The Current Farm Downturn versus the 1920s and 1980s Farm Crises: An Economic and Regulatory Comparison

Wendong Zhang and Kristine Tidgren

Working Paper 18-WP 577
February 2018

Center for Agricultural and Rural Development
Iowa State University
Ames, Iowa 50011-1070
www.card.iastate.edu

Wendong Zhang is assistant professor in the Department of Economics, Iowa State University, Ames, Iowa. E-mail: wdzhang@iastate.edu

Kristine Tidgren is Director, Center for Agricultural Law & Taxation, and Adjunct Assistant Professor, Agricultural Education & Studies, Iowa State University, Ames, Iowa. E-mail: ktidgren@iastate.edu

This publication is available online on the CARD website: www.card.iastate.edu. Permission is granted to reproduce this information with appropriate attribution to the author and the Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa 50011-1070.

The authors wish to thank Charles Brown for sharing his Farmer C case study and Chad Hart, Kelvin Leibold, William Edwards, Robert Jolly, Mike Duffy, and Dale Nordquist for discussions and comments on an earlier draft, especially regarding the Farmer B case study. We also appreciate the feedback from the participants of 2016 NC-1177 meeting in Denver, Colorado. This work was supported in part by the USDA National Institute of Food and Agriculture Hatch project 1010309 and NC-1177. For questions or comments about the contents of this paper, please contact Wendong Zhang, wdzhang@iastate.edu.

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Interim Assistant Director of Equal Opportunity and Compliance, 3280 Beardshear Hall, (515) 294-7612.
The Current Farm Downturn versus the 1920s and 1980s Farm Crises: An Economic and Regulatory Comparison

Wendong Zhang\textsuperscript{1} and Kristine Tidgren\textsuperscript{2}

\textsuperscript{1}: Department of Economics and Center for Agricultural and Rural Development, Iowa State University, 478C Heady Hall, Ames, Iowa 50011. \texttt{wdzhang@iastate.edu}, 515-294-2536

\textsuperscript{2}: Center for Agricultural Law and Taxation, Iowa State University, 211 Curtiss Hall, Ames, Iowa 50011. \texttt{ktidgren@iastate.edu}, 515-294-6365

Forthcoming in \textit{Agricultural Finance Review}

Acknowledgements:

The authors wish to thank Charles Brown for sharing his Farmer C case study and Chad Hart, Kelvin Leibold, William Edwards, Robert Jolly, Mike Duffy, and Dale Nordquist for discussions and comments on an earlier draft, especially regarding the Farmer B case study. We also appreciate the feedback from the participants of 2016 NC-1177 meeting in Denver, Colorado. This work was supported in part by the USDA National Institute of Food and Agriculture Hatch project 1010309 and NC-1177.
Abstract

Purpose – This paper examines the current farm economic downturn and credit restructuring by comparing it with the 1920s and 1980s farm crises from both economic and regulatory perspectives.

Design/methodology/approach – This paper closely compared critical economic and regulatory aspects of the current farm downturn with two previous farm crises in the 1920s and 1980s, and equally importantly, the golden eras that occurred before them. This study compares key aggregate statistics in land value, agricultural credit, lending regulations, and also evaluates the situations and impacts on individual farmer households by using several case studies.

Findings – We argue that there are at least three economic and regulatory reasons why the current farm downturn is unlikely to slide into a sudden collapse of the agricultural markets: strong, real income growth in the 2000s, historically low interest rates, and more prudent agricultural lending practices. The current farm downturn is more likely a liquidity and working capital problem, as opposed to a solvency and balance sheet problem for the overall agricultural sector. We argue that the trajectory of the current farm downturn will likely be a gradual, drawn-out one like that of the 1920s farm crisis, as opposed to a sudden collapse as in the 1980s farm crisis.

Originality/value – Our review provides empirical evidence for cautious optimism of the future trajectory of the current downturn, and argues that the current downturn is much more similar to the 1920s pattern than the 1980s crisis.

Keywords: Farm crisis, farm downturn, land value, farm income, agricultural credit, interest rate

Manuscript Type: General Review
**Introduction**

If we define a “golden era” in agriculture as a period when the inflation-adjusted value of farmland significantly exceeds the 1910 level, there have been three major golden eras in modern U.S. agriculture over the last 100 years: 1910 to 1920, 1973 to 1981, and most recently 2003 to 2013 (Zhang, 2017; also see Figure 1). The most recent run was fueled by at least three factors: the value of China’s imports of U.S. agricultural products grew more than 400% from 2003 to 2013 (Gale et al., 2014), for the first time the 10-year U.S. Treasury Constant Maturity rate dropped below 2% in 2011–2013 (FRS, 2017), and finally, U.S. corn used for ethanol production increased from less than 12% in 2003 to more than 37% in 2013 (US DOE, 2017). With the current monthly average cash corn prices received by Iowa farmers less than half of its August 2012 peak level of $6.89/bushel (Johanns, 2017), and U.S. farm income and asset values declining correspondingly, many farmers and agricultural professionals worry about the current farm downturn deteriorating into another farm crisis (Gabriel, 2017). As a result, it is critical to put today’s downturn into perspective by comparing the economic and regulatory conditions across the previous boom-bust cycles of U.S. agriculture, especially the two previous golden eras and ensuing 1920s and 1980s farm crises.

This article provides a timely general review that examines the current farm economic downturn through both an economic and regulatory lens and compares it with the 1920s and 1980s farm crises as well as the golden eras before them. In our review, we make use of aggregate economic statistics from the agricultural sectors and data reflecting historical agricultural credit regulatory conditions. We also employ three representative case studies of farmer households, each of whom went through the three ups and downs in agriculture. In particular, for each golden era and ensuing farm downturn or crisis, we examine and compare trends in farm income, interest rates, as well as agricultural lending practices and regulations. In addition, we use three case studies of farmers who lived in the 1910s–1930s, 1970s–1980s and 2000s–present to showcase how the golden eras and farm downturns were manifested at the
individual producer level. These individual farmer case studies transform numbers on a page into real life, and could be used for extension publications and presentations.

We argue that despite the growing farm financial stress across the Midwest over the past few years (Plastina, 2016), we are unlikely to see a replay of 1980s farm crisis as evidenced by the sudden, precipitous collapse of the U.S. agricultural land market and mounting delinquent farm loans and foreclosures (Gabriel, 2017; Harl, 1990), nor a general economic crisis like the 1930s Great Depression. This somewhat optimistic outlook mainly stems from the strong farm income growth from 2003 to 2013 (USDA ERS, 2017), the historically low interest rate environment (FRS, 2017), and more prudent agricultural lending practices (FRS, 2015). Instead, our review suggests that the trajectory of the current farm downturn will likely be a gradual, drawn-out one like that of the 1920s farm crisis, as opposed to a sudden collapse as in the 1980s farm crisis. This rests on two important distinctions: first, the inflation-adjusted net farm income rose in the golden era and then declined in the downturn period for both the current downturn and the 1910s–1920s period, while the real net farm income dropped in the 1970s due to the high inflation and then shot up shortly in the mid-1980s. Second, the annual average 10-year Treasury Constant Maturity rates for now and the 1910s–1920s are significantly lower than in the late 1970s to early 1980s (FRS, 2017), which offers more management options for most agricultural producers and agribusinesses to weather the current downturn.

In the next section, we closely examine several key sector-wide economic and regulatory statistics underlying the golden eras and farm downturns, and then investigate and showcase how a changing agricultural economy impacted individual producers using three case studies of farmer households. Finally, we evaluate how future land market and monetary policy changes might impact the trajectory of the current farm downturn using the 2000s case study.

Are We Going to See a Replay of 1920s or 1980s Farm Crises?

In this section, we discuss several critical aspects of today’s agricultural economy by comparing the
current downturn with the 1920s and 1980s farm crises. We group the discussions into two categories: economic considerations, including discussions on farm income and interest rates; and, regulatory and institutional considerations, such as lending regulations, shifts in underwriting practices, and sources of agricultural credit.

**Economic Considerations**

*Much stronger, real income growth before the current downturn*

Table 1 presents the average annual percentage change in nominal and inflation-adjusted Iowa land values, as well as U.S. gross and net farm income for the three golden eras and farm downturns. These data series were based on USDA NASS Land Value and Cash Rent Survey (USDA-NASS 2017) as well as the USDA ERS Farm Income Forecast (USDA ERS, 2017), and deflated using the annual average consumer price index for all urban consumers (CPI-U) as the deflator (US BLS, 2017). Figure 1 further shows the trajectory of inflation-adjusted Iowa Land Values and U.S. net farm income over the past century, with these three golden eras and farm downturns highlighted. While it is concerning to see that gross and net cash income has decreased 4.5% and 9.8% per year since 2013, respectively, it is equally important to note that from 2003 to 2013, gross and net income consistently grew 4.5% and 8.1% every year, respectively, reaching almost record-high levels in both farm income and land values. In particular, forecasted income for August 2017 by USDA-Economic Research Service suggests that farm income is stabilizing in Corn Belt states like Iowa.

A comparison between this third golden era and the two previous reveals that farmers accumulated much more income in real terms during the most recent decade than during the 1910s and 1970s. Inflation-adjusted net farm income growth before the 1980s farm crisis was negative, even though nominal farm income and land values skyrocketed during the same time. Preceding the 1980s crisis, the
U.S. economy experienced high inflation due to government financing of the Vietnam War and President Johnson’s “War on Poverty” (Harl, 1990; FDIC, 1995). In particular, Dr. Neil Harl described the gains in gross farm income and land value as “illusionary” and driven by inflation (Harl, 1990). In contrast, high commodity prices and increasing net farm income in the 2000s seem to have positioned current agricultural producers to better withstand the current headwinds. The trajectory of farm income for the most recent run-up and farm downturn resembles that of the 1910s–1930s more than the 1980s farm crisis. In particular, the inflation-adjusted net farm income rose in the boom periods before the 1920s farm crisis and the current downturn; however, the high inflation resulted in declines in real net farm income despite growth in nominal terms. In addition, the inflation-adjusted net farm income during the 1980s farm crisis increased as opposed to decreased, partially due to substantial government support (Harl, 1990; Sumner et al., 2010).

Historically low interest rates

The capitalization model suggests that put simply, land value is the net present value of all discounted future income flows (Ricardo, 1817). If we treat land as an annuity with constant income streams into infinity, one could think of land value being annual net income divided by interest (discount) rate (Barlowe, 1986). Despite recent decisions by the Federal Reserve to raise the federal funds rate by a total of 75 basis points, current interest rates remain at historically low levels (FRS, 2017). The one-year Treasury Constant Maturity Rate was around 3%–7% during the 1910s and 1920s, jumped to 15%–20% during the early 1980s, and is now around 1.2% (FRS, 2017). Farmland mortgage rates resemble this trend as well. So the interest situation much more closely resembles that of the 1920s more than the 1980s.

Low interest rates are favorable to keep the farmland market afloat: on the one hand, it encourages stronger loan demand due to lower interest payments, and on the other hand, low interest rates signal that the returns on other competing assets, such as stocks and bonds, aren’t as appealing thus a higher investor demand for farmland (Zhang and Duffy, 2016). Even with recent hikes, interest rates are still very low...
compared to the 1980s and only modestly lower than the rates in the 1920s, and the Federal Reserve is likely to raise the interest rate at a slow pace, as opposed to a sudden hike, which makes loan restructuring possible.

The different interest rate environment has important implications on agricultural producers’ debt repayment capacity and working capital. Due to abnormally high interest rates in the 1980s, the mortgage payment for a typical farmland loan was almost three times higher than the typical cash rent, and extending the farmland loan repayment schedules from 15 to 30 years did almost nothing to alleviate the financial burden faced by landowners (Zhang, 2017). This eventually led to massive foreclosures, bankruptcies, suicides, and even the killing of a Hills Bank lender (Atkinson, 1999). However, under today’s low interest rate environment, debt restructuring is feasible and makes sense. With current prevailing farmland loan rates similar to 1920s rates, extending a farmland loan from a 15- to 30-year repayment schedule would cut the annual mortgage payment needed from over $350/acre—higher than the 2016 cash rent payment of $230/acre—to a level comparable to the typical cash rent payment. In fact, many lenders are now advising their clients to take advantage of the current favorable interest rates to secure repayment capacity (ABA, 2017). Although it is difficult to rule out a future sudden change in interest rates, it is safe to say that at least for the foreseeable future, producers who are currently over-leveraged still potentially have the option to take advantage of the low interest rates.

**Regulatory and Institutional Considerations**

The current farm credit landscape is markedly different from that which existed than in either the 1920s or and the 1980s. The current environment is more highly regulated, lenders employ more stringent underwriting practices, and banks are subject to higher capitalization requirements.

**Shift to More Diversified Institutional Lenders**

In 1920, private individuals held 70% of farmland mortgage debt (Dyson, 1971). In 1980, private investors still held 31% of farmland debt, second only to Farm Credit Services (FCS). By 2016, however, that share
had shrunk to only 5.6% (USDA ERS, 2017). Most farmland loans are now made by the Farm Credit System (FCS) (46.2% in 2016) and commercial banks (37.6% in 2016) (USDA ERS, 2017). Commercial banks held only 13% of farmland loans in 1920 and 9% in 1980 (USDA ERS, 1985). Commercial banks did, however, hold 40% of non-real estate farm debt in 1980 (FDIC, 1995). The shift to institutional farmland lending has accompanied an increase in regulations governing these entities. The period between 1980 and 1994 saw more legislative and regulatory change affecting the financial services industry than any other since the 1930s (FDIC, 1995).

Additionally, as commercial banks have increased their farmland lending activity, they have continued to consolidate. The FDIC defines an institution as an “agricultural bank” or “farm bank” if at least 25% of its total outstanding loan volume was made to agriculture (FDIC, 2017a). In September 2017, 1,421 institutions met this definition (FDIC, 2017b), compared to 4,316 agricultural banks in 1980 (FDIC, 1995). This consolidation of lending institutions has generally created larger banks with more diversified loan portfolios. This risk diversification, coupled with the emergence of Farmer Mac as a guarantor of many farm loans (FAMC, 2017), suggests that a downturn in agriculture today may be less likely than during prior decades to trigger the widespread collapse of large numbers of financial institutions. However, the number of farm banks has been declining more slowly than the number of non-farm banks (FCA, 2016); and, one-third of an average farm bank’s loan portfolio in 2016 comprised agricultural loans (ABA, 2017). As such, modern agricultural banks remain at risk when the farm economy suffers a downturn (FCA, 2016). These banks may be less inclined to renew operating loans for finally distressed clients and more likely to initiate foreclosure actions for delinquent loans.

More Stringent Underwriting Practices

Regulatory authorities have, since the early 1980s, tightened requirements for loan underwriting. Agricultural lenders have also embraced more conservative lending policies (FRS, 2015). Despite many commercial lenders easing underwriting standards during the early 2000s, agricultural lenders did not
generally follow suit (OCC, 2017a). These more conservative practices continued even as crop prices and
land values rose (FRB M, 2013).

Helping to set the stage for the 1980s crisis, the Farm Credit Act of 1971 (Pub.L. 92-181, December 10, 1971) increased the allowable loan-to-value ratio for FCS association loans from 55% to 85% for
standard real estate loans and to 97% of the appraised value for real estate loans guaranteed by the
government. Legislators deemed this a “prudent relaxation” of then-current restrictions (U.S. Congress, 1971). During the 1970s, the Farmers Home Administration (FmHA) emerged as a prominent lender,
providing government-subsidized operating and farmland loans to family-sized farmers unable to obtain
credit through other channels (Massey, 1994). The ready availability of easy credit drove land prices even
higher (USDA ERS, 1985), which allowed farmers to use their inflated land value as collateral to obtain
more loans and expand their operations (FDIC, 1995, p. 263).

Most significantly, lenders during this era frequently based their lending decisions on the current
inflated market value of collateral and the current crop prices, rather than on cash-flow analysis (FDIC,
1995, p. 263). This meant lower down payments and a growth of credit availability that exceeded even
quickly rising income levels. Farm debt rose steadily with land prices, and when the bubble burst in the
early 1980s, most mortgage debtors were vastly over-extended. By mid-1985, FCS’s federal land banks
and FmHA held 52.3% of outstanding farm real estate debt (FDIC, 1995, p. 276). Unlike during the 1970s
and early 1980s, regulators now require agricultural lenders to rely on cash flow, not collateral value, in
assessing loan eligibility (OCC, 2017b). Consequently, banks do not generally make farm loans for real
estate with loan-to-value ratios greater than 60%–70% (Congressional Oversight Panel, 2009). All FDIC-
insured institutions must abide by federal regulations that require “prudent underwriting standards” (12
C.F.R. §365.2). Additionally, federal banks are supervised by bank examiners from the Office of the
Comptroller of the Currency, which requires its banks to mitigate risk, guard against an overconcentration
of agriculture-related loans, and use prudent underwriting practices (OCC, 2017a). These regulations set
fundamental limits on lending activities, such as requiring loan-to-value ratios no greater than 85% for loans to purchase improved property, such as farmland (12 C.F.R. §365.2).

In particular, the OCC handbook states, with respect to underwriting agricultural loans, that the value of collateral should be calculated based on expected, multi-year-average operating cash flow as opposed to market value, which is subject to stronger influences of inflation and speculation:

“There should be a strong emphasis on borrower cash flow and repayment capacity. Ag banks should not place undue reliance on collateral and cyclical factors as part of underwriting decisions…an Ag loan approval should be based on a reasonable expectation that operating cash flow will provide sufficient repayment, not on the Ag land value. (OCC, 2017b).”

Likewise, FCS’s lending requirements have become more stringent since the 1980s farm crisis. Although regulations still allow FCS to lend up to 85% of the appraised value of real estate, the standard practice is 50% loan-to-value ratio (FCSA, 2016). Like other lenders, FCS focuses on cash flow and repayment capacity, as opposed to current collateral value. The FCA Loan Portfolio Management Handbook includes a section on “Lessons from the Past” warning against “over-reliance on inflated expectations for future incomes combined with rapidly increasing values for agricultural assets” (FCA, 2017).

*Increased Capitalization Requirements*

Regulations designed to strengthen the capitalization requirements for lending institutions also protect against the collapse of agricultural lending institutions. Prior to the 1980s, federal regulators did not set specific numerical requirements for the capital adequacy of banks (FDIC, 2003). These determinations were left to the discretion of bank supervisors (FDIC, 2003). In 1988, in response to the International Basel Committee on Bank Supervision’s first Basel Accord (FRS, 2003), federal regulators imposed new capital adequacy standards upon banking institutions. This capital had to consist primarily of “Tier 1” or low-risk
capital. In contrast, the agricultural banks that failed in the 1980s tended to have more high-risk capital and fewer low-risk assets such as federal government securities (Belongia and Gilbert, 1987).

Current FDIC regulations incorporate guidance from Basel III, a comprehensive set of reform measures developed by the global Basel Committee on Banking Supervision. All FDIC-insured lending institutions, state and federal, must have a total capital to total risk-weighted assets ratio of at least 8% (FDIC, 2003). Of that, the ratio for common equity tier 1 capital to total risk-weighted assets ratio must be 4.5%. Basel III also instituted a new “capital conservation buffer,” to strengthen financial resilience during economic cycles. Beginning in 2016, this minimum requirement increases until reaching 2.5% in 2019 (12 C.F.R. § 324.300). In response, farm banks have significantly increased high quality capital reserves during the past several decades, providing them with more insulation to survive potential downturns in the agricultural economy (ABA, 2017).

“Farming in Our Blood”: Case Studies of Farmers Who Lived Through the Downturn

While the previous section focused on aggregate economic and regulatory considerations, this section illustrates how the golden eras and farm downturns were manifested at the individual producer level using three representative case studies.

Farmer A – 1920s

Farmer A is largely borrowed from Murray (1967). He owned a 311-acre farm in 1919 in central Iowa on which he owed a mortgage debt of $11,000. Up to this time, he had resisted all temptations to buy during the boom. He had seen the farm next to his sell four times between 1909 and 1917—at $100 an acre in 1909 and at $190 an acre in 1917. Demand for food in Europe after World War I—especially a large U.S. food aid program—further drove up crop and land prices, as well as net farm income. Finally, in March of 1920 at the top of the boom, courthouse records show that Farmer A bought the neighboring farm of 240 acres at $396 an acre for a total of $95,000.
To make the purchase, Farmer A borrowed $34,000 in cash by increasing the mortgage on his home farm from $11,000 to $45,000. This $34,000, plus $16,000 of additional cash from deposits and bank loans on livestock and equipment, totalled $50,000, which was paid on the $95,000 purchase, leaving only $45,000 to be financed. Compared to most of the land boom sales, this one was conservative with more than 50% of the amount paid in cash (Murray, 1967; Rajan and Ramcharan, 2015).

Farmer A’s new mortgage debt was not heavy in relation to the value of the farm. He had a mortgage of $45,000 on each farm for a total of $90,000 in debt on 551 acres, or an average of $163 an acre. With land valued at around $400 an acre, his debt was considerably less than one-half of the land value.

The first blow, which came in 1921, was the drop in prices of farm products (Shideler, 1957). Corn, which had been averaging over $1.00/bushel and actually selling for $2.00/bushel in the summer of 1919, plunged to $.41/bushel in 1921 (Johanns, 2017). The boom was definitely over.

The second blow was the interest payment on the mortgage debt, which hit like a "ton of bricks" in 1921. In the actual case of Farmer A with a $90,000 mortgage debt, the required interest payment of $5,000 was more than the value of all the corn produced on both of his farms that year (Murray, 1967). While the interest payments were large for the time, the interest rates were much lower than comparable rates for the 1980s, but only modestly higher than today’s rates (FRS, 2017). Some farm owners borrowed money from banks, relatives, and any other sources available to meet their required payments, hoping that next year would see corn above $1.00/bushel. That never happened, as the average corn price for 1921–1925 was only $.63/bushel (Johanns, 2017; Murray, 1967). Although farmer A had paid over half of the purchase price in cash, he lost both of his farms in 1927 and 1928 because he exhausted his borrowing capacity to stave off farm foreclosures. Farmer A was typical of a particularly unfortunate group of land boom victims who had invested a large amount of their own resources, only to see them evaporate with the continued low level of corn-hog prices after 1920 (Murray, 1967).

Farmer B – 1970s- 1980s
Combined testimonies of farm families from Minnesota and Iowa form the basis for the creation of “Farmer B.” These testimonies were documented in a book called *Farming is in Our Blood* with extensive interviews of 43 Minnesota farmers (Rosenblatt, 1990) and a documentary *The Farm Crisis* showcasing multiple Iowa farmer families (IPTV, 2013).

Farmer B started farming in the mid-1970s in Fayette County in Northeast Iowa, renting 500 acres to grow corn and soybeans. He also inherited 160 acres, which he owned free and clear, from his grandfather. After accumulating income for a few years, and inspired by the skyrocketing commodity and land prices that began in 1973 (Rosenblatt, 1990), Farmer B wanted to further expand his operation. With the encouragement of lenders, he bought 320 acres in 1978 at an auction for $1,650 an acre.

After paying slightly more than 20% as a down payment for the 320 acres, Farmer B obtained two land loans. One loan was a 10-year farmland mortgage of $150,000 with 10% fixed interest obtained from a local community bank, while the other was a 15-year variable rate loan of $250,000 from a local Federal Land Bank (FLB). The interest rate was fixed for the first three years at 9%, and then adjustable to prevailing market rates. In addition, Farmer B had a five-year machinery loan of $50,000 initiated in 1977 and an annual $30,000 operating loan with a floating interest rate from PCA (Production Credit Association).

When Farmer B obtained these farmland loans, he had every intention to make timely and regular payments. In 1978, his crop income was more than double the annual mortgage payments needed for the land loans, and he saw the collateral value on his balance sheet and his net-worth on the bank statements skyrocket.

Things turned ugly for Farmer B in the early 1980s after the Soviet Union grain export embargo. In addition, crude oil prices had doubled in 1979, and the cost of fertilizer, seed and farm chemicals rose by 20% (Rosenblatt, 1990; USDA ERS, 2016). More importantly, the Federal Reserve Bank determined that higher interest rate were needed to curb inflation, which was around 10%–12% in late 1970s due to
Like his neighbors, Farmer B sensed the tightening agricultural profitability but still thought his balance sheet was strong. In 1983, he had about $1,000/acre unpaid for the two land loans, and high interest rates started to take a significant toll. After a disastrous 1983 harvest, Farmer B was still current on his debt payments for the machinery, land, and operating loans. However, his working capital quickly shrank to less than $25,000. The cost of production and grain prices were not that different (Johanns, 2017), but interest rates almost doubled from 9% to 17% (FRS, 2017).

In February 1984, Farmer B was called in to the FLB, and the bank officer told him they needed $50,000 more in collateral for loan security purposes. Farmer B was caught by surprise and at a loss as to how he could work through this. Neither FLB nor PCA was able to offer loan restructuring or a reduction in the interest rate.

In addition, the PCA sought additional collateral and could not offer additional operating loans. Farmer B finally went to FmHA and got a $20,000 operating loan at a 15% interest rate. Farmer B struggled through the 1984 crop season, but saw in early 1985 another 30% decline in the value of his 500 acres. All proceeds went to the bank to pay interest and almost none went toward principal. With the additional reduction in collateral value, the FLB called in its loan. Farmer B was unable to refinance. His farm, including the 160 acres he inherited in the 1970s, went to farm auction a year later, and Farmer B was out of business.

Farmer C - 2010s

Farmer C is based on data using FINPACK (FINPACK, 2017) collected by Charles Brown, an Iowa State University Extension and Outreach farm management specialist. Farmer C farms 1,223 acres in Freeborn County, Minnesota. He rented 1,000 acres for $257/acre in 2015 and owned 223 acres, which he
purchased in 2005. On the rented acres, he employed a 50/50 corn-soybean rotation, while growing
continuous corn on his own 223 acres.

Farmer C’s major source of income stems from his corn and soybean crops. Because of accumulated
savings from the late 2000s, he had $200,000 in cash and $113,969 prepaid expenses and supplies
associated with an annual operating loan before the 2015 planting season. He owns his large equipment
(e.g., tractor and combine). With land values increasing to close to $8,000/acre in early 2015, his total
asset value was above $3 million as of January 2015. In terms of liabilities, Farmer C has a 20-year land
mortgage with a $301,145 remaining balance and a fixed 5% interest rate, and a five-year combine and
tractor note in the amount of $300,000 with a fixed 5% interest rate and final payment due in late 2019. In
sum, Farmer C had a strong balance sheet, with a 24.3% debt-to-asset ratio, as well as a 2.26 current ratio,
with $272,886 of working capital in January 2015.

In 2015, Farmer C had decent yields, 180 bushels/acre for corn and 55 bushels/acre for soybeans, and
good prices, $3.90/bushel for corn and $10.00/bushel for soybeans, but not as good as in previous years.
He did not change his operation, and due to high production costs, including the $275/acre cash rent, he
earned only $42,255. With high mortgage payments for the machinery and land loans, he incurred a
negative capital replacement margin of $94,146. If Farmer C had cut production expenses by $50/acre or
negotiated to get a reduction in the cash rent, he could have improved profitability significantly.
Alternatively, he could have refinanced the machinery and land loans to a longer term and locked in the
current, low interest rates. This option would not improve profitability, but would buy more time and
slow the erosion of working capital.

Because Farmer C made no changes in his operation for the 2015 growing season, he saw more
erosion in his working capital, and a $94,146 loss in cash available after loan payments. In addition, the
value of Farmer C’s land dropped from $8,000 to $7,000 an acre a year later.
For the 2016 growing season, Farmer C achieved much better yields than expected—210 bushels/acre for corn and 65 bushels/acre for soybeans—but prices were lower than 2015 at $3.40/bushel for corn and $8.75/bushel for soybeans. Cash rent for the 1,000 rented acres was reduced by $50 to $225/acre, and input costs, especially fertilizer costs, were reduced from 2015 prices as well. There was a continued erosion of working capital, falling from $272,886 in early 2015 to $159,557 in late 2016 (Table 2). Despite declining land values leading to a reduction in the value of long-term assets, Farmer C’s debt-to-asset ratio is comparable to or even smaller than two years ago at 23.7%. This is because he paid down a significant amount of debt, especially the machinery debt, over the prior two years. The inaction of Farmer C to refinance, however, resulted in a negative capital debt repayment margin of -$25,032, and his term debt coverage ratio dropped to 1.07, well below the safe threshold of 1.75 (Table 3) (FINPACK, 2017).

Summary of the Farmer Case Studies

There are some common themes for the three farmer case studies presented above, including declining farm incomes, rising mortgage payments and erosion of working capital and borrowing capacity. However, there were also important differences for the experiences of farmers A, B and C: For Farmers A and C, deteriorating farm income due to reduction in commodity prices and low-to-negative profit margins gradually drained their working capital and resulted in a slow erosion of their capital debt repayment capacity. Both their net farm incomes saw an increase in the boom period and then declined significantly in the following downturn years. In contrast, while Farmer B was hit by declining farm income, extremely high interest rates were a major, if not more important, factor as well (Harl, 1990; FRS, 2017). The high interest rates led to high interest payments, which resulted in a much faster erosion of Farmer B’s debt capital repayment capacity compared to Farmers A and C. Had Farmer B stayed solvent with his farming operation in the late 1980s, he would have actually seen a rebound of the net farm income largely due to substantial support from government programs to combat the 1980s farm crisis.
Looking Ahead: the Trajectory of the Current Farm Downturn

As shown in the previous section, our representative case study farmer from the most recent era—Farmer C—still has an excellent balance sheet, but his working capital is quickly draining away. Tables 2 and 3 showcase how his balance sheet, working capital, and capital debt repayment capacity would change under several alternative future scenarios, including changes in interest rates and land values for 2018.

No Changes

Farmer C has not refinanced, and with potential risk for drought, yields are back to normal in 2017—180 bushels/acre for corn and 55 bushels/acre for soybeans. He began 2017 with $159,557 of working capital. He still has a healthy current ratio and has managed to pay off a substantial portion of his machinery loans. In this scenario, we assume that he did not refinance nor lower his production costs, but his cash rent for 1,000 rented acres dropped another $10 to $215/acre.

For 2018, we also hypothesize business as usual. Grain prices have slightly improved, pushing corn prices to $3.50/bushel and soybeans to $9.00/bushel. We also hypothesize a minor reduction in land value, down from $6,500/acre a year ago to $6,250/acre in 2018. Due to the loss in capital debt repayment margin in 2017, Farmer C cannot pay it all using the cash on hand and he will have to sell $10,000 in additional bushels of corn inventory to have more cash on hand, yet his working capital still shrinks by less than $10,000. However, because the farm still has an excellent balance sheet and the value of his collateral still significantly outweighs his debt obligations, there is no risk of default.

Interest Rate Hike

First, we assume for purposes of this scenario that Farmer C, who actually has fixed-rate machinery and land loans, has variable rate loans with a rate that has increased to 8%, which would be close to the high rates in the 1920s but only half of the 1980s rates (FRS, 2017). We also assume that the capitalization rate for land valuation rises from 3% to 5% due to higher interest rates. Table 2 shows that an increase in the capitalization rate would lead to a steep reduction in land value to $3,900/acre. Despite this decline,
Farmer C would still have a strong balance sheet; however, his debt-to-asset ratio would rise to almost 27%, and, more importantly, Table 3 shows that his total interest paid would almost double, lowering his capital debt repayment capacity by close to $100,000. Under those conditions, cost management and improved marketing would be imperative for Farmer C.

Land Value Reduction

Another possible scenario is the substantial and sudden reduction in land value, specifically another 30% reduction from 2017 due to continued stagnation in commodity prices and farm income, while the interest rate remains flat at around 5%. Continued negative cash income leads to more debt and lower asset values. Tables 2 and 3 show that a reduction in land value lowers Farmer C’s total farm asset value, but does not necessarily change the profitability of production, unless the loan officer requests additional cash as security. His capital debt repayment capacity as a result incurs an additional loss of about $10,000 compared to the baseline.

Discussion and Concluding Remarks

In this article, we provide a timely general review that examines the current farm economic downturn through cross-era comparisons of economic, regulatory and institutional factors. While we lack micro-level data to elicit causal comparison between these three eras, we make use of both aggregate sector wide statistics and three representative farmer case studies in this general review. Essentially, we argue that despite the deteriorating agricultural financial conditions and continued decline in farm income, the current farm downturn is more likely a liquidity and working capital problem, as opposed to a solvency and balance sheet problem for the entire agricultural sector.

We argue that there are at least three economic and regulatory reasons why this farm downturn is unlikely to slide into a sudden collapse. First, a comparison between the third golden era of the 2000s and the previous two reveals that gross and net farm income growth was much stronger during the most recent decade. Second, regulators and agricultural lenders have tightened underwriting standards, including
valuing collateral based on cash flow as opposed to inflated market value (OCC, 2017b), and
strengthened capitalization requirements. Third, despite recent moves by the Federal Reserve, farmers and
other agricultural businesses still enjoy a very low interest rate, which limits the amount of debt in the
agricultural sector and keeps asset values strong. To this day, the balance sheet of the U.S. farm sector is
still very strong, and the delinquency rates for agricultural loans are still fairly low.

From the perspective of Farmer C, our representative case study farmer for the current period, he has
an excellent balance sheet, even after several years of low-to-negative-profit production years. Farmers
like him have been able to make loan payments on time, but have seen a significant reduction in their
working capital. However, relative to producers in the 1980s, most farmers today are in a much better
financial position going into the downturn, do not have substantial land or operating debt, and can still
take advantage of low interest rates in securing and refinancing loans. Likewise, today’s agricultural
lenders prevent clients from becoming overextended, requiring them to demonstrate repayment capacity,
based upon cash flow, as a condition of receiving additional credit. In the era of low-to-negative margins,
cost management and better marketing would help current farmers slow down or prevent working capital
erosion.

We argue that we are likely experiencing a gradual, drawn-out downward adjustment to the historical
normal return levels for the agricultural economy, rather than an abrupt farm crisis. This is likely a result
of several factors, including the strong balance sheet still enjoyed by some producers, the likely slow
upward adjustment in interest rates and improving commodity prices through slow acreage reduction in
the U.S. and beyond. If one has to predict future farmland market movement, it is likely under additional
downward pressure as a small portion of producers will be forced to liquidate some of their assets. It is,
however, more likely a gradual, drawn-out trajectory like that of the 1920s–1930s as opposed to the
sudden collapse of the mid-1980s or the global economic collapse of the 1930s Great Depression. While
this current downturn will no doubt force some producers to leave farming, we suggest that it will not
lead to a sector-wise collapse or exodus like those of the prior eras.
References


Figures

Figure 1. Inflation-adjusted Iowa land values and U.S. net farm income (1910 = 100).
Table 1. Golden Eras versus Crises and Declines: Average Annual Percentage Change in Nominal and Inflation-adjusted Iowa Land Values and U.S. Farm Income

<table>
<thead>
<tr>
<th>Variable</th>
<th>Golden Eras</th>
<th>Crises and Declines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa Land Value</td>
<td>9.3%</td>
<td>9.0%</td>
</tr>
<tr>
<td>U.S. Gross Income</td>
<td>19.5%</td>
<td>9.8%</td>
</tr>
<tr>
<td>U.S. Net Income</td>
<td>13.7%</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Golden Eras</th>
<th>Crises and Declines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa Land Value</td>
<td>1.7%</td>
<td>1.1%</td>
</tr>
<tr>
<td>U.S. Gross Income</td>
<td>9.6%</td>
<td>0.7%</td>
</tr>
<tr>
<td>U.S. Net Income</td>
<td>11.0%</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

Note: Iowa state average land values are based on USDA Census of Agriculture and USDA NASS Land Value and Cash Rent Survey (USDA NASS, 2017), while the data on U.S. gross and net farm income is from the USDA Economic Research Service Farm Income and Wealth Statistics database (USDA ERS, 2017).
Table 2. Farmer C’s Current and Future Projected Balance Sheet for 2018

<table>
<thead>
<tr>
<th></th>
<th>December 2016</th>
<th>December 2017 Base</th>
<th>December 2018 Base (sold 10,000 bushels soybean in inventory)</th>
<th>If Farmer C pays 8% interest (cap rate is 5%) – December 2018</th>
<th>Land value drops another 30% - December 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current farm assets</td>
<td>$ 377,090</td>
<td>$ 291,237</td>
<td>$ 227,918</td>
<td>$ 194,896</td>
<td>$ 205,432</td>
</tr>
<tr>
<td>Cash on hand</td>
<td>$ 107,443</td>
<td>$ 21,570</td>
<td>$ 46,011</td>
<td>$ 12,989</td>
<td>$ 23,525</td>
</tr>
<tr>
<td>Intermediate farm assets</td>
<td>$ 427,050</td>
<td>$ 375,850</td>
<td>$ 329,395</td>
<td>$ 329,395</td>
<td>$ 329,395</td>
</tr>
<tr>
<td>Long-term farm assets</td>
<td>$ 1,636,000</td>
<td>$ 1,524,500</td>
<td>$ 1,463,750</td>
<td>$ 941,094</td>
<td>$ 1,045,625</td>
</tr>
<tr>
<td>Value of Owned land</td>
<td>$ 1,561,000</td>
<td>$ 1,449,500</td>
<td>$ 1,393,750</td>
<td>$ 871,094</td>
<td>$ 975,625</td>
</tr>
<tr>
<td>Total assets</td>
<td>$ 2,440,140</td>
<td>$ 2,191,587</td>
<td>$ 2,021,063</td>
<td>$ 1,465,385</td>
<td>$ 1,580,452</td>
</tr>
<tr>
<td>Current farm liabilities</td>
<td>$ 217,533</td>
<td>$ 219,128</td>
<td>$ 218,084</td>
<td>$ 218,084</td>
<td>$ 218,084</td>
</tr>
<tr>
<td>Intermediate farm liabilities</td>
<td>$ 131,179</td>
<td>$ 67,196</td>
<td>$ 4,198</td>
<td>$ 4,198</td>
<td>$ 4,198</td>
</tr>
<tr>
<td>Long-term farm liabilities</td>
<td>$ 228,752</td>
<td>$ 201,514</td>
<td>$ 177,347</td>
<td>$ 177,347</td>
<td>$ 177,347</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>$ 577,464</td>
<td>$ 487,838</td>
<td>$ 399,629</td>
<td>$ 399,629</td>
<td>$ 399,629</td>
</tr>
<tr>
<td>Net worth</td>
<td>$ 1,862,676</td>
<td>$ 1,703,749</td>
<td>$ 1,621,434</td>
<td>$ 1,065,756</td>
<td>$ 1,220,494</td>
</tr>
</tbody>
</table>

Liquidity

|                                | December 2016 | December 2017 Base | December 2018 Base (sold 10,000 bushels soybean in inventory) | If Farmer C pays 8% interest (cap rate is 5%) – December 2018 | Land value drops another 30% - December 2018 |
|                                |               |                   |                                                               |                                                              |                                           |
| Current ratio                  | 1.73          | 1.33              | 1.05                                                          | 0.89                                                          | 0.94                                      |
| Working capital                | $ 159,557     | $ 72,109          | $ 9,834                                                       | -$ 23,188                                                     | -$ 12,652                                 |
| Working capital to gross farm income | 19.2%       | 10.7%             | 1.4%                                                          | -3.3%                                                         | -1.8%                                     |

Solvency

|                                | December 2016 | December 2017 Base | December 2018 Base (sold 10,000 bushels soybean in inventory) | If Farmer C pays 8% interest (cap rate is 5%) – December 2018 | Land value drops another 30% - December 2018 |
|                                |               |                   |                                                               |                                                              |                                           |
| Farm debt to asset ratio       | 23.7%         | 22.3%             | 19.8%                                                         | 27.3%                                                         | 25.3%                                     |

Note: the value of owned land is included in the long-term farm assets above it, and the analysis is based on FINPACK (2017).
Table 3. Farmer C’s Current and Future Projected Budget and Capital Debt Repayment Capacity

<table>
<thead>
<tr>
<th></th>
<th>2016 Crop Year</th>
<th>2017 Crop Year</th>
<th>2018 Crop Year</th>
<th>If Farmer C has pay 8% interest (cap rate = 5%) – 2018 Crop Year</th>
<th>Land value drops another 30% - 2018 Crop Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop income</td>
<td>$800,597</td>
<td>$676,226</td>
<td>$702,990</td>
<td>$702,990</td>
<td>$702,990</td>
</tr>
<tr>
<td>Crop insurance indemnity</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Commodity payments</td>
<td>$32,535</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Gross farm income</strong></td>
<td><strong>$833,132</strong></td>
<td><strong>$676,226</strong></td>
<td><strong>$702,990</strong></td>
<td><strong>$702,990</strong></td>
<td><strong>$702,990</strong></td>
</tr>
<tr>
<td>Interest paid</td>
<td>$31,577</td>
<td>$26,965</td>
<td>$24,469</td>
<td>$44,521</td>
<td>$24,469</td>
</tr>
<tr>
<td><strong>Net farm income</strong></td>
<td><strong>$117,660</strong></td>
<td><strong>$15,966</strong></td>
<td><strong>$48,718</strong></td>
<td><strong>$28,666</strong></td>
<td><strong>$48,718</strong></td>
</tr>
<tr>
<td>Depreciation</td>
<td>$51,200</td>
<td>$46,455</td>
<td>$42,700</td>
<td>$42,700</td>
<td>$42,700</td>
</tr>
<tr>
<td>Nonfarm income</td>
<td>$56,000</td>
<td>$56,000</td>
<td>$56,000</td>
<td>$56,000</td>
<td>$56,000</td>
</tr>
<tr>
<td>Income taxes</td>
<td>$19,977</td>
<td>$2,256</td>
<td>$9,060</td>
<td>$4,368</td>
<td>$2,040</td>
</tr>
<tr>
<td>Interest on term debt</td>
<td>$23,668</td>
<td>$19,504</td>
<td>$17,625</td>
<td>$19,521</td>
<td>$17,625</td>
</tr>
<tr>
<td><strong>Capital debt repayment capacity</strong></td>
<td><strong>$116,551</strong></td>
<td><strong>$23,669</strong></td>
<td><strong>$43,983</strong></td>
<td><strong>$30,519</strong></td>
<td><strong>$51,003</strong></td>
</tr>
<tr>
<td>Total scheduled principal and interest</td>
<td>$109,048</td>
<td>$109,542</td>
<td>$109,542</td>
<td>$129,100</td>
<td>$109,542</td>
</tr>
<tr>
<td><strong>Capital debt repayment margin</strong></td>
<td><strong>$7,503</strong></td>
<td><strong>-$85,873</strong></td>
<td><strong>-$65,559</strong></td>
<td><strong>-$98,581</strong></td>
<td><strong>-$58,045</strong></td>
</tr>
<tr>
<td>Cash required for replacement</td>
<td><strong>$7,503</strong></td>
<td><strong>-$85,873</strong></td>
<td><strong>-$65,559</strong></td>
<td><strong>-$98,581</strong></td>
<td><strong>-$58,045</strong></td>
</tr>
</tbody>
</table>

Note: The interest rate for the 2016-2018 in the baseline conditions is 5%, the 2015, 2016, 2017 cash rent for rented acres are $275, $225, $215 per acre respectively, and the 2015, 2016, 2017, and 2018 land value are $8,000, $7,000, $6,500, and $6,250 per acre in the baseline.