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## A panel study of Iowa Farm Financial Conditions: 2014-2016

### Introduction

1. Average accrued Net Farm Income (NFI) in Iowa declined by 82% between its peak in 2012 and 2016 (Figure 1).
2. Relative aggregate measures of solvency (debt to asset ratio, DTA) and liquidity (current ratio, CR) have deteriorated rapidly since then, and are now similar to 2006 levels (Figure 2).
3. However, average net worth per acre (NWA) has remained stable at around \$2,750 since 2011 (Figure 1).

Figure 1. Average NFI and NWA in Iowa

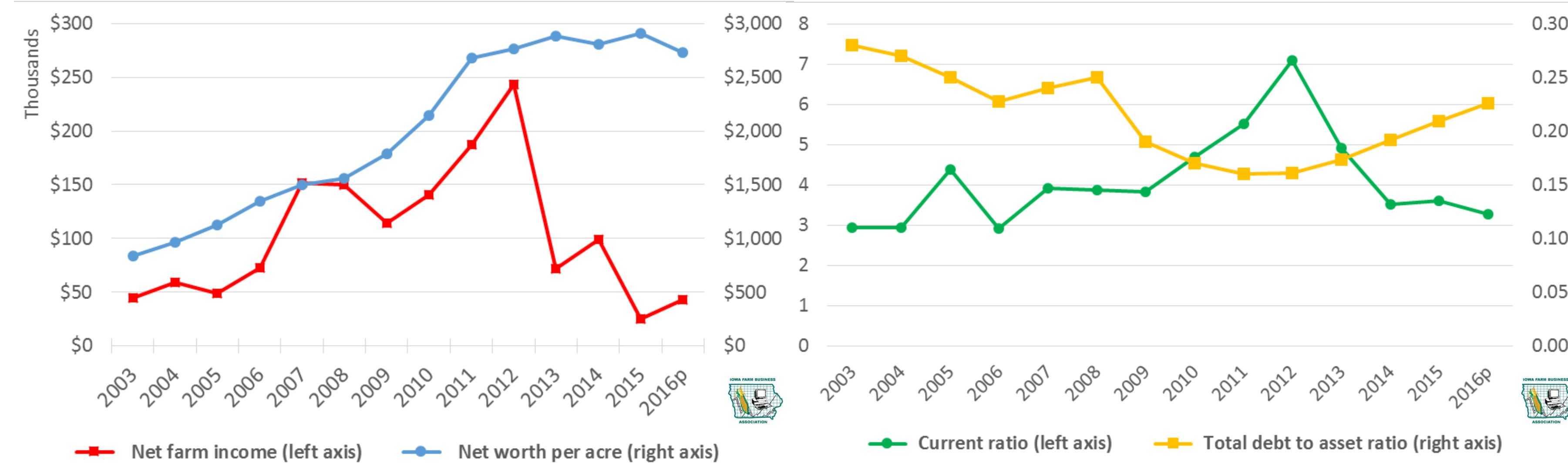
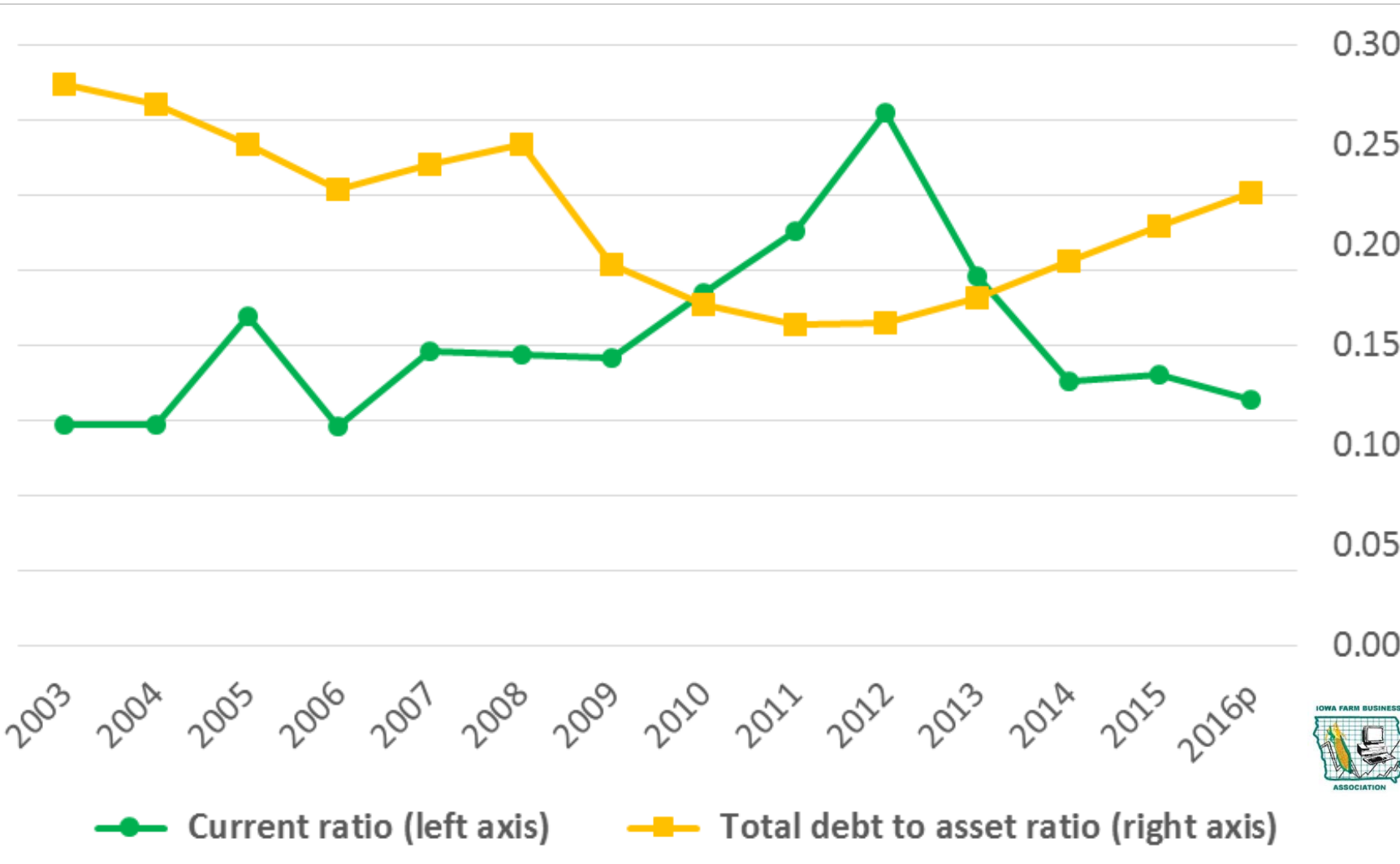


Figure 2. Average DTA and CR in Iowa



### Objective

To evaluate the extent to which average financial measures hide the degree of actual financial stress across Iowa farms.

### Data

1. The data consists of a panel of 273 farms from the Iowa Farm Business Association, with complete balance sheets in Dec 2014, Dec 2015 and Dec 2016; and complete income statements for 2015 and 2016.
2. The dataset is representative of medium sized commercial farms (Tables 1 & 2).

Table 1. Farm Size

Farm Size (Acres)	IFBA Farms		2012 Ag Census	
	N	%	N	Percent
a) 1 to 9	0	0.00	6,707	7.57
b) 10 to 49	1	0.37	20,665	23.31
c) 50 to 179	9	3.30	22,788	25.71
d) 180 to 499	77	28.21	18,654	21.05
e) 500 to 999	117	42.86	11,581	13.07
f) 1000 and up	69	25.27	8,242	9.30
Total Observations	273	100	88,637	100

Average Acres		796	345
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Table 2. Age of Principal Operator

Age Group	IFBA Farms		2012 Ag Census	
	N	%	N	Percent
a) Under 25	1	0.37	595	0.67
b) 25 to 34	10	3.66	5,647	6.37
c) 35 to 44	20	7.33	9,824	11.08
d) 45 to 54	71	26.01	20,765	23.43
e) 55 to 64	114	41.76	25,701	29.00
f) 65 and up	57	20.88	26,105	29.45
Total Observations	273	100	88,637	100

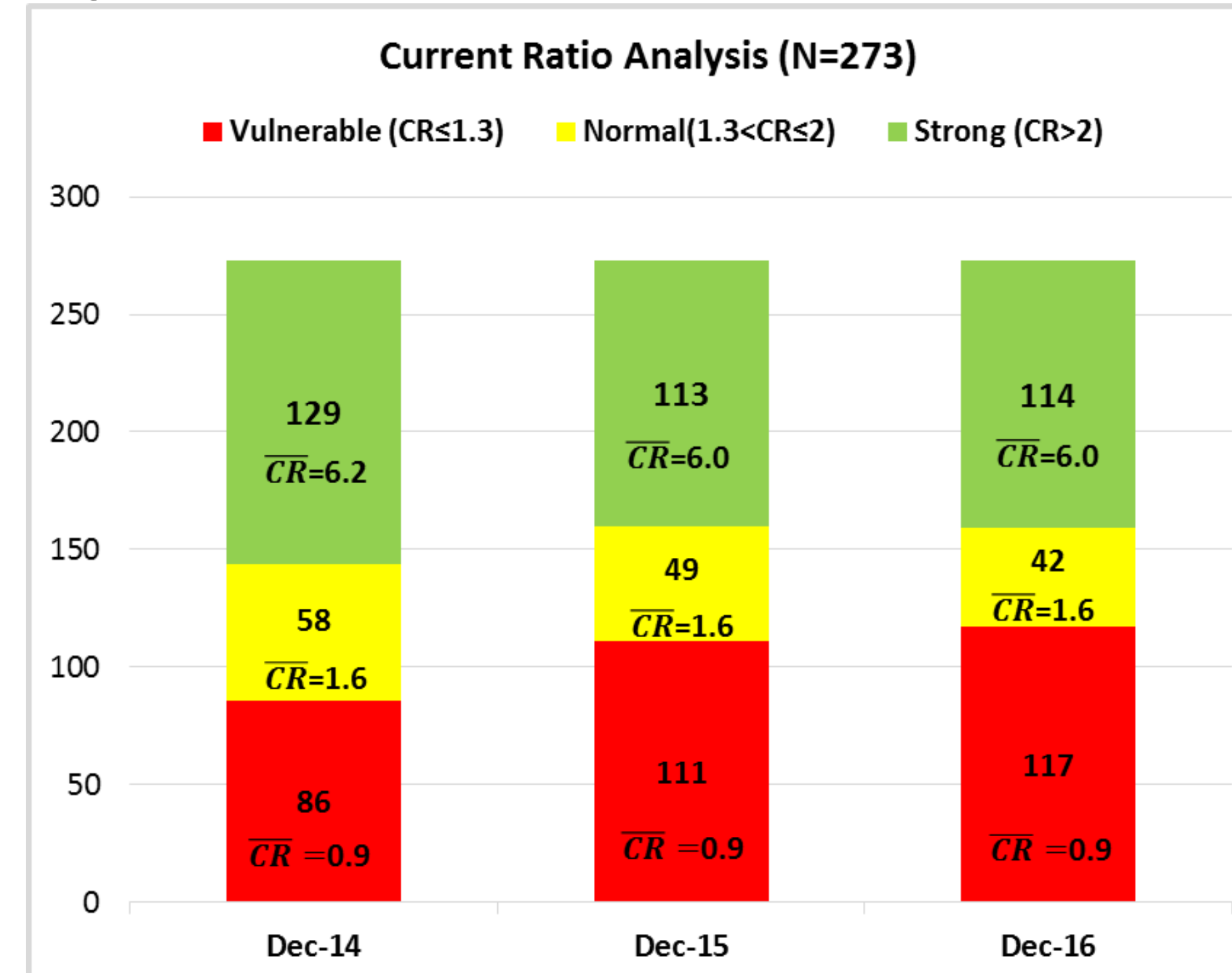
Average Age		56	57
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### Methods

1. Each farm is classified according to its DTA into one of three categories:
  - Strong Solvency ( $DTA \leq 0.3$ )
  - Normal Solvency ( $0.3 < DTA \leq 0.6$ )
  - Vulnerable Solvency ( $DTA > 0.6$ )
2. Each farm is classified according to its CR into one of three categories:
  - Strong Liquidity ( $CR > 2$ )
  - Normal Liquidity ( $1.3 < CR \leq 2$ )
  - Vulnerable Liquidity ( $CR \leq 1.3$ )
3. Changes in the number of farms in each category and their financial situation are evaluated across years.
4. Average changes in working capital per acre (WKA) are calculated for groups of farms according to their classification in Dec 2016.

### Results

Figure 3. Financial Liquidity: Current Ratio



Dec14 vs Dec16 (Figure 3):

- Share of farms with Strong Liquidity declined from 47.3% to 41.8%
- Share of farms with Normal Liquidity declined from 21.3% to 15.4%
- Share of farms with Vulnerable Liquidity increased from 31.5% to 42.9%.
- Overall average CR declined from 3.54 to 3.15.

Figure 4. Financial Solvency: Debt to Asset Ratio

Dec14 vs Dec16 (Figure 4):

- Share of farms with Strong Solvency declined from 42.5% to 39.9%
- Share of farms with Normal Solvency declined from 37.0% to 34.8%
- Share of farms with Vulnerable Solvency increased from 20.5% to 25.3%.
- Overall average DTA increased from 0.39 to 0.43

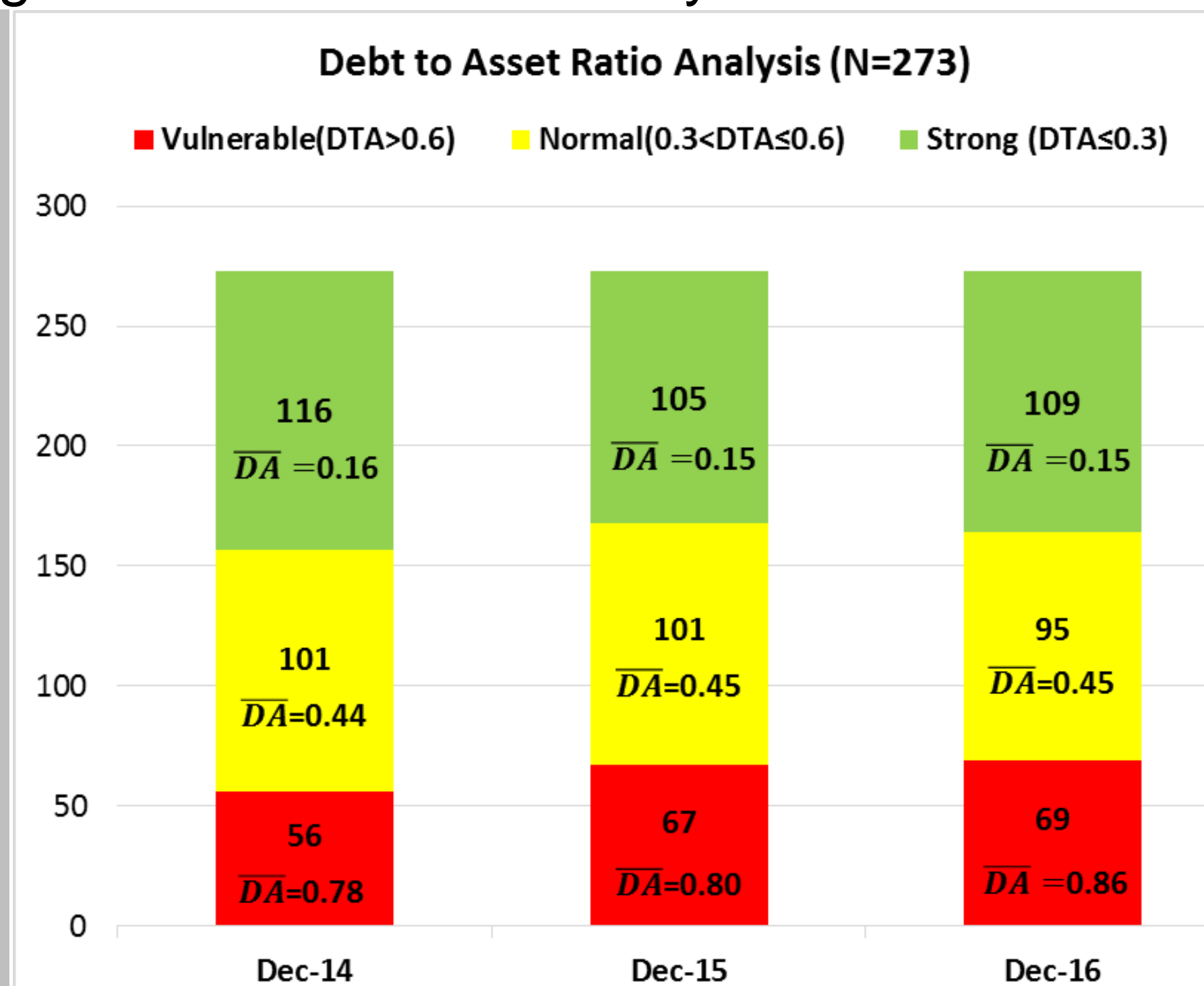


Table 3. Financial Indicators Dec 2014

		Current Ratio Status Dec 2014		
		Strong (CR>2)	Normal (1.3<CR≤2.0)	Vulnerable (CR≤1.3)
Debt to Asset Ratio Status Dec 2014	Strong (DTA≤0.3)	N=90	N=19	N=7
	%=	32.97	6.96	2.56
	Avg. CR=	6.75	1.62	1.01
	Avg. DA=	0.15	0.2	0.16
	Avg. Size=	783	779	584
	Avg. Age Operator=	60	63	61
	Avg. Working Capital/Acre=	\$775	\$316	\$3
	Avg. Farm Net Worth/Acre=	\$3,337	\$4,290	\$8,315
	Avg. Machinery Inv.15/Acre=	\$494	\$572	\$873
Normal (30%<DTA≤60%)	N=	33	29	39
	%=	12.09	10.62	14.29
	Avg. CR=	5.21	1.6	0.97
	Avg. DA=	0.39	0.45	0.48
	Avg. Size=	949	865	790
	Avg. Age Operator=	56	56	53
	Avg. Working Capital/Acre=	\$708	\$716	-\$50
	Avg. Farm Net Worth/Acre=	\$2,248	\$2,293	\$1,880
	Avg. Machinery Inv.15/Acre=	\$518	\$491	\$482
Vulnerable (DTA>60%)	N=	6	10	40
	%=	2.2	3.66	14.65
	Avg. CR=	2.43	1.58	0.78
	Avg. DA=	0.72	0.74	0.8
	Avg. Size=	584	786	734
	Avg. Age Operator=	46	47	52
	Avg. Working Capital/Acre=	\$514	\$847	-\$261
	Avg. Farm Net Worth/Acre=	\$1,298	\$1,353	\$798
	Avg. Machinery Inv.15/Acre=	\$353	\$471	\$462

Table 4. Financial Indicators Dec 2016

		Current Ratio Status Dec 2016		
		Strong (CR>2)	Normal (1.3<CR≤2.0)	Vulnerable (CR≤1.3)
Debt to Asset Ratio Status Dec 2016	Strong (DTA≤0.3)	N=84	N=17	N=8
	%=	30.77	6.23	2.93
	Avg. CR=	6.92	1.62	1.14
	Avg. DA=	0.14	0.17	0.21
	Avg. Size=	788	705	500
	Avg. Age Operator=	60	62	67
	Avg. Working Capital/Acre=	\$689	\$233	\$82
	Avg. Farm Net Worth/Acre=	\$3,460	\$4,212	\$7,387
	Avg. Machinery Inv.16/Acre=	\$504	\$613	\$664
Normal (30%<DTA≤60%)	N=	28	17	50
	%=	10.26	6.23	18.32
	Avg. CR=	3.47	1.6	0.97
	Avg. DA=	0.4	0.46	0.47
	Avg. Size=	846	1054	894
	Avg. Age Operator=	55	52	56
	Avg. Working Capital/Acre=	\$546	\$293	-\$37
	Avg. Farm Net Worth/Acre=	\$2,324	\$1,551	\$1,845
	Avg. Machinery Inv.16/Acre=	\$476	\$445	\$531
Vulnerable (DTA>60%)	N=	2	8	59
	%=	0.73	2.93	21.61
	Avg. CR=	4.63	1.58	0.8
	Avg. DA=	0.66	0.82	0.87
	Avg. Size=	298	755	716
	Avg. Age Operator=	37	54	50
	Avg. Working Capital/Acre=	\$587	\$405	-\$264
	Avg. Farm Net Worth/Acre=	\$1,481	\$899	\$732
	Avg. Machinery Inv.16/Acre=	\$79	\$357	\$430

1. Comparing Dec14 vs Dec 16 (Tables 3 & 4):

- Share of farms with vulnerable solvency and liquidity ratings increased from 15% (40 farms) to 22% (59 farms).
- Share of financially stressed farms (vulnerable solvency or liquidity ratings) increased from 38% (102 farms) to 47% (127 farms).
- Share of non-financially-stressed farms (normal or strong solvency and liquidity ratings) declined from 63% (171 farms) to 53% (146 farms).

2. In Dec16, machinery investment per acre among farms with vulnerable liquidity status is much higher than among farms with strong or normal liquidity status (Table 4).

3. Cumulative loss of WKA (Table 5):

- Farms with strong liquidity : \$98.
- Farms with normal liquidity: \$154.
- Farms with vulnerable liquidity: \$347.
- All farms: \$180.

Table 5. Changes in Working Capital per Acre

			Current Ratio Status Dec 2016			
			Strong (CR>2)	Normal (1.3<CR<=2.0)	Vulnerable (CR<=1.3)	All
Debt to Asset Ratio Status Dec 2016	Strong (DTA≤.3)	Dec15-Dec14	-\$69	-\$81	-\$141	-\$76
		Dec16-Dec15	-\$15	-\$15	-\$112	-\$22
		Cumulative	-\$84	-\$96	-\$253	-\$98
	Normal (0.3<DTA<0.6)	Dec15-Dec14	-\$53	-\$134	-\$181	-\$135
		Dec16-Dec15	-\$4	\$53	-\$53	-\$20
		Cumulative	-\$57	-\$81	-\$234	-\$154
	Vulnerable (DTA>0.6)	Dec15-Dec14	\$116	-\$134	-\$198	-\$187
		Dec16-Dec15	\$160	-\$44	-\$193	-\$128
		Cumulative	\$277	-\$178	-\$391	-\$314
	All	Dec15-Dec14	-\$76	-\$135	-\$181	-\$123
		Dec16-Dec15	-\$22	-\$20	-\$166	-\$57
		Cumulative	-\$98	-\$154	-\$347	-\$180

### Acknowledgement

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