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

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

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

Disciplines

Agricultural and Resource Economics

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

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41 **Manuscript Type:** General Review

42

43

44 **Introduction**

45 If we define a “golden era” in agriculture as a period when the inflation-adjusted value of farmland
46 significantly exceeds the 1910 level, there have been three major golden eras in modern U.S. agriculture
47 over the last 100 years: 1910 to 1920, 1973 to 1981, and most recently 2003 to 2013 (Zhang, 2017; also
48 see Figure 1). The most recent run was fueled by at least three factors: the value of China’s imports of
49 U.S. agricultural products grew more than 400% from 2003 to 2013 (Gale et al., 2014), for the first time
50 the 10-year U.S. Treasury Constant Maturity rate dropped below 2% in 2011–2013 (FRS, 2017), and
51 finally, U.S. corn used for ethanol production increased from less than 12% in 2003 to more than 37% in
52 2013 (US DOE, 2017). With the current monthly average cash corn prices received by Iowa farmers less
53 than half of its August 2012 peak level of \$6.89/bushel (Johanns, 2017), and U.S. farm income and asset
54 values declining correspondingly, many farmers and agricultural professionals worry about the current
55 farm downturn deteriorating into another farm crisis (Gabriel, 2017). As a result, it is critical to put
56 today’s downturn into perspective by comparing the economic and regulatory conditions across the
57 previous boom-bust cycles of U.S. agriculture, especially the two previous golden eras and ensuing 1920s
58 and 1980s farm crises.

59 This article provides a timely general review that examines the current farm economic downturn
60 through both an economic and regulatory lens and compares it with the 1920s and 1980s farm crises as
61 well as the golden eras before them. In our review, we make use of aggregate economic statistics from the
62 agricultural sectors and data reflecting historical agricultural credit regulatory conditions. We also employ
63 three representative case studies of farmer households, each of whom went through the three ups and
64 downs in agriculture. In particular, for each golden era and ensuing farm downturn or crisis, we examine
65 and compare trends in farm income, interest rates, as well as agricultural lending practices and
66 regulations. In addition, we use three case studies of farmers who lived in the 1910s–1930s, 1970s–1980s
67 and 2000s–present to showcase how the golden eras and farm downturns were manifested at the

68 individual producer level. These individual farmer case studies transform numbers on a page into real life,
69 and could be used for extension publications and presentations.

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

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

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

91 In this section, we discuss several critical aspects of today’s agricultural economy by comparing the

92 current downturn with the 1920s and 1980s farm crises. We group the discussions into two categories:
93 economic considerations, including discussions on farm income and interest rates; and, regulatory and
94 institutional considerations, such as lending regulations, shifts in underwriting practices, and sources of
95 agricultural credit.

96 *Economic Considerations*

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

98 *<Insert Figure 1>*

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

111 *<Insert Table 1>*

112 A comparison between this third golden era and the two previous reveals that farmers accumulated
113 much more income in real terms during the most recent decade than during the 1910s and 1970s.
114 Inflation-adjusted net farm income growth before the 1980s farm crisis was negative, even though
115 nominal farm income and land values skyrocketed during the same time. Preceding the 1980s crisis, the

116 U.S. economy experienced high inflation due to government financing of the Vietnam War and President
117 Johnson’s “War on Poverty” (Harl, 1990; FDIC, 1995). In particular, Dr. Neil Harl described the gains in
118 gross farm income and land value as “illusionary” and driven by inflation (Harl, 1990). In contrast, high
119 commodity prices and increasing net farm income in the 2000s seem to have positioned current
120 agricultural producers to better withstand the current headwinds. The trajectory of farm income for the
121 most recent run-up and farm downturn resembles that of the 1910s–1930s more than the 1980s farm
122 crisis. In particular, the inflation-adjusted net farm income rose in the boom periods before the 1920s
123 farm crisis and the current downturn; however, the high inflation resulted in declines in real net farm
124 income despite growth in nominal terms. In addition, the inflation-adjusted net farm income during the
125 1980s farm crisis increased as opposed to decreased, partially due to substantial government support
126 (Harl, 1990; Sumner et al., 2010).

127 *Historically low interest rates*

128 The capitalization model suggests that put simply, land value is the net present value of all discounted
129 future income flows (Ricardo, 1817). If we treat land as an annuity with constant income streams into
130 infinity, one could think of land value being annual net income divided by interest (discount) rate
131 (Barlowe, 1986). Despite recent decisions by the Federal Reserve to raise the federal funds rate by a total
132 of 75 basis points, current interest rates remain at historically low levels (FRS, 2017). The one-year
133 Treasury Constant Maturity Rate was around 3%–7% during the 1910s and 1920s, jumped to 15%–20%
134 during the early 1980s, and is now around 1.2% (FRS, 2017). Farmland mortgage rates resemble this
135 trend as well. So the interest situation much more closely resembles that of the 1920s more than the
136 1980s.

137 Low interest rates are favorable to keep the farmland market afloat: on the one hand, it encourages
138 stronger loan demand due to lower interest payments, and on the other hand, low interest rates signal that
139 the returns on other competing assets, such as stocks and bonds, aren’t as appealing thus a higher investor
140 demand for farmland (Zhang and Duffy, 2016). Even with recent hikes, interest rates are still very low

141 compared to the 1980s and only modestly lower than the rates in the 1920s, and the Federal Reserve is
142 likely to raise the interest rate at a slow pace, as opposed to a sudden hike, which makes loan restructuring
143 possible.

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

158 **Regulatory and Institutional Considerations**

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

162 *Shift to More Diversified Institutional Lenders*

163 In 1920, private individuals held 70% of farmland mortgage debt (Dyson, 1971). In 1980, private investors
164 still held 31% of farmland debt, second only to Farm Credit Services (FCS). By 2016, however, that share

165 had shrunk to only 5.6% (USDA ERS, 2017). Most farmland loans are now made by the Farm Credit
166 System (FCS) (46.2% in 2016) and commercial banks (37.6% in 2016) (USDA ERS, 2017). Commercial
167 banks held only 13% of farmland loans in 1920 and 9% in 1980 (USDA ERS, 1985). Commercial banks
168 did, however, hold 40% of non-real estate farm debt in 1980 (FDIC, 1995). The shift to institutional
169 farmland lending has accompanied an increase in regulations governing these entities. The period between
170 1980 and 1994 saw more legislative and regulatory change affecting the financial services industry than
171 any other since the 1930s (FDIC, 1995).

172 Additionally, as commercial banks have increased their farmland lending activity, they have continued
173 to consolidate. The FDIC defines an institution as an “agricultural bank” or “farm bank” if at least 25% of
174 its total outstanding loan volume was made to agriculture (FDIC, 2017a). In September 2017, 1,421
175 institutions met this definition (FDIC, 2017b), compared to 4,316 agricultural banks in 1980 (FDIC, 1995).
176 This consolidation of lending institutions has generally created larger banks with more diversified loan
177 portfolios. This risk diversification, coupled with the emergence of Farmer Mac as a guarantor of many
178 farm loans (FAMC, 2017), suggests that a downturn in agriculture today may be less likely than during
179 prior decades to trigger the widespread collapse of large numbers of financial institutions. However, the
180 number of farm banks has been declining more slowly than the number of non-farm banks (FCA, 2016);
181 and, one-third of an average farm bank’s loan portfolio in 2016 comprised agricultural loans (ABA, 2017).
182 As such, modern agricultural banks remain at risk when the farm economy suffers a downturn (FCA,
183 2016). These banks may be less inclined to renew operating loans for finally distressed clients and more
184 likely to initiate foreclosure actions for delinquent loans.

185 *More Stringent Underwriting Practices*

186 Regulatory authorities have, since the early 1980s, tightened requirements for loan underwriting.
187 Agricultural lenders have also embraced more conservative lending policies (FRS, 2015). Despite many
188 commercial lenders easing underwriting standards during the early 2000s, agricultural lenders did not

189 generally follow suit (OCC, 2017a). These more conservative practices continued even as crop prices and
190 land values rose (FRB M, 2013).

191 Helping to set the stage for the 1980s crisis, the Farm Credit Act of 1971 (Pub.L. 92-181, December
192 10, 1971) increased the allowable loan-to-value ratio for FCS association loans from 55% to 85% for
193 standard real estate loans and to 97% of the appraised value for real estate loans guaranteed by the
194 government. Legislators deemed this a “prudent relaxation” of then-current restrictions (U.S. Congress,
195 1971). During the 1970s, the Farmers Home Administration (FmHA) emerged as a prominent lender,
196 providing government-subsidized operating and farmland loans to family-sized farmers unable to obtain
197 credit through other channels (Massey, 1994). The ready availability of easy credit drove land prices even
198 higher (USDA ERS, 1985), which allowed farmers to use their inflated land value as collateral to obtain
199 more loans and expand their operations (FDIC, 1995, p. 263).

200 Most significantly, lenders during this era frequently based their lending decisions on the current
201 inflated market value of collateral and the current crop prices, rather than on cash-flow analysis (FDIC,
202 1995, p. 263). This meant lower down payments and a growth of credit availability that exceeded even
203 quickly rising income levels. Farm debt rose steadily with land prices, and when the bubble burst in the
204 early 1980s, most mortgage debtors were vastly over-extended. By mid-1985, FCS’s federal land banks
205 and FmHA held 52.3% of outstanding farm real estate debt (FDIC, 1995, p. 276). Unlike during the 1970s
206 and early 1980s, regulators now require agricultural lenders to rely on cash flow, not collateral value, in
207 assessing loan eligibility (OCC, 2017b). Consequently, banks do not generally make farm loans for real
208 estate with loan-to-value ratios greater than 60%–70% (Congressional Oversight Panel, 2009). All FDIC-
209 insured institutions must abide by federal regulations that require “prudent underwriting standards” (12
210 C.F.R. §365.2). Additionally, federal banks are supervised by bank examiners from the Office of the
211 Comptroller of the Currency, which requires its banks to mitigate risk, guard against an overconcentration
212 of agriculture-related loans, and use prudent underwriting practices (OCC, 2017a). These regulations set

213 fundamental limits on lending activities, such as requiring loan-to-value ratios no greater than 85% for
214 loans to purchase improved property, such as farmland (12 C.F.R. §365.2).

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

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

222 Likewise, FCS’s lending requirements have become more stringent since the 1980s farm crisis.
223 Although regulations still allow FCS to lend up to 85% of the appraised value of real estate, the standard
224 practice is 50% loan-to-value ratio (FCSA, 2016). Like other lenders, FCS focuses on cash flow and
225 repayment capacity, as opposed to current collateral value. The FCA Loan Portfolio Management
226 Handbook includes a section on “Lessons from the Past” warning against “over-reliance on inflated
227 expectations for future incomes combined with rapidly increasing values for agricultural assets” (FCA,
228 2017).

229 *Increased Capitalization Requirements*

230 Regulations designed to strengthen the capitalization requirements for lending institutions also protect
231 against the collapse of agricultural lending institutions. Prior to the 1980s, federal regulators did not set
232 specific numerical requirements for the capital adequacy of banks (FDIC, 2003). These determinations
233 were left to the discretion of bank supervisors (FDIC, 2003). In 1988, in response to the International Basel
234 Committee on Bank Supervision’s first Basel Accord (FRS, 2003), federal regulators imposed new capital
235 adequacy standards upon banking institutions. This capital had to consist primarily of “Tier 1” or low-risk

236 capital. In contrast, the agricultural banks that failed in the 1980s tended to have more high-risk capital and
237 fewer low-risk assets such as federal government securities (Belongia and Gilbert, 1987).

238 Current FDIC regulations incorporate guidance from Basel III, a comprehensive set of reform
239 measures developed by the global Basel Committee on Banking Supervision. All FDIC-insured lending
240 institutions, state and federal, must have a total capital to total risk-weighted assets ratio of at least 8%
241 (FDIC, 2003). Of that, the ratio for common equity tier 1 capital to total risk-weighted assets ratio must be
242 4.5%. Basel III also instituted a new “capital conservation buffer,” to strengthen financial resilience during
243 economic cycles. Beginning in 2016, this minimum requirement increases until reaching 2.5% in 2019 (12
244 C.F.R. § 324.300). In response, farm banks have significantly increased high quality capital reserves
245 during the past several decades, providing them with more insulation to survive potential downturns in the
246 agricultural economy (ABA, 2017).

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

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

251 *Farmer A – 1920s*

252 Farmer A is largely borrowed from Murray (1967). He owned a 311-acre farm in 1919 in central Iowa on
253 which he owed a mortgage debt of \$11,000. Up to this time, he had resisted all temptations to buy during
254 the boom. He had seen the farm next to his sell four times between 1909 and 1917—at \$100 an acre in
255 1909 and at \$190 an acre in 1917. Demand for food in Europe after World War I—especially a large U.S.
256 food aid program—further drove up crop and land prices, as well as net farm income. Finally, in March of
257 1920 at the top of the boom, courthouse records show that Farmer A bought the neighboring farm of 240
258 acres at \$396 an acre for a total of \$95,000.

259 To make the purchase, Farmer A borrowed \$34,000 in cash by increasing the mortgage on his home
260 farm from \$11,000 to \$45,000. This \$34,000, plus \$16,000 of additional cash from deposits and bank
261 loans on livestock and equipment, totalled \$50,000, which was paid on the \$95,000 purchase, leaving
262 only \$45,000 to be financed. Compared to most of the land boom sales, this one was conservative with
263 more than 50% of the amount paid in cash (Murray, 1967; Rajan and Ramcharan, 2015).

264 Farmer A's new mortgage debt was not heavy in relation to the value of the farm. He had a mortgage
265 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
266 land valued at around \$400 an acre, his debt was considerably less than one-half of the land value.

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

270 The second blow was the interest payment on the mortgage debt, which hit like a "ton of bricks" in
271 1921. In the actual case of Farmer A with a \$90,000 mortgage debt, the required interest payment of
272 \$5,000 was more than the value of all the corn produced on both of his farms that year (Murray, 1967).
273 While the interest payments were large for the time, the interest rates were much lower than comparable
274 rates for the 1980s, but only modestly higher than today's rates (FRS, 2017). Some farm owners
275 borrowed money from banks, relatives, and any other sources available to meet their required payments,
276 hoping that next year would see corn above \$1.00/bushel. That never happened, as the average corn price
277 for 1921–1925 was only \$.63/bushel (Johanns, 2017; Murray, 1967). Although farmer A had paid over
278 half of the purchase price in cash, he lost both of his farms in 1927 and 1928 because he exhausted his
279 borrowing capacity to stave off farm foreclosures. Farmer A was typical of a particularly unfortunate
280 group of land boom victims who had invested a large amount of their own resources, only to see them
281 evaporate with the continued low level of corn-hog prices after 1920 (Murray, 1967).

282 *Farmer B – 1970s- 1980s*

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

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

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

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

303 Things turned ugly for Farmer B in the early 1980s after the Soviet Union grain export embargo. In
304 addition, crude oil prices had doubled in 1979, and the cost of fertilizer, seed and farm chemicals rose by
305 20% (Rosenblatt, 1990; USDA ERS, 2016). More importantly, the Federal Reserve Bank determined that
306 higher interest rate were needed to curb inflation, which was around 10%–12% in late 1970s due to

307 government financing of the Vietnam War and the “War on Poverty” (Harl, 1990). With a strong U.S.
308 dollar hurting U.S. agricultural exports, the prices of corn, soybeans, and wheat received by Farmer B
309 dropped significantly below his cost of production, and his farm income dropped precipitously.

310 Like his neighbors, Farmer B sensed the tightening agricultural profitability but still thought his
311 balance sheet was strong. In 1983, he had about \$1,000/acre unpaid for the two land loans, and high
312 interest rates started to take a significant toll. After a disastrous 1983 harvest, Farmer B was still current
313 on his debt payments for the machinery, land, and operating loans. However, his working capital quickly
314 shrank to less than \$25,000. The cost of production and grain prices were not that different (Johanns,
315 2017), but interest rates almost doubled from 9% to 17% (FRS, 2017).

316 In February 1984, Farmer B was called in to the FLB, and the bank officer told him they needed
317 \$50,000 more in collateral for loan security purposes. Farmer B was caught by surprise and at a loss as to
318 how he could work through this. Neither FLB nor PCA was able to offer loan restructuring or a reduction
319 in the interest rate.

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

327 *Farmer C - 2010s*

328 Farmer C is based on data using FINPACK (FINPACK, 2017) collected by Charles Brown, an Iowa State
329 University Extension and Outreach farm management specialist. Farmer C farms 1,223 acres in Freeborn
330 County, Minnesota. He rented 1,000 acres for \$257/acre in 2015 and owned 223 acres, which he

331 purchased in 2005. On the rented acres, he employed a 50/50 corn-soybean rotation, while growing
332 continuous corn on his own 223 acres.

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

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

351 Because Farmer C made no changes in his operation for the 2015 growing season, he saw more
352 erosion in his working capital, and a \$94,146 loss in cash available after loan payments. In addition, the
353 value of Farmer C's land dropped from \$8,000 to \$7,000 an acre a year later.

354 For the 2016 growing season, Farmer C achieved much better yields than expected—210
355 bushels/acre for corn and 65 bushels/acre for soybeans—but prices were lower than 2015 at \$3.40/bushel
356 for corn and \$8.75/bushel for soybeans. Cash rent for the 1,000 rented acres was reduced by \$50 to
357 \$225/acre, and input costs, especially fertilizer costs, were reduced from 2015 prices as well. There was a
358 continued erosion of working capital, falling from \$272,886 in early 2015 to \$159,557 in late 2016 (Table
359 2). Despite declining land values leading to a reduction in the value of long-term assets, Farmer C’s debt-
360 to-asset ratio is comparable to or even smaller than two years ago at 23.7%. This is because he paid down
361 a significant amount of debt, especially the machinery debt, over the prior two years. The inaction of
362 Farmer C to refinance, however, resulted in a negative capital debt repayment margin of -\$25,032, and his
363 term debt coverage ratio dropped to 1.07, well below the safe threshold of 1.75 (Table 3) (FINPACK,
364 2017).

365 *Summary of the Farmer Case Studies*

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

379 **Looking Ahead: the Trajectory of the Current Farm Downturn**

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

384 *No Changes*

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

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

397 *Interest Rate Hike*

398 First, we assume for purposes of this scenario that Farmer C, who actually has fixed-rate machinery and
399 land loans, has variable rate loans with a rate that has increased to 8%, which would be close to the high
400 rates in the 1920s but only half of the 1980s rates (FRS, 2017). We also assume that the capitalization rate
401 for land valuation rises from 3% to 5% due to higher interest rates. Table 2 shows that an increase in the
402 capitalization rate would lead to a steep reduction in land value to \$3,900/acre. Despite this decline,

403 Farmer C would still have a strong balance sheet; however, his debt-to-asset ratio would rise to almost
404 27%, and, more importantly, Table 3 shows that his total interest paid would almost double, lowering his
405 capital debt repayment capacity by close to \$100,000. Under those conditions, cost management and
406 improved marketing would be imperative for Farmer C.

407 *Land Value Reduction*

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

415 **Discussion and Concluding Remarks**

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

423 We argue that there are at least three economic and regulatory reasons why this farm downturn is
424 unlikely to slide into a sudden collapse. First, a comparison between the third golden era of the 2000s and
425 the previous two reveals that gross and net farm income growth was much stronger during the most recent
426 decade. Second, regulators and agricultural lenders have tightened underwriting standards, including

427 valuing collateral based on cash flow as opposed to inflated market value (OCC, 2017b), and
428 strengthened capitalization requirements. Third, despite recent moves by the Federal Reserve, farmers and
429 other agricultural businesses still enjoy a very low interest rate, which limits the amount of debt in the
430 agricultural sector and keeps asset values strong. To this day, the balance sheet of the U.S. farm sector is
431 still very strong, and the delinquency rates for agricultural loans are still fairly low.

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

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

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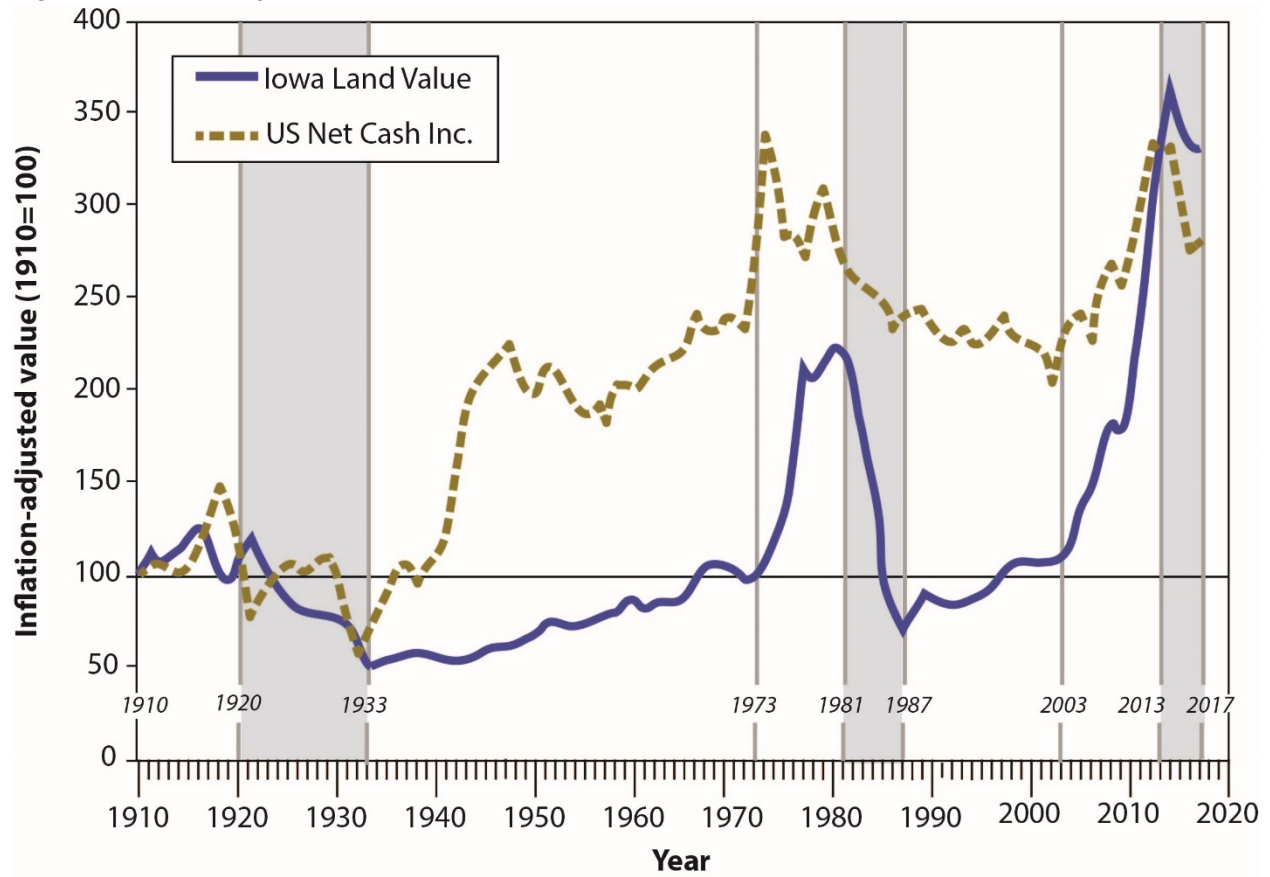
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583 **Figures**

584 Figure 1. Inflation-adjusted Iowa land values and U.S. net farm income (1910 = 100).



585
586

587 Table 1. Golden Eras versus Crises and Declines: Average Annual Percentage Change in Nominal and
 588 Inflation-adjusted Iowa Land Values and U.S. Farm Income
 589

Average annual percent change in nominal terms						
Variable	Golden Eras			Crises and Declines		
	1910-1920	1973-1981	2003-2013	1921-1933	1981-1987	2013-2017
Iowa Land Value	9.3%	19.5%	13.7%	-8.9%	-14.0%	1.1%
U.S. Gross Income	9.0%	9.8%	7.1%	-4.7%	2.1%	-2.4%
U.S. Net Income	8.4%	5.3%	10.7%	-3.6%	7.3%	-6.4%
Average annual percent change in inflation-adjusted terms						
Variable	Golden Eras			Crises and Declines		
	1910-1920	1973-1981	2003-2013	1921-1933	1981-1987	2013-2017
Iowa Land Value	1.7%	9.6%	11.0%	-5.8%	-15.0%	-0.1%
U.S. Gross Income	1.1%	0.7%	4.5%	-2.0%	-2.4%	-3.7%
U.S. Net Income	0.5%	-3.4%	8.2%	-1.3%	2.7%	-7.6%

590

591 Note: Iowa state average land values are based on USDA Census of Agriculture and USDA NASS
 592 Land Value and Cash Rent Survey (USDA NASS, 2017), while the data on U.S. gross and net farm
 593 income is from the USDA Economic Research Service Farm Income and Wealth Statistics database
 594 (USDA ERS, 2017).

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596

597

Table 2. Farmer C's Current and Future Projected Balance Sheet for 2018

	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 farm assets	\$ 377,090	\$ 291,237	\$ 227,918	\$ 194,896	\$ 205,432
<i>Cash on hand</i>	\$ 107,443	\$ 21,570	\$ 46,011	\$ 12,989	\$ 23,525
Intermediate farm assets	\$ 427,050	\$ 375,850	\$ 329,395	\$ 329,395	\$ 329,395
Long-term farm assets	\$ 1,636,000	\$ 1,524,500	\$ 1,463,750	\$ 941,094	\$ 1,045,625
<i>Value of Owned land</i>	\$ 1,561,000	\$ 1,449,500	\$ 1,393,750	\$ 871,094	\$ 975,625
Total assets	\$ 2,440,140	\$ 2,191,587	\$ 2,021,063	\$ 1,465,385	\$ 1,580,452
Current farm liabilities	\$ 217,533	\$ 219,128	\$ 218,084	\$ 218,084	\$ 218,084
Intermediate farm liabilities	\$ 131,179	\$ 67,196	\$ 4,198	\$ 4,198	\$ 4,198
Long-term farm liabilities	\$ 228,752	\$ 201,514	\$ 177,347	\$ 177,347	\$ 177,347
Total liabilities	\$ 577,464	\$ 487,838	\$ 399,629	\$ 399,629	\$ 399,629
Net worth	\$ 1,862,676	\$ 1,703,749	\$ 1,621,434	\$ 1,065,756	\$ 1,220,494
Liquidity					
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					
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

	2016 Crop Year	2017 Crop Year	2018 Crop Year Baseline	If Farmer C has pay 8% interest (cap rate = 5%) – 2018 Crop Year	Land value drops another 30% - 2018 Crop Year
Crop income	\$ 800,597	\$ 676,226	\$ 702,990	\$ 702,990	\$ 702,990
Crop insurance indemnity	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Commodity payments	\$ 32,535	\$ 0	\$ 0	\$ 0	\$ 0
Gross farm income	\$ 833,132	\$ 676,226	\$ 702,990	\$ 702,990	\$ 702,990
Interest paid	\$ 31,577	\$ 26,965	\$ 24,469	\$ 44,521	\$ 24,469
Net farm income	\$ 117,660	\$ 15,966	\$ 48,718	\$ 28,666	\$ 48,718
Depreciation	\$ 51,200	\$ 46,455	\$ 42,700	\$ 42,700	\$ 42,700
Nonfarm income					
Family living	\$ 56,000	\$ 56,000	\$ 56,000	\$ 56,000	\$ 56,000
Income taxes	\$ 19,977	\$ 2,256	\$ 9,060	\$ 4,368	\$ 2,040
Interest on term debt	\$ 23,668	\$ 19,504	\$ 17,625	\$ 19,521	\$ 17,625
Capital debt repayment capacity	\$ 116,551	\$ 23,669	\$ 43,983	\$ 30,519	\$ 51,003
Total scheduled principal and interest	\$ 109,048	\$ 109,542	\$ 109,542	\$ 129,100	\$ 109,542
Capital debt repayment margin	\$ 7,503	-\$ 85,873	-\$ 65,559	-\$ 98,581	-\$ 58,045
Cash required for replacement					
Replacement margin	\$ 7,503	-\$ 85,873	-\$ 65,559	-\$ 98,581	-\$ 58,045
Term debt coverage ratio	1.07	0.22	0.40	0.24	0.47

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.