	32%
	Fringe metro	1	11	20%	18%	25	55%
	Mid-sized metro	2	14	14%	10%	50	34%
	Small metro	3	13	24%	18%	36	55%
Nonmetro HQ ("rural")	Large nonmetro, adjacent	4	12	23%	22%	25	63%
	Large nonmetro, nonadjacent	5	10	30%	31%	19	73%
	Mid-sized nonmetro, adjacent	6	8	30%	37%	13	76%
	Mid-sized nonmetro, nonadjacent	7	7	30%	39%	10	79%
	Rural, adjacent	8	5	31%	53%	7	83%
	Rural, nonadjacent	9	4	32%	56%	5	86%

[a] Beale Code definitions are as follows. Metropolitan counties (0–3): 0—central counties of metropolitan areas of 1 million population or more; 1—fringe counties of metropolitan areas of 1 million population or more; 2—counties in metropolitan areas of 250,000–1,000,000 population; 3—counties in metropolitan areas of less than 250,000 population. Nonmetropolitan counties (4–9): 4—urban population of 20,000 or more, adjacent to a metropolitan area; 5—urban population of 20,000 or more, not adjacent to a metropolitan area; 6—urban population of 2,500–19,999, adjacent to a metropolitan area; 7—urban population of 2,500–19,999, not adjacent to a metropolitan area; 8—completely rural (no places with a population of 2,500 or more) adjacent to a metropolitan area; 9—completely rural (no places with a population of 2,500 or more) not adjacent to a metropolitan area.
Note. Data from FDIC.

Distance insulates rural banks from competition, so even smaller, less efficient banks may thrive there. Distance can also insulate high-profit banks from competition. Even if there are no barriers to entry (other than fixed costs), space imparts market power because lenders can afford to charge nearby customers higher rates without fear of losing them to more distant competitors, because distance increases the costs of monitoring loans. By the same token, the proximity of the lender to the borrower, and their participation in the same social networks or community institutions can improve opportunities for loan origination and make applicant screening and monitoring more efficient. Relationship lending has been shown to be essential to a bank's competitiveness (Moss, Barry, & Ellinger, 1997). In addition, because bricks-and-mortar banks are lumpy, sparsely populated counties may simply be too small to justify the construction of an additional bank office. Banks are required to obtain approval to enter a new market from the relevant regulatory agency. Part of this approval process involves justifying that there is a need for additional banking services in the local market.

In sum, financial intermediaries in rural areas may be able to price-discriminate without losing their rural customers, because other potential lenders are effectively too far away (Degryse & Ongena, 2004). Price discrimination and barriers to entry may result in less credit being extended in rural areas than is optimal. To test if these conditions exist, we can examine data on commercial banks for indicators of above-normal profitability and indicators favoring entry into the region's credit markets. An obvious shortcoming of this approach is that we are not able to fully account for competition from other rural financial intermediaries. But it is a place to begin—particularly given the market share dominance of banks in rural credit markets.

To determine if rural banks possess exploitable market power, we have to account for the fact that many banks operate in more than one location. This includes banks that are headquartered in rural areas but operate as either as a multibank holding company or simply have several branches, as well as large money-center banks that branch into rural areas. To begin, we estimate the market power enjoyed by a bank by weighting the bank's share of each market in which they operate by the market's share of the bank's total deposits. Then we estimate the profitability of a bank in a location by weighting the profitability of each bank with an office in the location by that bank's share of the total deposits in the location. A bank may have market power, but if it isn't profiting from it, we conclude it is not exploitable—that the markets are sufficiently competitive. Finally, we test the hypothesis that a location's profitability is sufficient to induce entry.

We analyzed the data on all the banks with offices in the Midwest, including more than 4,000 bank firms and their offices by county across five Federal Reserve districts in 12 Midwestern states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and

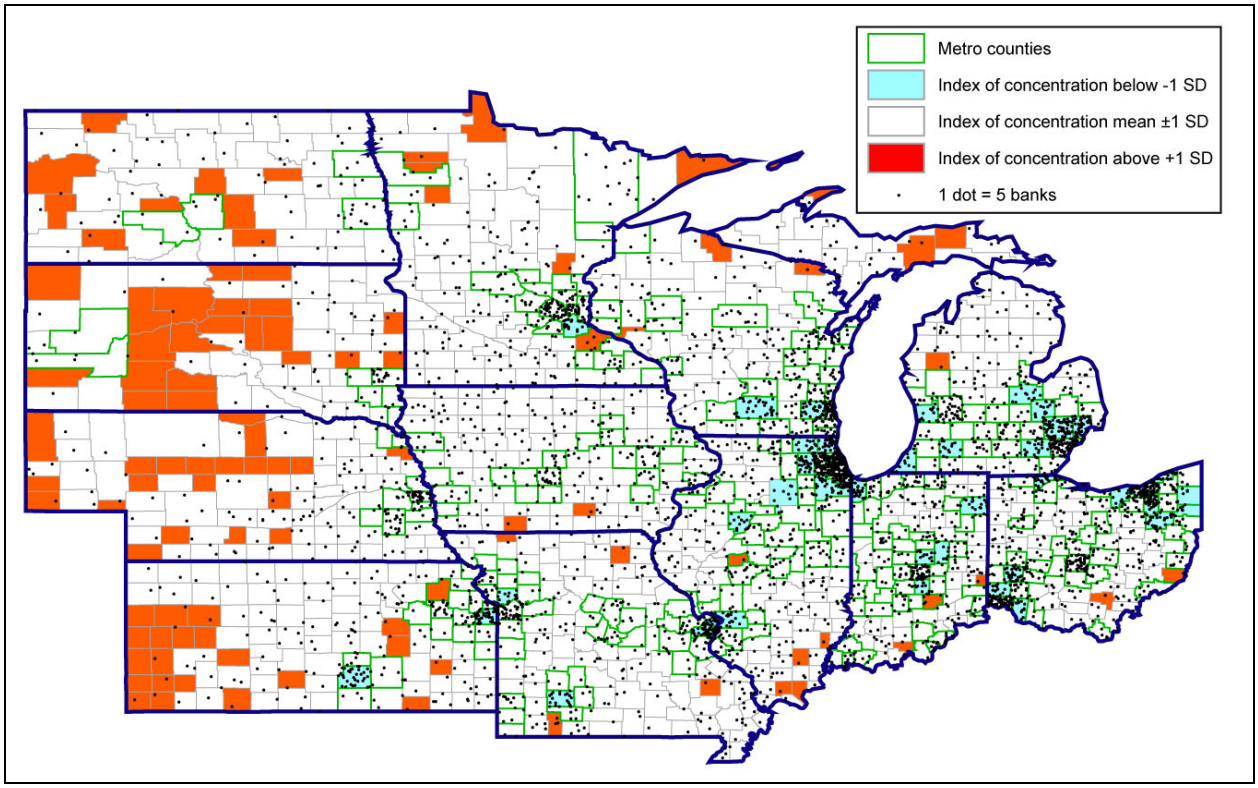

Figure 1. Low-competition counties.

Wisconsin, as reported to the FDIC on June 2000, 2001, and 2003. We found significant evidence of room for more competition in credit markets. Banks that control larger shares of the deposits in the counties in which they have offices have earned above-normal profits. This evidence is consistent with the hypotheses that the market power rural banks have is exploitable. Banks with superior management or production technologies who are insulated from competition by distance, or who differentiate their financial products, have been able to exercise and profit from market power in the Midwest. The percent of loans to farmers or backed by farmland also supports higher profits for commercial banks.

Figure 1 shows the counties with unusually few competitors. The blue-shaded counties are counties where the banking market is quite competitive and the market power of any one bank is low. The orange-shaded counties are where one or a few banks have unusually large shares of the deposits, indicated by a high Hirschman-Herfindahl Index. These counties are low on competition. Because our statistical analysis indicates that banks with low competition do earn higher profits, it is into these counties that a bank may consider expanding.

Next, we investigated whether the profitability of banks in a county has in fact been sufficient to induce entry into a county in the recent past. Between 2001 and 2003, the number of bank offices rose by 1,600; in all types of Midwestern counties except rural counties adjacent to metropolitan ones (FDIC data; Table 2). The largest rate of growth in offices was in counties with towns larger than 20,000 that are not adjacent to metro areas. Midwestern rural counties continue to be much denser in terms of bank offices per person than urban counties. Because there are already more bank offices per person in nonadjacent rural areas than any other type of county, there was little expansion in those counties. But despite the emergence of e-banking, the profitability of being physically close to one's customers was apparently sufficient to justify the existence of one brick-and-mortar bank office per 1,000 persons in the totally rural areas of the Midwest (Table 2).

In our statistical analysis we found that existing banks did indeed open additional offices in profitable locations. But the profitability has not been sufficient to entice new bank firms into those counties—just new offices of existing banks. Bank office coverage also appears to be diffusing across space. More new offices have opened in places where office density is lower; especially in urban areas where there were fewer offices per capita, but also in nonadjacent rural areas where there were fewer offices per square mile. Nevertheless, in

Table 2. Bank firm and office entry.

County type[a]	Code	2001 # firms	2001 # offices	2001 Offices/ 1,000 cap	2001-2003, % change # firms	2001-2003, % change # offices	2001-2003, % change POP	2001-2003, % change Offices per capita
Central metro	0	33.0	161	0.27	4.9%	12.0%	2.1%	9.7%
Fringe metro	1	11.3	25	0.35	5.3%	5.0%	4.3%	0.7%
Mid-sized metro	2	13.5	50	0.33	6.8%	5.7%	1.5%	4.2%
Small metro	3	12.7	36	0.35	6.8%	7.6%	1.0%	6.6%
Large nonmetro, adjacent	4	12.0	25	0.38	2.0%	2.3%	0.3%	2.0%
Large nonmetro, nonadjacent	5	10.2	19	0.41	7.8%	10.8%	-0.3%	11.2%
Mid-sized nonmetro, adjacent	6	7.6	13	0.50	3.0%	3.3%	0.6%	2.7%
Mid-sized nonmetro, nonadjacent	7	6.7	10	0.59	3.3%	3.4%	-0.6%	4.0%
Rural, adjacent	8	5.3	7	0.73	-1.6%	-0.2%	-0.3%	0.1%
Rural, nonadjacent	9	3.6	5	0.91	1.0%	1.4%	-1.4%	2.8%

[a] See Table 1 footnote for Beale Code definitions.

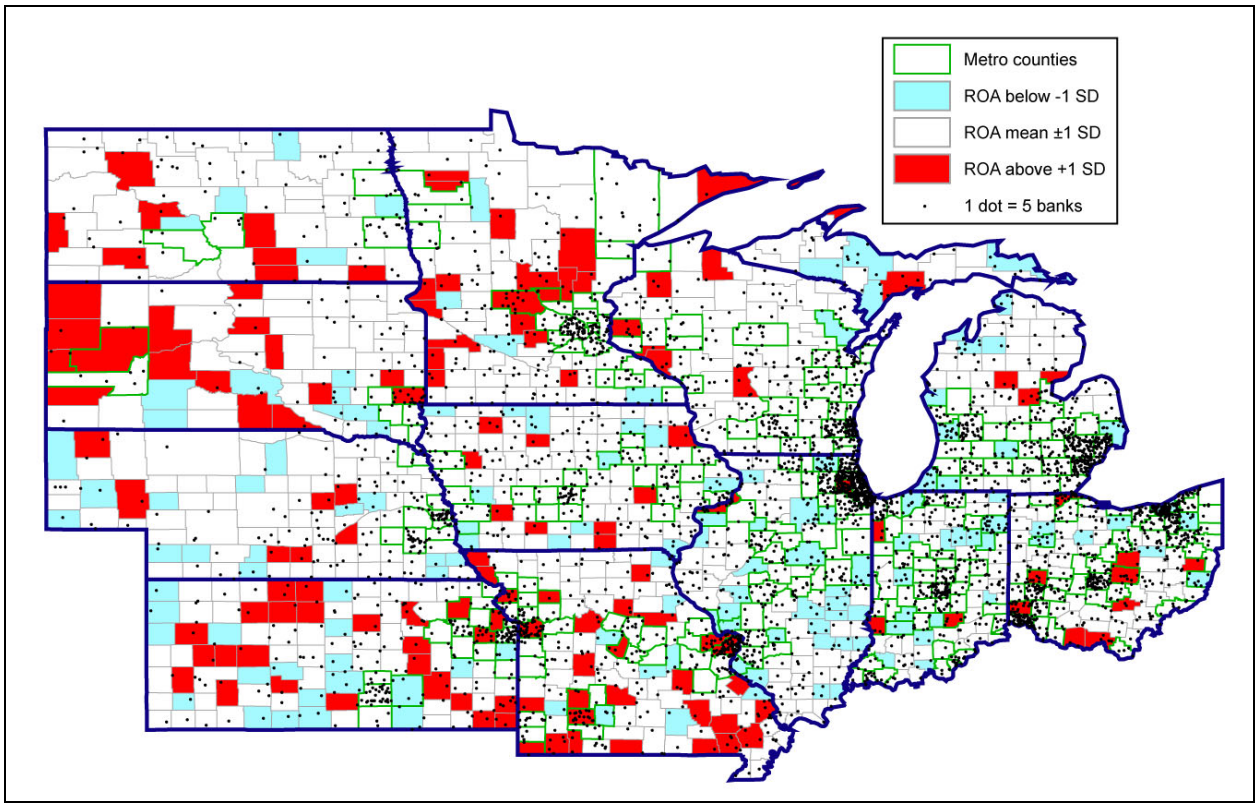

Figure 2. High-profitability counties.

rural counties adjacent to metro areas, there were bank and office closures.

In particular, Figure 2 shows the counties that display the conditions that recently inspired existing banks to open new branches. These are counties where the rate of return on bank assets has been unusually high and the number of bank firms is unusually low. The map highlights the 106 Midwestern counties (10% of the total 1,047) worth a closer look. These hot spots are colored red. These counties are where the returns on bank assets, weighted by the share each bank has of all the deposits in the county, are more than one standard deviation above average. The blue counties are where the banks that operate there are not profitable. One may also infer that some of those blue counties may be places where there are just "deadbeat"

banks, whose rates of return on assets are low because of poor management. Those counties may also be areas where more efficient banks could profitably open new branches.

Many of the potentially attractive counties are in South Dakota and Nebraska. By the way, those two states are served by Farm Credit Services of America, the agricultural credit association that Rabobank recently bid to acquire. Sixty-five percent of the hot spots are completely rural counties, with no towns larger than 2,500. Metro counties are outlined in green. Although only 2% of the region's metro counties look attractive for entry, over 13% of the nonmetro counties may be. We conclude that there is room for more competition in rural credit markets.

Further market research is needed to understand if these might be attractive locations for bank office entry, expansion, or takeover. Census data indicates that some of these rural hot spots have high Native American populations. That makes some sense if banks in casino areas are unusually profitable. Product differentiation may explain their advantages. Our FDIC data also indicates that the people in these hot counties are savers. Bank deposits per capita are 25% higher on average. They are also more self-sufficient places. The proportion of local residents employed within their county of residence is twice as high in the hot counties than in all the other counties. And they are not necessarily high-growth places—yet. The average rate of population growth over the decade 1990–00 in the hot counties was only 0.5%, compared to an average population growth rate of 6% in the rest of the Midwest.

All our analyses showed that regardless of their size, headquarters location, or other characteristics, banks that specialize in farm lending are more profitable. In the presence of barriers to entry, this is consistent with a hypothesis that banks providing farm credit engage in credit rationing towards farmers and away from nonfarm borrowers, as shown by Turvey and Weersink (1997). Coupled with the evidence in Collender and Shaffer (2003) that farming-dependent county income growth is more sensitive to local bank firm concentration, it suggests a hypothesis that agricultural credit demands may crowd out nonfarm demands for bank loans in farming-dependent rural areas. It also suggests that there is room for more of both farm and nonfarm lending in the rural Midwest. We hope these tables and maps have provided the kind of information that helps community leaders and existing Corn Belt bankers to focus their attention on some of these opportunities.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

FCSA Sale to Rabobank: Selling What? On Whose Authority? And For Whose Benefit?

Roger Ginder

Rabobank's proposed buyout of Farm Credit Services of America (FCSA) would not, on its face, seem to be a radical event. Buyouts, mergers, and consolidations are certainly not an uncommon event in the US economy. Aren't buyouts nothing more than one of the methods firms use to adjust to changes in market conditions? Absent any egregious anticompetitive side effects, they usually occur with a minimum of fanfare beyond the press releases of the parties involved.

But in the case of FCSA, there were strong and sometimes strident outcries from a number of quite varied sources. Challenges were coming not only from some of the current FCSA members, but also from former directors and members, other farm credit institutions, and even some US congressmen and senators. Just what made the proposed FCSA deal so different from all of the others?

At least some of the differences observed in the Rabobank-FCSA case are related to the ambiguities created by (a) the FCSA charter and its intent; (b) the relationships of FCSA to the rest of the Farm Credit System (FCS); (c) the historical background of the FCSA entity; (d) the fact that FCSA is organized as a cooperative rather than an investor-oriented corporation (IOC); and (e) the FCSA pattern of retaining its earnings as unallocated equity rather than allocating it to borrowers. These factors not only create a larger set of stakeholders than would typically be the case for an IOC, but they also create a much different set of claims and expectations.

The Charter

The charter for the FCS banks or Agricultural Credit Associations differ from typical commercial bank charters in a couple of important ways. The vast majority of corporate charters, including those for commercial banking corporations, are issued by the states. In addition, the charter is required to enter the banking business. These banking charters are issued and regulated by either state banking authorities, or the Office of the Comptroller of the Currency (OCC) in the case of national banks, and usually permit the holder to take deposits from the public. The charters issued to the Farm Credit System banks do not permit depository rights and are issued by the federal government in accordance with farm credit legislation passed by Congress. But, there is another key difference. FCS charters are issued in a way that guarantees that there is an FCS bank serving the producers in all geographic areas of the United States. Thus, the charters are issued as a means of meeting a legislative mandate rather than simply enabling the establishment of a commercial entity. At a minimum this complicates the question of selling an FCS Bank or Ag Credit Association such as FCSA to a non-FCS entity.

After such a sale, the legislative mandate still exists for the FCS to serve the geographic area. However, the operational means to accomplish the mandate has been sold to a noneligible entity that is beyond the reach of the FCS regulators. There is always the option to charter a new FCS entity and start over. However, it could take years before the new entity could develop significant market share, become well capitalized, and effectively serve the market. The "new start-up" solution also ignores the question of whether there is a genuine need for an additional player in the market. Just how the intended uniform access to the FCS would be achieved remains an issue in this kind of transaction.

Whether the current shareholders of an FCS chartered Agricultural Credit Association or a FCS bank have the unilateral authority to liquidate the capital built up while it was operating under that FCS charter is also an open question. In addition to the unique responsibilities mandated by the charter, there are also unique advantages. The charter carries some significant tax and funds acquisition

advantages for building equity and reserves that would generally not be available to other non-FCS institutions.

As long as the FCS-chartered entity continues to perform its legislative mandate, these advantages are more easily defended. But when a group of stockholders attempt to sell the Agricultural Credit Association or bank and distribute its accumulated unallocated surplus and reserves, the special treatment may be less defensible. The action would not only leave the FCS entity in a poor position to perform on its legislative mandate, it would also create a more favorable treatment for the current set of FCS Agricultural Credit Association stockholders than the treatment accorded similar sets of stockholders in other non-FCS lenders.

The Other Banks in the Farm Credit System

Other banks in the system were clearly not supportive of the sale, and some raised vocal opposition to their members, regulators, and the press. It would appear that the stockholders of FCSA would have the undisputed authority to sell or dissolve without any obligation to the other parts of the FCS. All of the Farm Credit System banks and associations (including CoBank, AgroBank, etc.) are independent business entities with separate balance sheets governed by separate boards of directors and owned by distinct sets of stockholders. Why should other FCS banks and Agricultural Credit Associations care if FCSA dissolves itself?

Despite the autonomy of each FCS bank or entity in most visible respects, they have some less obvious interdependencies and shared responsibilities. When FCS bonds are sold into the financial markets, they are sold for the entire FCS as a whole rather than individual FCS chartered banks or associations. This means that exit of an FCS entity with significant loan volume has the potential impact of reducing the size of issues. Likewise, exit of an FCS entity serving a specific region may marginally reduce the geographic and commodity diversity of the portfolio behind the issue. Perhaps even more significantly, all of the banks and associations in the system are "jointly and severally liable" for the bonds issued. Stated differently, in the event that an FCS entity fails and cannot meet its obligations to bondholders, a formal set of loss-sharing procedures defined among the remaining FCS entities is triggered.

Thus, a portion of the equity in all FCS banks or Agricultural Credit Associations serves as the first line of defense when a system entity cannot meet its obligation to FCS bondholders. This procedure was last triggered in the mid-1980s during the farm debt crisis, when capital from all parts of the Farm Credit System was used to prevent default when some of the banks began to fail. Subsequently, even this measure proved inadequate. Assistance from the US government was required to partially recapitalize many of the entities in the Farm Credit System to avoid a default on bonds that had been issued.

When it became apparent that US government assistance would be required to avoid default, the FCS banks and Agricultural Credit Associations did not approach the government individually. Instead, the Farm Credit System as a whole made a unified request. When the money provided by the government to avoid default was repaid in the 1990s, it was done through the system. FCSA benefited from these system-wide activities at a critical point in its history.

Although the individual Farm Credit System entities operate autonomously with respect to managing and capitalizing their activities, the authority for an entity to unilaterally decide to sell or liquidate itself remains unclear. The agreements for joint and several liability and the established patterns of joint behavior in times of great crisis for FCSA creates some ambiguity about the true extent of this autonomy. At a minimum, there is a serious question about whether any bank that has benefited from loss sharing and government assistance has absolutely no obligation to the rest of the system and is free to behave in a way that diminishes the stature and effectiveness of the system.

Organization as a Cooperative Versus an IOC

Firms organized as cooperatives share many characteristics with firms organized as investor-oriented corporations. Both are state-chartered corporate entities controlled by elected directors with a fiduciary responsibility to shareholders who have invested equity capital. Both are subject to market forces and may fail unless explicit intervention by government prevents it. To the general public, there are few visible differences as the firms go about their day-to-day business.

There are, however, a number of important differences between the two. Capitalization is one key difference. In a cooperative, the people using the products and services of the firm usually provide the equity capital required by the firm. In virtually all cases, some level of capitalization is required if the user is to share in the profits generated from the firm's

operation. Some cooperatives require capital to be provided not only as a condition for sharing in the profits generated by the cooperative, but also as a prior condition for gaining access to the products and services the cooperative produces. Farm Credit System banks impose this requirement on their borrowers.

In contrast, the investment activity in an IOC and the access to the firm's services are completely decoupled. A consumer of the IOC's goods and services may or may not choose to be an investor and an investor in the IOC may or may not choose to use the firm's products and services. Any melding of the role of investor and consumer is strictly voluntary and occurs entirely at the pleasure of the party involved.

Distribution of net margins or profits is another important difference between cooperatives and IOC's. Net profit margins generated by IOC's are distributed to stockholders based on the amount of equity provided. If the net margins are retained in the business instead of being distributed to stockholders, the value of the IOC is expected to increase. The presumption is that shareholders will receive more for their shares when they sell them and thereby capture the value.

Cooperatives generally distribute net margins based on the level of business that a member shareholder has done with the cooperative rather than the level of investment the member shareholder has made in the cooperative. The idea is to operate on an "at-cost" basis by returning any excess net margins above actual cost to those who were charged more than actual cost when they purchased products and services from the co-op. It is also common for cooperatives to distribute at least a portion of the net margins as equity rather than cash. This creates a pool of equity that has been retained to meet the need for additional equity. However, unlike the retained earnings in the IOC, these earnings have been identified with individual stockholder names, and there is an expectation that it will be redeemed in cash at some future date. It should be noted that most cooperatives hold some of the net margins as unallocated surplus reserves. It permits some level of operating loss to be absorbed without canceling some of the equity that has been allocated in prior years. (However, it is not at all common for a cooperative to retain virtually all of the earnings as unallocated equity, as FCSA did.)

Because members who do more business with the cooperative receive a proportionately greater percentage of the earnings, they also contribute a proportionately greater percentage of the allocated equity under this arrangement. Stated differently, their ownership of the cooperative is kept in rough proportion to their use. As long as the stockholder's equity contribution is roughly proportional to the level of business done with the cooperative, there is little quantitative difference between what the stockholder would have received had the net margins been distributed based on the amount of equity he or she held.

This raises the question: If there is little or no difference, then why not just organize as an IOC and pay out the net margins based on profits? The answer lies in the motivation the founders have for forming the organization. If the motivation is simply to maximize return on capital invested, then the IOC is the superior choice. Once formed, the IOC is free to seek out maximum return to shareholder capital as its singular goal and pursue any legal opportunity to do so.

However, if the motivation is to address some sort of market failure (such as providing a product or service that is underprovided by the market or providing increased competition in the marketplace), the cooperative may be a better choice. In that case, the founders want to limit the activity of the firm to those markets they use and wish to influence. Although it is still important to generate a return on shareholder investment, maximizing return on investment is not the singular goal. A dual goal of correcting market failure and generating an acceptable return on invested capital is pursued. An additional consequence of the dual goal is a more complex board of director's fiduciary responsibility to shareholders.

A third important difference between cooperatives and IOC's is the way that owners exit the business. In the typical publicly traded IOC (and some that are not publicly traded), the IOC assumes no responsibility to redeem its stock in cash. The stockholder must sell the shares to a third party in order to receive the value of his or her interest in the company. Potential buyers of the stock are presumed to capitalize any undistributed net earnings into the share price; thus, the sale of stock incorporates the value of any undistributed net margins due the shareholder into the share price.

In contrast to the IOC, cooperatives typically redeem purchased shares of stock at the same face value it had at the time of purchase. Net margins that have been issued as equity for later redemption are handled in a similar fashion. This creates no problem as long as the cooperative allocates all of the net margins to individually identified users of the coop-

erative. When a member exits, he or she has explicit rights to both the purchased share and the allocated net margins received while actively using the cooperative.

However, if net margins have been retained as unallocated surplus (without an identified user's name attached), a serious problem arises in reflecting the increased value of the firm when the stockholder no longer needs the co-op and wishes to exit. The share price is fixed and will be redeemed at the same value it had when it was purchased. If the net margins have been held in unallocated form instead of allocated, the shareholder has no explicit rights to them. Absent any explicit claims, cooperative members receive the value of the unallocated surplus only upon sale or dissolution—an extreme measure.

Because few (if any) FCSA earnings had been allocated since the mid-1980s, this was precisely the situation confronting FCSA shareholders in 2004. Following the farm debt crisis of the mid-1980s and the passage of the Agricultural Credit Act of 1987, FCSA and its predecessor banks had dutifully repaid government assistance given, capitalized an insurance fund, and steadily rebuilt reserves by withholding earnings as unallocated surplus reserves.

Under the leadership of the board of directors (and most likely at the behest of regulators), members borrowing from the bank during this period agreed to forgo receiving allocated patronage refunds in order to rebuild adequate reserves to provide the bank with enough reserves to withstand another period of disastrous losses without assistance from the government. Apparently, most borrowers felt that ensuring the existence of a viable Farm Credit System bank dedicated to providing a consistent source of competitively priced long- and intermediate-term credit to agriculture was worthy of the sacrifice.

Some would argue that FCSA had gone past the level of reserves required for prudence and could have begun allocating equity long before it did in late 2004. Indeed, a large number of the sister Agricultural Credit Associations and FCS banks in the Farm Credit System (including CoBank) had done so. Perhaps this was due to an incomplete understanding about the differences between cooperatives and IOC's and the inability of cooperative stockholders to access unallocated reserves. Or, perhaps the turmoil experienced in the 1980s caused the management and board of FCSA to act with an abundance of caution and to continue to build unallocated reserves. One can only speculate about the motives, but the fact that Federal Land Bank sourced earnings could be placed into surplus without taxation almost certainly played at least some role. It enabled these earnings to be placed into surplus without a tax consequence. Had these earnings been allocated to members, either the member who received the allocation or the co-op would have had to pay income tax on them.

The Offer From Rabobank

By early 2004, FCSA found itself holding a very large pool of unallocated equity with no visible way (short of sale or liquidation) for members to access it. This made it an ideal target for an outside offer to purchase. Sale of the FCSA would result in an inflow of cash; the cash could then be distributed to current stockholders who had purchased shares of stock at a modest cost as a condition for joining. The payout would be multiples of the relatively modest price of the shares they had purchased. This creates an enormous incentive to sell the cooperative, perhaps even at a bargain price.

The payout to current shareholders would be very lucrative even if the sale price of FCSA were significantly less than its value as a going concern or its fair market value. Division of only half the fair market value (as estimated by some analysts) among the relatively small number of current stockholders would still yield a significant sum. Some large-volume borrowers would receive sums in five or six figures. All of this presumes that the current members of FCSA hold the only legal claims to the unallocated surplus reserves and can legitimately divide the proceeds among themselves. But are the current stockholders of FCSA really the exclusive and rightful owners of the unallocated surplus?

The answer for an investor-owned corporation (which pays its stockholders based on the amount of equity they hold) is straightforward. It belongs to the current stockholders. Those who have sold their stock and are not currently shareholders have no claims. Presumably, the value of retained earnings was capitalized into the stock price when they sold their shares. Thus, all prior stockholders received fair market value at the specific time of the sale, and all of the value of the unallocated retained earnings would be due to current stockholders.

In the case of FCSA (which is a cooperative), the answer is not so simple. Several key differences between cooperatives and ordinary investor-oriented corporations complicate things. (a) Unlike the ordinary corporation, earnings in the cooperative are issued to stockholders based on their use of the cooperative rather

than on the amount of capital provided, and in nearly all cases the equity cannot be publicly traded. (b) The decision to invest was not solely based on generating a return on investment. For FCSA borrowers it was also coupled with the right to use the cooperative. The FCSA borrower *had* to be a stockholder in order to use the cooperative. (c) The equity in FCSA is purchased and redeemed at face value. Those who redeemed their stock after paying off their loan received only face value. This is radically different than what happens in an IOC. For the IOC, the level of unallocated retained earnings is usually reflected in the share value at the time it is purchased and at the time the share is sold.

When the current shareholders of FCSA bought their shares in the cooperative, the price they paid for the share did not reflect the capitalized value of the unallocated retained earnings. But if they sold or liquidated FCSA, they stood to divide the surplus and receive many times what they paid for their share.

So Who Owns the Capital Surplus?

The ambiguities that arise from the FCSA charter, its relationship to the other FCS banks, FCSA's own history, and its cooperative structure raise serious questions about who has legitimate (if not strictly legal) claims to the unallocated surplus reserves. A case could be made that several different groups and institutions could lay claim to at least a portion of the reserves. At least five such potential claimants could be identified:

- the current stockholders;
- the past stockholders who contributed to building the surplus;
- the successor FCS Ag Credit Association chartered to replace FCSA;
- the other Farm Credit System banks that provided assistance; and
- the government who provided the initial risk capital, special tax treatment, and recapitalized it in the 1980s.

The unallocated surplus in FCSA represents an endowment generated by past members for current (and future members) to use in capitalizing the lending cooperative. It was not generated exclusively by the current stockholders. Nor was the investment cost for current stockholders adjusted to reflect the level of unallocated retained earnings when they entered. Finally, the decision of individual stockholders to buy or sell was based on their need for credit rather than the level of unallocated retained earnings.

So who owns the surplus? Is it those past member stockholders who generated it by forgoing the option to receive a patronage refund on their interest bill? Is it the current member stockholders who now own and use the cooperative and will make the decision of whether or not to liquidate? Or is it possibly the future member stockholders who will want to join a well-capitalized Agricultural Credit Association? Stated differently, should the surplus be taken into the new Agricultural Credit Association that will be chartered to replace FCSA after it has been sold?

One possible answer is it belongs to those who generated the surplus over the past 20 years or so. It could be argued that those who owned and used FCSA during the critical period when FCSA was being recapitalized in the mid-1980s have the most legitimate claims. However, 20 years is a long time, and there are numerous difficulties in looking back that far. More than a few of those members are now deceased and their estates long ago settled.

Another possible answer is that those who have the most legitimate claims are the members who used the cooperative over a more recent (albeit still somewhat arbitrary) period when much of the retained earnings were generated. This has in some cases been formalized in cooperative statutes. Some state statutes (including Iowa, which is part of the FCSA market territory) designate that unallocated retained earnings must be distributed to current and former patrons based on the amount of unredeemed allocated equity they hold.

This kind of provision allows those who did business with the cooperative in the past, and contributed to building the surplus, to share in the distribution—even though some of them may no longer be active members. But in the case of FSCA, virtually all the earnings were put into surplus, and there is no allocated equity to use as a basis for determining how much each patron should receive. It would be necessary to pick some arbitrary period, look back, and calculate what the claims *would have been* if the equity actually had been allocated rather than put into surplus.

A third possible answer is that people who are currently owners and users have the most legitimate claim. They, after all, have undertaken the current fiduciary responsibility for the assets of FCSA, and they are the ones who have the voting rights. But, should the entire endowment be distributed to them simply because they happen to be members at this time? Was it really the intent of prior members (who built the surplus) to create a windfall for the voting members at some future moment in time?

A fourth possible answer is that the surplus is truly an endowment from past and current users for use in capitalizing a user-owned and -controlled cooperative for current and future farm borrowers. Upon sales of liquidation, should at least the majority of the endowment be kept and used toward capitalizing the new FCS Agricultural Credit Association that will have to be chartered and formed to serve the region? Could it be argued that those who built the surplus did it for that purpose rather than for the purpose of distributing it in its entirety as a windfall gain to current members?

Some would argue that the remaining parts of the system should get at least some of the surplus. All parts of the system assume "joint and several liability" for the other parts. If FCSA benefited from this assurance during the period when the surplus was built, does it not have a legitimate claim to at least some of the surplus? To a degree, the exit fee levied by the FCS does this, but questions can be raised about whether the fee is more or less than adequate to accomplish this.

Finally, some might argue that the US taxpayers have a legitimate claim to at least part of the unallocated reserves. The portion of the unallocated surplus that was sourced from land loans was never taxed. Furthermore, the system was conceived and started by the US government, and the majority of the capitalization through the most risky periods of its life came from the government. Some might argue that the taxpayers should have a claim.

Technically, the government assistance was structured as a loan, and it has been repaid in full. But most would agree that at least part of these funds played the role typically played by equity capital rather than the role typically played by debt capital. Is it reasonable that some of the unallocated reserves should be returned to the taxpayers as a return for taking on the role of entrepreneur and venture capitalist during start-up and the most perilous times FCSA has survived? If they are not compensated for playing these roles, should the taxpayers at least be compensated for the untaxed earnings sourced from FCSA's land lending activities?

Going Forward from Here

The buyout process was halted before it went to stockholders for a vote. We will never know how it would have played out. It is still interesting and perhaps helpful to consider who would have had the most just or legitimate claim. Would it have been only the narrow legal claims of current stockholders that counted in the end? Would it have simply been decided on the provisions in FCSA articles of incorporation and provisions in the FCSA bylaws along with board resolutions? Or have other stakeholders weighed in through the courts? Or would Congress perhaps have weighed in through legislation? The answers will never be known. It may be useful to consider the other stakeholder claims and evaluate their merit as a measuring rod for future actions. The FCSA experience implies a need for some changes going forward.

Greater effort needs to be made in differentiating the role of the board of directors in a cooperative and from the role of an IOC board. Although there are many similarities, and both IOC and Cooperative boards serve the same general function, the cooperative board has a much more complex task. In many cases, this is not well understood by cooperative boards.

IOC commercial bank boards have a fiduciary responsibility to protect stockholders' investments and maximize return on stockholders' investments. Regulators and insuring agencies such as the Federal Reserve, Federal Deposit Insurance Corporation (FDIC), and the Office of Comptroller of the Currency (OCC) in the Treasury Department place added fiduciary responsibilities on IOC commercial banks to protect customers.

Cooperative boards have a similar responsibility to protect the stockholders' investments and to earn a return on the stockholder's investment. Regulators and insurers, such as Farm Credit Administration and FCS Insurance Corporation, place added fiduciary responsibilities on cooperatively owned Agricultural Credit Associations such as FCSA to protect their borrowers in much the same way that the FDIC and OCC do for IOC commercial banks.

However, the fiduciary responsibility of the cooperative board to its congruent set of owner-users goes beyond that of the IOC board's responsibility to its noncongruent sets of shareholders and customers. The fact that the owners and the users are congruent does not exempt the cooperative board from earning a return on it invested capital. It does, however, place constraints on what the board can do *in pursuit of* returns on invested capital. Although the cooperative board is pursuing return on its capital, it must also ensure that the stockholder's investment is applied in a way that benefits stockholders *as users as well as investors.* Balancing the two is sometimes difficult, and it nearly always forecloses some of the options for generating a return on capital that are readily available to the IOC.

Greater efforts also need to be made to assist cooperative management and boards in understanding the differences in the mechanics that exist between benefit flows from IOCs and benefit flows from cooperatives. Actions that are fair to IOC shareholders will not always be fair for cooperative shareholders. Because cooperative stock and allocated equity is redeemed at face value, the fiduciary responsibility of cooperative directors could extend well beyond the contemporaneous set of voting shareholders in many cases. Simply copying IOC behavior will not always lead to a similar result in a cooperative. It is important for cooperative boards to understand this and communicate it effectively to hired management—especially when the prior experience base of that management has not been in the cooperative sector.

The incentives created by the tax exemption for Federal Land Bank earnings also need to be carefully evaluated. If the exemption applies only when earnings are held as unallocated reserves, it may create future problems similar to the ones encountered at FCSA. One possible solution would be to permit earnings to be allocated as nonqualified patronage distributions by the Agricultural Credit Association with no taxation until the allocation is actually redeemed to the borrower in cash. This would, in essence, leave the Agricultural Credit Association in the same position it currently holds. However, it would identify the member whose business generated the earnings and create an explicit future claim for that member—even if he or she had repaid a loan and exited. By creating a specific property right, this action would eliminate some of the exiting incentive for current stockholders to sell or liquidate as a means of dividing the unallocated surplus.

Finally, there needs to be a clearer specification of what individual system banks and associations have the authority to sell unilaterally. Title to real estate, vehicles, and fixtures are probably not in question. It seems clear that the FCS charter for a regional bank cannot be sold to an entity outside FCS. However, it is less clear whether the loans, customer lists, customer history, and other customer information are the exclusive property of the Agricultural Credit Association or the FCS. The procedures for exiting the system, and the property rights of the stakeholder groups, need to be much more clearly defined before the next sale of an FCS entity is attempted.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

The New Basel Capital Accord: Implications for US Agricultural Lenders

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The first Basel Capital Accord, the current system used for evaluating capital adequacy, was implemented in 1988 by the Basel Committee on Banking Supervision. The accord's objectives are to ensure the soundness and stability of the banking system, to achieve greater uniformity in capital standards across countries, and to provide equitable standards promoting bank competition. The current accord, also known as Basel I, sets the minimum regulatory capital for banks at 8% of the risk-weighted value of their assets. The guidelines proposed in Basel I were accepted by more than 100 countries. Basel I, however, turned out to be too simplistic to address the needs of the banking system in a changing environment of new technology and increased globalization and competition.

The Basel Committee on Banking Supervision has been developing a new accord, Basel II, to address the shortcomings of the current accord and to reflect the new developments in the assessment and management of risk. The Committee has developed several proposals for revising the existing accord and has conducted four quantitative impact studies related to these proposals (posted at the Bank for International Settlements' website, http://www.bis.org). Basel II is expected to be implemented by the end of 2006.

Overview of Basel II

Basel II rests on three mutually reinforcing pillars: (1) minimum capital requirements, (2) supervisory review, and (3) market discipline.

Pillar 1 outlines the calculation procedures of the capital requirements for banking organizations. Under Basel I, the minimum required capital ratio (set at 8%) is calculated as the regulatory capital divided by the risk exposure (measured by the risk-weighted assets). The difference under Basel II will be that the risk exposure will be evaluated as the total of the credit risk, market risk, and operational risk exposure of the bank, where more refined measures will be incorporated to calculate credit and operational risk.

Pillar 2 addresses the supervisory review process in ensuring sound capital management and comprehensive assessment of the risks and the capital adequacy of the banking institutions. This pillar seeks to increase the transparency and accountability of the banking system and to a large extent has already been incorporated in the United States.

Pillar 3 aims at improving market discipline by requiring banks to publicly disclose key information regarding their risk exposures and capital positions. Because Basel II gives banking institutions greater discretion in calculating their own capital requirements, it is anticipated that the disclosure statements will allow market participants to better assess the safety and soundness of the banking environment and thus exert stronger market discipline.

Basel II will include three options for measuring credit risk and another three options for measuring operational risk. The options for calculating credit risk are the *standardized approach* and two internal ratings-based approaches—the *foundation approach* and the *advanced approach*. The standardized approach is similar to the approach currently used for categorizing bank assets according to their risk and then weighing them using fixed weights. Under the internal ratings-based approaches, banks will evaluate key elements of credit risk: the probability of default, the loss given default, the exposure at default, and the remaining maturity of the exposure. Under the foundation approach, banks will estimate the probability of default of their loans, but the regulators will provide the other measures. Finally, under the advanced approach, banks will calculate all key elements of their credit risk exposures.

Likewise, there are three options for calculating operational risk: the *basic indicator approach*, the *standardized approach*, and the *advanced measurement approach*, with varying degrees of bank-provided versus regulator-provided inputs in the calculations of operational risk. As incentives for adopting the more advanced approaches for credit and operational risks, banks are anticipated to experience lower capital requirements.

Basel II Implementation in the United States

The US banking agencies (the Board of Governors of the Federal Reserve System, the Office of Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Office of Thrift Supervision) have already initiated the process for implementing Basel II. These agencies have recommended that the largest, most complex banks (with total assets of at least $250 billion or total foreign exposure of at least $10 billion) be required to implement the advanced measurement approaches of Basel II to assess credit and operational risks (Federal Reserve Board, 2003). Currently, ten banks meet these size requirements, and another ten banks have chosen to adopt the advanced approaches of Basel II. These twenty banks account for 99% of the foreign assets and more than 65% of the total assets held by US lenders. It is expected that over time other large banking and nonbank institutions will also choose to adopt advanced capital calculations.

The banking agencies have identified several areas of concern regarding the implementation of Basel II in the United States (Federal Reserve Board, 2003). The first concern is the equitability of a bifurcated scheme whereby large banks will be required to adopt Basel II while small banks will continue to operate under the existing Basel I. Small banks that remain under the current capital regime would generally have higher capital requirements, which would also be less sensitive to risk. Thus, these small banks would be at a competitive disadvantage. However, the banking agencies predict that Basel II may not have a large impact on capital holdings, because many small banks currently choose to hold capital in excess of the required minimum. The second concern is that the adoption of advanced approaches for measuring credit and operational risk may be too expensive, especially for smaller banks. The adoption of these approaches, of course, will not reduce losses but rather will better align capital requirements and losses. However, even if not required by Basel II, these approaches may be needed in order to compete effectively in the existing banking environment. The third concern is the way operational risk is treated, either as an explicit capital charge under pillar 1 or on a case-by-case basis under pillar 2.

Basel II and Agriculture

The New Basel Accord does not include any special treatment for agricultural lending. Basel II implies that large agricultural loans would be treated as corporate loans and small agricultural loans as retail loans. The regulators, however, need to take into account the particular characteristics of farm loans when setting capital charges for organizations involved in agricultural lending (Barry, 2001). Farm businesses are characterized by cyclical performance, seasonal production patterns, high capital intensity, leasing of farmland, participation in government programs, and annual payments of real estate loans. Because of these characteristics, losses in agricultural lending may not be frequent, but could be large due to high correlations among farm performances. At the same time, high capital intensity, especially involving farmland, offers relatively strong collateral positions, thus mitigating the severity of default when default problems do arise.

Katchova and Barry (2005) developed models for quantifying credit risk in agricultural lending. They calculated probabilities of default, loss given default, portfolio risk, and correlations using data from farm businesses. The authors showed that the calculated expected and unexpected losses under Basel II critically depend on the credit quality of the loan portfolio and the correlations among farm performances. These analyses of portfolio credit risk could be further enhanced if segmented by primary commodity and geographical location. Agricultural lenders could adopt similar models to quantify credit risk, a key component in the calibration of minimum capital requirements.

Farm Lending Institutions

Among agricultural lending institutions, commercial banks and the Farm Credit System are the largest providers of credit. Commercial banking in the United States has long been characterized by a large number of smaller community banks, many of which are heavily dependent on agriculture. Deregulation and consolidations are reducing the number of banks, although federal data for 2004 indicate that approximately 2,600 "agricultural" banks still provide more than 50% of bank loans to agriculture. However, the share of agricultural loans held by banks with

more than $500 million of assets has been growing rapidly. Such larger banks likely have the capabilities to move toward the adoption of the internal ratings-based approaches to risk assessment and capital management, whereas smaller banks serving different market niches will probably remain under the current standardized approach.

The Farm Credit System (FCS) is a federated organization of five mostly wholesale banks lending to 90–100 farmer-owned lending associations, which in turn provide credit and related services to agricultural borrowers. Autonomy of individual units of the FCS has been high, although recent consolidations, business practices, product and service offerings, risk assessment, and capital management have become more uniform over time. Uniformity helps the FCS to present a more understandable, coherent structure to the national and international financial markets. Investors in these markets, in turn, purchase securities issued by the FCS banks, thus providing the loan funds for agricultural borrowers.

In general, the FCS has sufficient size, specialization, and expertise to move toward adopting the internal ratings-based approaches to capital management. Initial steps have involved the design of data systems needed to compile and store loan-level loss data over time and the development of dual rating systems for categorizing the frequency and severity of default by borrowers. The goals are to achieve greater precision and granularity in risk classifications. These steps will lead to the formulation of economic capital models that combine measures of credit, market, and operational risks to determine capital adequacy, risk-adjusted returns on capital, and risk-adjusted pricing of loans and services.

Essential to the adoption of more advanced internal ratings-based approaches is the acceptance by federal regulatory agencies—the Farm Credit Administration in the case of the FCS and the Fed, Comptroller of the Currency, and the FDIC for commercial banks. Basel II requires a formal approval process for the measurement, modeling, and management of risk-based capital. Thorough documentation, rigorous testing, complete validation, and ongoing use are key elements of gaining and maintaining approval.

In Conclusion

As occurred under Basel I, the new spectrum of choices for capital management under Basel II will be widely reflected throughout the financial system. The scope and depth of Basel II have followed the "best practices" of the top tier of banks worldwide. Such successful practices typically permeate a financial system with modifications to fit institutional size and resource base. Vendors offering fee-based capital services, further consolidations among financial institutions, data sharing arrangements, and experience gained by the industry and its regulators will hasten the permeation process and enable community banks—as well as the internationally active ones—to utilize internal ratings-based approaches and economic capital concepts in their risk management.

For More Information

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CHOICES
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1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Agri-lending Vision 2020: When Vision and Reality Meet

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Envision the future of agricultural lending as it evolves over the next 15 years. By recognizing current trends and looking toward the future, individuals can strategically position their businesses and people to proactively mitigate risk in adverse events and capitalize on opportunities. This paper will first examine the realities of the agricultural lending marketplace. Second, we will analyze the future structure of agricultural products, services, and credit risk assessments demanded, and then conclude with strategic planning implications for financial institutions serving agricultural producers.

The Landscape of Agriculture

First, examination of the landscape of agriculture will set the stage. Agriculture will continue to consolidate mainstream production in North America and throughout the globe driven by consumer wants and needs and the food retail sector. Agri-lenders will be providing financial products and services to a smaller group of producers that will generate a larger share of revenue. This segment will be faced with margin compression created by global competition. On the other hand, a large number of agriculturalists will be involved in agriculture that will stretch the paradigms of any planner to think outside the box. For example, financing hunting lodges, bed and breakfasts, or multientity businesses (such as grain farmers who own a car wash or computer consulting firm to fully employ resources) will be common.

As a large share of production consolidates to approximately one million producers worldwide and 150,000 producers in the United States, natural and man-made risk potential will increase. Although large farms tend to manage risk better, a breakout of pandemic flu or a natural disaster in an agricultural cluster area can be devastating to a large share of the portfolio. This will create an environment of extreme earnings and deficits for commercial agribusiness producers, which will test portfolios and management strategies of the smallest to the largest institutions.

Direct government support for agriculture will decline and shift toward environmental and natural resource management in many developed countries over the next 15 years. With more women and minorities operating farms, a lending institution that fails to have a female or minority strategy will be behind the curve in meeting a very important emerging agricultural market.

In a time-compressed environment, producers will differentiate themselves from competitors through information and people, rather than production and capital as was common in the past. In the workplace, lifestyle issues, like time management and balancing family and social activities, will drive the business model rather than the business model driving the lifestyle. Leaders' failure to recognize this balance imperils long-term sustainability of a customer or employee of the institution or business.

Finally, the first of many shots were fired in the summer of 2004 when Rabobank made an offer on a Farm Credit Services entity. This was a wake-up call to a complacent agri-lending environment, stagnant through government supports and high land values. Agri-lending will be required to evolve into a more fluid and competitive global industry that can quickly but objectively meet a changing environment.

Agricultural Structure

The 2004 Family Farm Report, based upon data from the annual Agricultural Resource Management Survey (ARMS), uses the ERS typology on farm size and organization to define the current state of agriculture. As agricultural industry structure progresses toward the year 2020, subsequent hypotheses suggest that it is evolving into seven unique business and lifestyle models yet to be defined

in the research literature or captured in the databases.

Super Commodity/Agribusiness

Model one will be the *super commodity/agribusiness* operation. Anecdotal evidence suggests this model will generate $1.5 million of revenue on average in today's dollars, but will generate twice this amount on the East and West coasts outside the traditional government payment zones. These operations will pocket in 35 to 40 regions in the United States and Canada in prime natural resource base areas for land and water, with minimal public disruption. Control, rather than ownership, of assets will require lenders to revolutionize underwriting standards and alter marketing, operations, products, services, and delivery systems.

These entities will extend to multiple counties, states, provinces, countries, and (to a small extent) hemispheres. They will be comprised of multiple entities, some not defined as agriculture, to provide balance and diversity in their businesses. This model will operate for the most part as a multiple family unit or investor under the guise of corporations and limited liability corporations to foster business formality. This segment will stretch the parameters of government-based lending entities that are historically slow to react to change, making them an excellent target for an international lending institution.

Super commodity/agribusiness operations will be geographically and publicly challenged with site selection and location. For example, environmental, air quality, and animal welfare issues will be numerous and constant. Those that finance crop operations will find land use, resource management, and water issues a high portfolio risk factor. This customer, while dealing with large input suppliers on a regional, national, or international basis, will not always be the most profitable relationship for the institution despite large volumes.

Moving toward 2020, these entities will utilize very sophisticated information systems, such as global positioning systems and autotrack equipment, allowing them to link production to the bottom line profits. Profits on food and fiber products will ultimately be driven by the demands of the consuming public and retailers.

Needs for this model from the agri-lender include growth and strategic management, cash and working capital programs, venture capital, equity management, coaching services, execution of strategies and facilitation of acquisitions, mergers, and alliances as delivered by a lender management team that handles no more than 40–50 accounts. These specialists must be adept in the awareness of macro issues, but be able to drill down on specific issues of the entity as a solutions-based provider.

The five C's of credit will still apply from the credit side. The challenge to the credit analyst will be to develop underwriting standards on soft asset financing, such as human resources, business best management practices, execution strategies, and metrics, that can be quantified and tested in a volatile marketplace.

Traditional Family Farm

The second model is known as the *traditional family farm*, generating revenue in the $50,000–600,000 range, in today's dollars. Although this range is large, it encompasses a large number of farms. Global economics will produce dramatic change in this segment in the future. The Norman Rockwell version of the farm or ranch will evolve by those who have the passion to carry on the farm family legacy. This model will be particularly important to agri-lenders, because these operations have traditionally been the most profitable customers.

Vision 2020 finds that the number of traditional family farms will be driven by dynamics of rural communities, lifestyle issues, economies of scale, and technology. These operations, particularly crop and less intensive livestock farms, while large by today's standards, could be operated on a part-time basis, bringing a whole new mode of ownership and management to the picture.

Ten percent of current traditional family farms will grow to larger entities generating $600,000 and $1.5 million in revenue. Thirty percent will scale down, becoming lifestyle farms and ranches; another 30% will exit the industry because of development or recreational use opportunities, leaving approximately 30% remaining as traditional family farms. To any strategic planner, realizing the rapid reduction of government supports, the introduction of new technology, information base, or regulatory standards could radically adjust these numbers in a five-year period, similar to what occurred in western Canada, South Africa, Australia, and New Zealand.

The visionary lender will find new methods to make this customer segment transition profitable. The land-based operations will be purchased by extended family members or outside investors for recreational, housing, water, and natural resource development. Farm management services and reverse mortgages to pump liquidity into a cash-starved older age rural population base could be opportunities knocking on the door.

Today's credit standards will still work quite well, but marketing financial products and services will have to be adjusted using enhanced delivery systems involving alliances with realtors and accountants to be able to gain exposure to absentee property owners. Youth that leave areas to seek higher incomes and exciting lifestyles may boomerang back to these areas in later stages of life to seek balance in quality-of-life issues.

Vertically Integrated Operation

Vertically integrated agricultural models, such as hogs and poultry, which have been the bread and butter of the agricultural finance portfolio in some areas late in the last century, will not be as large of a growth segment in the portfolio of the future. Large multinational agribusiness firms will find it more economical and environmentally friendly to move a portion of this business offshore. These businesses will still be popular with the younger segment who are technology-oriented and seek a stable earning base as an entrance into agriculture; however, more will seek vertically integrated opportunities on a part-time basis.

Contract Agriculture

Contract agriculture will be a growth market with traditional commodities such as vegetables, beef, milk, and tobacco, but will also meet the needs of a more sophisticated affluent consumer. Strategic alliances with agribusinesses, medical, and technology companies will stretch the paradigms of what is considered farming and life sciences. This type of operation will have the image of a white collar or scientist's family farm. Contracts, patents, and copyrights will be the collateral and conditions that will underwrite these loans and financial services. This segment will be very attractive to large national and international financial institutions and equity capital entities. These entities will be pocketed and isolated in rural areas to protect their products and services. The contract agriculture segment will frustrate planners, regulators, and government policy makers, who will struggle to develop policies and standards that are flexible and expedient enough to meet technology and cutting-edge initiatives driven by the affluent consumer.

Lifestyle Segment

The *lifestyle segment*, which should not be referred to condescendingly as "hobby farmers" or "sundowners," is the largest segment of producers by number and will continue to represent a dynamic marketplace. Ninety percent of these businesses will locate within reasonable driving distances of rural affluent zones, which have the following characteristics: good schools, hospitals, health care systems, infrastructure, technology, natural amenities, reasonable cost of areas to live, and convenient shopping and social opportunities.

Some efficient agri-lenders already handle 600–1,000 lifestyle loans. Streamlined, simple underwriting standards will be the norm, with the deeper analysis being concentrated on the layering of risk, that being industry, community, and economy risk. Twenty-four-hour access to loan services, through kiosks, will not be an option but a requirement. Again, developing alliances, such as with realtors, and being able to target specific areas and match the products and services to the customer will be critical. With over 50% of Americans desiring to live on 20 acres in the country (according to *USA Today*), this segment will be dynamic and profitable to those who mesh credit, marketing, and operations into a streamlined mode of delivery.

Value-added Agriculture

The *value-added model* is alive and well, particularly outside the traditional government payment zones with agricultural enterprises that encourage and reward outside-the-box entrepreneurial thinking. These businesses exploit a location, production, servicing, technology, branding, or systems aspect to give them the differential advantage. Markets will be 80% domestic and 20% international, with a focus on natural and organic foods and emerging energy and natural resource products, such as ethanol, biodiesel, wind power, water, and mineral harvesting aspects.

Special units or teams will evolve to handle these entrepreneurial entities across institutions and even with competitors. This agricultural segment is in dire need of new credit underwriting standards that capture the risk and components of a successful entity. Needs of these enterprises from lenders include business planning, strategy development, growth management, coaching, working capital and cash management, and networking across markets and sectors. Profits and sustainability, along with risk, are high as this group takes on the characteristics of entrepreneurial small businesses.

Agri-entertainer

Finally, the fastest growing model will be coined as the *agri-entertainer*. Financing of lodges for hunting, pumpkin festivals, bed and breakfasts, the urban farmer's market, horse trails, or all-terrain vehicle recreational sites will become more commonplace. This model can be easily integrated into any of the previously mentioned entities as a side venture. Lifestyle, value-added, and

the agri-entertainer models will attract a new set of youth and adults bringing needed energy to North American agriculture as they seek to fulfill their dreams.

The Future of Agri-lending

The new models just discussed will be better defined by their consumer-driven attributes than by demographics. This in turn will change the landscape of agri-lending institutions. Agricultural community and commercial banks that currently number approximately 2,500 will most likely decline to near 1,000 in the future. Small community or family-owned banks will continue to serve the traditional, lifestyle, and new emerging segments. Their strategic advantage will be investors and management teams that do not focus on a maximization of next quarter's results to satisfy stockholders, as the large institutions tend to do. Quick decision-making and fast, friendly, human-oriented service with baseline technology will be critical to success. Government guarantees and special program initiatives, such as government liquidity savings accounts and reverse mortgages, may provide the differential advantage. Being located near rural affluent zones may be critical for the attraction of human resources to provide quality service.

The Farm Credit System, which has nearly 100 associations and five district banks nationwide, will most likely consolidate down to 25–30 associations or alliance entities with other institutions. Government Sponsored Enterprise (GSE) status may become a concept of the past, if the agricultural environment requires the system to expand products, services, and authorities to meet a dynamic marketplace. Farm Credit will find that the "better is better" strategy rather than the "bigger is better" strategy is very applicable in a cooperative system that operates 364 days a year as a business and one day as a cooperative.

Farm Credit's strategic advantage as an efficient deliverer of credit must evolve to become a financial solutions-based provider. They must continue to brand the image of not being a fair-weather lender regardless of government entity status and having a well-trained educated staff and customer.

The Farm Service Agency and Farmer Mac will be critical in either guaranteed lending or pooling of risk, particularly as agriculture consolidates. This will be necessary as commodities such as soybeans and corn find increased competitive pressure from South America, wheat gets competition from the Baltic States, and cotton and apples move to China, shutting windows of opportunity and increasing volatility. These programs will be critical in providing stability and opportunities for young producers in the agricultural financial sector as well as assisting in farm business transition.

Insurance companies and particularly nontraditional lenders and input supply firms will continue to compete as niche and stealthy competition, exploiting the vulnerabilities of the larger institutions. They will continue to build on strategic advantages of streamlined decision-making and being a total agribusiness solutions provider to the segments that they target. Some agribusiness firms may form global alliances with international lenders. This will be more common with the larger producer and agribusiness segments that are perceived to be sustainable in the global marketplace without subsidies and supports.

Implications

The following are items that any strategic planner needs on the agenda to help envision and plan for the future. The objective is to provoke thought, which may provide the differential edge for success in the agribusiness and agri-lending industry of the future.

- Data systems must evolve to facilitate moving raw data to information, leading to knowledge that is shared throughout the organization and with customers. This will, in turn, help anticipate opportunities and provide solutions that transform vision to reality. Although leading agribusiness firms are currently doing this, the traditional lender of today has yet to see the advantages, particularly those of a portfolio made up of the seven business models outlined above.
- Leadership and boards of directors of institutions and agribusinesses must be revamped to reflect the realities of the marketplace. Having representation of women and minorities, as well as board accountability, education, and evaluation, must be a requirement. Businesses will seek higher levels of expertise in line with the portfolio concentration of segments represented by the seven business models. The practice of appointing versus electing directors, particularly in cooperatives, will be re-examined to help seek this balance.
- Education of employees and customers must be a high priority even in times of tight budgets. A concept called "edu-marketing" is an effective differentiation strategy by making your customer more knowledgeable and sustainable through educational pro-

grams, such as young, beginning, and executive producer schools sponsored by lenders. Smaller banks and cooperatives will join in alliances with agribusinesses and even competitors to provide these opportunities. Programs for both customers and employees that deal with medical, pension, retirement, and transition planning will be a high priority to maintain a sustainable customer and employee base, as Medicare and Social Security face more challenges. The concept of blended education, encompassing Internet-based training guided by mentor experience and oversight, will be critical to combine the components of high tech and high touch. Internship and cooperative education programs that are organized nationally or internationally can provide an opportunity for red-shirting of prospective employees—a popular concept in sports—which is similar to the employee and employer having an extended interview. These concepts will challenge banks and lending cooperatives of small-town America but will also be a must for both customers and employees in a global environment.

- CEOs, leaders, and management of agri-lending institutions must operate with a long-term mentality rather than a short-term maximization strategy. Agriculture, particularly in the United States, is an industry that does not adjust readily to large paradigm shifts; those that do not recognize it will be doomed to failure.
- Historically, technology has been the differentiator in the competitive marketplace in lending. In the future, as the technology curve flattens, the differential advantage will come through a humanization strategy—combining high tech with a balance of high touch. The challenge will be to train younger employees who are technology-oriented, but challenged when it comes to emotional intelligence, involving working with people and critical thinking skills, which are both very important for success. Lenders in rural areas that don't have the quality of life attributes desired will struggle to find new employees.
- Products and services must be "customerized." That is, a customer could have access to a menu of choices inside and outside the organization through strategic alliances to be customized to meet their needs. This will require the 2020 agri-lender to play the roles of a teacher, coach, and facilitator.

Agriculture in 2020 will be an industry in which one size does not fit all. Being fast, fluid, and flexible, and realizing the customer drives change and the business model, will be important. The competitive agri-lender must think globally—beyond 20 miles of their home base—but act locally. Understanding people, philosophies, and consumer dynamics, while demonstrating a passion for the agricultural industry, is the recipe for making the vision become reality.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Markets for the Environment

Richard T. Woodward

Markets are increasingly being used and proposed as a way to address environmental problems and manage natural resources. Functioning markets exist for water rights and sulfur dioxide credits can even be purchased via the Internet. Markets are being developed for trading water quality credits, greenhouse gas emissions, and many other environmental services. In this paper, I examine why such markets are being widely proposed, give some background on their history, and speculate on their future. The other papers in this *Choices* theme provide an overview of what is really happening "on the ground," discussing how well the promise of these new markets has been met in reality.

Background

Most economists are quite enthusiastic about markets; they make buyers and sellers better off and create incentives for innovation. These benefits can also be achieved when applied to the environment. Markets can help reduce the cost of achieving environmental goals and move resource usage permits to those that value them most. However, Adam Smith's invisible hand does not magically materialize to provide clean air, protect endangered species, or even ensure the best use of fresh water. If markets are to be used to address these issues, then the rights to be transacted must be intentionally defined.

The advantages of markets have led economists to look for ways to harness market forces for the management of the environment and our natural resources. After being promoted for decades by economists, this policy tool is beginning to have some notable successes. Costs of controlling sulfur dioxide have fallen dramatically, and water quantity trading is now routine in some regions. It might even be argued that the development and implementation of environmental markets constitutes the single most valuable contribution of environmental economists to date, having saved billions of dollars in the SO_2 program alone. Today markets are being promoted as part of the solution to an ever-increasing range of environmental problems, including overfishing, urban sprawl, and global climate change.

Articles in this Theme:

Markets for the Environment 49
Lessons Learned from SO2 Allowance Trading 53
The Evolving Western Water Markets 59
The Future of Wetlands Mitigation Banking 65
Crunch Time for Water Quality Trading 71

What are the Economic Benefits of Environmental Markets?

The theory behind market-based approaches to deal with pollution problems arose in the late 1960s in work by Dales (1968) and Crocker (1966). In such a system, rights to emit pollutants or use natural resources would be distributed to stakeholders but could then be sold. Market negotiations between potential permit buyers and sellers would occur and result in the reallocation of these permits across the stakeholders. In the textbook version of such a program, a cap is first placed on total pollution emissions. Second, permits equal to the cap are distributed to the polluters. Finally, a market develops in which the sellers are those firms with relatively low abatement costs who end up reducing emissions by more than initially required; buyers are those with relatively high abatement costs who end up reducing emissions by less than initially required. Regardless of the aspect of the environment being considered, the market-based approach requires that transferable rights be defined and protected (typically by government), an initial allocation is set, and trade in these permits is allowed. The textbook result is an efficient market equilibrium in which a pollution target is achieved at lowest cost or a resource is used in a way that yields the most value to society.

At least, that is how it is supposed to work—the simplest theoretical models never quite work in practice. For

example, Dales' original proposal was to use transferable rights to improve water quality. Coincidentally, one of the earliest applications involved markets for water pollution on the Fox River in Wisconsin. However, significant barriers to market trades arose because the difficulty in obtaining regulatory authority for trades and the persistent concerns about "hot spots"—locally high concentrations of the pollutants. In the end, the Fox River program, established in 1981, did not give rise to a single trade during the first 14 years of its existence.

Challenges to Market Design

As the Fox River example makes clear, the design of environmental markets is not without challenges. Numerous decisions must be made when such markets are put in place. The nature of the rights must be carefully defined so that environmental goals are met but market flexibility remains. The initial allocation of rights must be established, sometimes being handed out based on historical precedents and other times being auctioned by the government. These decisions, and many others, can be politically contentious and can affect the success of the market.

Whether they are used to address pollution problems or fisheries management, all transferable rights programs require that an institution (typically the government) certify the validity and transferability of the property right. In addition to defining the rights and obligations associated with the permit, the oversight agency must monitor compliance. This is more difficult than in standard markets. When someone purchases an apple at the supermarket, they know the purchase is complete when they walk out of the store; if the apple is rotten they can usually return it for a refund. When someone purchases a pollution permit, they know that it is legitimate when the government informs them that they are allowed to increase their pollution, but they usually have no way to know (or reason to care) if the seller of the permit actually reduced its pollution to generate the offsetting environmental benefit. Compliance must be enforced by the government. Monitoring and enforcement is also needed to create demand for the rights to be transacted. Permits will be valued only if polluters know that they are required by the government. As Dennis King puts it in his paper in this series, "the 'invisible hand' will not work without the 'visible foot' of a regulator insuring compliance."

Further inhibiting the performance of environmental markets is the fact that they usually grow out of more traditional regulatory programs and often carry excess baggage as a result. As Robert Hahn (1990) noted, "In the real world, regulatory systems are rarely discarded and replaced wholesale. Rather, reform of regulatory systems proceeds in an incremental fashion." Hence, the earliest transferable rights programs in pollution are hardly identifiable as market-based systems at all. In some cases flexibility arises over time, but such evolution is not automatic. As Leonard Shabman and Paul Scodari argue in their paper in this series, the level of flexibility that has been introduced in the management of our nation's wetlands is so limited that the program can not even qualify as truly market based.

A Brief History of Environmental Markets

The development of the institutions needed to support transferable rights is more natural in some instances than in others. The buying and selling of water rights, which is centuries old, is a natural improvement over fights that inevitably arise over this scarce resource. As governments became more involved in resource management, however, they often created barriers to trades that made transactions more difficult. Government control of water, environmental regulations, and restrictions on the rights to use water often made water trading quite difficult. However, as Richard Howitt notes in his paper in this series, in recent years there have been efforts to encourage markets by modifying laws to facilitate trading. Fierce battles are still being fought, but pressed by rising scarcity, there has been substantial growth in water markets.

For pollution and environmental services, there is no natural tendency for markets to arise; the initiation had to come from the regulatory branch. In the 1970s, the US Environmental Protection Agency started down the path toward market-based instruments when it began introducing some flexibility into its air quality programs. The 1980s saw an expansion in the use of this tool: Trading was allowed as part of the rules that removed lead from refined gasoline and as part of the US approach to controlling chlorofluorocarbons. That decade also saw the development of a number of small-scale market-based programs to address water-quality: the Fox River program noted above, programs in Lake Dillon and Cherry Creek Reservoir in Colorado, and on the Tar Pamlico River in North Carolina. By the 1990s, the

number and scope of market-based programs was expanding rapidly. The national SO_2 program, started in 1990, has proven that a program can work in textbook-like fashion. California introduced an ambitious trading program in air pollutants, and water pollution programs have sprouted up around the nation.

In addition, it appears that interest in market-based mechanisms is as strong as ever. In fact, it often appears today that when environmental policy is discussed in the US, market-based approaches are assumed desirable unless proven otherwise.

Why this Issue?

Today there are many proposed markets, and we can observe a number of successful and unsuccessful efforts. It is a good time to take stock of where we are. In this collection of articles, *Choices* explores the reality of environmental markets in the United States today. In this package of papers:

- Robert Stavins reviews the market for permits to emit sulfur dioxide, which is widely viewed as an enormous success;
- Richard Howitt and Kristiana Hansen look at the emerging markets for water in the West, where markets remain quite limited despite the fact that there seems to be great potential for gains from trade;
- Leonard Shabman and Paul Scodari look at wetlands mitigation banking, which, they argue, is so restricted that it is like any other offset program and cannot legitimately be called a market-based program; and
- Dennis King looks at the problem of water quality markets and finds that the potential in this arena has yet to materialize; and it may never do so unless government plays a stronger role.

What Do the Papers Tell Us?

A constant theme repeated throughout these papers is that *details matter* and the creation of markets for natural resources and environmental services is no small task. As we look to the future, it may be prudent to avoid exuberant predictions of huge economic benefits from trading. Although it is clear that these instruments will continue to be part of the policy landscape for years to come, they will also face challenges and setbacks, and markets may not be appropriate in every setting. Over time, market-based instruments may take a less prominent place in the policy mix, to be seen as one tool among many that can be used for improved management of the environment and natural resources.

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CHOICES
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Lessons Learned from SO_2 Allowance Trading

Robert N. Stavins

The most ambitious application yet undertaken of a market-based instrument for environmental protection has been for the control of sulfur dioxide (SO_2) emissions in the context of acid rain reduction under Title IV of the Clean Air Act amendments of 1990. That Act established an allowance trading program to cut SO_2 emissions by 10 million tons from 1980 levels—a 50% reduction. In this article, I identify lessons that can be learned from this grand experiment in economically oriented environmental policy.

The System and Its Performance

In Phase I of the allowance trading program, emissions allowances were assigned to the 263 most SO_2-emissions-intensive generating units at 110 power plants operated by 61 electric utilities, located largely at coal-fired power plants east of the Mississippi River. After January 1, 1995, these utilities could emit SO_2 only if they had adequate allowances to cover their emissions. The US Environmental Protection Agency (EPA) allocated each affected unit, on an annual basis, a specified number of allowances related to its share of heat input during the baseline period (1985-87) plus bonus allowances available under a variety of special provisions. Cost-effectiveness was promoted by permitting allowance holders to transfer their permits among one another and bank them for later use. Under Phase II of the program, which began on January 1, 2000, almost all electric power generating units were brought within the system. Certain units are exempted to compensate for potential restrictions on growth and to reward units that were already unusually clean.

The SO_2 allowance trading program has performed successfully. Targeted emissions reductions have been achieved and exceeded, and total abatement costs have been significantly less than what they would have been in the absence of the trading provisions. Trading volume has increased over the life of the program (Figure 1), and the robust market has resulted in an estimated cost savings of up to $1 billion annually, compared with the cost of command-and-control regulatory alternatives that were considered by Congress in prior years, representing a 30–50% cost savings.

The allowance trading program has had exceptionally positive welfare effects, with estimated benefits being as much as ten times greater than costs. It is notable that the majority of the benefits of the program are due mainly to the positive human health impacts of decreased local SO_2 and particulate concentrations, not to the ecological impacts of reduced long-distance transport of acid deposition. This contrasts with what was assumed at the time of the program's enactment in 1990.

Lessons for Design and Implementation of Tradable Permit Systems

The performance of the SO_2 allowance trading system provides valuable evidence for environmentalists and others who have been resistant to these innovations. It shows that market-based instruments can achieve major cost savings while accomplishing environmental objectives. The system's performance also offers lessons about the importance of flexibility and simplicity, the role of monitoring and enforcement, and the capabilities of the private sector to make markets of this sort work.

In regard to flexibility, tradable permit experience indicates that systems should be designed to allow for a broad set of compliance alternatives, in terms of both timing and technological options. Allowing flexible timing and intertemporal trading of the allowances—that is, "banking" allowances for future use—has played a very important role, much as it did in EPA's lead rights trading program a

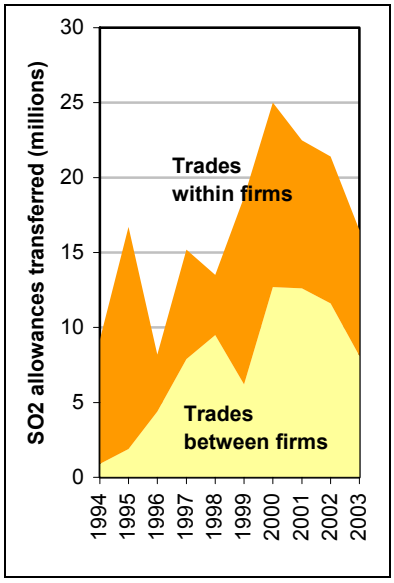

Figure 1. Trading volume in the SO_2 Allowance Trading Program.
Source: Based on data from USEPA "Trading Activity Breakdown" (see http://www.epa.gov/airmarkets/trading/so2market/transtable.html).

decade earlier. The permit system was based on emissions of SO_2 (as opposed to sulfur content of fuels), so that both scrubbing and fuel-switching were feasible options. Moreover, one of the most significant benefits of the trading system was simply that technology standards requiring scrubbing of SO_2 were thereby avoided. This allowed Midwestern utilities to take advantage of lower rail rates (brought about by railroad deregulation) to reduce their SO_2 emissions by increasing their use of low-sulfur coal from Wyoming—an approach that would not have been possible if scrubbers had been required.

In regard to simplicity, simple formulas for allocating permits based upon historical data have proven to be difficult to contest or manipulate. More generally, experience shows trading rules should be clearly defined up front without ambiguity. For example, there should be no requirements for prior government approval of individual trades. Such requirements hampered the EPA's Emissions Trading Program for local air pollutants in the 1970s, while the lack of such requirements was an important factor in the success of lead trading in the 1980s. In the case of SO_2 trading, the absence of requirements for prior approval reduced uncertainty for utilities and administrative costs for government and contributed to low enforcement and other program implementation (transactions) costs.

Considerations of simplicity and the experience of the SO_2 allowance system also argue for using absolute baselines—not relative ones—as the point of departure for tradable permit programs. The difference is that with an absolute baseline (so-called "cap-and-trade"), sources are each allocated some number of permits (the total of which is the "cap"); with a relative baseline, reductions are credited from a hypothetical baseline—what the source would have emitted in the absence of the regulation. A hybrid system—where a cap-and-trade program is combined with voluntary "opt-in provisions"—can also be undesirable because it would create the possibility for "paper trades," where a regulated source is credited for an emissions reduction (by an unregulated source) that would have taken place in any event. Relative baselines would have complicated the program and could have led to an unintentional increase in the total emissions cap.

The SO_2 program has also brought home the importance of monitoring and enforcement provisions. In 1990, environmental advocates insisted on continuous emissions monitoring, which helps build market confidence. The costs of such monitoring, however, are significant. On the enforcement side, the Act's stiff penalties—$2,000 per ton of excess emissions, a value more than 10 times that of marginal abatement costs—have provided sufficient incentive for the very high degree of compliance that has been achieved.

Another lesson involves permit allocation procedures. There are obvious political advantages of allocating permits without charge, as was done for the SO_2 program. But the same characteristic that makes such allocations politically attractive—the conveyance of valuable allowances to the private sector—also makes free allocations problematic. It has been estimated that the costs of SO_2 allowance trading would be 25% lower if permits were auctioned rather than freely allocated, because auctioning yields revenues that can be used to finance cuts in preexisting distortionary taxes. Furthermore, in the presence of some forms of transaction costs, the post-trading distribution of emissions—and hence aggregate abatement costs—are sensitive to the initial permit allocation. For both reasons, a successful attempt to establish a politically viable program through a specific initial permit allocation can result in a program that is significantly more costly than anticipated.

Finally, the SO_2 program's performance demonstrates that once a tradable system is established, the private sector can then step in to make it work. In the SO_2 context, despite claims to the contrary when the program was enacted, entrepreneurs provided brokerage needs, developed price information, matched trading partners, developed electronic bid/ask bulletin boards, and made available allowance price forecasts. The annual EPA auctions may have served the purpose of helping to reveal market valuations of allowances, but bilateral trading has also informed the auctions.

Lessons for Judging Effectiveness of Tradable Permit Systems

When examining the effectiveness of trading programs, economists have typically employed some measure in which gains from trade are estimated for moving from conventional standards to marketable permits. Aggregate cost savings are the yardstick best used for measuring success.

The challenge is to compare realistic versions of both tradable permit systems and likely alternatives, not idealized versions of either. It is not enough to analyze the cost savings in any year. For example, the gains from banking allowances should be considered (unless this is not permitted in practice). It can also be important to allow for the effects on technology innovation and diffusion, especially when permit trading programs impose significant costs over long time horizons.

More generally, it is important to consider the effects of the preexisting regulatory environment. The level of preexisting taxes can affect the total costs of regulation, as emphasized above. Also, because SO_2 is both a transboundary precursor of acid rain and a local air pollutant regulated under a separate part of the Clean Air Act, local environmental regulations have sometimes prevented utilities from acquiring allowances rather than carrying out emissions reductions. Moreover, because electricity generation and distribution have been regulated by state commissions, a prospective analysis of SO_2 trading should consider the incentives these commissions may have to influence the level of allowance trading.

Lessons for Identifying New Permit Trading Applications

Market-based policy instruments are now considered for almost every environmental problem, ranging from endangered species preservation to global climate change. Experiences with SO_2 trading offer some guidance as to when tradable permits are likely to work well and when they may face greater difficulties.

First, permit trading is likely to work best where there are wide differences in the cost of abating emissions. SO_2 trading is such a case. Initially, SO_2 abatement cost heterogeneity was great because of differences in ages of generating equipment and their proximity to sources of low-sulfur coal. When abatement costs are more uniform across sources, the political costs of enacting an allowance trading approach are less likely to be justifiable.

Second, the greater the degree of mixing of pollutants in the receiving airshed or watershed, the more attractive will be a tradable emission permit (or emission tax) system, relative to a conventional uniform standard. This is because taxes or tradable permits can lead to localized "hot spots" with relatively high levels of ambient pollution. This is a significant local or regional issue, and it can become an issue of overall consequence, as well, if damages rise more than proportionally with increases in pollutant concentrations.

Third, economic theory has taught us that the efficiency of a tradable permit system will depend on the pattern of costs and benefits. If uncertainty about marginal abatement costs is significant, and if marginal abatement costs are relatively constant, but the benefits of abatement fall relatively quickly at higher levels of abatement, then a quantity instrument (such as tradable permits) will be more efficient than a price instrument (such as an emission tax). The advantage of tradable permits is reinforced when there is uncertainty about both the marginal costs and the marginal benefits of pollution reductions, and these are positively correlated.

Fourth, tradable permits will work best when marketing and brokerage costs are low, and the SO_2 experiment shows that if properly designed, private markets will tend to render such costs minimal. Finally, considerations of political feasibility point to the wisdom of proposing trading instruments when they can be used to facilitate emissions reductions—as was done with SO_2 allowances and lead rights trading—as opposed to using these instruments only to lower the costs of achieving status quo emissions.

What about Greenhouse Gas Trading?

Many of these issues can be illuminated by considering the current interest in applying tradable permits to the task of cutting greenhouse gas emissions—largely carbon dioxide (CO_2) emissions—to reduce the risk of global climate change (for more on why this might occur, see the Fall 2004 issue of *Choices*). It is obvious that the number and diversity of sources of CO_2 emissions due to fossil fuel combustion are vastly greater than in the case of SO_2 emissions as a precursor of acid rain, where the focus can be placed on a few hundred electrical utility plants.

Any pollution-control program must face the possibility of "emissions leakage" from regulated to unregulated sources. This could be a problem for meeting domestic targets

for CO_2 emissions reduction, but it would be a vastly greater problem for an international program, where emissions would tend to increase in nonparticipant countries. This also raises serious concerns with provisions in the Kyoto Protocol for industrialized countries to participate in a CO_2 cap-and-trade program while nonparticipant (developing) nations retain the option of joining the system on a project-by-project basis. As emphasized earlier, provisions in tradable permit programs that allow for unregulated sources to opt in can lower aggregate costs by substituting low-cost for high-cost control but may also have the unintended effect of increasing aggregate emissions beyond what they would otherwise have been. This is because there is an incentive for adverse selection: Sources in developing countries that would reduce their emissions, opt in, and receive excess allowances would tend to be those that would have reduced their emissions in any case.

To the limited degree that any previous trading program can really serve as a model for the case of global climate change, attention should surely be given to the tradable-permit system that accomplished the US phaseout of leaded gasoline in the 1980s. The currency of that system was not lead oxide emissions from motor vehicles, but rather the lead content of gasoline. So, too, in the case of global climate, great savings in monitoring and enforcement costs could be had by adopting input trading linked to the carbon content of fossil fuels. This is reasonable in the climate case, because—unlike in the SO_2 case—CO_2 emissions are roughly proportional to the carbon content of fossil fuels, and scrubbing alternatives are largely unavailable, at least at present. On the other hand, natural sequestration of CO_2 from the atmosphere—such as by expanding forested areas—is available at a reasonable cost (even in the United States), and is explicitly counted toward compliance under the Kyoto Protocol. Hence, it could be important to combine any carbon trading (or carbon tax) program with a carbon sequestration program.

Developing a tradable permit system in the area of global climate change would surely bring forth an entirely new set of economic, political, and institutional challenges, particularly with regard to enforcement problems. But, it is also true that the diversity of sources of CO_2 emissions and the magnitude of likely abatement costs make it equally clear that only a market-based instrument—some form of carbon rights trading or carbon taxes—will be capable of achieving the domestic targets that may eventually be forthcoming from international agreements.

Conclusion

Given that the SO_2 allowance-trading program became fully binding only in 1995, we should be cautious when drawing conclusions about lessons to be learned from the program's performance. But despite the uncertainties, market-based instruments for environmental protection—tradable permit systems in particular —now enjoy proven successes in reducing pollution at low cost.

Market-based instruments have moved to center stage, and policy debates look very different from the time when these ideas were characterized as "licenses to pollute" or dismissed as completely impractical. Of course, no single policy instrument—whether market-based or conventional—will be appropriate for all environmental problems. Which instrument is best in any given situation depends upon characteristics of the specific environmental problem and the social, political, and economic context in which the instrument is to be implemented.

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The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

The Evolving Western Water Markets

Richard Howitt and Kristiana Hansen

Expanding population and environmental protection the world over are placing additional demands on existing water supplies. Meeting these demands by traditional structural supply augmentation is dogged by increasing environmental and fiscal costs, which leave excess water demand to be met largely by conservation and reallocation of existing supplies. Water trading clearly has a role in reallocating supplies and stimulating conservation by providing a clear measure of its value for conservation and a voluntary self-compensating mechanism for reallocation. Despite these advantages, traditional markets have been slow to evolve in the western United States for institutional and hydrologic reasons. However, even when institutional, political, and physical impediments prevent textbook water markets from developing, significant gains in efficiency can result from relaxing restrictions on ownership, use, and transfer. Most water markets in the western United States fall between the two extremes of textbook markets in which, on the one hand, price is determined by unfettered market forces, and on the other, there is an outright legal prohibition of trading.

Three fundamental reasons probably cause the slow evolution of water markets in the West. First, water has many *public good* characteristics, benefiting not only the owner of a water right, but also the public at large. Public interest in water is supported by the fact that most western states retain the ultimate property right to water; individual water rights are more akin to use rights than private property rights. Second, fluctuations in water supply result in periodic "thin" markets with few participants. Third, water transfers often require significant costs, in terms of both institutional costs and the cost of physically transporting the resource. Even in the presence of willing buyers and sellers, trades of permanent water rights are often not approved by regulators because they would result in significant *externalities*—physical impacts on parties not involved in the transaction—and in third party financial impacts to the exporting region.

A worldwide survey of existing markets makes it clear that gains in efficiency can occur even in the absence of theoretically perfect markets (Saleth & Dinar, 2004). The efficiency gains are achieved by moving water to higher value uses. To achieve these gains, many states west of the Mississippi River have implemented legislation to facilitate water trading within their borders. However, because water has both private and public good characteristics, it has often been developed with some degree of public financing or subsidies. Hence, its reallocation generates heated controversy—especially when potential profits are involved.

Water Market Determinants

What factors determine whether and how markets develop? Why is trading heavier in some states than in others? The importance of water's physical characteristics cannot be emphasized enough. In many parts of the West, the water supply is uncertain; there is tremendous temporal and spatial variation in rainfall. Furthermore, supply and demand peaks do not generally coincide within the water year. For example, when snow pack melts in the spring, it is stored in surface reservoirs until late summer when farmers' irrigation demand peaks. These fundamental characteristics of precipitation make water market development all the more desirable, but they hinder the creation of markets in the first place. Transportation and storage facilities have been constructed throughout the West, largely at public expense, to convey water across time and space. Not surprisingly, water markets have tended to develop in locations where the Bureau of Reclamation and state water projects have invested resources in creating an infrastructure to facilitate the transportation and storage of water.

Yet obstacles remain. Even though water garners substantial political attention and controversy, its economic value at the margin is actually quite low relative to the cost of conveyance. For example, the option purchase price for

water in a 2002 transaction between Glenn-Colusa Irrigation District in northern California and the Metropolitan Water District serving the Los Angeles area was $110/acre-foot. The cost of transport (including a mandatory 20% environmental mitigation requirement and 300-mile transport and pumping fees) is approximately $143/acre-foot, for a total delivered cost of $253/acre-foot. Such high transaction costs reduce the number of trades that are financially viable and the geographical scope of markets.

Water's mobility also makes property rights enforcement a challenge. Property rights are easier to monitor in some settings than others. For example, annual fallowing transfers from rice growers in the north of California to urban users in the south of California are relatively easy to monitor. If the fields are fallowed, the water must still be in the river and presumably flows to the purchasers. In contrast, monitoring sales of water saved by more efficient field application methods requires the detailed assessment of current and past irrigation technologies as well as the level of implementation.

For trades to occur easily, property rights must be clearly defined, enforceable, and transferable. In most western states, water property rights are governed by prior appropriation, whereby the first to claim the water in a waterway for beneficial use has first priority to the water, and a water right not exercised for a period of some years is relinquished. When appropriative rights were codified into state laws in the late 19th and early 20th centuries, state lawmakers did not envision widespread leasing and permanent transfers of water rights. As a result, western rights holders have historically been reluctant to lease water out, for fear of losing their right to the water in the longer term. Further, permanent transfers of water rights under prior appropriation have usually been costly and time-consuming. Permanent transfers and leases have recently become easier, as state laws have changed to facilitate market transactions.

One water market in the West where property rights are clearly defined, enforceable, and transferable is a Bureau of Reclamation project on the eastern slope of the Rocky Mountains: the Colorado-Big Thompson (CBT). Water rights in the CBT are correlative; shares fluctuate annually in response to water conditions, and all shareholders benefit or lose each year in like manner. The shares are entirely homogeneous, and transfer occurs with minimal fees and paperwork. However, the CBT system has the great advantage of using water imported from another watershed, thus freeing it from the impacts of reduced or altered flows on downstream users or externalities that complicate water trades along natural rivers. In contrast, California water rights are far from homogeneous. California continues to recognize riparian rights (water rights that are attached to the land adjacent to the waterway) alongside appropriative rights, which makes defining water rights with sufficient precision to sell them costly and litigious (Carey & Sunding, 2001). Furthermore, in many parts of California (as elsewhere in the West), federal ownership of developed water resources complicates market development.

The differential in water values between current owners and potential buyers is often great enough to stimulate potential trades. However, another complexity is the physical and environmental externalities intrinsic to trading an environmental resource. Reduced or altered flows on a waterway affect water quantity and quality downstream. Drawdown in an underground aquifer affects neighbors' pumping costs. Such externalities may be positive or negative. When they are negative, there is a role for regulatory agencies to ensure that nonmarket values placed on the waterways by society are taken into account. The absence of adequate protections for those adversely affected by negative externalities may result in trade volume that exceeds the socially efficient level. On the other hand, these concerns have traditionally been handled through lengthy court procedures, which may discourage socially beneficial trading. Over time, regulatory agencies should develop procedures to address these issues in a less costly manner, perhaps through the development of a body of precedent cases to guide water traders and through the standardization of environmental impact reports.

Although water trades may increase overall efficiency within a market, there can be negative financial impacts on third parties in the area of origin through local loss of income and employment and through impacts on neighboring groundwater users. Trades are more likely to occur where impacts on third parties in the area of origin are minimal (perhaps because the water does not leave the watershed in which it originates) or where state law does not recognize them. Standard economic theory does not usually consider these third-party financial losses to be legitimate. However, many trades do provide some compensation to third parties, often to appease public opinion. This concern for third-party financial losses results from fundamental water property rights. In most of the west-

Table 1. Volume and volume-weighted prices for reported water transactions, 1999–2002.

	Volume (thousand acre-feet)				Price ($/acre-foot, in 2004 dollars)	
State	Lease	Sale	Total	Lease/sale ratio	Lease	Sale
AZ	1,371	24	1,395	53	73	894
CA	3,127	227	3,354	14	80	1,207
CO	74	242	316	0.3	22	3,451[a]
ID	692	1	693	692	10	201
KS	4	0.2	4.2	20	51	—
MT	5	—	5	—	5	—
NM	338	10	348	34	66	1,233
NV	—	49	49	—	—	2,572
OK	10	—	10	—	59	—
OR	532	38	570	14	283	1,045
TX	877	322	1,199	3	81	864
UT	6	3	9	2	6	870
WA	68	13	81	5	53	513
WY	105	—	105	—	40	—
Total	7,211	929	8,140	8	86	1,299

[a] CBT sales omitted. If included the average sale price is $7,801.
Source: Data from the Water Strategist. The authors acknowledge Adams, Crews and Cummings (Georgia State University) for generously providing us with their database of Water Strategist transactions; and Alex Lombardi for assistance.

ern states, the ultimate owner of the water is the state itself, which is bound to protect the welfare of its citizens.

Externalities and third-party damages are likely to become more important as a greater volume is traded. Thus, we expect that these pressures will induce a higher percentage of leases relative to permanent sales, as negatively affected parties exert political pressures in regulatory arenas to limit permanent transfers. Examination of columns four and five in Table 1 suggests that states where more volume is traded have a higher lease-to-sale ratio. This tension between the benefits to trading partners and the negative effects on third parties is likely to be the dominant influence on future trading patterns.

What Do Existing Water Markets Look Like?

We were unable to find public source of consistent data on western water trading, so we compiled a summary of trading from fourteen western states for 1999–2002 from back issues of the *Water Strategist.* Although the *Water Strategist* may not record all the trades in western water, it is the only comprehensive source of water trade information. If there is a selection bias in the reported trades, it should be consistent across states and thus not influence the comparisons. We classified the trades as *sales* and *leases*. In a permanent sale, the right to the water for all time is transferred. Lease transactions involve short-term trades of water; the underlying property right remains unaffected by the transaction. Table 1 shows that water leases dominate the market in terms of water volume traded. Permanent sales comprise approximately 10% and leases 90% of the volume traded, although it is important to remember that a permanent water rights sale only appears once, whereas a lease is often an annual contract that must be renewed each year to reflect the same quantity of water over the long term.

A majority of the trades reported in the *Water Strategist* are from agricultural sellers to urban buyers who are grappling with projected increases in demand. In Colorado and New Mexico, municipal agencies are purchasing permanent rights and leasing them back to the irrigators from whom they purchased in the first place until needed to meet anticipated future demand. The *Water Strategist* data suggest that water purchases for municipal and industrial use trade at higher prices than water for agricultural or environmental use.

Market purchases for environmental use have increased in recent

years. In California, for example, direct purchases such as those made by state and federal entities to comply with federal environmental regulations (primarily augmenting stream flow to enhance fish runs) accounted for one third of traded volume in 2001. By contrast, municipal buyers only accounted for about 20% of market activity (Hanak, 2002). This trend is repeated elsewhere in the West. In the Pacific Northwest, for example, water market development has been driven by the need to acquire water for environmental purposes (Smith, 1995).

The sale prices reported in the *Water Strategist* in Colorado, Nevada, and New Mexico over the survey period are markedly higher than in other states, probably reflecting the relative scarcity of the resource in these locations. Financial theory would suggest that the price of a right would exceed the capitalized value of a lease for two reasons. First, the purchase of a right eliminates the risk inherent in relying on future lease markets. Second, given the uncertainty of the value of future water rights, rational sellers would require a premium or hurdle rate in addition to the capitalized value of current leases to consummate the deal. A counterpoint to the risk argument is that leases are more likely to be concentrated in years of greater scarcity, whereas the return from the sale of a right should be averaged over all types of water year.

The lease-to-sale price ratios in Table 1 give us the implicit capitalization rate over an infinite planning horizon, which averages 6.6%. This is below the standard commercial capitalization rate of 10%, but it seems a reasonable rate given the risk reduction from permanent sales. It is also worth noting that high-volume states, such as Arizona and California, have rates close to 6.6%, whereas low-volume states exhibit tremendous variation in their implicit capitalization rates. The variation is likely due in part to thin markets with few buyers and sellers.

Permanent Sales, Leases, and Options

One striking aspect of the descriptive statistics provided in Table 1 is the dominance of leases in 12 of the 14 states. Permanent trading is only clearly dominant in the dry states of Nevada and Utah, where diversions and permanent trading have always been an integral part of settlement and development.

In the presence of supply uncertainty, many water agencies in the West seek to purchase water only in dry years when their own supplies are inadequate. This may explain trading behavior in Idaho, Oregon, and Washington, where most water transfers are leases for environmental and (to a lesser extent) agricultural use. Such leases may be in response to annual water year conditions. A water rights transfer would be an appropriate response to permanent shortage rather than the year-to-year supply uncertainty which often prevails. In short, leases are common because temporary transfers of one year or less face significantly fewer environmental regulations, the costs of defining rights sufficiently to sell them permanently are often prohibitive, and the presence of sufficient supply in wet years makes permanent transfers unnecessary and costly in many cases.

A specific type of leasing—the *option agreement*—is gaining currency in California. Under an option agreement, the purchaser pays an option cost in the fall before the winter precipitation for the right to purchase a specific quantity of water in the spring, should the water year turn out to be dry. By paying the option cost, the buyer manages supply risk by avoiding last-minute spring contract negotiations for water, which may no longer be available at a reasonable price. Buyers can further decrease transaction costs by negotiating long-run, multiple exercise options. The benefits of options are twofold.

First, the water remains in the basin of origin during average and wet water years, lowering third-party financial impacts and making it more likely that regulators will approve the transfers. Options undertaken due to the burdensome regulatory requirements of permanent transfers are second best from an economic efficiency perspective, but are preferable nonetheless to no trades at all. Second, given supply and demand circumstances in California, this is an efficient arrangement of property rights and uses. In California, a typical trade might be between small water rights holders in the North with low-value agricultural use and a large municipal water agency in the South with relatively high-value use. Because the municipal agency has a relatively high-value use but sufficient developed supplies during wet and normal years, the water is most efficiently allocated to the municipal user in dry years and the agricultural farmers in wet and normal years.

Who should own the water to best ensure efficient allocation between dry and wet years? If we assume for simplicity that the transaction costs are the same regardless of who owns the water, then the water right should remain with the low-value agricultural use, so that transaction costs are a lower proportion of the buyer's final sale price. If transaction costs vary depending on who

possesses the water right (small buyers may collectively face higher bargaining costs than a single large buyer), this further strengthens the case for low-value users to retain their water rights.

An option agreement negotiated in advance of the water year helps the municipal agency manage its supply uncertainty. If the difference in value between the buyer and sellers is larger than the transaction costs, the agricultural rights holders can be sufficiently compensated for this dry-year option contract. To the extent that western states will have to increase water trading to balance demands, and third-party pressures increase, we expect the proportion of option contracts to increase.

Water Markets in the Future

Markets as a mechanism for water allocation are gaining traction in the western United States. However, concern over environmental and economic externalities and third-party impacts in exporting regions will continue to be issues with which developing markets must contend. These institutional impediments to water transfers, combined with the uncertainty of water supply, will probably lead to a proportional increase in the number of lease transactions relative to permanent sales of water rights. In particular, the risk-sharing characteristics of option agreements correspond precisely to the need for flexibility in those instances where supply risk is shared by both parties or where it is possible to sell risk between parties.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

The Future of Wetlands Mitigation Banking

Leonard Shabman and Paul Scodari

Introduction

Concern over historic wetlands loss led to a national goal of no net loss (NNL) of wetlands acres and their environmental services. In support of the NNL goal, the US Army Corps of Engineers (Corps), under authority granted by Section 404 of the Clean Water Act, reviews permits to discharge fill material into wetlands. A permit review process called *sequencing* requires a permit applicant (permittee) to first demonstrate to a regulator that they have applied all practical means to avoid and minimize the filling in of wetlands areas as part of a development project. Then the NNL goal requires permittees to provide replacement wetlands—ecologically successful restoration of former or degraded wetlands or creation of new wetlands from uplands—to offset the adverse environmental effects of the permitted wetlands filling (see Shabman, Stephenson, & Shobe, 2002, for a discussion of offset programs in air and water pollution control programs).

When the replacement requirement was first established, permittees were expected to provide replacement wetlands (or wetlands "credits") that were similar to the types of wetlands filled ("in-kind"), and that were located on or adjacent to the area of the fill ("on-site"). However, over time, program evaluations consistently found that inferior wetlands restoration and creation practices often were employed by permittees who had little skill (or interest) in wetlands restoration. Even when state-of-the-art practices were applied, the on-site and in-kind requirement often prohibited long-term ecological success, especially for replacing lost habitat services (e.g., wetlands hydrology was compromised by surrounding development). Meanwhile, because limited agency resources for monitoring and enforcement had to be scattered among many small wetlands credit projects, the quality of the credits was not assured; in fact, some required credit projects were never undertaken. These problems motivated interest in new approaches—generally called "wetlands mitigation banking"—for securing ecologically viable credits. One approach to mitigation banking relies on third parties (neither the regulator nor the permittee) to produce wetlands credits that can be used as offsets. Third-party wetlands mitigation banking often has been cited as a successful application of market-like environmental policy. After reviewing the experience with wetlands mitigation banking, we will conclude with a comment on whether this regulatory innovation fits the definition of market-like environmental policy.

Mitigation Banking in Brief

The *single-user wetlands mitigation bank* leaves the responsibility for credit production with the permittee. Under this mitigation option, a large land developer or a state Department of Transportation that expected to receive multiple future permits develops one large credit project in advance of and located away from ("off-site") their anticipated fills. The credits, once certified by the Corps, are deposited into a "bank account" that is drawn upon as future fills are permitted. The off-site location and large size of these credit projects increases the chance of ecological success and allows the Corps to better target its limited monitoring and enforcement resources.

Cases where investment in a single-user wetlands bank was not an option because of the small size of wetlands fills (e.g., parts of an acre) or the infrequent nature for a user led to the development of *fee-based programs*. In a fee-based program, permittees pay a fee to a third party, certified by the Corps, who produces wetlands credits in one or more off-site locations. Once the fee is paid, the third-party provider accepts financial and legal responsibility for the success of the credits. In an in-lieu fee (ILF) program, wetlands credit production occurs when a new project is initiated, while in a cash donation program the fees are

What is a wetland? An area that is regularly saturated by surface water or groundwater and is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions (e.g., swamps, bogs, fens, marshes, and estuaries). However, not all wetlands are subject to regulation under section 404 (US EPA, "Terms of Environment," http://www.epa.gov/OCEPAterms. Photograph by Lynn Betts, courtesy of USDA-NRCS.)

used to expand an ongoing wetlands restoration project beyond its original scope. In either case, credit production does not begin until adequate funds are collected. Because fee-based providers are typically government agencies or nongovernmental conservation organizations that have the mission of wetlands restoration and creation, there is some confidence in the quality of the credits that will be produced. Nevertheless, fee-based programs have been criticized for inadequate credit production practices and for setting fees that either may not recover the costs of producing credits, or that may be so high that they discourage use of the program. Also, there is a temporal loss of wetlands acres and services while sufficient fees are being accumulated (see Scodari & Shabman, 2001, for a review of in-lieu fee programs).

Fee-based programs established a precedent for transferring legal and financial responsibility from permittees to third-party credit providers in return for cash payments. That precedent generated incentives for the development of *commercial wetlands mitigation banks* in which private entrepreneurs make investments in wetlands credit production and then earn a return on those investments by selling the resulting credits to permittees. In developing federal guidance for certification and use of commercial wetlands banks, regulators faced a tension between ensuring high-quality credits and the financial viability of commercial wetlands bankers. The former could be guaranteed by requiring wetlands credits to be produced and certified before they could be sold. However, it may take five or more years before ecological success can be fully judged, and a private investor typically cannot wait that long to begin accumulating returns. Thus, commercial wetlands banks were allowed to engage in limited "early" credit sales (i.e., before the credits have been certified as fully successful) in return for the posting of financial assurances that would be released when credit success was assured. This compromise facilitated the development and use of commercial wetlands mitigation banks that have produced high-quality credits and reduced time lags for securing offsets.

Regulatory Conditions and Commercial Mitigation Banking

Currently, commercial wetlands banks provide only a relatively small fraction, perhaps 10–20%, of all wetlands credits, and there are very few areas where robust credit markets have developed. This situation can be traced to the rules governing when wetlands permits are required and the separate certification rules for commercial wetlands banks that raise costs of credit production and create demand uncertainty.

First, consider investor costs. In addition to investment costs, there are considerable administrative costs to becoming certified as a commercial wetlands bank; the approval process may stretch over several years. These costs and time delays serve as barriers to entry and must be added to credit prices when a prospective banker does successfully navigate the certification process. These increased costs restrict supply of salable credits and at the same time reduce the quantity of credits likely to be demanded by permittees. (For a discussion of these and other regulatory conditions on credit prices, see Shabman, Scodari, & Stephenson, 1998.)

A number of factors work together to create significant credit demand uncertainty. There is market uncertainty about whether future land development in an area will intersect with wetlands and thus require fill permits. But even when permit demand can be predicted, the credit requirements that will be

placed on permittees—and the resulting demand for credits—is highly uncertain. In fact, regulatory factors are the greatest source of wetlands credit demand uncertainty. Perhaps most important, the sequencing process continues to give regulatory preference for on-site credits. Only after regulators have determined that on-site credit production is impractical or environmentally undesirable can credits from a third-party credit provider be used as wetlands credits. Then, commercial wetlands banks often must compete with ILF and cash donation programs that do not have equivalent regulatory approval or upfront investment costs. For example, ILF and cash donation programs are not typically required to post financial assurances and do not need to reflect the opportunity cost of capital in credit fees, because they accumulate funds before they undertake credit production. The result is that permittees will favor fee-based credit options over commercial wetlands banks when those alternatives are available. Finally, uncertainty about the future of the regulatory program contributes to credit demand uncertainty. For more than 30 years, administrative and court decisions have rearranged the basic structure of the federal permit program. These changes include matters as basic as what constitutes wetlands, what constitutes fill, and what types of fills are significant enough to warrant sequencing review. These shifting regulatory principles create uncertainty about future permit demand as well as the kinds of credits that may be required or allowed as offsets.

Nonetheless, some commercial wetlands credit production has occurred in many areas of the county since the mid-1990s, indicating that the private sector will provide upfront capital for wetlands credit production if there is an opportunity to profit from such investments. Explicit or tacit understandings with prospective permittees and regulators have offered reasonable assurances that there would be a demand for some of the credits produced, and the allowance for early credit sales (with financial assurances) has helped to ensure a competitive return on investments. It is in such situations that commercial wetlands banks have developed. But, as noted, the amount of credits now supplied by commercial wetlands banks is small relative to other mitigation options, and there are very few areas with multiple commercial wetlands banks competing for business. Moreover, commercial wetlands banks must set credit prices to recover not only the costs of credit production but also the costs of gaining bank certification and the risk costs associated with future demand uncertainty. As a result, the credit prices charged by commercial wetlands banks may exceed what many permittees are able to pay.

A New Form of Mitigation Banking

The private sector has demonstrated the capacity to provide quality-assured wetlands credits, in advance of fill impacts, for use as offsets. To tap this potential of the private sector and to assure that credit prices paid by permittees reflect the full cost of credit production, a new form of mitigation banking is being discussed and developed. Called a *credit resale program*, the approach is now in the early stages of application in the North Carolina Ecosystem Enhancement Program (NCEEP). For a further description of the NCEEP, see Shabman and Scodari (2004).

Three interrelated components characterize a wetlands credit resale program. First, funds to capitalize the program are provided to a government agency that has the mission of securing wetlands credits for permitted fills. Second, that agency uses some of the funding for planning to predict the near-term wetlands credit needs of permittees by type and location. Third, the mitigation agency is given the authority to act as both a purchaser and reseller of credits. In that role, the agency uses a competitive bidding (Request for Proposal or RFP) process to build an inventory of quality-certified credits from private sector suppliers. The bidding process can encourage vigorous competition among wetlands credit providers on both quality and price. The winning bidders immediately begin credit production and are paid by the agency on a defined schedule tied to credit development milestones, the posting of financial assurances, and the attainment of performance criteria. The RFP stipulates credit certification requirements, and the defined payment schedule eliminates credit demand uncertainty, for the winning bidders. The agency then resells the wetlands credits it has purchased to future fill permittees at prices that recover the full costs of securing the credits. As the credit inventory is depleted, new RFPs are issued. If properly designed and administered, this approach can secure the supply, quality, and price advantages of a competitive market for wetlands credits (numerous credit sellers competing for the business of permittees).

Experience to date with the NCEEP wetlands credit resale program suggests two design considerations for helping such a program work as envisioned. First, the RFP application process can be costly, although not as costly as the process

A wetland restoration project at the Phalen Corridor Initiative in St. Paul, Minnesota, 1996-2001. (1996 and 1997 photographs by Phalen Corridor Initiative (http://www.phalencorridor.org). 2001 photograph by Jessie Deegan.)

for getting certified as a commercial wetlands bank. Over time, qualified credit suppliers will need to be the winning bidders on some number of RFPs, or they will not be able to remain in the credit provision business. Thus, the credit resale program will need to issue a significant number of RFPs and then spread the work in some fashion among qualified bidders. However, there will not be enough permitted wetlands fills in one place to assure this result. Extending the program to providing other forms of mitigation credits (e.g., stream restoration, nutrient reduction, etc.) required by different pollution control programs could add to the number of RFPs issued in any year. Also, expanding the wetlands credit resale program concept regionally and across the nation could increase the likelihood that multiple credit providers would be able to prosper.

Second, wetlands offset requirements, and the resulting RFPs for wetlands credits, should be defined in terms of categories of wetlands services (that include hydrology, water quality, and habitat) rather than in terms of the wetlands asset (i.e., wetlands area and aggregate services). The water quality and hydrologic services of wetlands are watershed-location dependent, and if lost to a permitted fill, often must be replaced on or nearby the fill site. However, the values of wetlands habitat services to people and wildlife are less site-dependent, and since wetlands habitat services that are replaced on-site can often be compromised by surrounding development, these services are better secured at off-site locations. In the current wetlands mitigation program, a continuing tension over which services to favor has led to the requirement that wetlands credits be located in the same (usually small) watershed area as the fill permits. However, limiting the location of credits to small watersheds has led to thin markets in wetlands commercial banking (often only one certified bank in many areas). A similar problem would confront a credit resale program in which the RFP process was focused on a very limited geographic area, because this would constrain the possible sites in a watershed where land is suited for a winning

wetlands project. As the availability of suitable lands for credit production becomes more limited, it is less likely that competition for credit contracts can be fostered. If offset requirements were stated in terms of wetlands services rather than for the wetlands asset, then a credit resale program could issue RFPs for wetlands habitat services at larger ecoregion scales. This would increase the pool of land parcels that would be suitable sites for credit production, thus making for more robust competition for credit supply contracts.

If the wetlands credit resale approach was used to secure offsets for only the habitat services lost to permitted fills, regulators would still need to secure offsets for any lost hydrologic and water quality services. In determining any needed offsets for site-dependent hydrologic and water quality services, regulators would appropriately consider whether nonwetlands alternatives required by other regulatory programs could provide the necessary offsets. Site design changes (e.g., low-impact development), stormwater ponds, pervious pavement, riparian buffers, and a host of other methods can be substitutes for the water quality and hydrologic services of wetlands and can be implemented on or near the sites of permitted fills. A variety of local and state regulatory programs currently require actions to mitigate for the hydrologic and water-quality effects of land development. Recognition of nonwetlands programs would require wetlands regulators to coordinate with the relevant nonwetlands programs. The responsibility for assuring this coordination could fall to the mitigation agency charged as the credit reseller. (See Scodari & Shabman, 2001, for further discussion of the logic of this approach.)

Discussion

Commercial wetlands mitigation banking and ILF programs are often cited as examples of market-like environmental policy. The reasons for this perception are understandable. A discharger releases a pollutant (fill) into the environment (wetlands) and in turn must pay a price (credit fee) to make that discharge. This appears to be an application of the market-like concept of an effluent discharge fee. Or the permittee must bear the cost of securing an offsetting credit (a manufactured wetland) from another entity, so the NNL goal is met if they make a discharge. This appears to be an application of market-like concepts of cap and trade.

However, the reality does not match the perception. Wetlands mitigation requirements and mitigation credit options are not examples of market-like programs. The polluters (permittees) do pay when they make a discharge, but the discharger does not have discretion on when it is in their interest to avoid the wetlands and when it is in their interest to pay the fee (bear the cost of an offset) and make the discharge. Regulators require permit applicants to do everything the regulator deems practical to avoid wetlands impacts, and regulators determine what kind of offsets will be required and where they can be located. In this regard, the wetlands offset program is like any other offset program. Regulatory reviews drive the permittee towards zero discharge, and then require offsets for the discharges that remain. Wetlands offset requirements are thus best understood as a permit condition tied to a traditional command and control regulatory program.

As with other offset programs, regulators need to have offsets available in a timely fashion and in sufficient quality and quantity to meet the environmental goal—in this case, NNL of wetlands. It was in seeking to meet these needs that the wetlands mitigation program has experimented with different forms of wetlands mitigation banking—some of which have been understood as drawing on the logic of markets. Certainly encouraging private investors to compete for the right to sell wetlands credits is an application of a market-like idea. In the case of commercial wetlands banking, there is a perception that credit prices are being set by a competitive buying and selling. They are not. And it might seem logical that ILF rates are tied to a market price from a competitive credit sales program. They are not.

The wetlands credit resale program is an emerging idea that can use competitive bidding to meet the particular challenge of securing offsets for the wetlands regulatory program. However, unless permittees make the choice about when it is best to avoid making the discharge and when it is best to make the discharge and buy wetlands credits, the wetlands regulatory program should not be viewed as an application of market-like environmental policy. This observation is not offered as a recommendation to change the current practice of wetlands permitting. It is only offered to make the point that applications of market-like environmental policy are rare; at times, what appears to be a market-like policy may not be that at all. That said, as the wetlands credit resale idea suggests, the benefits of competition—certainly an idea derived from the logic for markets—still has much to contribute to the design of wetlands mitigation programs.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Crunch Time for Water Quality Trading

Dennis M. King

Economists have been promoting water quality (WQ) trading for decades. Over the past few years, many political leaders and upper-level government officials have been joining them. Money has even started to flow from Washington to local trading organizations to help make WQ trading work. However, enthusiasm about WQ trading is based mostly on conceptual arguments about its potential to generate cost savings and ideological arguments about the superiority of market-based solutions over conventional regulatory programs. Experiences with actual WQ trading programs have been discouraging. Under current regulatory conditions, there is simply not enough supply or demand to support WQ trading. The critical question now is whether the regulatory conditions that are inhibiting trading will change any time soon.

According to a recent EPA-funded review, the number of WQ trading initiatives in the United States during 2004 was more than 70 (Breetz et al., 2004), which is up from around 25 just a few years earlier (Environomics, 1999; King & Kuch, 2003) However, this recent review, like previous ones, showed that WQ trading programs are frozen at an awkward pretrading stage of development—plenty of new guidelines, regional trading institutions, and computer simulations of trading, and even some well-developed WQ trading software and websites, but very little actual trading taking place. Most importantly, point/nonpoint[1] trading involving agriculture—the type that will be needed for WQ trading to have a significant impact in many watersheds and the type of trading that will be addressed in this article—has not materialized at all.

Advocates of WQ trading are putting their hopes on the anticipated establishment over the next few years of *Total Maximum Daily Loads* (TMDLs) for individual water bodies. These are a kind of total pollution budget that could be divided among pollution dischargers as individual discharge allowances that could be made tradable. The Clean Water Act of 1972 required each state to develop and implement TMDLs by 1979, but they are only now being developed in most parts of the country. Eventually, TMDLs may provide the market driver that is needed to make WQ trading work. (See Boyd, 2000.) However, establishing TMDLs will merely be the first of many steps that will all need to be taken quickly if WQ trading is to be given a fair chance to succeed. State and local WQ regulators, under increasing pressure to do something soon about growing WQ problems, are beginning to turn to familiar command-and-control methods and subsidy programs that often preclude the possibility of ever having meaningful WQ trading.

The three questions that even diehard trading advocates are beginning to ask are: Why are there so few WQ trading success stories? Why aren't the point and nonpoint sources who are supposed to benefit from WQ trading more supportive? What can be done to improve the situation?

Reviews of regional WQ trading programs reveal the most often cited problems inhibiting regional WQ trading, such as inadequate trading institutions, unclear scoring criteria, and high transactions costs of performing trades, are being overcome in most places (King & Kuch, 2003). What is preventing WQ trading is a simple absence of willing buyers and sellers. Under existing regulatory conditions, the supply and demand curves in fledgling WQ markets barely exist and certainly don't cross at any positive price. Moreover, those attempting to make regional WQ work are usually not in positions to change the situation. Tighter federal and/or state limits on individual dischargers will be required before there will be any commodities (rights) to trade in WQ markets; aggressive enforcement of those limits will then be needed to bolster supply and demand.

1. *Point sources discharge pollution from a single place, such as a pipeline outflow. Nonpoint sources discharge pollution from many places, such as along the edge of a farm or housing development.*

New Water Quality Trading Guidance

In November 2004, the Environmental Protection Agency (EPA) published a *Water Quality Trading Assessment Handbook* (EPA, 2004) to help regional organizations establish "the necessary conditions for successful WQ trading." This national guidance is very general and focuses on tasks such as developing trading institutions, measuring the equivalency of pollution discharges, establishing rules of exchange, setting baselines, assigning liability, and so on. Most of these tasks may be necessary for successful WQ trading. However, none of them will provide the buyers and sellers that are really needed for WQ trading programs to succeed. In fact, managers of the existing regional WQ trading programs that have been failing to produce trades have already completed most of the tasks recommended in these new EPA guidelines. What are needed beyond what is outlined in the EPA guidance are steps that will change the incentives and disincentives facing prospective buyers and sellers in ways that will make them want to trade.

Time Pressure

Developments in the Chesapeake Bay region, especially in the State of Maryland, illustrate why these steps need to take place soon, before WQ trading becomes impossible. More than three years of work by a partnership of state/federal resource agencies and stakeholders culminated in 2003 with a set of guidelines to support watershed-based WQ trading. At that time, it was generally assumed that TMDLs were just around the corner and that once trading guidelines were adopted, trading would take place with wastewater treatment facilities (point sources) that have relatively high discharge treatment costs purchasing WQ "allowances" from agricultural interests (nonpoint sources) with relatively low discharge reduction costs.

In early 2004, however, Maryland's governor and state legislature responded to public pressure to do something about WQ by establishing an innovative $2.50 per month "flush tax" on water and sewer users (mostly urban dwellers) to create a fund to subsidize the installation of state-of-the-art discharge treatment technologies at the state's wastewater facilities. A similar tax was levied on households on wells and septic systems (mostly rural dwellers) to subsidize the planting of agricultural cover crops and other agricultural "best management practices." Of course, the flush tax all but eliminated the expected demand for WQ credits by wastewater facilities; and the subsidization of agricultural practices all but eliminated the expected supply of low-cost agricultural WQ credits. With the stroke of the governor's pen, prospects for WQ trading any time soon in Maryland evaporated.

Beyond the ABCs of WQ Trading

In principle, establishing an emission trading program is a simple three-step process involving: (a) establishing an overall cap on pollution discharges, (b) allocating portions of the cap as allowances to individual discharge sources, and (c) allowing each source to meet its allowance by reducing its discharge or by purchasing credits from other sources that reduce their discharges below their allowances. As long as there are differences in discharge reduction costs, sources with high costs of meeting their allowances will purchase credits from sources with low costs, and a market will be born. This is the process that established the highly acclaimed and apparently successful air emission trading programs that helped reduce SO_2 emission (acid rain) problems (see Stavins, this issue).

However, the land and water use decisions by nonpoint sources that cause local water quality problems are very different than the point source smokestacks that cause regional air pollution problems. Most water emissions are difficult to measure, change with the weather, have different impacts depending on where they occur, and are the results of ever-changing locally made and locally regulated decisions. This is a complicated problem to attempt to address with trading. In fact, two areas of recent economic research suggest that in this type of situation a great deal of political and regulatory reform may be necessary to interest anyone in trading.

The first area of economic research won two economists—Finn Kydland of Carnegie Mellon University and Edward Prescott of Arizona State University—the 2004 Nobel Prize in economics. Kydland and Prescott (1977) explained why and how people "game" regulatory programs; that is, why and how they strategize to evade regulations and employ legal and political maneuvering to avoid, delay, and reduce penalties for violating regulations they cannot avoid. The second involves work in what might be called "environmental enforcement economics." This area of research also addresses how people "game" regulatory programs, but focuses specifically on that little benefit/cost calculation that each regulated entity performs to determine whether or not to comply with a regulation.

Market-based solutions to WQ problems, despite considerable rheto-

ric to the contrary, are not substitutes for regulatory solutions; they rely on and complement regulations. It is well known, for example, that the acid rain trading program succeeded because precise individual SO_2 discharge limits were established and strictly enforced with 100% monitoring and severe financial penalties for violators (see Stavins, this issue). For now, at least, most nonpoint water pollution dischargers are either unregulated or do not expect that violating regulations will be detected or will be very costly. As a result, they have little incentive to get involved in allowance trading. Many of them are also aware that accepting the notion that tradable discharge allowances (i.e., "pollution rights") can be neatly defined and assigned to individual entities could undermine their long-term political and legal strategies for fending off regulations. Asserting that they have a credible basis for earning money by selling WQ credits now, in other words, means that others will have a credible basis for justifying future restrictions on their emissions that could result in significant long-term costs later.

Based on the above-mentioned economic research, what is being observed in WQ trading programs, in other words, is exactly what should be expected. In the face of weak, rarely enforced emission discharge restrictions and penalties for noncompliance that are small and easily avoided, few dischargers are interested in buying WQ credits. Where there is no demand for WQ credits, there is no incentive for anyone to try to supply credits. This is a fairly simple conclusion, but it implies that strategies to improve point/nonpoint WQ trading should focus on demand-side and supply-side issues, rather than the institutional and technical issues that occupy the time of most WQ trading experts.

Demand-Side Issues

To appreciate what needs to be done to stimulate demand, it is useful to abandon the standard economist's operating assumption that a potential buyer's willingness to pay for a WQ credit is based on that entity's marginal cost of complying with nutrient discharge restrictions (e.g., dollars per pound of nutrient discharge reduction). Instead, assume that the correct measure of an entity's willingness to pay for a credit is the expected cost of *not* complying with a government-imposed discharge restriction. If the expected cost of not complying is lower than the cost of complying by purchasing credits, there is no economic incentive to purchase credits.

Virtually everywhere that WQ trading is being attempted, laws limiting nutrient discharges (on nonpoint sources at least) are weak, rarely enforced, and involve such low penalties that the expected cost of noncompliance is near zero. The corresponding willingness to pay for nutrient discharge credits, therefore, is also near zero. There is no "natural" demand in regulation-driven markets; demand always depends on what regulations are in place and how they are enforced.

The two 2004 Nobel-winning economists examined the deterrent effects of regulations in considerable detail and pointed out the impact of what they labeled "time inconsistency problems" with many regulatory programs. In case after case involving financial and real estate markets, flood insurance markets, and environmental compliance, they showed that people, acting alone and in groups, significantly discounted the expected cost (penalty) of not complying with a regulation if they believed that it would not be implemented consistently over time and could be influenced later. Kydland and Prescott's work demonstrated that people tend to believe that if government yields to one kind of political pressure to pass laws restricting their polluting behavior now, they can be expected to yield to other political pressure later that will prevent the enforcement of those laws or the imposition of meaningful penalties.

Their research showed that the success or failure of regulatory systems (market based or otherwise) depends overwhelmingly on bottom-up microeconomic decisions regarding opportunities to game those systems, and far less on macroeconomic governmental decisions about how those systems are supposed to work.

Based on this research, it seems that bolstering the demand side of WQ markets will require mustering the political will to establish a credible system for enforcing individual allowances, and imposing meaningful penalties for exceeding them.

Supply-Side Issues

The gaming model (as opposed to the marginal cost model) also explains what is inhibiting the supply side of regional WQ trading markets. In watersheds where agricultural sources are significant, it is usually assumed that they will be the primary suppliers of WQ credits. However, the willingness of farmers to supply WQ credits depends in critical ways on how it might affect their ability to continue receiving agricultural subsidies and green payments and to fend off future environmental regulations. The main problems farmers face here (although they do not refer to them in these terms) are what in environmental trading circles have become known as *baseline/additionality* issues.

To protect the integrity of trading programs, trading guidelines nearly always prohibit farmers from selling credits for undertaking land use/land management changes that are legally required (e.g., by state regulation) or for which the farmer has already been paid (e.g., green payments). Setting the baseline for credits in this way reduces the ability of farmers in most watersheds to supply low-cost WQ credits. However, it has other impacts on farmers as well. It means producing WQ credits by implementing management practices that go beyond what they are already required to do will require farmers to somehow validate that these practices do, in fact, reduce discharge levels. The need to establish a baseline and show additionality poses two problems for farmers who are considering supplying WQ credits.

First, it requires that someone examine and document what farmers are already doing to meet their legal requirements in order to establish the baseline for measuring marketable WQ credits. Most farmers, for obvious reasons, are not interested in having government representatives or their agents examining, thinking, and talking about the legality of their on-farm land use/land management practices or their justification for green payments.

Second, farmers know that their discharges are not regulated as much as discharges from most other sources because, presumably, farm discharges are too difficult to control or measure, too dependent on the weather, too expensive for farmers to manage, and so on. Selling credits requires farmers to provide evidence to validate that, in fact, they can reduce their discharges and document the results. Many analysts have addressed validation requirements in terms of their potential to increase transaction costs associated with completing market trades and the likelihood that these higher costs could drive a wedge between buyers and sellers. However, a more important problem may be that if farmers show that they can validate the creditworthiness of their on-farm activities, it is bound to call into question whether they should be regulated any differently than other dischargers.

There are also other disincentives facing farmers. The price farmers will accept for WQ credits reveals their discharge control costs and shows the world that they are most certainly lower than the discharge control costs of those buying credits. This focuses attention on what many already believe are inequities in the way discharges are regulated and, perhaps, in the way allocations of discharge allowances are made to farmers and others. It also provides evidence that a better long-term cost-saving strategy for dealing with WQ problems might be to tighten restrictions on farmers with low treatment costs and relax them on other dischargers who have higher marginal treatment costs.

The sources of these disincentives on the supply side of WQ trading are similar to those on the demand side. Weak, vague, and largely unenforced discharge restrictions inhibit potential suppliers from engaging in trading, just as they inhibit potential buyers. However, the strategies that farmers can and will use to game market-based environmental programs are intertwined with their strategies for gaming other government programs, so supply-side problems appear to be more complex.

The Immediate Challenge

Careful observers of emerging WQ trading understand that this type of market-based solution is not an alternative to WQ regulations. However, this is still not fully understood by many political leaders and agency heads. One immediate challenge, therefore, is to convince those who are using the promise of market-based environmental solutions as a justification for relaxing regulations that this strategy cannot succeed. Another immediate challenge is to convince those who are introducing new WQ initiatives, such as mandatory engineering or discharge standards, that their decisions may make it impossible to have WQ trading or to realize potential cost savings from WQ trading. At the same time, it would be useful for those involved in developing regional WQ trading to perform what might be called a "WQ enforcement audit" in their region to determine how much political and regulatory reform will be needed to stimulate supply and demand and make WQ trading work.

The fact remains, however, that the regulatory context that provides the incentives and disincentives for buyers and sellers to participate in regional WQ trading is usually not within the control of the people who are attempting to make regional WQ trading work. One useful strategy, therefore, is for those people (and all the rest of us who want WQ trading to have a chance to live up to its potential) to work together to influence state and federal agencies and elected officials who set the legal and regulatory context for WQ trading. Such an initiative could focus on the following five tasks:

- Make sure the new EPA guidance is followed when establishing a WQ trading program;
- discourage command-and-control regulatory programs that inhibit WQ trading;

- encourage binding discharge restrictions on point and nonpoint sources;
- encourage meaningful monitoring and enforcement of restrictions with stiff penalties; and
- determine gaming strategies that point and nonpoint sources will use to limit regulation and avoid penalties and encourage countervailing public policies.

If these tasks are undertaken soon, the potential of WQ trading might be realized. If not, WQ trading will probably wind up in the overflowing dustbin of well-intentioned economic policies that attracted attention for a while but never delivered.

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CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Are E-Grocers Serving the Right Markets?

Casie Berning, Stan Ernst, and Neal H. Hooker

Buying Food Online?

Prior to 2003, the biggest news in the E-grocery sector had been the dramatic implosion of high-profile operators. Silicon Valley and Wall Street saw "dot.bombs" in many sectors during the 1990s, but failings in the grocery business seemed magnified due to unique supply chain relationships and, most importantly, strong consumer expectations about product and service quality that do not disappear when customers move online. Online grocers like Webvan were among the myriad of startups that failed to balance true market potential with their investment in technology and business strategy. Some firms simply subsidized online operations as long as they could as an "experiment" before giving up; reasons for these failures ranged from market selection problems to corporate culture and commitment. Others simply tried to run before they had crawled. Some thought that new technology offset the need for strategic ways of dealing with known consumer expectations and industry practices—and failed accordingly. The exit of Publix Supermarkets from the E-grocery arena illustrated risks from trying to build such an enterprise in areas with limited online subscribers or consumer suspicion of online purchasing. Despite these early stumbles, the E-grocery market rebounded and has grown dramatically since 2003. New entrants—many of them traditional grocery retailers venturing into E-commerce—are offering more products and services to broader geographic areas. The question we address here is whether surviving E-grocers are entering the right markets—ones containing enough of the kinds of customers inclined to use this service and generate profits—and what a right market looks like.

Consistent estimates of current market size and projected growth in the E-grocery industry are elusive targets. In 2002, sales for online food, beverages, and groceries were estimated to range between $4.25 billion (Keenan Vision) to $6.4 billion (Yankee Group). Forrester Research called 2002 online grocery sales at $5 billion. A more recent estimate by Jupiter Research predicts that online grocery sales will hit $2.4 billion in 2004, or 0.4% of the total grocery market of $570 billion. By 2008, the estimate grows to $6.5 billion, just 1% of the total forecasted market of $641 billion, but showing an annual growth rate of 42%. Clearly this sector continues to grow:

- Safeway.com doubled its business in two years (2001–2003) and expected it to double again in 2004.
- Ahold-owned Peapod reports that it has 150,000 active customers in its system, which includes Chicago and parts of the East Coast. By 2006, Peapod expects to nearly double its reach to areas serving 14 million potential households.
- In 2004, New York-based pure play Fresh Direct had 100,000 active customers—four times the number of just a year earlier.

What is an E-grocer?

E-grocers use the Internet to sell perishable and nonperishable grocery items. Products are ordered online for delivery or pick-up. E-grocers are divided into two categories: *Bricks & clicks* are traditional grocers that also offer Internet-based ordering; *Pure plays* organizations lack traditional grocery stores.

What are the Right Markets for E-Grocers?

A major factor in determining the future viability of the E-grocery sector is understanding whether these retailers are entering and servicing the right markets. Based on a comprehensive literature review and our research group's previous firm, manager, and consumer research, the characteristics of an "ideal" E-grocery consumer can be identified (see papers and presentations at http://aede.osu.edu/programs/e-agbiz). Age, gender, household income, household size, and level of education are key indicators of willingness to buy food online. Factors such as computer literacy and access, time pressure, and focus on convenience also play a role. The question becomes

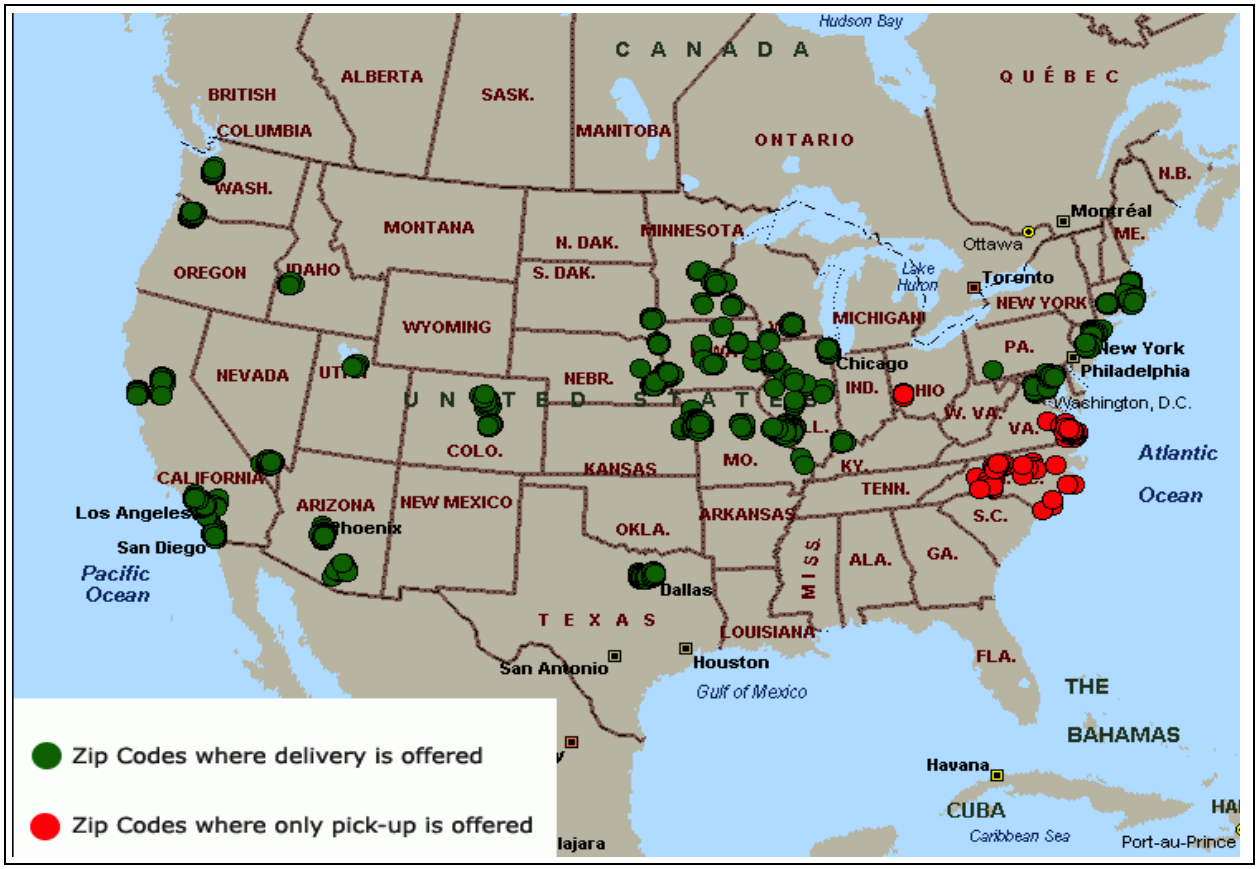

Figure 1. Zip-code-level distribution of E-grocery service—September 2004.

whether sufficient densities of customers with ideal characteristics show up in the markets in which E-grocers operate. Information we gathered from E-grocery managers in 2001 and 2004 indicated they generally recognize the value of these variables but were inconclusive on the role they played in selecting markets to enter. Marketing managers of grocers who were less active online appear to discount the importance of time/convenience and focus more on household income as a potential indicator of online grocery acceptance.

Are E-Grocers Targeting Ideal Consumers?

To explore the proportion of ideal E-grocery consumers in markets currently serviced by firms, we first obtained a list of 2003's top 75 grocery stores (based on sales) and identified their subsidiaries, creating a list of 143 different grocery chains. To this list we added all full-service pure-play E-grocers identified in our previous research. Each grocer's website was visited to determine whether they had full-service E-grocery operations. Of the 143 firms, 23 operations offered delivery and/or pick-up of both perishable and nonperishable items (see Table 1). These firms operate in 26 states and the District of Columbia, with most in large cities such as Los Angeles, New York, Detroit, and Salt Lake City. Seventeen are bricks-and-clicks and six are pure plays. Some offer delivery within 30–40 minutes of placing an order; others offer next-day delivery in a temperature-cooled tote.

Ideal E-grocery consumers are:

- women, aged 35 to 44;
- college educated;
- in households with income greater than $50,000;
- more likely to have children; and
- looking for convenience and therefore less price sensitive.

Service areas for these E-grocers were determined at a zip code level from their websites, creating a database of 1,371 distinct areas out of the more than 29,000 zip codes nationally. Using a commercial zip code-level database (Microsoft MapPoint), a socioeconomic analysis was completed for each market currently serviced by one or more E-grocer (Figure 1). This analysis considered key demographic measures: age, gender, household income, level of education, and size of household. Other characteristics, such as number of households with Internet access,

Table 1. Number of zip codes serviced by individual E-grocers by type and state—September 2004.

	Zip codes serviced	States serviced
Bricks & clicks—delivery[a]		
Stop & Shop (Ahold)	80	CT, MA, NY, RI
Giant (Ahold)	21	D.C.
Safeway	16	CA
Vons/Pavilions (Safeway)	178	CA, NV
King Soopers (Kroger)	55	CO
Albertsons	383	WA, OR, ID, NV, TX, CA
Acme (Albertsons)	54	PA
Hy-Vee	226	IL, MO, KS, NE, IA, SD, MN
D'Agostino's	31	NY
Schnucks	162	IL, MO
Bashas	55	AZ
Bricks & clicks—pick-up[a]		
Lowes	33	NC, SC
Sentryonthego	18	WI
Norkus	14	NJ
Santoni's	27	MD
Dorothy Lane Markets	3	OH
FarmFreshMarkets	28	VA
Pure play[b]		
Peapod (Ahold)	41	IL
YourGrocer	47	NY
Fresh Direct	58	NY
Whyrunout	57	CA
Xpress Grocer	38	NY
Simon Delivers	55	MN

[a] "Bricks & clicks/delivery" refers to traditional grocery stores offering E-commerce and delivery or pickup at the store.
[b] "Pure play" firms have no traditional store front.

adults with a credit card, average commute time to work (a proxy for "time-starved" consumers), and the average amount that households spend on food, were also assessed. These data are key to determining whether E-grocers are currently serving markets with a large proportion of ideal consumers.

What We See...

Initial analysis of our work suggests that households in areas serviced by E-grocers have the financial and technical means, tools, and time-starved incentives to purchase groceries online. There also appears to be a critical mass of optimal consumers for E-grocers to target within these zip codes, because they contain three times more people and households than the national average. Household incomes in these zip codes are $10,000 greater than the national average, and households spend about $1,000 more per year on groceries than average. These households have three times more 25- to 44-year-olds and teenagers, indicating a significant likelihood of both higher spending on food and time constraints on routine household activities such as grocery shopping. Gender does not appear to play a role, separate of the fact that E-grocery service is offered in high-population areas having more of both women and men. Zip codes currently targeted by E-grocers have households that are three times more likely to have credit cards and to adopt E-commerce more generally—other leading indicators of market potential. A final indicator of the importance of convenience is that wage earners in zip codes targeted by E-grocers are three times more likely than average to commute 45 minutes or more. These findings indicate that, to some extent, existing E-grocers seem to be targeting the correct geographic areas. What is less clear to us, and yet to be clarified by research, is whether these geographic selections are truly intentional or merely ones of convenience. Given the nature in which this industry has emerged, there is evidence to suspect both scenarios.

Questions remain as to the future adoption rate of online grocery shopping by consumers. After four years of research and observation in this area, we can be reasonably confident that although analysis typical in location decisions for traditional grocery stores may have some value in deciding where to offer online sales of groceries, other variables are potentially more important. Convenience and consumer comfort with the technology are logical considerations. These factors are more likely to drive the proportion of households that adopt within a service area than to indicate which new zip codes are optimal for growth. Time-starved consumers, or those facing other constraints on their ability to shop traditionally, are primary drivers of expansion in this sector. As internet and E-commerce adoption continue to grow, it remains to be seen how much advantage is gained by targeting the right geographic regions suggested by our research and when such service will become sufficiently efficient and accepted to be seen as a mass market practice making the selection of individual geographic markets less important.

Casie Berning is a former undergraduate student; Stan Ernst is an outreach program manager; and Neal H. Hooker is an assistant professor. This work is part of a broader longitudinal study of online food retailing (see http://aede.osu.edu/programs/e-agbiz).

CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

The Farmapine Model: A Cooperative Marketing Strategy and a Market-Based Development Approach in Sub-Saharan Africa

Godfred Yeboah

Developing countries, especially those in Sub-Saharan Africa, rely on a few primary commodities and minerals as their main sources of revenue and foreign exchange. Ghana, a typical developing country, has relied on cocoa, gold, and timber, which together have accounted for more than 70% of export earnings. There was an urgent need to diversify Ghana's export base following the persistent decline in the prices of cocoa and gold in the 1980s and 1990s. Efforts to diversify the export base resulted in the promotion of wood, aluminum, marine products, and horticultural products—referred to as nontraditional exports (NTE)—along with tourism (ISSER, 2002).

Horticultural products in general and pineapples in particular have received a lot of support from the World Bank and the United States Agency for International Development (USAID; Boselie & Muller, 2002). The diversification efforts paid off, and pineapple has since become the most important agricultural NTE. Pineapple exports have increased from 2,600 metric tons in 1986 to more than 42,000 metric tons in 2002, earning the nation over $47 million (FAO, 2004). In addition, pineapple production has provided employment and income in the pineapple growing regions. However, the current industry structure and organization makes it very difficult to realize the full potential of the industry.

The main focus of this paper is to examine a marketing arrangement in Ghana—the Farmapine model—that has the potential of changing the industry structure and offering a means of realizing some of the potentials in the industry. Specifically, this paper examines the institutional arrangement behind the establishment of Farmapine and the inherent efficiencies in the model over existing arrangements. Secondly, this paper seeks to identify and discuss factors that will impact replication of the model by other producer groups in Ghana and other developing countries. To achieve the objectives of this study, 60 small-scale pineapple producers were surveyed, and information on their production and marketing activities was collected via questionnaires. Thirty of the small-scale producers were selected from the 172-member Farmapine cooperatives. The remaining thirty were selected from among the hundreds of noncooperative small-scale producers. In addition, twelve exporters were surveyed for information on their export and marketing activities. The twelve exporters were selected from the 16-member Sea-Freight Pineapple Exporters of Ghana (SPEG), an umbrella organization for exporters. This organization is responsible for over 90% of all pineapple exports from Ghana.

Pineapple Industry in Ghana

The pineapple industry in Ghana is composed of producers and exporters. There are three categories of producers: large, medium, and small-scale. Large-scale producers are producers with more than 100 acres of pineapple under active cultivation. Medium-scale producers have 50–100 acres under cultivation. Small-scale producers (also known as *outgrowers*) have less than 50 acres under cultivation. The majority, however, have less than ten acres under cultivation. Most of the large-scale and some of the medium-scale producers also operate as pineapple exporters, exporting their fruits mainly to Europe. Exporters buy approximately 40% of their export requirements from outgrowers

under various arrangements. These arrangements are seldom characterized by formal contracts. An exporter may provide assistance—often in the form of chemicals, planting materials, or even cash advances—to an outgrower with the understanding that the outgrower sells his produce to the exporter. In most cases, outgrowers receive no assistance from the exporter. Exporters usually approach outgrowers when they need fruits to meet an export order, whereas outgrowers only contact exporters when their fruits mature.

Most of the producer/exporters usually try to produce the bulk of exportable fruits from their own farms, taking on all the production and marketing risks. This requires huge investments in land and equipment. They also face severe credit constraints, as they find it very difficult getting approved for loans (Obeng, 1994). The result is that they end up not being able to produce all the fruits needed for export. Thus, exporters are forced to rely on outgrowers. However, in the absence of formal contracts, outgrowers can be unreliable, often reneging on prior agreements and selling to other exporters offering higher prices. This scenario makes it difficult for exporters to enter into long-term contracts with their European importers. In addition, the quality of outgrowers' fruits cannot always be guaranteed, as exporters have no knowledge of the agronomic and cultural practices to which the fruits are subjected.

Outgrowers, on the other hand, also take all the production and marketing risks in their operations. During periods of high demand that occur during the winter months, outgrowers are assured of a ready market for their produce. At these times, exporters try to outbid each other for the outgrowers' fruits. However, when European domestic fruits become available in summer (especially June and July), outgrowers find it very difficult to sell their fruits (Obeng, 1994). During such times, some exporters would not honor prior agreements made to buy fruits from outgrowers. In some cases, exporters abscond after taking delivery of fruits. Outgrowers also have had to contend with delayed payments—sometimes as late as six months after fruits have been delivered. Given the above arrangements, neither the exporters nor the outgrowers were satisfied.

The Farmapine Arrangement

The Farmapine cooperatives were formed as a result of the unsatisfactory arrangements between outgrowers and exporters. According to the cooperative members, the cooperatives were formed to enhance their ability to attract help in producing and marketing their produce. Technoserve, a US-based development agency, has been assisting the cooperative members to improve their production and management practices (Boselie & Muller, 2002). The cooperative members, however, were still constrained by the lack of a reliable market source and lack of access to credit. The prevailing industry structure, coupled with their small sizes, made them helpless in overcoming these constraints. Stanton (2000) has identified small sizes as the underlying factor in most of the challenges rural producers face, and suggests the formation of cooperatives as one way of overcoming this problem.

In 1999, the World Bank, under its agricultural diversification program, provided $1.4 million for the formation of Farmapine Ghana Limited (FGL). The money was to be repaid in 10 years at a 7% interest rate. FGL is a marketing concern that processes and exports the farmers' produce. It is owned by members of five farmers' cooperatives and two former producers/exporters. The five cooperatives have 80% ownership; the former exporters hold the remaining 20%. Once the World Bank loan is repaid, the cooperative members will be able to share in any profits resulting from operations. The cooperative members sell their fruits to FGL for processing and export. The whole arrangement is guided by formal contracts signed between FGL, the cooperatives, and cooperative members. Membership in these cooperatives was initially open to all pineapple producers. Once FGL was formed, new members were no longer accepted.

Pineapple was selected for support due to the following reasons. It is an exportable crop with a ready market in Europe and has a relatively shorter gestation period. Moreover, the farmers' cooperatives were already formed and active. The limiting factors were access to the European market in the form of reliable importers or buyers and in-depth knowledge of the export market. To overcome this, the two former exporters were included as shareholders in the FGL arrangement. Farmapine was incorporated in March 1999 and commenced operations in September 1999. A managing director hired by the board of directors oversees day-to-day operations, assisted by three production managers and an export manager. The board is made up of the presidents of the five farmers' cooperatives, the two former exporters, the managing director, and a representative from Technoserve.

The cooperative members receive chemical inputs on credit from FGL, which is repaid when their fruits are harvested. This significantly reduces

their financing needs, as the cost of chemicals constitute the single largest variable-cost item in pineapple production. The cooperative members do not receive any other credit facilities. Output price is negotiated at the beginning of the growing season and reviewed periodically to reflect prevailing prices in the industry. More importantly, the price is indexed to the US dollar, and payment takes place approximately 2–5 weeks after harvest. Indexing the price to the dollar offers protection against depreciation in the local currency. This arrangement guarantees payment to the cooperatives' members once fruits are supplied to FGL.

Additionally, the cooperative members receive technical advice from the production managers at FGL. The production managers act as extension officers or field specialists and assist the farmers with any challenges they face in production. They coordinate the planting and harvesting activities of the farmers to ensure that they fit into the overall export program of FGL. They also advise and monitor the level of chemical usage by the farmers to ensure that they conform to export standards. Farmers affiliated with FGL still have to bear the production risk. However, this risk is reduced considerably due to the advice, interaction, and monitoring of their farming activities by the FGL field specialists.

Farmapine, on the other hand, is assured of quality fruits to meet its export obligations. It is able to negotiate favorable prices for its exports, based on its ability to provide a steady and reliable supply of quality fruits. Although FGL takes on all the price risk, it is able to sign contracts with importers and thus transfer the price risk to the importer.

As mentioned previously, Farmapine supplies chemical inputs to the cooperative farmers on credit. In order to do this, Farmapine usually requires financing from banks and other funding sources. Financing is a constraint for individual cooperative members, but because Farmapine is a larger entity with professional management, it is able to obtain financing from institutions at more favorable terms. Additionally, it is able to buy larger quantities of chemicals at significant discounts.

Performance of Farmapine

Farmapine has been profitable since its inception in 2000 and is the second largest exporter of pineapples from Ghana. In 2003, Farmapine exported 4,854 mt of pineapples valued at $1.52 million. Cooperative members are able to consistently achieve exportable yields of 65% or more from their fields, which translates to guaranteed profits of about $1,000 per acre.[1] On average, cooperative members cultivate five acres, and thus earn about $5,000 per growing season. This amount is significant when compared to Ghana's per-capita gross national income of $320 (World Bank, 2004a). Profits for FGL and the outgrowers are expected to increase further as planted acreage and exportable yield increases.

Outgrowers not affiliated with FGL achieve lower exportable yields of 50% or less, translating to profits of $500 per acre. This profit also carries a greater degree of uncertainty, whereas profit for the FGL outgrowers is almost given. The non-FGL outgrowers also face higher variations in their yield due in part to the lack of technical support in their operations and their inability to strictly adhere to recommended rates when applying chemicals. The noncooperative farmers have to rely on inadequate extension support from the Ministry of Food and Agriculture (MOFA). They are also severely constrained by the high cost of chemical inputs, which is further compounded by the absence of loans or credit of any kind. This causes them to ration the quantities of chemicals they apply on their farms, contributing to the low yields and the variation in yield. Both sets of outgrowers sell their "export rejects" on the local market for $0.01–0.04/kg compared to the export price of $0.10/kg.

Total land available for pineapple cultivation is about the same for both sets of outgrowers. However, planted acreage by the cooperative members is higher on average than that of the noncooperative members. The cooperative members average five acres, while the noncooperative members average less than two acres. In addition, the cooperative members are very intent on expanding their farms. This contention is evidenced by the more than 50% of cooperative members who have leased more land or are in the process of leasing more land. This clearly indicates that they are optimistic about the future of their operations and the pineapple business in general. The FGL cooperative members are mostly full-time farmers; farmers not affiliated with FGL tend to have other occupations. The cooperative members have on average two full-time workers and also employ temporary workers for land clearing and planting operations.

Replication of the Model

The apparent success of the Farmapine concept begs the question: How feasible is it to replicate the model for other producer groups in Ghana and

in other developing countries? Based on the working of the Farmapine model, four important factors have been identified for successful replication of the model. The most important and fundamental factor is the existence of cooperatives or organized farmers' groups. In the Farmapine arrangement, the cooperatives were active and already working with Technoserve (Boselie & Muller, 2002). This trait contributed to the successful implementation of the program. If no entities such as Technoserve exist, extension and development specialists could help organize interested farmers or producers into viable groups.

In addition to an existing cooperative, funding is critical for the successful implementation of any such program. Funding is needed for any facility or infrastructure needed to process and market produce. Small-scale farmers in developing countries find it very difficult to get approval for loans and usually do not have enough equity of their own. One way out is for governments to provide grants or credit guarantees to producer groups to establish any such program. Groups relying on governments for support would have to compete for funds with national development needs such as health care, basic education, and so forth. A workable solution would be for the small-scale producers to join forces and form cooperatives or producer groups. These groups can explore funding sources that would not be available to the individual members (Stanton, 2000). The producer groups can work with development specialists who can direct them to viable sources of funding and help them meet the selection criteria for funding. A potential source of funding would be donor agencies that fund and support a variety of projects in developing countries. In 2002, average per-capita aid for the 688 million people in Sub-Saharan Africa was $28.20 (World Bank, 2004b).

Development specialists have a larger role in the success of any such arrangement. They are especially needed to organize producers into active cooperatives. These specialists could work with producers to form cooperatives where none exist, or they could help established cooperatives to embark on productive ventures. In the Farmapine arrangement, development specialists from Technoserve contributed significantly to the establishment of FGL and continue to support the outgrowers in managing their operations. Similarly, development specialists were very instrumental in the success of New Generation Cooperatives (NGC)—a cooperative arrangement prevalent in North America with structures similar to the Farmapine model. Fulton (2001) lists the supporting role of rural development officers among the factors that have accounted for the spread of NGCs in the United States.

Finally, successful implementation of Farmapine-like arrangements requires a marketable produce—preferably one with a shorter gestation period. A healthy demand for any product reduces the marketing constraints and offers the hope of recouping any investments made. Pineapple is ideally suited for this kind of arrangement because of the huge demand it enjoys in Europe and its short gestation period (12–14 months). Based on these requirements, products such as papaya, yams, cassava (processed into chips or starch), assorted vegetables, and others would also be suitable for such ventures.

In addition to the factors described above, an important and related issue that would impact replication is the organizational structure of the group. The current cooperative structure of Farmapine may not be an optimal structure for some producers. To enhance replication, some producer groups may find it beneficial to adopt alternative organizational structures. Fulton (2001) describes the dynamic nature of NGCs in adapting to local conditions as a contributing factor to their success. One popular option that US producers have been using in forming joint ventures is formation of Limited Liability Companies (LLC) (Jorgensen, 2005). An LLC offers more flexibility in organizing a joint venture or business activity. Individual producers could form an LLC as an alternative structure to engage in productive activities that add value to their produce. (A more detailed description of LLCs and brief descriptions of other corporate forms can be found in Meehan-Strub and Harris, 2004.)

Concluding Remarks

The Farmapine arrangement has proved more successful than conventional arrangements. Farmapine outgrowers make higher profits and face lower risks than outgrowers not affiliated with FGL. The arrangement has been successful in increasing farmers' income, generating employment, and stemming migration to the cities in search of jobs. In addition, the cooperative members have been active in their communities, funding the building of schools and providing other basic amenities. The Farmapine model could serve as a sustainable model for rural development in Sub-Saharan Africa.

Replication of the Farmapine model is feasible granted that certain factors previously described are in place. The key ingredient needed to

bring all the factors together and enhance replication of the model in the subregion is government commitment. A committed government would serve as a facilitator to bring all the factors together to pave the way for a successful implementation of any such program.

Note

[1] This is based on average plant population of 20,000/acre, average fruit weight of 1.5 kg, output price of $0.10/kg, and a production cost of $1,000.

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This research was sponsored with a SAGA research grant.

CHOICES
The magazine of food, farm, and resource issues
1st Quarter 2005 • 20(1)
A publication of the American Agricultural Economics Association

Comment and Reply

Comment: "Tracking and Testing of US and Canadian Cattle Herds for BSE: A Risk Management Dilemma"

Ed C. Curlett, USDA Animal and Plant Health Inspection Service

There appears to be a flaw in the paper by Cox et al. that was recently published in *Choices* (4th Quarter 2004), wherein they presented an estimate of the benefits of being able to track and test Canadian cattle in the face of potential BSE outbreaks.

Namely, Cox et al.'s conclusions state: "In other words, the benefit from tracking in this case does not come from avoiding the cost of 100% testing of US cattle, because this is costly. Rather, it comes from the assumed reduced loss of US beef sales if the country of origin of a BSE case detected in the United States is Canada and this can be ascertained and announced." However, history contradicts this conclusion. The origin of the cow involved with the December 2003 Washington State BSE case was known to be Canadian within days of its discovery. This knowledge of the Canadian origin of that US-discovered BSE case did not lead to the Cox et al. "assumed reduced loss of US beef sales." Rather, shortly thereafter the US faced, and continues to face, severe trade restrictions on exports of US cattle and beef, which continue today—over a year later. Consequently, Cox et al.'s assumption of reduced loss of US beef sales seems to be in error, and this calls into question their conclusions and benefit estimates related to the tracking and testing of cattle.

Authors' Reply:

Louis Anthony Cox, Jr., John J. VanSickle, Douglas A. Popken, and Ranajit Sahu

We thank Dr. Curlett for pointing out what appears to him to be an error in our conclusions. However, we believe the example he provides and the facts of the case support our conclusion. Our model assumed that one of the main values of an adequate tracking program is that it would allow cattle of Canadian origin to be reliably and rapidly distinguished from cattle of US origin and that future risk-management programs would be rational in using this information. Dr. Curlett suggests that even though the Washington State cow was known and announced to be of Canadian origin "within days," it did not lead to marked reductions in trade restrictions applied to imports of US cattle and beef. In reality, the USDA announced on December 23, 2003 that BSE had been confirmed in an animal located in the state of Washington. Japan, South Korea, Taiwan, and other countries announced on December 24, 2003 they were imposing a ban on US beef and cattle imports. On December 27, 2003, the USDA announced that preliminary information suggested the index cow was imported from Canada. On January 9, 2004, sixteen days after US export markets were closed, the USDA provided confirmation to the World Organization for Animal Health (OIE) that DNA testing of the index cow indicated that it was of Canadian origin.

Our export markets closed before the USDA was able to use DNA testing to identify it as of Canadian origin. Moreover, in the absence of country-of-origin labeling and an adequate tracking program, the discovery that the cow was of Canadian origin did not create an option for the United States to promptly identify and stop exporting such cattle. Our model suggests that this risk-management option would be very valuable. Under an adequate tracking program, as we proposed, Japan and the other countries would not have acted on information that a US cow had BSE—they would have reacted on information that a Canadian cow imported into the United States at the age of 4 had BSE. Exports of beef from Canadian-origin cattle could have been promptly halted—precisely what Japan subsequently suggested as a precondition for resuming imports of beef from the United States. Thus, more complete information at the time of identifying the animal with BSE, and the use of risk management options that such information would have made possible, may have prompted those countries to reach a different decision, especially in

light of the fact that Japan had previously been willing to accept US beef with verification that it came from cattle of US and not Canadian origin. In summary, the example provided by Dr. Curlett is precisely one of the considerations motivating a better approach, as addressed in our analysis.

For More Information

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CHOICES
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1st Quarter 2005 • 20(1)
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Coming Attractions

Consumers and Markets

Economic Incentives, Public Policies, and Private Strategies to Control Foodborne Pathogens

New threats, like "mad cow disease," are altering global markets. Recent food safety innovations have been spurred by stringent standards demanded by large buyers, domestic and overseas, and by regulatory agencies. While Hazard Analysis and Critical Control Point (HACCP) systems started as a private-public partnership to develop safer food for US astronauts, in the mid-1990s the Food and Drug Administration and the Food Safety and Inspection Service in USDA required HACCP for seafood, meat and poultry, juice, and now shell eggs. Both private and regulatory HACCP systems are evolving with new scientific information, innovative equipment, and new pathogen tests and management strategies. Some companies are using continuous food safety innovation as a competitive strategy. Not only are global markets at stake, but foodborne pathogens cause acute illness in 76 million US consumers, 5,000 deaths, and an unknown number of chronic complications annually.

Agriculture and Trade

US in WTO

The United States has initiated numerous regional and bilateral trade negotiations over the last four years and is heavily engaged in multilateral trade negotiations in the World Trade Organization (WTO). These initiatives have important implications for US agriculture in terms of market access and expanding trade. Progress in the WTO will likely mean not only more open markets, but some changes in trade distorting domestic support used by the United States, the European Union, and Japan. This series of articles examines prospects for progress in the WTO, challenges created by recent Dispute Settlement rulings, and the implications of the Central American-Dominican Republic Free Trade Agreement.

We are working on future theme coverage on supply chains, appraising nonmarket environmental attributes, GMOs, and checkoff programs.