Declining Liquidity in Iowa Farms: 2014–2017

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Abstract

The goal of the present study is to describe the evolution of financial liquidity in Iowa farms for 2014–2017, using a unique panel of 220 mid-scale commercial farms. Farms with vulnerable liquidity ratings increased from 33.2 percent in December 2014 to 45.0 percent in December 2017. On average, farms lost $244 of working capital per acre over that period, but farms with vulnerable liquidity ratings in December 2017 lost almost 60 percent more than that, or $388. Average farm size, machinery investment per acre, farm net worth per acre, debt-to-asset ratio, and age of operator were not significantly different across liquidity-rating categories.

INTRODUCTION

Average accrued net farm income in Iowa, the largest corn producer state and the second largest soybean producer state in the United States, declined by 89 percent from its peak at $243,072 in 2012 to $27,927 in 2015, before recovering to $57,928 in 2017 (Plastina & Johanns, 2018). Because of this erosion in farm profitability, a deterioration of the overall financial health of the farm sector ensued, in terms of both lower average liquidity[1] levels and higher average farm debt levels (Figure 1). In particular, the average current ratio[2] for Iowa farms peaked in 2012 at 7.08, and it has since declined to 2.74 in 2017, its lowest level since 2001 when it reached 2.46 (Plastina & Johanns, 2018). Similarly, the average working capital[3] per dollar of gross revenue declined from 0.78 in 2013 to 0.55 in 2017, the lowest level since 2011 (0.43) (Plastina & Johanns, 2018).

However, understanding the actual distribution of liquidity across farms is more relevant than measuring the liquidity of an average farm. This is particularly true for a low-commodity-price environment with sticky costs that puts extra strain on farms' cash-flow budgets. The goal of this article is to describe the evolution of financial liquidity in Iowa farms between 2014 and 2017. This report is expected to inform the policy discussion on the appropriateness of the current farm safety net, provide valuable insights to lenders and regulators about the potential systemic risk in agricultural production, and provide benchmarks for farms and agricultural stakeholders to design appropriate liquidity management strategies.

The novelty of this article stems from the use of detailed farm records collected by the Iowa Farm Business Association (IFBA), an independent association, managed and controlled by its farmer-members.[4] Because the IFBA data are collected through multiple interactions through time between farmer-members and regional consultants from the same association, the quality of the enumeration is expected to be higher than that of similar data sets collected through a single annual interaction between enumerators and farmers (such as the Agricultural Resource Management Survey (ARMS) conducted jointly by the National Agricultural Statistics Service and the Economic Research Service of the U.S. Department of Agriculture).

At calendar year-end, the liquidity of each farm is evaluated using its current ratio, and the farm is assigned one of the following liquidity ratings: vulnerable, normal, or strong. The evolution of financial liquidity in Iowa is assessed by evaluating the number of farms in each liquidity-rating category through time, as well as their average current ratio and average working capital per acre. Net worth per acre, machinery investment per acre, farm size, and age of the operator are also evaluated to better understand how the average farm in each liquidity-rating category changed through time. This article extends and refines the analysis conducted by Plastina (2016), by incorporating two years of additional data and expanding the list of variables used to characterize farms.

The next section explains the sample selection process, discusses its representativeness, and provides details on the valuation methods and their impact on our solvency measures. A methodological section follows, explaining the liquidity ratings. After presenting the results, we provide practical perspectives for farmers, lenders, and policy-makers in the concluding section.

DATA

The 220 farms analyzed in this study were selected from the IFBA database based on the availability of complete and detailed financial statements for the years 2014 to 2017. Because the IFBA data are not collected using survey sampling methods, they are not representative of the population of Iowa farms. However, after classifying the sample farms according to their Gross Farm Cash Income using the typology proposed by the USDA's Economic Research Service (2017), it becomes apparent that the IFBA data is comprised mostly of mid-scale farms (Figure 2). Furthermore, sample farms are usually larger than 180 acres and operated by people 45 years old or older (Table 1). In summary, the sample farms are believed to be representative of mid-scale commercial farms largely managed by experienced farmers.

Financial statements prepared by IFBA consultants use a mix of valuation strategies to track farm financial performance: current assets are valued at their market value, but some intermediate and all long-term assets (such as machinery and land, respectively) are valued at their cost (or book) value. If a cost value is not available, then the asset is assigned a value equivalent to certain percent of the market value the first time it is recorded, and its value is reduced thereafter by a fixed percentage if the asset is depreciable. Therefore, solvency measures (such as net worth) or measures of investments (such as machinery investment per acre) are not affected by changes in market prices or by their tax basis.

METHODOLOGY

To ensure the comparability of financial liquidity across farms of different sizes, the assessment is conducted using the current ratio (CR), calculated as current assets divided by current liabilities. While dairy farms or other farms that have continuous sales throughout the year can safely operate with lower CRs, operations that concentrate sales during several periods each year (such as cash grain farms) need to strive for higher CRs, especially near the beginning of the crop year.

According to the Farm Financial Scorecard (Becker et al., 2014), a CR above 1.7 indicates a *strong* liquidity position; a ratio below 1.3 indicates a *vulnerable* liquidity position, and a ratio between 1.3 and 1.7 is *normal* and indicates that liquidity should be kept under close watch. Based on its calendar year-end CR and the thresholds recommended by Becker et al. (2014), we assign each farm one of the three liquidity ratings: vulnerable, normal, or strong. To avoid outliers in the sample, only farms with non-negative current ratio values below 50 were selected.

The distribution of counts of farms across the three categories is used as an indicator of the overall financial liquidity situation among mid-scale commercial farms in Iowa at calendar year-end. Selected indicators are reported for each category to characterize the various groups: working capital per acre, farm net worth per acre, farm size, age of the operator, and machinery investment per acre.

Working capital per acre (WKA), calculated as the ratio of the difference between current assets and current liabilities to the number of acres in the operation, is a complementary measure of liquidity to the CR that indicates the dollar amount of liquid assets to cancel short-term obligations on a per acre basis. A negative WKA indicates that liquid assets are insufficient to cover current liabilities, and the need for extra cash. The larger the WKA, the lower the need for extra cash over the following 12 months.

Farm net worth per acre (NWA), calculated as the ratio of the difference between total farm assets and total farm liabilities to the number of acres in the operation, is a relative measure of solvency that indicates the dollar amount of equity available in the operation on a per acre basis. The larger the NWA, the more likely the operation is to have access to lines of credit using its own equity as collateral to finance short-term gaps in working capital.

A complementary measure of financial solvency is the debt-to-asset ratio (DTA), calculated as the ratio of total liabilities to total assets. The higher (lower) the DTA, the higher (lower) the leverage of the operation and therefore the lower (higher) the relative equity in the business.

Farm size is measured as the number of cropland acres per operation, and is included in the analysis to evaluate whether farms with vulnerable liquidity ratings tend to be smaller than other farms.

Age of the operator is used as an imperfect indicator of farming experience, and farms with vulnerable liquidity ratings are expected to be operated by younger farmers than other farms.

Machinery investment per acre is included in the analysis to evaluate whether machinery investment is associated with liquidity ratings. Anecdotal evidence suggests that financially stressed farms tend to have overinvested in machinery in recent years.

The count of farms that switched categories across years is used as an indicator of the change in the liquidity situation for Iowa farms.

RESULTS

Almost half (44.5 percent) of the farms had a strong liquidity rating by December 2014, and one-third (33.2 percent) had a vulnerable liquidity rating (Table 2). By December 2015, the percent of farms with vulnerable liquidity ratings increased by 9.1 percentage points, and vulnerable farms accounted for a slightly larger share of the sample than farms with strong liquidity ratings: 42.3 percent versus 39.1 percent, respectively. By December 2016, almost half (46.4 percent) of the farms had vulnerable liquidity ratings, while the shares of the other two groups continued to decline. By December 2017, there was a slight reduction in the share of farms with vulnerable liquidity (from 46.4 percent to 45.0 percent), and a 7.3 percentage points in the share of farms with normal liquidity ratings, resulting from a large reduction in the share of farms with strong liquidity. By direct comparison of the shares of the three groups in December 2014 and December 2017, it becomes apparent that the financial liquidity of mid-scale commercial farms in Iowa experienced a strong deterioration, going from having almost half of the sample classified into the strong category to having almost half of the sample classified into the vulnerable category.

The evolution of the average value of the CR (Table 2) for the group of farms with strong liquidity ratings (that change in composition over the years) suggests that its average liquidity declined by 16 percent (from 6.2 to 5.22) between December 2014 and December 2017. However, the difference in means is not statistically significant (p-value=0.22). Because of the use of fixed thresholds to classify farms according to their CR, the average value of the CR for the vulnerable and strong liquidity categories remained stable through time.

The means of the other variables characterizing farms in each category listed in Table 2 (farm size, age of operator, investment in machinery, debt-to-asset ratio, and farm net worth per acre) are numerically different across categories and through time, but the differences are not statistically significant at the 10 percent significance level. Therefore, we are not able to associate particular farm characteristics to a higher or lower risk of falling into the vulnerable liquidity category.

The average loss in WKA across all farms in the sample amounted to $146.5 in 2015, $78.4 in 2016, and $19.3 in 2017, accumulating a $244.2 loss over the entire period (Table 3). The difference between average WKA losses in 2015 and 2017 is statistically significant at the 10 percent level of confidence, as indicated by the non-overlapping confidence intervals in Table 3.

Farms with vulnerable liquidity ratings in December 2017 accumulated an average loss of $387.9 in WKA since 2014. In 2015 and 2016, the three categories showed average losses in WKA, but in 2017, only the vulnerable category continued to lose WKA. However, on an annual basis, the only significant difference (at the 10 percent significance level) is that between the mean loss in WKA by vulnerable farms versus the mean loss in WKA by strong farms in 2017.

CONCLUSIONS

This article describes the evolution of financial liquidity across Iowa farms over 2014–2017, using a unique panel of farm financial statements collected by the Iowa Farm Business Association (IFBA).

The share of farms with vulnerable liquidity ratings increased from 33.2 percent in December 2014 to 45.0 percent in December 2017. On average, farms lost $244.2 of working capital per acre over that period, but farms with vulnerable liquidity ratings accumulated a loss of $387.9. More than two in five farms run the risk of not being able to pay off their obligations as they become due over the course of 2018.

This study does not find statistical evidence that farm characteristics — such as farm size, average machinery investment per acre, farm net worth per acre, debt-to-asset ratio, and age of operator — differ significantly across liquidity-rating categories or years. Further research including more detailed variables in the analysis should be pursued to evaluate whether specific farm traits affect the likelihood of facing larger liquidity risks.

The results of this study serve as a unique guide to understand the extent of financial stress across agricultural operations in Iowa, which is particularly relevant in the current context of low commodity prices, where a new Farm Bill and a changing trade scenario could potentially curtail the demand for agricultural products from Iowa. Results are expected to serve as benchmarks for Iowa and Midwest producers and to be incorporated in the process of farm financial planning. For example, lenders could use the information presented in this article to discuss in an impersonal way the recent deterioration of overall liquidity indicators and the importance of cash flow budgeting for farms of all sizes and operators of all ages.

ENDNOTES

1. Liquidity indicates the degree to which debt obligations coming due over the following year can be paid from cash or assets that soon will be turned into cash, and is typically measured by the current ratio and the working capital.
2. The current ratio is calculated as the ratio of current assets to current liabilities, and measures the number of dollars in current assets per dollar of current liabilities.
3. Working capital is calculated as the difference between current assets and current liabilities.
4. More information on the IFBA is available online at http://www.iowafarmbusiness.org/services.html.

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Table 1. Sample farms by size (in acres) and age of principal operator.

	IFBA Farms			IFBA Farms	
Farm Size (Acres)	**N**	**%**	**Age Group**	**N**	**Percent**
a) 1 to 9	0	0	a) Under 25	1	0.45
b) 10 to 49	2	0.91	b) 25 to 34	8	3.64
c) 50 to 179	6	2.73	c) 35 to 44	11	5
d) 180 to 499	67	30.45	d) 45 to 54	61	27.73
e) 500 to 999	84	38.18	e) 55 to 64	89	40.45
f) 1000 and up	61	27.73	f) 65 and up	50	22.73
Total Observations	**220**	**100**	**Total Observations**	**220**	**100**
Average Size	**814.53**		**Average Age**	**56.85**	

Table 2. Distribution of farms by Liquidity Rating and year, and selected characteristics by group

Variable	Year	Current Ratio Status		
		Vulnerable (CR<=1.3)	Normal (1.3<CR<=2.0)	Strong (CR>2)
Percent of Farms in Sample	2014	33.2	22.3	44.5
	2015	42.3	18.6	39.1
	2016	46.4	15	38.6
	2017	45	22.3	32.7
Average Current Ratio	2014	0.9 (0.26)	1.6 (0.17)	6.2 (6)
	2015	0.91 (0.28)	1.59 (0.2)	5.83 (6.08)
	2016	0.91 (0.27)	1.66 (0.2)	5.5 (5.43)
	2017	0.87 (0.27)	1.6 (0.21)	5.22 (5.12)
Average Debt-to-Asset Ratio	2014	0.6 (0.31)	0.44 (0.22)	0.25 (0.18)
	2015	0.63 (0.29)	0.4 (0.21)	0.25 (0.17)
	2016	0.63 (0.28)	0.41 (0.25)	0.23 (0.16)
	2017	0.65 (0.33)	0.44 (0.23)	0.23 (0.18)
Average Farm Size (in acres)	2014	761 (544)	857 (609)	833 (539)
	2015	846 (596)	699 (505)	836 (532)
	2016	795 (554)	887 (691)	809 (501)
	2017	809 (586)	836 (552)	808 (522)
Average Age of Operator	2014	54.3 (11)	57.1 (12.4)	58.1 (9)
	2015	55 (11.3)	56.7 (12.3)	58.4 (8.6)
	2016	54.7 (12)	57.5 (10.1)	58.6 (8.4)
	2017	55.7 (11.3)	55.4 (11.5)	58.7 (8.7)
Average Working Capital per Acre	2014	-108.5 (258.6)	679.7 (1091.4)	769.7 (601.3)
	2015	-23.7 (645.6)	292.1 (137.8)	686.5 (475.2)
	2016	-126.7 (407)	335.3 (168.3)	622.2 (369.8)
	2017	-146.6 (468.6)	377.1 (326.8)	594.7 (325.3)
Average Farm Net Worth per Acre	2014	2023 (4044)	2816 (2483)	2936 (1942)
	2015	1667 (1635)	3302 (4997)	3014 (1930)
	2016	1820 (3434)	2500 (2053)	3079 (1827)
	2017	1817 (3594)	2550 (1867)	3008 (1889)
Average Machinery Investment per Acre	2014	526 (305)	513 (255)	502 (246)
	2015	491 (264)	514 (285)	513 (289)
	2016	504 (271)	537 (282)	501 (311)
	2017	516 (271)	565 (348)	459 (259)

Note: Standard deviations in parenthesis.

Table 3. Average changes in working capital per acre by Liquidity Rating in 2017			
Liquidity Rating in 2017	**Period**		
	Dec2014-Dec2015	**Dec2015-Dec2016**	**Dec2016-Dec2017**
Vulnerable (CR<=1.3)	-191.2 (808.6)	-144.5 (737.3)	-52.3 (246.3)
	[-326.8; -55.5]	[-268.2; -20.8]	[-93.6; -10.9]
Normal (1.3<CR<=2.0)	-157.0 (364.0)	-16.3 (288.5)	15.1 (328.9)
	[-244.2; -69.8]	[-85.4; 52.8]	[-63.7; 93.9]
Strong (CR>2)	-78.6 (172.5)	-30.6 (166.9)	2.2 (151.5)
	[-112.5; -44.8]	[-63.4; 2.2]	[-27.6; 31.2]
All farms	-146.5 (576.4)	-78.4 (522.4)	-19.3 (243.3)
	[-247.7; -45.3]	[-170.1; 13.4]	[-62.1; 23.4]

Note: Standard deviations in parenthesis; 10% confidence intervals in square brackets.

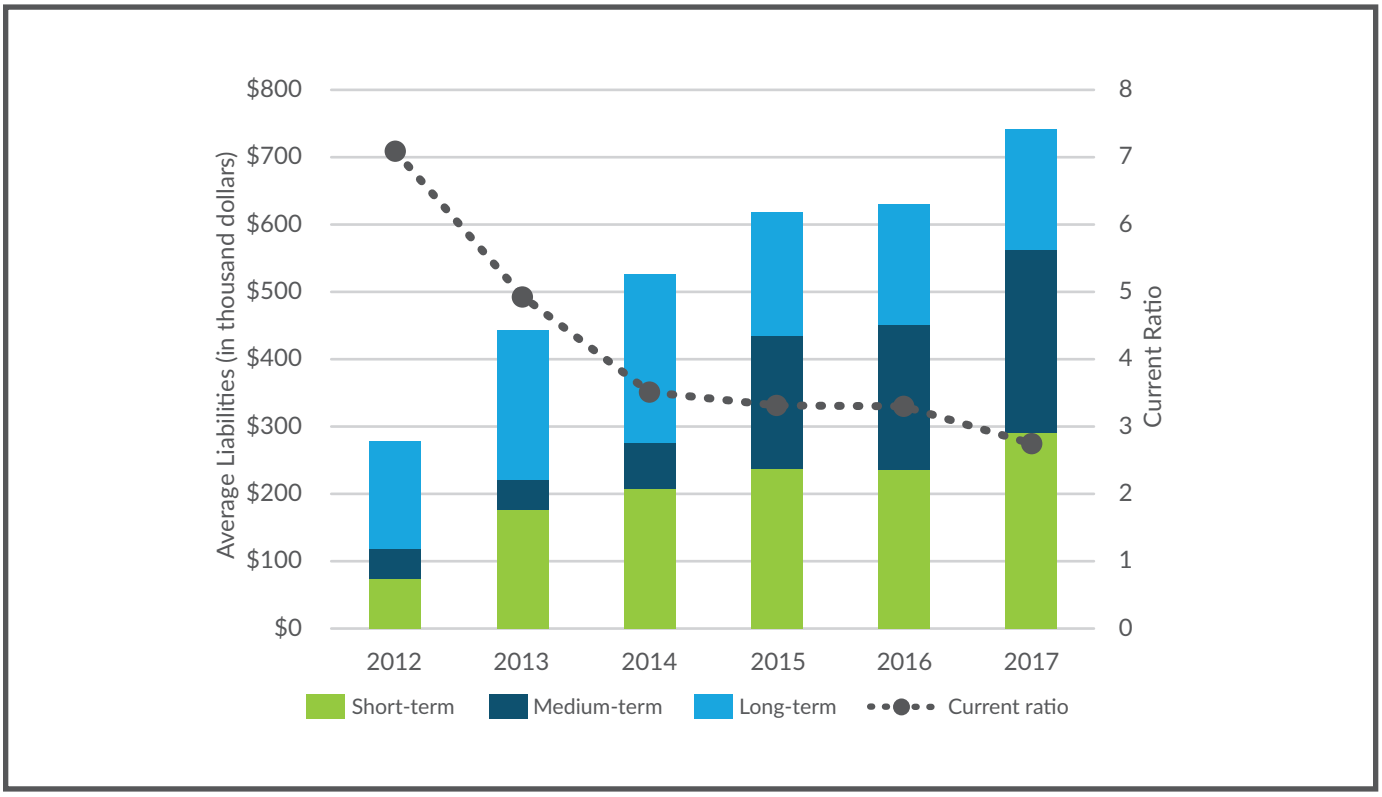

Figure 1. Current Ratio and Average Liabilities of Iowa Farms