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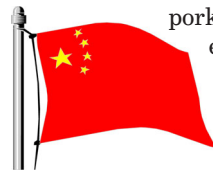
## Will China Become a Net Importer of Meat Products?

*Yijun Han and Thomas Hertel*

**C**hina's massive population and rapid economic growth have highlighted its potential role in agricultural trade. Since agricultural reforms began in the late 1970's, meat consumption in China has increased six-fold (Figure 1). Yet production has kept pace with demand, leaving trade to play a relatively minor role in the market for meats (Figure 2). Schmidhuber (2001) attributes this to increased production in remote rural areas, which are not well-integrated into the national and international economies. As demonstrated by developments since 1990, however, even a modest increase in China's

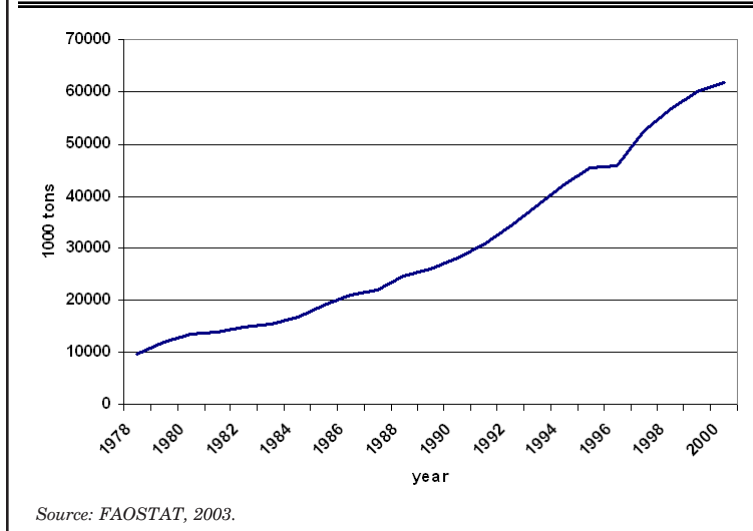
meat imports can strongly influence world markets: China is now the 4th largest market for poultry imports in the world, although the value of her poultry exports exceeds imports by about \$1 billion (Han and Hertel, 2003).

Will we ever see a day when US pork producers are exporting substantial quantities of pig meat to China? Or will cheap labor result in a surge in processed livestock exports from China – akin to what we have seen in toys, clothing and other manufactured goods? Not



surprisingly, many leading research institutions have explored this question, some of them using quantitative economic models. The Organization of Economic Cooperation and Development (OECD, 2000) projected that China will become a major *net importer* of poultry meat by 2005. In contrast, the International Food Policy Research Institute (IFPRI, 1999) projected an increase in China's net exports of poultry meat in the coming decades (Delgado, *et al.*). The Food and Agricultural Policy Research Institute (FAPRI) as well as researchers at the UN Food and Agriculture Organization (FAO) suggest that WTO accession will contribute to substantial net imports of poultry and pork by 2010 (Beghin and Fabiosa, 2001; Schmidhuber,

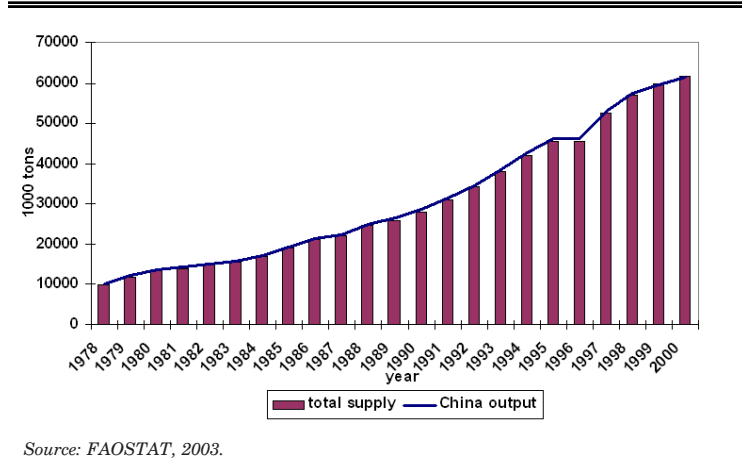
**Figure 1. China's total meat demand: 1978-2001**



### In This Issue

Will China Become a Net Importer of Meat Products? .....	1
Risk, Economic Value Added, and Capital Structure .....	6
Does Brazil Pose a Threat to the U.S. Pork Industry? .....	10
Department Website a Source of Ag Econ News and Information .....	13
Indiana Farm Management Tour .....	14
New Faculty .....	15
36 <sup>th</sup> Annual Purdue Top Farmer Crop Workshop West Lafayette Campus July 20-23, 2003 .....	16

**Figure 2. China's meat output vs. total availability (production - net exports)**



2001). Hertel, *et al.*, 2000 conclude that uncertainties about macro economic conditions and productivity growth in China will dominate her future trade status, with the ultimate outcome unclear at this point.

In light of these contrasting views, our focus here is on three scenarios about the determinants of China's future meat trade. In the first scenario, China becomes a large net

importer of meat products. The second scenario, maintains China's current net trade position. In scenario three, China becomes a major competitor in the global market for meat products.

#### Drivers of Change

The major drivers of change in China's livestock trade include demand-side forces, supply-side forces, and trade policy. An assessment of their historical evolutions will facilitate projections of their

impacts on future livestock trade under each scenario.

#### Demand

China's changing patterns of pork and poultry consumption over the past three decades are well-documented (e.g., Li and Wang, 1999). Rapid increases in household income, urbanization, foreign investment, and marketing have led to shifts in consumption toward non-traditional cereals and value-added products, including many derived from livestock. However, the consumption structures for meat in China and the U.S. differ greatly. Poultry and beef are the most important consumption items in the U.S., whereas two thirds of meat consumption in China is in pig meat with only 19% poultry meat, 9 % beef and 5% mutton. However, the mix of meat in Chinese consumers' diets is changing rapidly. Pig meat's current share in total meat spending is down from nearly 90% in 1980.

Chinese and U.S. consumption patterns differ further in the composition of pig and poultry products. For example, consumption of pig feet, head and viscera, account for 7.4% of total pork consumption in China (Li and Wang, 1999), yet are negligible in the U.S. These "by-products" are

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#### Editor

Gerald A. Harrison  
E-mail: harrisog@purdue.edu  
Phone: 765-494-4216 or  
toll free 1-888-398-4636

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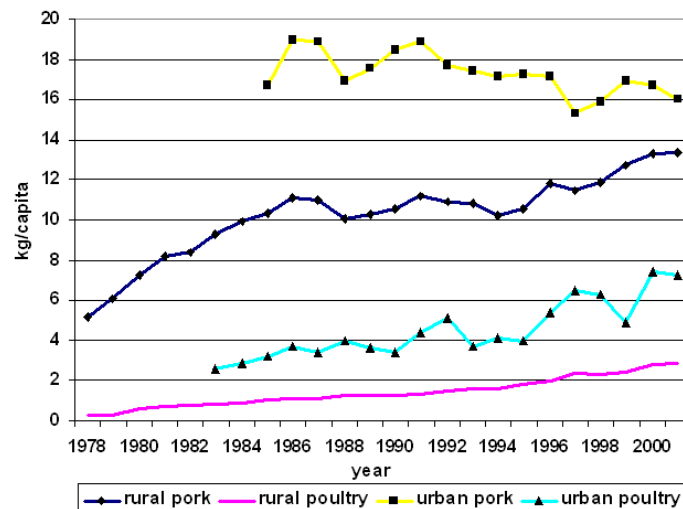
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**Figure 3. Consumption of pork and poultry meat in urban and rural China**



Source: National Statistical Bureau of China.

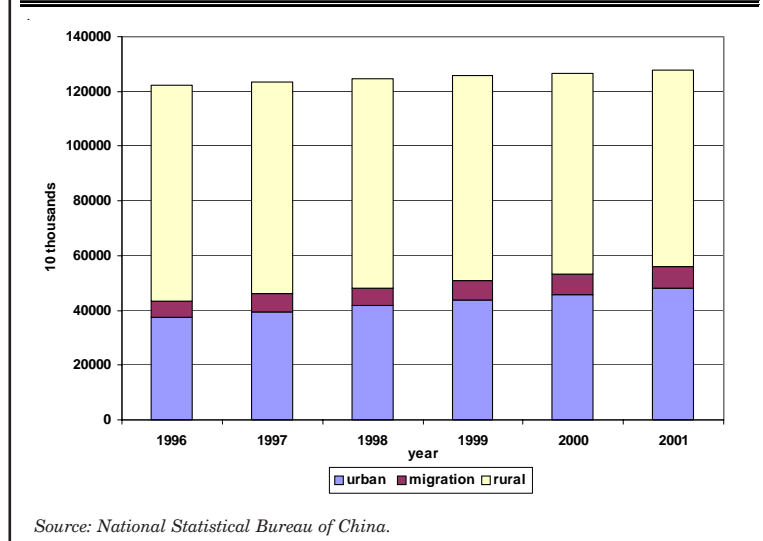
highly valued in China as evidenced by the price of chicken feet exceeding that of chicken breast meat.

Another feature of the Chinese economy that influences meat demand is the dramatic difference between incomes of rural and urban consumers. *Per capita* urban income is nearly three times as high as average rural income. This difference is reflected in the respective meat consumption levels. Figure 3 shows the evolution of per capita pork and poultry meat consumption in rural and urban areas. In the 1980's urban pork consumption per capita was about 60% above rural consumption. Since the beginning of the 1990's, urban pig meat consumption has declined, in favor of poultry consumption, with little change in overall per capita demand for meat. On the other hand, annual rural consumption of pork has risen and it is now just 2kg *per capita* below urban consumption in 2001. Meanwhile, urban consumption of poultry greatly exceeds that of rural consumption (Figure 3).

In many countries such a large income gap between rural and urban households would induce a mass rural-urban migration. In China, however, the household registration, *hukou* system prevents rural households from moving permanently and obtaining services (e.g., schooling for their children) in urban areas. The *hukou* system, however, has not prevented massive temporary migration of workers to obtain higher paying jobs in the urban areas. Current estimates put this temporary workforce at more than 80 million people.

The demand for temporary workers in China has been fueled in part by the rapid increase in labor needed in the coastal provinces, the location of China's export boom. Figure 4 categorizes China's 1.2 billion people into rural, urban and temporary migrants. Despite a flat overall population level, the urban population (legal residents plus temporary migrants) in China has grown by about 127 million since 1996. Given the difference in consumption profiles of the rural and urban populations, this shift

Figure 4. The changing composition of China's population: 1996-2001

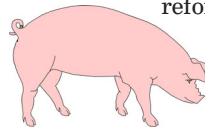


has clearly contributed to the change in total meat demand in China.

Future income growth in China may do little to boost per capita demand for pork products in the urban areas. Income growth in the rural areas, however, coupled with continuing rural-urban migration, should lead to modest overall growth for pork products. Poultry demand, on the other hand, is much more dynamic. Because of high rural and urban income elasticities of demand, continued per capita income growth in excess of 5%/year is likely to generate substantial increases in demand. The relative price declines of pork and poultry products relative to the CPI, 19% and 29% respectively since 1996, will also stimulate demand.

### Supply

Beginning in 1978, China started to reform her agricultural policies. One of the first steps was to encourage farmers to privately produce livestock products in addition to their work for the collective enterprise. As a result, meat production – primarily pork – increased very quickly. Most farmers bred 2-3 pigs, with some of these enterprises growing to 8-10 sows. At the time, they captured most of the

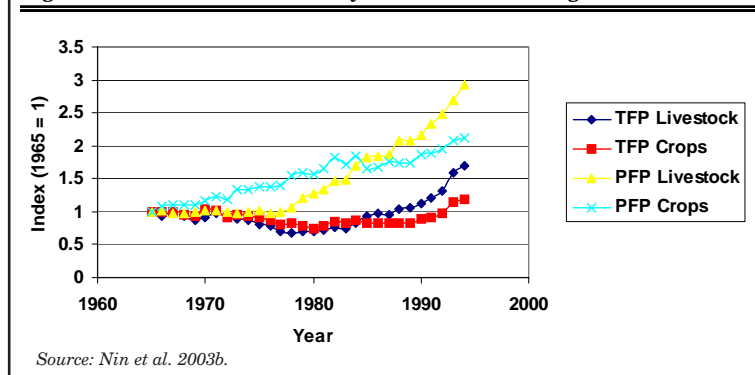


available scale economies. More recently a number of super-sized, industrial pork producers have emerged – breeding hundreds of hogs. In contrast to pork, farmers in China had much more difficulty achieving scale economies with poultry – largely due to disease problems and management requirements. Therefore growth in poultry production lagged behind pork until the last decade.

This evolution of China's livestock industry from backyard production to commercial operations is evident from output per head of livestock in pork and poultry (Hertel, et al., 2000). This *Partial Factor Productivity* (PFP) measure shows a sharp rise in the pork sector during the 1978 reforms. However, the increase in poultry productivity did not occur until a decade later. Much of this productivity growth stems from additional feed and labor inputs. *Total Factor Productivity* (TFP) for China's livestock sector (Nin, et al., 2003b), displayed in Figure 5, shows a more modest, but still substantial growth in livestock productivity since 1978. This growth exceeds the comparable world productivity growth rate for livestock by a factor of three over the 1964-95 period (Nin, et al., 2003b).

Over the past decade, the entire Chinese economy has grown very rapidly. Livestock production,

**Figure 5. Total Factor Productivity Growth in Chinese Agriculture**



however, would expand relative to other sectors only if total factor productivity in livestock is higher than for other sectors. Comparable figures are not readily available for the non-agricultural sectors. Nonetheless, the rate of growth in livestock productivity has been more than double that of crops. It is hardly a surprise that China has emerged as a net exporter of meats and a net importer of grains. Cheap labor in China's processing stage of meat production provides further impetus to export growth for processed livestock products.

Much of the productivity growth in livestock has been fueled by producers' "catching up" to modern technologies (Nin et al., 2003a). As

producers approach best practice technologies, however, the scope for further productivity gains will diminish. Nin et al. (2003a) place China's poultry output per head at about 40% of US levels, and 70% for hogs. Their estimated "catching up" curves in Figure 6 show a more rapid rate of convergence for poultry than for pigs. Their projections of pig production reach 90% of US productivity levels by 2015, with poultry reaching this level shortly thereafter. The supply-side story for poultry will be much more dynamic than that of pork in the coming decade.

#### Trade Policy

The third driver of China's livestock trade is trade policy. Until the 1990's,

China's meat tariffs were nearly prohibitive, with *ad valorem* rates frequently exceeding 100%. With China's pending accession to the WTO, tariff rates in the 1990's fell sharply, leading to a surge in reported imports. Meat imports into China are currently constrained by tariffs in 10 – 20 percent range. Under the WTO Accession Agreement, China established a tariff-only import regime for meats and dairy products, and all WTO-inconsistent non-tariff barriers are being removed. Foreign enterprises are permitted to engage in the full range of distribution services within China. This opens the way for significant increases in imports.

#### Future Scenarios

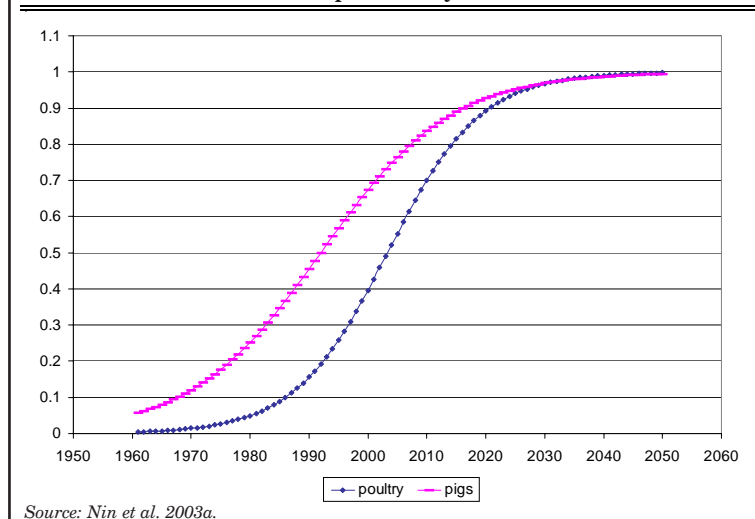
Based on the drivers of change identified above, we can consider the key forces underlying three alternative scenarios. Depending on the relative strength of each of these forces, the ultimate outcome may either be quite favorable to US exporters (Scenario 1) or it may favor Chinese exporters of meat products to East Asia (Scenario 3).

#### Scenario 1: China will be a major net-importer of meat products

Under this scenario, China defies the odds and capitalizes on WTO accession to dramatically reform the services sector (Mattoo, 2002). This reform would spur another round of rapid growth to 2010. In addition, an ambitious program of rural infrastructure investment, along with *hukou* reform and rural tax cuts would lift incomes in rural areas significantly faster than in the previous decade. In turn rural consumers would soon reach urban per capita pork consumption levels. Poultry consumption would increase even more rapidly due to the high rural income elasticity of demand for poultry meat.

On the supply-side of this scenario, exhaustion of the easy gains will slow productivity growth in pig and poultry production. Rapid growth in the rest of the economy also causes wages to rise, relative to the rest of the world, thereby eroding China's comparative advantage in

**Figure 6. Forecasts for China's pig and poultry output per head, expressed as a fraction of North American productivity levels**



labor-intensive livestock production and meat processing. In addition, WTO accession may fail to fully open up the grains sector, due to opposition in a few poorer provinces hard hit by the demise of state-owned industries. Finally, tariff rate quotas and other tools for managed trade would allow China to check feed grain imports, further raising costs for livestock producers. In this environment, China becomes a net importer of meat products in the coming decade.

### Scenario 2: China's net imports will remain little changed over the coming decade

Under the *status quo* scenario China's total livestock imports continue to increase at a modest rate, mostly due to increases in hides and skins for the leather and footwear industries, as well as by-products of meat processing in the USA and elsewhere (e.g., chicken feet). Imports of higher priced meat products are sluggish due to modest growth in domestic demand and the emergence of competing domestic suppliers – many affiliated with foreign firms. At the same time, exports of poultry products increase modestly, but disease problems prevent Chinese exporters from penetrating new markets. They continue to export primarily to Russia (canned meat products), Japan (de-boned meats) and Hong Kong (live animals). Sluggish growth in these economies constrains total export growth leaving net exports of livestock products at current levels over the coming decade.

### Scenario 3: China will be a fierce competitor in Asian markets

This scenario relies in part on Maddison (1998) being right about China's growth prospects. He has argued that future growth will likely be slower than during the 1978-1995 period, because China faces major problems in reforming state industry, fiscal and monetary policy. Increasing unemployment in the old industrial provinces of China prevent the reform of state-owned industries.

Poor performance of these industries, coupled with a half-hearted attempt to meet the WTO commitments in services reform sharply diminishes China's overall growth rate and growth in demand for meat products.

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## *“Which of these scenarios is right?”*

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Currently China's uncompetitive primary production facilities are offset by a highly competitive meat processing activity which relies on the abundance of cheap labor in China. Under this scenario, China combines rapid productivity “catch-up” on the farm, with continued cost advantages in processing to become a fierce competitor in all livestock markets, particularly for highly processed products. Adding favorable impacts of recent investments in disease control and health standards yield a potential boom in processed meat exports from China. De-boned chicken is now shipped throughout Asia, and US exporters compete head-to-head with Chinese firms in many different markets. With imports stagnant due to modest demand growth, and high value exports surging, China finds itself with a much larger trade surplus in meat products in the year 2010.

### Conclusions

Which of these scenarios is right? Only one thing is certain. The outcome of this footrace between supply and demand for meat products in the world's largest economy will have important implications for producers around the world. Understanding and monitoring the underlying drivers of change will be essential for those analyzing future developments in this market.

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Yijun Han (L) is an Agricultural Economist with the Research Center for Rural Economic, Ministry of Agriculture of P. R. China. Thomas Hertel (R) is a Professor and Director, Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, West Lafayette, IN.

# Risk, Economic Value Added, and Capital Structure

Michael Boehlje and Allan Gray

Most farm businesses use substantially less debt and less leverage than comparably sized non-farm and/or corporate businesses. Most farm term loans are structured with amortization schedules that result in a reduced indebtedness over time, whereas many non-farm businesses maintain a relatively constant indebtedness during their lifetime. And farmers appear to be highly motivated to reduce their indebtedness and eventually be debt-free, whereas non-farm businesses appear less focused on this goal.

Why this bias against debt as part of the capital structure for most farm businesses? Isn't it the case that debt is a source of risk, so reduced debt should be preferred? Is it an attempt to reduce cost, and is it the case that lower debt and less interest actually reduce cost? Should a farmer aspire to be debt free, or is there a desirable amount of debt that should be a permanent part of the farm business – an optimal capital structure? Are there some key concepts that might be useful in obtaining answers to

these questions? This article discusses two concepts: 1) leverage and the principle of increasing risk, and 2) economic value added (EVA). These concepts are used to inform the decision of the preferred leverage ratio (optimal capital structure) for a farm business.

## Financial Risk and Capital Structure

The risks that farmers face come from numerous sources, but their consequences can be categorized as affecting business operating performance or financial performance. Operating risk is commonly defined as the inherent uncertainty in the operating performance of the firm independent of the way it is financed. Thus, operating risk includes those sources of risk that would be present with 100 percent debt or 100 percent equity financing. Operating risk is evidenced by variability in the return on assets (ROA) of the business. The major sources of operating risk in any production period are price, cost, productivity, and production uncertainty. A number of factors may affect this variability over time,

including weather, markets, technology, weed and insect pests, diseases, management practices, etc.

Financial risk or uncertainty is defined as the added variability of net returns to owner equity that results from the financial obligation associated with debt (or capital lease) financing. This risk results primarily from the use of debt as reflected by leverage; leverage multiplies the potential return or loss that will be generated with different levels of operating performance. Financial risk is evidenced by variability in the return on equity (ROE) of the business.

There are other risks inherent in using debt. Uncertainty associated with the cost and availability of debt is reflected partly in fluctuations in interest rates for loans and partly through nonprice sources. Nonprice sources include differing loan limits, security requirements, and maturities, depending on the availability of loan funds over time. Thus, financial risk also includes uncertain interest rates and uncertain loan availability.

## Principle of Increasing Risk

Financial risk increases rapidly with the use of borrowed funds. The tendency for total risk to become greater at an increasing rate as the relative amount of nonequity (debt or capital lease) capital used in a business expands is referred to as the *principle of increasing risk*. The way this principle works is illustrated in Table 1.

Assume a farmer has \$200,000 of equity capital and can borrow additional capital at a cost of 9 percent. Consider first the situation where the operator has full equity in the business (leverage level 0 in Table 1). When a 15 percent return is earned on total assets (ROA), the gross return is \$30,000; because there is no interest to pay, earnings are also \$30,000 – a 15 percent rate of return on the \$200,000 equity (ROE). Similarly, there is a 15 percent loss on owner equity under adverse

**Table 1. The Principle of Increasing Risk**

	Leverage = (non-equity capital) ÷ (equity capital)		
	0	1	2
<i>Capital Structure</i>			
Equity capital used in business	\$200,000	\$200,000	\$200,000
Non-equity capital used in business	0	200,000	400,000
Total capital used in business	\$200,000	\$400,000	\$600,000
<i>Income When Return on Assets (ROA) is plus 15 percent</i>			
Returns to total capital used	\$30,000	\$60,000	\$90,000
Cost of non-equity capital (9 percent)	0	18,000	36,000
Total return on equity capital used	\$30,000	\$42,000	\$54,000
Rate of return on equity (ROE)	15 %	21 %	27 %
<i>Income When Return on Assets (ROA) is minus 15 percent</i>			
Returns to total capital used <sup>1</sup>	(\$30,000)	(\$60,000)	(\$90,000)
Cost of non-equity capital (9 percent)	0	18,000	36,000
Total return on equity capital used	(\$30,000)	(\$78,000)	\$126,000
Rate of return on equity (ROE)	(15 %)	(39%)	(63 %)

<sup>1</sup> Numbers in parentheses are negative.

business conditions (ROA equal to -15 percent).

In contrast, when the leverage level is 2, as reflected in the last column of Table 1, \$400,000 of debt is combined with the \$200,000 of equity to acquire \$600,000 of assets. At a 15 percent rate of return on assets, returns to capital total \$90,000, and after the interest cost of \$36,000 (9 percent interest rate), returns to equity capital total \$54,000, for a 27% rate of return on the \$200,000 of equity capital. But when the rate of return on assets is negative 15 percent, the loss is \$90,000, and the interest expense is \$36,000, for a total loss of \$126,000. This results in a very large rate of equity loss of minus 63 percent.

The numbers in Table 1 are graphed in Figure 1. Note the dramatic difference in the steepness of line A, which indicates the modest rate of increase in the ROE (assuming ROA is 15 percent and doesn't change) as one increases leverage and debt utilization, compared to that of line B, which indicates the precipitous rate of decline in ROE (assuming ROA is minus 15 percent and unchanged) as leverage and debt utilization is increased.

The use of nonequity capital – whether it is acquired by borrowing, leasing, or some other contractual agreement – creates a fixed financial commitment in the form of interest, lease payments, or other obligations. This commitment to the supplier of nonequity capital results in financial risk. As leverage (the amount of nonequity capital relative to equity capital) increases, the financial commitment increases; hence, the risk increases also. Note that with an equal percentage of gain or loss on assets (ROA), the magnitude and percentage of loss on equity capital (ROE) are greater than that of the gain. When ROA is positive 15 percent, the ROE for line A increases 12 percent as leverage approaches 70 percent, but when ROA is negative 15 percent as leverage approaches 70! Thus, we have the principle of increasing risk. At the same time, as long as the rate of return on capital invested (ROA) exceeds the cost of using nonequity

capital, there is a gain from the use of leverage in the form of increased returns to the owner of the business.

### Risk Management and Leverage

The principle of increasing risk clearly indicates the potential disastrous financial consequences of more leverage – the potential loss with increased leverage is higher than the potential gain. Yet some firms safely use more debt and leverage than others. Are they just lucky, or is there an approach to borrowing that captures the benefits but reduces or mitigates the risk?

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***“A concept critical in evaluating the performance of any business is economic value added.”***

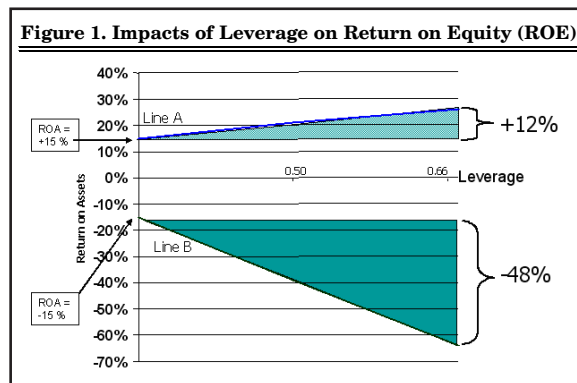
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The answer is – yes, there is! Returning to the earlier discussion of business operating risk and financial risk, the total risk the firm faces can be managed by reducing either (or both). Buying insurance, hedging, diversification, and contract production are all approaches to managing operating risk. And if a firm can withstand only a given amount of total risk, it must more aggressively manage the operating risk as it borrows more and thus incurs more financial risk. The firm must balance operating and financial risk so as to not exceed the total risk-bearing capacity of the business. So the methods that more highly leveraged firms use to capture the upside

potential of borrowing more, while protecting against downside risk exposure, are to give up some of that upside potential by, for example, buying crop insurance, hedging selling prices or, producing under contract. In essence, they incur some costs to reduce the operating risk in order to keep the financial risk within acceptable bounds. The implications of the principle of increasing risk are clear: if a business is going to use increased leverage, it must manage operating risk so as to limit total risk exposure.

### Economic Value Added and Capital Structure

A concept critical in evaluating the performance of any business is economic value added. In generic terms, value added refers to the additional or incremental value created by an activity or a business venture. Economic value added is a refinement of this concept. It measures the economic rather than accounting profit created by a business after the cost of all resources, including both debt and equity capital, have been taken into account. Economic value added (EVA) is a financial measure of what economists sometimes refer to as “economic profit” or “economic rent.” The difference between economic profit and accounting profit is essentially the cost of equity capital. An accountant does not subtract a cost of equity capital in the computation of profit, so an accountant's measure of income or profit is in essence the residual return to that equity capital since all other costs have been deducted from the revenue



stream. In contrast, an economist charges for all resources in his computation of profit, including an opportunity cost for the equity capital invested in the business, so an economist's definition and computation of the profit is net above the cost of all resources.

Sometimes this concept of profit is defined as pure profit or rent. In the terminology of a financial analyst it is called "economic value added" or "EVA." Thus, the fundamental concept of EVA is not whether the business or venture is profitable, but whether that profit is sufficient to compensate the equity capital

Over time, a firm that consistently exhibits a negative EVA will be shunned by investors because it is not generating an adequate return to compensate the equity capital contributors, and they will move their funds elsewhere.

#### Computing EVA

The mechanics of computing EVA are relatively straightforward, as reflected in Table 2. Note that, as in the traditional computation of earnings, interest on debt capital is subtracted from operating earnings (earnings before interest and taxes – EBIT) to obtain net income. Then,

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### ***“What insight does EVA provide about financial performance of a business and how to improve it?”***

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invested in the firm at its opportunity cost and have any revenue remaining after compensating the cost of all resources. EVA essentially asks the question, is there any value created after invested capital has been compensated at a market determined required rate of return? In essence, a firm can report a positive net income according to GAAP (Generally Accepted Accounting Procedures) rules and legitimately report to the public that it was "profitable" by typical financial and business terminology and standards, but have a negative economic value added if that accounting profit is inadequate to compensate the equity capital at its required rate of return. The end result in this case is that even profitable firms do not always create value unless they earn enough to cover the cost of debt as well as the opportunity cost of equity capital.

an opportunity cost on equity capital is subtracted to obtain EVA. The opportunity cost on equity capital is computed as the equity or net worth of the business times a rate of return that reflects the rate required by investors in the business. This required rate is in reality an opportunity cost measured by the rate of return that could be obtained on equity funds if they were invested elsewhere. A positive EVA means the firm is generating a return to invested capital that exceeds the direct (i.e., interest) and opportunity cost of that invested capital; a negative EVA means that the firm did not generate a sufficient return to cover the cost of its debt and equity capital.

#### Improving EVA

What insight does EVA provide about financial performance of a business and how to improve it? First, like any financial measure, the trend may be more valuable than the absolute value of EVA. Even if EVA is positive, a declining EVA suggests that financial performance is deteriorating over time and if this trend continues, EVA will become negative and financial performance unacceptable. A negative EVA indicates that the firm is not compensating its capital resources adequately and

that corrective action should be considered if this negative EVA persists over time.

What are some corrective actions? First, operating performance with respect to operating profit margins or asset turnover ratios could be improved to generate more revenue without using more capital. Second, the capital invested in the business might be reduced by selling under-utilized assets. This strategy will simultaneously improve operating performance through a higher asset turnover ratio, and reduce the capital charge against those earnings because of the reduced debt or equity capital investment. Third, redeploy the capital invested to projects and activities that have higher operating performance than the current projects or investments are exhibiting. And fourth, if the business is not highly leveraged, and the interest rate is lower than the required return to equity, change the capital structure over time by using debt as the primary source of funds to expand or grow the business. Even though this last strategy may increase interest cost, it will improve the EVA because a larger portion of lower cost debt and a smaller proportion of higher cost equity are being used to finance the business.

#### An Illustration

Let's use these concepts to evaluate the implications of different capital structures for a case farm – MBC Farms. The cost of debt (the interest rate) for this farm is 8.8 percent, and the cost of equity, which reflects the opportunity cost of investing the equity elsewhere, is 10 percent. Panel A of Table 3 indicates the ROE and EVA for this farm for different combinations of operating performance (ROA) and capital structure (debt to total assets). Panel B of Table 3 illustrates the implications of implementing strategies to reduce operating risk (for example buying crop insurance or hedging/contracting selling prices) for the same combinations of operating performance and capital structure. It is assumed that the risk-reducing strategies incur costs of approximately \$6,000 which reduces the

**Table 2. Calculating EVA**

	<b>EBIT (Earnings Before Interest and Taxes)</b>
Less	<i>Interest</i>
Equals	Net Income
Less	<i>Cost of Equity Capital</i>
Equals	EVA



ROA by .5 percent, but also reduces the downside risk in the ROA by 50 percent.

Note that in Panel A, when full exposure to operating risk exists, increasing the leverage (debt to asset) position from 23 percent to 70 percent results in a dramatic decline in ROE from 3.6 percent to -4.5 percent when the ROA is 4.8 percent. With an ROA of 4.8 percent, the EVA improves slightly from -\$118,544 with 23 percent leverage to -\$105,072 with 70 percent leverage. This improvement in EVA occurs because lower cost debt is being substituted for higher cost equity, and with a constant operating income, the substitution of less expensive for more expensive funding results in an improved EVA as debt utilization increases. It would appear that these two measures give different messages about financial performance in this situation; ROE declines as leverage increases, but EVA improves with increased debt utilization. In essence, even though the ROE is lower with higher leverage compared to lower leverage in this case, the value created is less negative because of the increased use of lower cost debt financing. Irrespective of whether overall performance of the firm is measured by ROE or EVA, performance is unacceptable, and when interest cost exceeds operating performance as measured by ROA, changing the capital structure does little or nothing to solve the problem.

With the average ROA of 9.52 percent, the ROE and EVA both increase modestly with increases in leverage. As ROA increases further to 14.28 percent, ROE increases dramatically from 15.9 percent with 23 percent leverage to 27.0 percent with 70 percent leverage. Note that the EVA increases only modestly compared to the ROE as leverage increases. This is a result of the fact that the cost of debt at 8.8 percent and the cost of equity at 10.0 percent are not widely different, and so the total capital charges for debt and equity used in computing the EVA do not vary dramatically in this case as leverage is increased.

Also note the additional information that EVA provides on financial

**Table 3. Impact of Leverage and Operating Performance (ROA) on Financial Performance of MBC Farms.**

Panel A		Debt to Asset Ratio		
		Low Debt (23%)	Current (47%)	High Debt (70%)
Low (4.8%)	ROE	3.6%	1.3%	-4.5%
	EVA	-118,544	-111,830	-105,072
Average (9.52%)	ROE	9.7%	10.1%	11.2%
	EVA	-4,930	1,783	8,540
High (14.28%)	ROE	15.9%	19.1%	27.0%
	EVA	109,811	116,524	123,281

Panel B		Debt to Asset Ratio		
		Low Debt (23%)	Current (47%)	High Debt (70%)
Low (7.14%)	ROE	6.6%	5.7%	3.3%
	EVA	-62,178	-55,464	-48,706
Average (9.27%)	ROE	9.4%	9.7%	10.4%
	EVA	-10,869	-4,156	2,601
High (14.03%)	ROE	15.6%	18.6%	26.1%
	EVA	103,789	110,502	117,259

performance for this business. When the ROA exceeds the interest cost, as it does with average returns and low debt (9.52 percent ROA and 8.8 percent interest), ROE (9.7 percent) exceeds ROA, which is an indication of acceptable performance. But EVA is negative in this case because the return to equity did not meet the cost of equity hurdle rate of 10 percent.

When costs are incurred to manage operating risk, as reflected in Panel B, the high and average ROA's are reduced slightly, but the low ROA is increased from 4.8 percent to 7.14 percent. Consequently, the ROE's and EVA's for the higher level ROA's are reduced only modestly from those of Panel A, and the impacts of increasing leverage are not changed significantly for the average and high ROA. But note the significant benefits of reducing operating risk for the low ROA level in terms of the ROE and EVA. Not only are the ROE and EVA generally higher, but the ROE in particular does not decline nearly as rapidly as leverage increases compared to the case of Panel A where operating risk is not reduced.

#### So What?

The basic implications of this discussion are contrary to common practice in the financing of farm businesses. In general, the preferred capital

structure for many businesses including farm businesses, involves some debt — *assuming* debt is a lower cost source of capital than equity. If debt is higher cost than equity, then a debt-free capital structure is preferred. Using increasing amounts of debt with a fixed equity base increases the financial risk of the business, but the best response to this increased risk is not always (or even often) to reduce debt use. Instead, the preferred response is to implement strategies to reduce the operating risk and thus the resulting financial risk that occurs with higher leverage and debt utilization. Such a strategy frequently results in a higher economic value added (EVA) and return on equity (ROE) without incurring unacceptable levels of risk.



Michael Boehlje (L) is a Professor and Allan Gray (R) is an Associate Professor, Department of Agricultural Economics, Purdue University.

# Does Brazil Pose a Threat to the U.S. Pork Industry?

*Celso Weydmann and Kenneth Foster*

**T**he U.S. agricultural community is familiar with the rise of Brazil as the chief U.S. competitor in the global soy market, but it is likely less familiar with Brazilian pork production. According to U.S. Foreign Agricultural Service (FAS) data, between 1997 and 2002, Brazilian pork production increased by 52 percent, and Brazilian pork exports increased by 345 percent. Much of the technical expertise fueling Brazil's rising pork production is being transferred from North America and Western Europe. These developments suggest that the Brazilian pork industry might evolve (similar to soybeans) into a significant rival in the pork export market.

In recent years, the U.S. has been a net exporter of pork despite a world pork market that became more competitive as new suppliers such as Canada and Brazil entered the market. Export markets are an extremely important activity in the U.S. pork sector because they have allowed the industry to gain economies of scale without generating a supply in excess of demand that would otherwise lead to lower prices. For developing countries like Brazil, pork exports also have the potential to add value to grain and low cost labor even though income levels in Brazil currently are insufficient to sustain a high per capita domestic demand for pork.

In this paper, we examine the current state of the Brazilian pork industry in order to draw conclusions about the degree to which Brazil is currently a threat to the U.S. We also identify the chief constraints

that must be overcome in the Brazilian industry to improve Brazil's competitive position. These constraints serve as indicators to be watched by decision makers in the U.S. as they determine how to remain competitive in the rapidly changing world pork market.

## Overview of Brazilian Pork Industry

Most of the recent growth in pork exports from Brazil have gone to Russia. Russia accounted for 57 and 81 percent of Brazilian pork exports in 2001 and 2002, respectively (source: Brazilian Association of Pork Processing, Annual Reports). Pork consumption in Russia has been increasing since 2000, but is still almost 20 percent below consumption levels in 1997. Thus, the Russian market is likely to continue importing pork from Brazil in the future, and Russia may be indicative of other potential growth markets around world such as Eastern Europe, Former Soviet Republics, Latin America, and Asia, where consumers are more concerned about price than quality attributes.

Brazilian hog production has traditionally been concentrated in the Southern part of the country (Figure 1). The three states in the Southern region (Santa Catarina, Rio Grande do Sul, and Paraná) all substantially increased their shares of total inventory during 1990-2002, and Santa Catarina (SC) has maintained the highest share of the Brazilian hog inventory since 1995. Pork export activity is also concentrated in Santa Catarina, which accounted for 86 percent of total Brazilian pork exports (by volume) in 2001.



## Competitive Strengths in Santa Catarina

Even though corn prices have averaged ten percent or more higher in Santa Catarina than in other parts of Brazil\*, the state has been successful in dominating hog production and pork exports primarily because it is the only area in Brazil

that is considered free of Foot and Mouth Disease (FMD). Under the WTO, it is possible for a region within a country to be considered free of disease and thus eligible to export pork even if other parts of the country either actively have the disease or are involved in a vaccination program against it. The disease still constitutes a barrier to Brazilian exports, however, because the U.S., Japan, and European Union (EU) refuse to import meat and animals from Brazil as long as the disease is not completely under control throughout the country. The states located in the Center-West region of Brazil (states of Distrito Federal, Goiás, Mato Grosso, and Mato Grosso do Sul) are either FMD infected or considered FMD disease free, but have active vaccination programs.\*\*

Santa Catarina also benefits from its history of pork production, and the human and physical capital to produce pork, feed, and pork research are centered in the Southern region. The industry in Santa Catarina has evolved to one with a high degree of coordination between farmers and packers that has led to efficiency and quality improvements (Hennessy & Lawrence, 1999).

## Competitive Weaknesses and Threats in Santa Catarina

Growing concern about the impact of hog production on the environment constitutes a threat to expanded hog production in Santa Catarina. Testa et al. (1996) estimated that only 20 percent of the 20,000 hog producers had some control of hog waste management in. Also, 85 percent of streams and rivers in the region are contaminated by fecal coliform (Takitane & Souza, 2000), and in many counties there is no new land available to spread manure if the hog inventory expands (Talamini et al., 1999). The rolling topography also contributes to the potential for water contamination due to runoff from manure storage and land that has received a manure application.

\* Brazil's highest corn prices over the past six years in Brazil occurred in Santa Catarina (\$2.71 per bushel). Source: CONAB, Brasilia.

\*\* Vaccination programs typically preclude export because it is not possible to distinguish between an animal that is an active carrier of FMD and one that has been vaccinated.

An European Commission on Food and Veterinary issues concluded that Santa Catarina cannot export pork to the EU because it does not comply with some EU requirements (European Commission, 2002) such as contingency plans for FMD and CSF (Classical Swine Fever) outbreaks, system failures in the certification of meat to preclude the distribution and use of veterinary drugs that are prohibited in Europe, and the lack of reliable traceability systems.

#### Potential for Expansion in Other Brazilian States

The price of corn is generally lower in the Center-West region, and those states have large land areas suitable for manure disposal. The state of Paraná is the largest producer of corn in Brazil, and is located close to the domestic population centers of São Paulo and Rio de Janeiro. State governments in the Center-West region also offer incentives to hog farmers, and large operations that can achieve economies of scale are more feasible than in the south. Some factors such as low population density, cheap land price, flat topography, dry weather, and soils deficient in nitrogen and phosphorus suggests a low cost to comply with environmental regulation in the Center-West as well.

Typically, capital is a limiting resource to the expansion of intensive pork production in a developing country such as Brazil. However, because hog production technology and management systems are extremely transferable, foreign investors have shown interest in investing in pork production in Brazil. This investment has waned somewhat with the decline in the Brazilian economy's performance in the past two years, but is expected to resume when growth resumes in the economy at large. An important implication of the outside investment capital is that it will undoubtedly encourage the adoption of modern production, marketing, and management systems across the entire industry in Brazil leading to expanded production capacity in non-traditional states.

#### Comparison of Brazil and the U.S. Pork Industries

Hayes (1998) developed some estimates of farm costs of production for hogs in various countries. His analysis showed that Brazilian costs at the farm level were slightly higher than those in the U.S. and Canada but still among the lowest in the world. However, the competitive position of different exporting countries cannot be determined by looking only at farm level costs of production. An accurate across-country assessment requires a focus on the profit margin of the entire pork sector because slaughter weights and other product attributes may differ.

Low labor costs benefit the Brazilian industry both at the farm and the slaughter levels, making profit in the entire pork chain competitive with that in other major producing countries. However, Brazilian exports are lower in unit value than U.S. pork exports due primarily to the status of FMD and CSF in the country and the inability of Brazil to access higher-valued markets. Elimination of FMD and CSF from Brazil could open higher valued export markets in the future, leading to greater head-to-head competition between Brazil and the U.S. for the high-valued markets such as Japan.

#### Some Drivers of Future Pork Trade

Brazil and other similar new entrants into pork production do not currently constitute a threat to the U.S. pork industry's export markets. However, there are a variety of scenarios that could unfold in the future to change that assessment. The following paragraphs endeavor to discuss the primary events or factors that could lead to a world market where Brazil would constitute a threat to U.S. pork exports. These factors constitute a "watch list" for producers and exporters in both countries to collect information about and to factor into their strategies.

#### Animal Health

Japan, Western Europe, and North America comprise the largest markets for high-value pork. These countries

also impose very strict standards concerning the health status of animal herds in the exporting countries. The EU also bans imports from countries that cannot certify that meat is free of antibiotics, synthetic hormones, or other growth promoters. This restriction essentially prohibits the importation of meat from outside the EU because no other country is able to comply with that standard. In addition, these markets are quickly moving toward full traceability of meat products from the farm of origin to the consumer in an effort to safeguard human food safety and to certify various quality attributes about the product and how it was produced. Consequently, the first indicator that Brazil might begin to penetrate these markets will likely be the certification, by OIE, that Brazil is free of FMD and CSF.

Another consideration in assessing Brazil's potential to penetrate high-value pork markets is the length of time that it takes to eradicate FMD. Haley and Jones (1996) suggested it takes at least five years from a FMD outbreak before a country can resume trade. However, they were referring to the Taiwanese

Figure 1. Pork Production Regions for Latin America



case that followed a stamping-out policy rather than a vaccination program like the one followed in Brazil. The use of a vaccination program would typically extend the period, but Brazil has several years of its program already completed. The development of marker vaccines that would allow the differentiation between vaccinated animals and those that actively carry FMD or CSF would constitute another major step toward verifying Brazil's disease free status. Thus, watching the progress of research in this area will be important for decision makers who might be affected by Brazil's growth in the world pork market.

#### Traceability and Product Quality

The markets in the countries importing high-valued pork are mature in the sense that there is little prospect for large growth in per capita consumption. Thus, the future expansion in these markets will tend to be in terms of quality attributes and product differentiation. Becoming FMD and CSF free could potentially open the Japanese and U.S. markets to Brazilian pork, but now that Denmark is able to export meat from animals that have not received antibiotics, it is possible that the Japanese market will make this a requirement for all suppliers in the near future.

It is doubtful that Brazil would be in a position to comply with this requirement for many years. Even with segregated early weaning, all-in all-out, and multi-site production systems, the vast majority of U.S. farms still routinely administer low levels of feed grade antibiotic to hogs. Denmark's relative success with anti-biotic free production hinges on the use of Specific Pathogen Free (SPF) technology in the breeding stock industry. This is a

very costly technology and one that requires substantial organization within the industry. The Brazilian industry is still dominated by small family farms, but the trend in expansion is toward coordinated large-scale production. Brazil is still a number of years away from being in a position to coordinate SPF technology to the degree that would allow anti-biotic free production.

#### Growth Markets

A second group of importing countries purchases lower valued pork for food processing. This group consists mainly of Russia, Philippines, Korea, Hong Kong, and China, and price rather than quality is the most important factor that determines the source of imported meat. The countries in this group are also more willing to accept meat from countries that are not completely free of FMD and CSF because they typically already suffer from the diseases themselves and have no significant meat export potential themselves. Unlike the first group of countries, this group has substantial potential to increase total demand for pork. These countries are typified by relatively low incomes and large populations but with potential for long-term growth in wealth and thus demand for meat. Consequently, product innovation and differentiation will be less important to meeting the demand for protein in these countries.

Brazil has already demonstrated that it can penetrate these markets with its success in Russia. With the current status of FMD and CSF in Brazil, it is likely that continued expansion into such markets and its domestic market will be the focus of the Brazilian pork sector. However, because these markets represent low unit values, there will be increased incentive as the industry expands in Brazil to make the improvements necessary to address the needs of the high-value markets. Brazil may find itself in a unique position in that the Center-West region does not have a strong existing industry. New investment can thus be tailored to fit the needs of antibiotic-free

production, and traceability systems can be implemented from the ground-up. This is in contrast to the U.S., where existing facilities were not designed with these production and marketing practices in mind and would require substantial additional investment or incur inefficiencies in order to be implemented.

Consequently, the evolution of governance structure in the pork industry may be a very good indicator of Brazil's future ability to switch from low valued markets like Russia to higher valued markets like Japan.\*\*\* For example, a vertically integrated structure or one that has a very high degree of coordination between the producer and the packer would indicate a situation where developing traceability and certification programs, and eradication of FMD to meet high-value market demands would be easier.

#### Conclusions

Although Brazilian pork production and exports have been rapidly increasing in recent years, the extent to which they can penetrate import U.S. pork export markets is limited by the existence of Foot and Mouth Disease in Brazil. However, a similar assessment of the Brazilian soybean industry might have been made in the 1970's, and today Brazil is a competitor in the soybean complex. Already low labor and construction costs in Brazil coupled with a reasonably favorable climate give it some competitive potential. Modern pork production and management technologies are extremely mobile, and already large-scale production systems that mimic U.S. and Western European technologies are being implemented in Brazil. Thus, the status of Brazilian production bears observation by decision makers in other Western Hemisphere pork exporting countries such as the U.S. Formulating strategies to maintain a competitive advantage over new entrants such as Brazil requires continued focus on production and processing efficiency as well as a renewed focus on product development and differentiation to meet changing demands in high-valued pork markets.

\*\*\* Governance structure in this context refers to the way in which successive stages of the production and marketing channel are coordinated. Different governance structures that have been observed in the pork industry include but may not be limited to: open markets, vertically integrated corporations or cooperatives, and contracts between private entities at points of product transfer.

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Professor Weydmann (L) was a visiting scholar in the Department of Agricultural Economics at Purdue University. He is Professor of Economics at Universidad Federal de Santa Catarina, Brazil (celsolw@cse.ufsc.br). Kenneth Foster (R) is a Professor in the Department of Agricultural Economics at Purdue University (kfoster@purdue.edu).

## Department Website a Source of Ag Econ News and Information

One of the recent developments in the Department of Agricultural Economics is a new departmental website: <http://www.agecon.purdue.edu/>. The new site has been designed to provide news about the department programs and people in a user-friendly and informative format. The homepage is updated on a weekly basis or sooner with the latest reports about or by department faculty, such as press releases or recent articles in *Purdue Agricultural Economics Report (PAER)*. Each update provides a link to further information, including the text of recent *PAER* articles and press releases. Recent homepage updates include Chris Hurt's forecast for the upcoming crop year and prospects for competition in soybean markets with Brazil and Argentina, Corinne Alexander's view on Indiana farmers' interest in biotech crops, and a report on a visit of agricultural faculty from Afghanistan's Kabul University to Purdue hosted by Kevin McNamara and other Purdue faculty. The homepage also provides a calendar of upcoming departmental events such as seminars and workshops as well as a link to the department monthly newsletter—*Keeping Track*.

Another key feature of the website is the navigation menu that provides links to detailed information about ongoing department programs. Prospective students can find just about all they need to know about our undergraduate and graduate degree programs. Producers interested in our Extension programs, such as our annual Outlook program, Farm Management Tour, and Top Crop Farmer Workshop can find schedules and reports on these programs under "Programs and Publications," as well as links to other Extension resources such as

the "Purdue Pork Page" and the "Indiana Local Government Information Site." Both html and pdf versions of *PAER* are available under the "Publications" area. The "Directory" area of the website provides information about department faculty and staff along with their areas of expertise. Also included in the Directory is a section about the history of the department and its former faculty as well as bios of Agricultural Economics Distinguished Alumni.

In the near future, we plan to begin an email newsletter for alumni and other friends of the department that includes recent highlights of department programs and people, links to further information, and complete articles on the website. If you are interested in receiving this newsletter, please email [agecon1@purdue.edu](mailto:agecon1@purdue.edu) and provide your name and email address. We are interested in receiving any comments or



suggestions you may have about the department website.

Sally Thompson is the Head in the Department of Agricultural Economics, Purdue University.

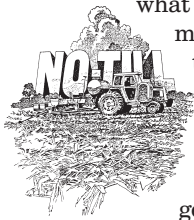
# Indiana Farm Management Tour

Montgomery and Putnam Counties  
July 9 and 10, 2003

Wednesday July 9, 2003

**1) Cain's Homelike Farm — Montgomery County — Interview at 1:00 p.m. Mini-tours on continuous no-till farming, Conservation Reserve Program participation (habitat restoration), and Conservation Security Program participation (conservation planning) at 1:40 p.m.**

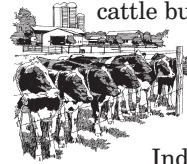
Six or seven generations from now, what will our family members see when they farm this land? What can we do now to ensure that our family will be sustained for generations to come by farming this land? These are the kinds of forward-looking questions that have led the Cain family to adopt conservation farming practices in a big way. Tour participants will see and hear how the Cains are



already reaping the benefits of long-term continuous no-till farming and habitat restoration. Related topics that will be highlighted are multi-use field borders, optimum conservation tillage systems, and optimal wildlife populations.

**2) Sennett Cattle Company — Montgomery County — Interview at 3:00 p.m. Mini-tours on beef producer initiatives, marketing new beef products (including an opportunity for tour participants to taste samples of new beef products), and nutrition, health, and housing management in the beef finishing enterprise.**

There is money to be made in the cattle business in Indiana, as shown by the Sennett Cattle Company, near Waynetown, Indiana. Clark Sennett, former president of the Indiana



Beef Cattle Association; son Lance; and partner Chad Cass operate a commercial-sized cattle feeding and breeding operation. They market 1,200 to 1,500 head of fed cattle each year. In addition, they operate both a purebred Limousin cowherd and a commercial crossbred herd. Their success in the cattle business is based on a combination of astute marketing, relationship management, careful attention to costs, and dedicated management of animal health, physical attributes, and housing to insure high-yielding, high-quality beef.

**3) Evening program at 7:30 p.m. "Are You Ready for a New Ag Venture?" Community Building, Putnam County Fairgrounds, State Road 231 North, Greencastle, IN**

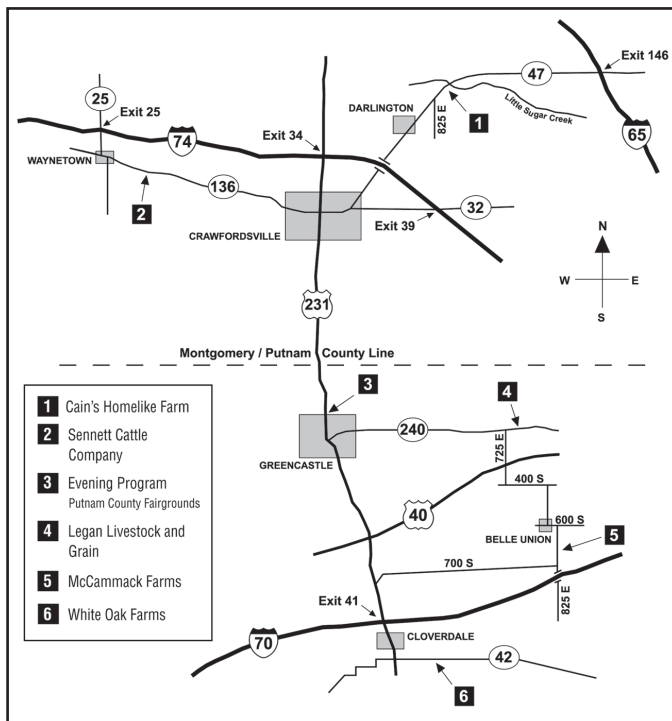
Thursday July 10, 2003

**4) Legan Livestock and Grain — Putnam County — Interview at 8:00 a.m. Mini-tours on cropping alliances with neighbors, manure nutrient management, hog production technology, and pond development, wildlife habitat, and wetland establishment at 8:45 a.m.**

Mark and Phyllis Legan have proven that a young couple can still establish a successful family farm



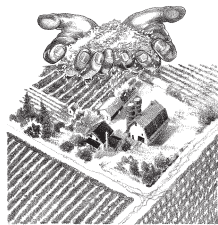
with sound management, deep commitment, and alliances with other farmers. Starting in 1989 with a modest capital base, their business today is comprised of 775 acres of crop land and 700 sows producing 15,000 pigs per year. The tour will feature their "farm-with-a-neighbor" cropping alliance and their no-till cropping system. Using irrigation to apply nutrients produced in the hog operation and hog production technology will also be highlighted. Participants will have a special



opportunity to tour a pond that was developed from a former hog lot into a recreational area complete with a wetland and wildlife habitat. The couple will share their leadership experiences at the local, state, and national levels.

**5) McCamrack Farms — Putnam County — Mini-tours on how to bring a son or daughter into the family farm business, tillage and residue management practices, double-cropping technology practices, and a Purdue corn yield test plot at 10:00 a.m. Interview at 11:30 a.m.**

David, Janice, and Clayton



McCamrack produce corn, soybeans, and wheat in Putnam, Hendricks, and Morgan Counties, on which

about 500 acres of soybeans are double-cropped. This fifth-generation grain farm is organized as a general partnership with David, his wife Janice, and son Clayton as general partners. When land has remained in a family for five generations, there is an obligation for each generation to make improvements. This long-term view has guided David as he has worked to improve tillage and residue management practices. The McCamracks are located just south of U.S. 40, so they are literally “on the line” for double-cropping wheat and soybeans. The reasons they double-crop extensively and the technology they use will be highlighted. Phil De Villez, Purdue Agronomist, will discuss Purdue’s corn performance testing program.

**6) Lunch will be served at 12 Noon at the McCamrack Farm. Chris Hurt, Extension Marketing Specialist at Purdue University, will provide an update on the outlook for grains, soybeans, and livestock immediately after lunch is served.**

**7) White Oak Farms — Putnam County — Interview at 2:00 p.m.**

**Mini-tours on cropland management and the economics of tile drainage, grain merchandising, and pork production and the feed mill operations at 2:45 pm.**



One essential for a successful business is having satisfied customers. How are you doing this on your farm? The Mann family has developed several strategies for providing what their customers want — whether that customer is a landowner, grain buyer, or hog packer. Another essential for continued business success is developing the next generation of management. Working one son or daughter into the management of a farm business can create several challenges. But what do you do when there are four sons who want to return to the farm? The visit to White Oak Farms will allow participants to explore how the Manns have accomplished this task

and also the payoff from drainage investments, how record data from the crop and hog enterprises are used to improve efficiency, their approach to technology adoption, and why they are growing milo.

**Hotel**

Walden Inn, Greencastle, IN (765) 653-2761. Web page: <http://www.waldeninn.com/accom.htm>

**Information**

Call Alan Miller at (765) 494-4203 or send e-mail to [millerwa@purdue.edu](mailto:millerwa@purdue.edu). For inquiries about other Purdue Extension programs, call 1- 888 - EXT - INFO.



W. Alan Miller is a Farm Business Management Specialist. Mr. Miller is a native of Indiana who joined the staff at Purdue in January 1995.

## New Faculty

**D**r. Alexander is an Extension specialist in the area of grain marketing. Her goal is to assist farmers and agricultural businesses with grain marketing both in commodity markets and in specialty markets.

Corinne’s research generally focuses on interactions between members of the supply chain, with a particular interest in contractual relationships. Her research includes work on contracts in California’s processing tomato markets, and on Iowa farmers’ decisions to plant genetically



**Corinne Alexander**

modified corn, and the role of seed company-supplied information in the farmers’ decisions.

Her research interests also include experimental economics; she received a pre-doctoral fellowship from the International Foundation for Research in Experimental Economics to spend a semester at the Interdisciplinary Center for Economic Science at George Mason University to develop her skills in experimental economics. She is very excited to bring these skills to the classroom as a teaching tool, and to her research.

## 36<sup>th</sup> Annual Purdue Top Farmer Crop Workshop West Lafayette Campus July 20-23, 2003

**B**e Here This Year! That's the workshop theme. For his last workshop, long-time coordinator Howard Doster has assembled an outstanding speaker list including farmers, industry leaders, and professors from twelve states. Here's perhaps the most useful information yet on site-specific farming. Here's eight industry presidents, three management consultants, three CPA's, representatives from John Deere, Pioneer, and AGCO plus your first look at a new multipurpose tool bar and also the first public appearance for this on-the-go pH/CEC sensor. Here's a farmer describing how he keeps 17 crop-share leases, and here's one sharing how he's exiting farming as he brings in a non-related neighbor's son, and here's another one telling how he is using five years of



geo-referenced soil and crop data from each of his 10,000 acres. Here's the Deputy Secretary of Agriculture, Jim Moseley; and the former Assistant Secretary of Agriculture, Bob Thompson; and former Soil Conservation Chief, Bill Richards.

Here's your opportunity to help Jess Lowenberg-DeBoer and Mike Boehlje evaluate future Midwest crop farming opportunities and suggest ways the new Workshop Team can leverage our past successes into making the "Best Workshop For the Money" into something better for you. Sally Thompson, our new Department Head, says it will continue to emphasize technology transfer and business management skills. Help make this happen.

You will adjust your rent to reflect the corn price, and your continued success will be based on how well you master the skills we teach in this

workshop. Sign up early and do your computer homework to test ways to improve your crop mix, machinery size, tillage system and/or farm size.

Whether you're one of the 7,000 previous workshop attendees, or a first-timer, Be Here This Year!

The conference registration fee is \$250 for the first person and \$75 for additional persons from the same farm.

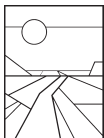
Refer to the website <http://www.agecon.purdue.edu/extension/programs/topfarmer.asp> for more information or call Howard Doster at (765)412-1495.



Howard Doster is Professor Emeritus. Besides the Top Farmer Crop Workshop, Howard organized the "Farming Together Winter Weekend" (a parent-child) seminar. You may contact

Dr. Doster at [doster@purdue.edu](mailto:doster@purdue.edu).

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Gerald A. Harrison  
Department of Agricultural Economics  
Krannert Building  
403 W State Street  
West Lafayette, IN 47907-2056

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