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Financial and Economic Shock Test
By Dr. David M. Kohl

My spring and summer have been filled with lending and banking schools across the country. Whether it is in side conversations during breaks or question-and-answer dialogue during the sessions, one of the favorite questions I have been asked by lenders is, "What shock tests should we conduct in individual loan analysis and for the overall portfolio?" With increased volatility in the red-hot land market and more pressure from regulators to be prepared for the unexpected, financial and economic shock testing are becoming more popular in agricultural credit analysis.

Let's begin with the shock testing of individual credits. The first shock test is in the area of repayment analysis. This is simply done by calculating the excess margin after all debt service, living expenses, and income taxes. If you want to be conservative, deduct capital expenditures for machinery and building improvements and upgrades. A reasonable figure for this is usually 10 percent to 15 percent of the value of buildings and equipment.

Then divide this margin by the total farm revenue, then by total expenses, and finally by total liabilities that are on variable interest rates. A minimal financial shock test should find that a business could handle a 5 percent decline in revenue, a 5 percent increase in expenses, and a 3 percent increase in interest costs that are on a variable rate. If there is a question concerning quality of financial data, an operation is in a growth mode, or there is extreme volatility in revenue and cost with no risk management program, the test needs to be increased to 10 percent on revenue and expenses and perhaps as high as 5 percent on variable interest rates.

For example, if the margin after all debt service expenses, family living expenses, taxes, and capital expenditures is $100,000, and the revenue is $1 million, then $100,000 divided by $1 million is 10 percent, and the operation could handle a 10 percent decrease in revenue. If expenses are $800,000, the shock would be $100,000 divided by $800,000, which is equal to 12.5 percent. This percentage would pass the second level of shock testing, indicating that the business could withstand up to a 12.5 percent increase in expenses.

These shock tests are critical for making financial projections with various price and cost scenarios as well. Showing results of shock tests objectively illustrates to the customer the boundaries and limitations in debt levels, production and price risk management

programs to ensure reasonable management decisions can be made and debt can be repaid.

The next level of shock tests are in the area of working capital, which is often a secondary source of repayment. First, one would like to see the ratio of working capital to revenue above 33 percent. A level below 10 percent would suggest possible issues should repayment adversity occur.

Next, a loan officer should then test the quality of working capital through a series of questions. Are the corn, soybeans, and wheat in the bin or the cattle in the pens price protected or on a contract? At what levels and how much are prices protected? For example, $6.00 per bushel corn in the bin that declines to $3.50 per bushel corn can erode working capital very quickly.

Next, are accounts receivable that make up working capital collectible? What is the concentration of receivables, i.e. are they all from one customer or spread over a number of accounts? If prepaid expense strategies are utilized, what is the financial status of the cooperatives, businesses, or individuals that checks are being written to? Frequently, a lender’s line of credit funds these prepaid expenses, which in turn are unsecured lines of credit issued by the producer.

If crops growing in the field make up a large proportion of current assets, are they covered by crop insurance and at what levels? Finally, how much of the working capital is old-fashioned cash? The higher the amount, the more secure the working capital is as a source of repayment.

Now, the big financial shock test everyone wants to see in loan narratives and examiner reviews is a test of farmland value decline. How much can land values decline in a global financial analysis context without the loan going underwater or being in the position to take a major “haircut” should the operation be liquidated? Levels can be debated; however, history would suggest a range from 10 percent to 25 percent on the light side to 40 percent to 50 percent on the high side, given a worst-case scenario. History of the 1980s would suggest that the real rate of land value decline was approximately 40 percent in many of the farm belt states. Lenders with breeding livestock, machinery, and equipment held as collateral may consider shock testing up to a 50 percent decline in value.

A final shock test includes both individual accounts and the overall portfolio. Larger, more complex loans with many entities need to be carefully scrutinized for interconnectedness or third-party counterparty risk. For example, a hay producer may have a receivable with a livestock producer, who in turn may have a contract with a corn and soybean grower, who may have a contract with an ethanol plant or vertically integrated poultry or pork entity. If one or more of these businesses experience financial or economic adversity, the ripple effect could be devastating for the individual credit or the portfolio as a whole.

What is different in today's agricultural portfolio compared to the 1980s is the overall debt concentration among larger agriculture producers and agribusinesses that are interconnected through complex business and contractual agreements. Liquidation of these large businesses often will result in specialized assets such as dairies and hog operations with few potential buyers, which results in lost capital or a steep decline in asset values.

If these financial shock tests do not grey your hair as a risk manager, then probably the "new normal" complacency has set in. Yes, agricultural lending is a risky business; however, with risk comes the responsibility to conduct "but what if" scenario testing and objectively think through corrective actions and solutions should the worst occur.

Lender Tip: Time for Education

Ongoing education is a competitive strategy of leading lenders. Get signed up for the National Agricultural Bankers Conference in Minneapolis in November , which includes a powerful agenda including Orion Samuelson, ag broadcaster, and Dr. Lance Fox, a large animal veterinarian who has climbed Mt. Everest, along with many other sessions pertinent to ag lending. Attend some of the state educational seminars this fall and winter to learn about the latest trends in lending. Also, Farmer Mac will have a series of educational meetings this fall at which I will discuss economic and financial issues via video. Check out the Farmer Mac website for more information.

Global Economics

The most dramatic period of emerging countries' economic growth resulted in the great commodity super cycle. Is the super cycle coming to an end? This is the trillion dollar question for the 60 million people living in rural America who have been the beneficiaries of the growth of agriculture, energy, minerals and other related small businesses. Since the late 1990s, 73 percent of developed countries managed to outpace the growth of the U.S. economy on average by 3.3 percent per year, of course led by the emerging BRICS nations of Brazil, Russia, India, China, and South Africa. The term BRIC was coined by Jim O'Neill of Goldman Sachs Asset Management, and the "S" was added to include South Africa in 2010.

The BRICS have amassed $4.6 trillion in reserves, with China sitting on $3.5 trillion in reserves. This is resulting in a global savings glut that has driven down interest rates, encouraging heavy borrowing by the public and individuals in developed countries like the United States. This in turn has resulted in the purchase of consumer products by these bigger nations. The emerging nations then raised their standard of living, resulting in increased demand for food, fiber, and fuel products provided by many entities in agriculture and rural America.

After two decades of rapid growth by the emerging nations, often at double-digit rates, the easiest steps to economic prosperity have been taken. These nations are now in the process of evolving from investment infrastructure growth economies to internal and interregional economies that are consumer driven with slower growth. This in turn could result in slower demand for the products produced in agriculture and rural America.

For example, with the European region mired in economic recession and the North American economies in a struggling economic mode, China's economic growth has stumbled from 10.8 percent in recent years to the current level of 7.5 percent annual growth. The new Chinese leader who is economically versed indicated that the growth is most likely lower, in the 3 percent to 4 percent range. He observes electrical use, freight traffic, and credit growth as his barometers for growth as a supplement to the questionable government-produced data.

One might say that the seas of change in the world economy are in process. The agriculture and ag lending industries need to be prepared for economic adjustments in prices and asset values. The amount of adjustment and the timing will be fodder for future articles.

Domestic Economics

"I'm confused" was a favorite saying of Marilyn, one of my former graduate students. This phrase is very applicable to the current U.S. economy.

The lead economic indicator (LEI) and its diffusion index have been flat and basically neutral thru the summer; however, July's indicator showed a slight increase to 96.0, and

a diffusion index of 80, which means 8 of the 10 metrics that contribute to the LEI moved in a positive direction. The purchasing manager index (PMI) dropped below 50 in May, a sign of a contracting economy; however, it exploded to 55.4 for July, a jump indicating rapid expansion not seen in years.

Housing starts have settled in at a level of 896,000, which is definitely better than two years ago, but still not anywhere near 1.1 million, the target at which it would suggest a robust industry. Higher interest rates, increased taxes, and general uncertainty regarding healthcare and unemployment have placed a lid on these housing starts. Tensions in the Middle East have pushed oil prices higher this summer.

Factory utilization is still quite robust in the high 70s. Both core and headline inflation are under control, at 1.7 percent and 2.0 percent respectively for July. The unemployment rate, while declining to 7.4 percent, is 14 percent when U-3 through U-6 workers are included, and is a thorn in the side of government officials and the Federal Reserve.

The U.S. economy is a mixed bag at best. The fall agenda, with Federal Reserve tapering, debt ceiling issues, political bickering in the nation's capital, and the announcement of a possible new Federal Reserve Chairman, will be a season of economic confusion.

Lender and Business Dashboard Economic Indicators (for the month of July)

Indicator	Current	Green	Yellow	Red
Leading Economic Index - LEI	96.0	✓		
LEI Diffusion Index	80%	✓		
Purchasing Manager Index - PMI	55.4	✓		
Housing Starts (millions)	0.896			✓
Factory Capacity Utilization	77.6%		✓	
Unemployment Rate	7.4%		✓	
Core Inflation	1.7%	✓		
Headline Inflation	2.0%	✓		
Oil Price ($/barrel)	$104.97			✓
Yield Curve	2.56	✓		

Lender and Business Dashboard Economic Indicator Benchmarks

Indicator	Green	Yellow	Red
The Conference Board Leading Economic Index® - LEI	Increasing	Flat to Decline	Decline 0.3% for 3 consecutive months AND >1% over the period
LEI Diffusion[1]	>60%	40%-60%	<40%
Purchasing Manager Index - PMI	>50	41.7-50	<41.7
Housing Starts (millions)	>1.5	1.0-1.5	<1.0
Factory Capacity Utilization	>80%	70%-80%	<70%
Unemployment Rate	5%-6%	6%-8%	>8% or <5%
Core Inflation	0%-2%	2%-4%	>4% or <0%
Headline Inflation[2]	0%-4%	4%-5%	>5% or <0%
Oil Price[3] ($/barrel)	<$50	$50-$100	>$100
Yield Curve[4]	Steep	Flattening	Inverted

[1]Ten indicators make up the LEI - measures % that are increasing; [2]Includes food & energy;
[3]Consumer's perspective; [4]3-Month Treasury Bill rate to 10-Year Bond rate