The Effects of Section 179 Deductions and Bonus Depreciation on Farm Financial Ratios

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U N I V E R S I T Y.

Introduction

Purpose: To measure the effects Section 179 deduction, bonus depreciation and capital investment levels have on farm financial ratios.

Overview:
- Depreciation, Section 179 and bonus depreciation
- Data used to determine the effects
- Models estimated
- Results

Depreciation

- Reduction of the value of an asset over time to account for the use of the asset
- Modified Accelerated Cost Recovery System (MACRS)
  - General Depreciation System (GDS)
    - Three methods available
  - Alternative Depreciation System (ADS)
    - One method available

Depreciation Methods

- General Depreciation System (GDS)
  - Straight-line
  - Double-declining balance
  - One and one-half declining balance
- Alternative Depreciation System (ADS)
  - Straight-line

Background of Section 179

- Section of the Internal Revenue Service (IRS) tax code
- Helps small and medium-size businesses by reducing the cost of investment in asset purchases
- Allows deduction of full purchase price
- Includes purchased, financed or leased, new or used equipment

Background of Section 179

- Tailored to small and medium-size businesses by deduction and equipment purchase limits
- Deduction limit
  - Maximum total deduction in a year
- Equipment purchase limit
  - Maximum total investment in year
  - Deduction phases out on a dollar-for-dollar basis when limit is reached

Background of Bonus Depreciation

- Outlined in Section 168(k) of IRS tax code
- Used to accelerate depreciation
- Not always available and percentage changes
- Must be claimed within the first year of assets' use
- Originally only applied to new assets – modified to include used assets in 2017

Background of Bonus Depreciation

- Generally used after Section 179 deduction limit reached unless a taxpayer does not have taxable profit
- Allows businesses with net loss to deduct depreciation and carry the loss forward
- Useful for large businesses that spend more than the Section 179 limits

Key Policies

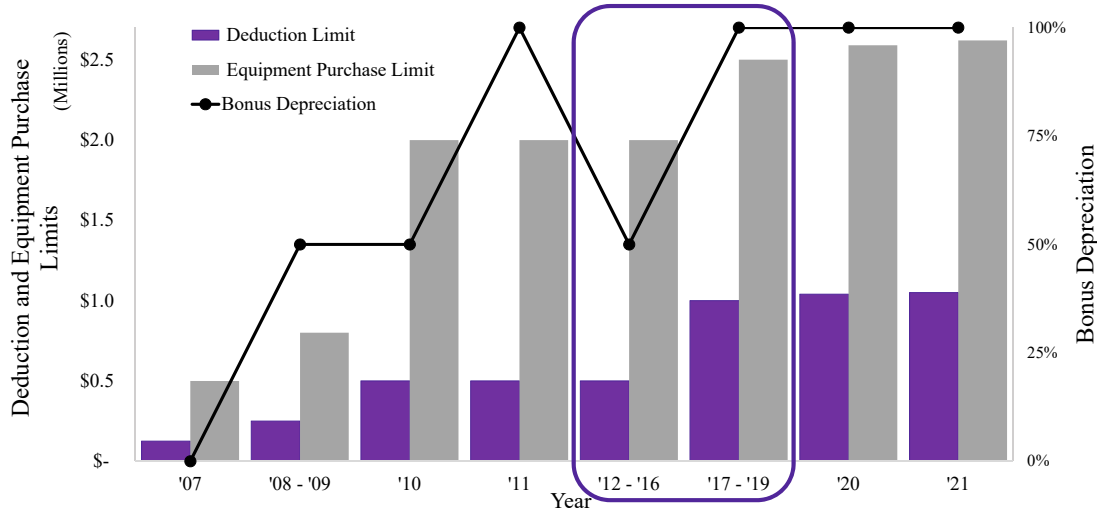| Policy	Section 179 Deduction Limit	Section 179 Equipment Purchase Limit	Bonus Depreciation
Economic Stimulus Act of 2008	$250,000	$800,000	50%
American Recovery and Reinvestment Act of 2009	$250,000	$800,000	50%
Hiring Incentive to Restore Employment (HIRE) Act of 2010	$250,000	$800,000	-
Small Business Jobs and Credit Act of 2010	$500,000	$2,000,000	50%
Tax Relief Unemployment Insurance Reauthorization, Job Creation Act of 2010	$500,000	$2,000,000	100%

Key Policies

Policy	Section 179 Deduction Limit	Section 179 Equipment Purchase Limit	Bonus Depreciation
American Taxpayer Relief Act of 2012	$500,000	$2,000,000	50%
Tax Extenders Bill of 2014	$500,000	$2,000,000	50%
Protecting Americans from Tax Hikes Act of 2015	$500,000	$2,000,000	50%
Tax Cuts and Jobs Act of 2017	$1,000,000	$2,500,000	100%

Changes in Section 179 limits and Bonus Depreciation
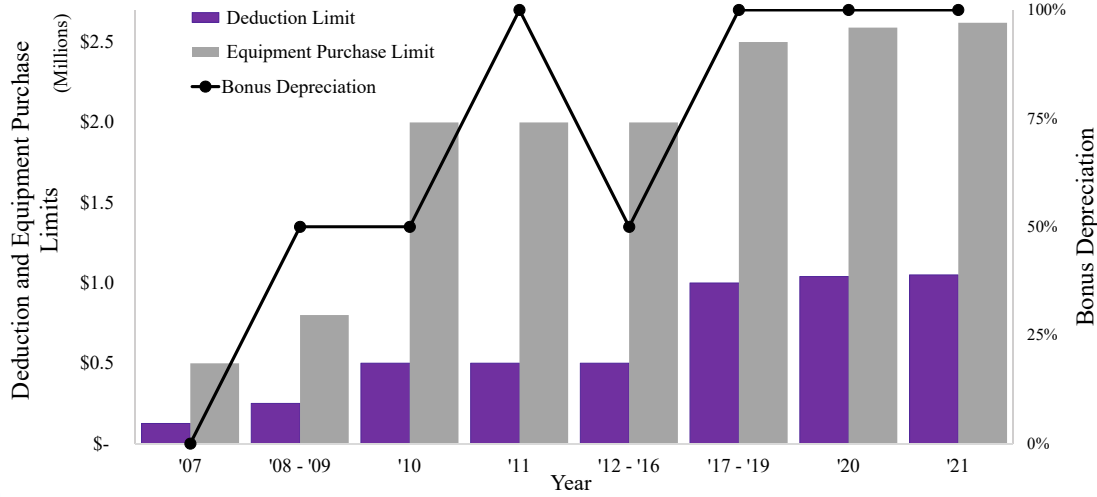
Changes in Section 179 limits and Bonus Depreciation

Depreciation Data

- Farm level data from Kansas Farm Management Association (KFMA) 2014 to 2019
- Includes capital investment purchases and depreciation of investments
- Key variables
  - Cost basis – cost of capital investment
  - Section 179 deduction – dollar amount of depreciation elected
  - Bonus – dollar amount of bonus depreciation elected

Depreciation Data

- Modifications
  - Kept assets purchased and placed into service in the same year
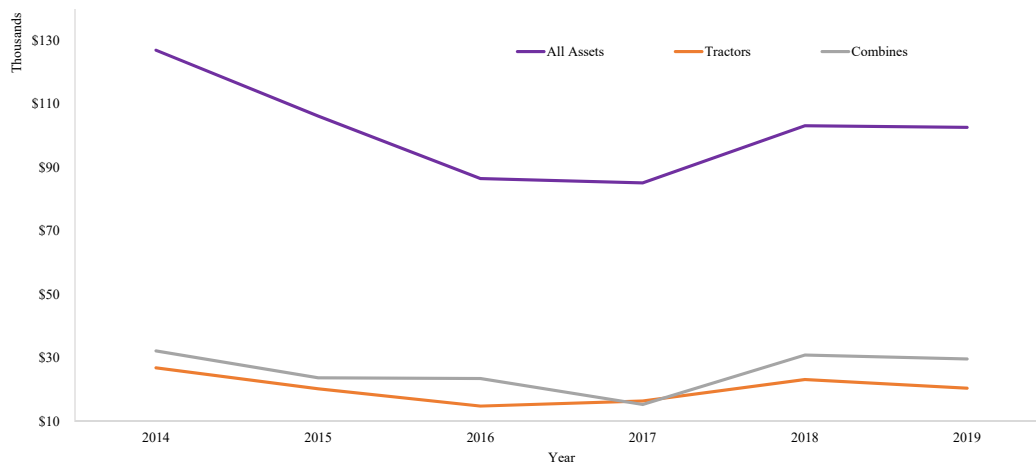 - Removed investments used for less than 50% business use

1,830 Farms
43,318 assets

Combine assets by year →

662 Farms

Total capital investment, Section 179 deduction, Bonus Depreciation

Average Capital Investment

Average Section 179 and Bonus Depreciation
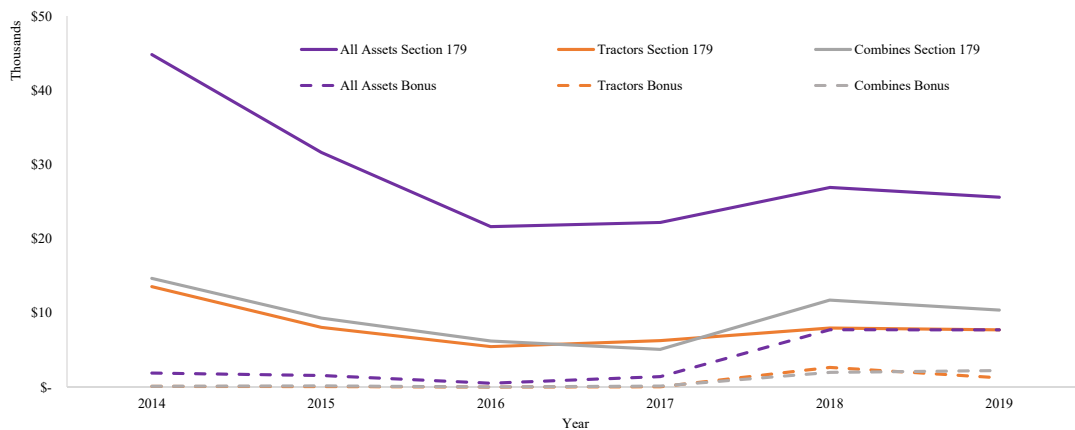
Percentage Share of Investment by Type

Financial Data

1,830 Farms → Assets by year → 518 Farms
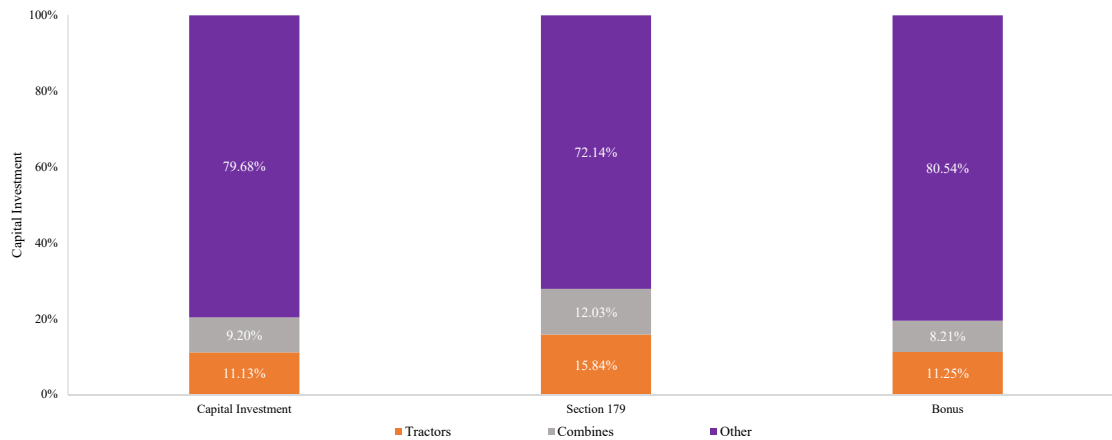
- Total capital investment, Section 179 deduction, bonus depreciation and numerous financial variables

Average Capital Investment of 1,830 farms and 518 farms
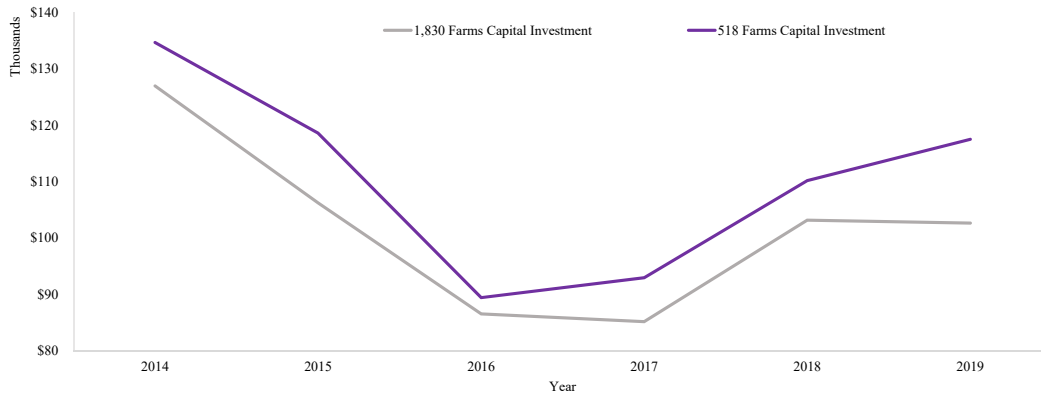
Average Section 179 and Bonus Depreciation of 1,830 farms and 518 farms
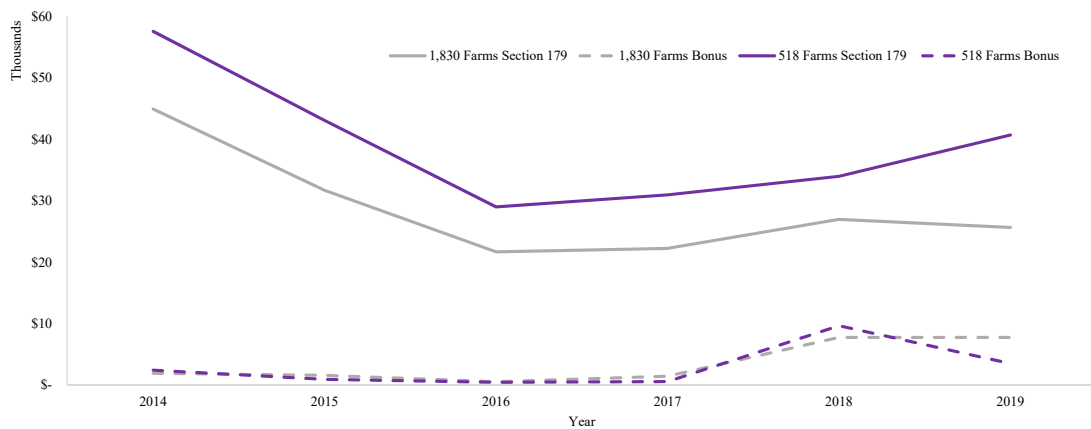
Financial Ratios

- Inverse Current Ratio
- Working Capital
- Working Capital Ratio
- Working Capital Percent
- Owner Equity Percent
- Capital Debt Repayment Capacity
- Probability of Default

Models

- Five models estimated with nine variations each
  - Working Capital Ratio
  - Probability of Default
  - Capital Debt Repayment Capacity
  - Owner Equity Percent
  - Working Capital Percent

Models

- Five models estimated with nine variations each
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  - Capital Debt Repayment Capacity
  - Owner Equity Percent
  - Working Capital Percent

Models

Working Capital Ratio

$$WCR_i = f(COSTBASIS_{i,t})$$
$$WCR_i = f(EXPDED_{i,t})$$
$$WCR_i = f(BONUS_{i,t})$$

Probability of Default

$$PROB_i = f(COSTBASIS_{i,t})$$
$$PROB_i = f(EXPDED_{i,t})$$
$$PROB_i = f(BONUS_{i,t})$$

Where *WCR* is working capital ratio, *PROB* is probability of default, *COSTBASIS* is capital investment, *EXPDED* is Section 179 deduction, and *BONUS* is bonus depreciation. Subscript *t* denotes lag year and *i* denotes the model variation number.

Models

Capital Debt Repayment Capacity

$$CDRC_i = f(COSTBASIS_{i,t})$$
$$CDRC_i = f(EXPDED_{i,t})$$
$$CDRC_i = f(BONUS_{i,t})$$

Owner Equity Percent

$$OEP_i = f(COSTBASIS_{i,t})$$
$$OEP_i = f(EXPDED_{i,t})$$
$$OEP_i = f(BONUS_{i,t})$$

Where *CDRC* is capital debt repayment capacity, *OEP* is owner equity percent, *COSTBASIS* is capital investment, *EXPDED* is Section 179 deduction, and *BONUS* is bonus depreciation. Subscript *t* denotes lag year and *i* denotes the model variation number.

Results

	Model 1: Working Capital Ratio								
	Section 179 Deduction			Bonus Depreciation			Capital Investment		
Variables	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	-0.00000029*								
Lag 2		-0.0000003*							
Lag 3			-0.00000028*						
Bonus Depreciation:									
Lag 1				0.00000017					
Lag 2					0.00000044				
Lag 3						0.00000037			
Capital Investment:									
Lag 1							-4.3E-09		
Lag 2								-1.8E-08	
Lag 3									-2.5E-08
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0295	0.0297	0.0277	0.0015	0	-0.0004	0.0006	-0.0002	0.0001

*Significant of p<.0001

Results

Section 179 Deduction ↑   Working Capital Ratio ↓

Model 1: Working Capital Ratio

Variables	Section 179 Deduction			Bonus Depreciation			Capital Investment		
	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	-0.00000029*								
Lag 2		-0.0000003*							
Lag 3			-0.00000028*						
Bonus Depreciation:									
Lag 1				0.00000017					
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Capital Investment:									
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Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0295	0.0297	0.0277	0.0015	0	-0.0004	0.0006	-0.0002	0.0001

*Significant of $p<.0001$

Results

Model 2: Probability of Default

Variables	Section 179 Deduction			Bonus Depreciation			Capital Investment		
	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	-0.00000245*								
Lag 2		-0.00000246*							
Lag 3			-0.00000235*						
Bonus Depreciation:									
Lag 1				-0.00000105					
Lag 2					-0.00000589				
Lag 3						-0.00000625			
Capital Investment:									
Lag 1							-0.00000002		
Lag 2								0.000000079	
Lag 3									0.00000017
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0283	0.0248	0.023	0.0004	0.001	0.0012	-0.0006	-0.0006	-0.0004

*Significant of $p<.0001$

Results

Section 179 Deduction ↑ Probability of Default ↓

	Model 2: Probability of Default								
	Section 179 Deduction			Bonus Depreciation			Capital Investment		
Variables	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	-0.00000245*								
Lag 2		-0.00000246*							
Lag 3			-0.00000235*						
Bonus Depreciation:									
Lag 1				-0.00000105					
Lag 2					-0.00000589				
Lag 3						-0.00000625			
Capital Investment:									
Lag 1							-0.00000002		
Lag 2								0.000000079	
Lag 3									0.00000017
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0283	0.0248	0.023	0.0004	0.001	0.0012	-0.0006	-0.0006	-0.0004

*Significant of $p < .0001$

Results

	Model 3: Capital Debt Repayment Capacity								
	Section 179 Deduction			Bonus Depreciation			Capital Investment		
Variables	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	0.0001422*								
Lag 2		0.0001922*							
Lag 3			0.0001556*						
Bonus Depreciation:									
Lag 1				0.0001584					
Lag 2					0.0004388				
Lag 3						0.0006881			
Capital Investment:									
Lag 1							0.00002412		
Lag 2								0.0000232	
Lag 3									0.0000131
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0146	0.0255	0.0169	0.0031	0.0009	0.0037	0.0018	0.0015	-0.0004

*Significant of $p < .0001$

Results

Section 179 Deduction ⬆   Capital Debt Repayment Capacity ⬆

| Variables | Model 3: Capital Debt Repayment Capacity | | | | | | | | |
| | Section 179 Deduction | | | Bonus Depreciation | | | Capital Investment | | |
	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	0.0001422*								
Lag 2		0.0001922*							
Lag 3			0.0001556*						
Bonus Depreciation:									
Lag 1				0.0001584					
Lag 2					0.0004388				
Lag 3						0.0006881			
Capital Investment:									
Lag 1							0.00002412		
Lag 2								0.0000232	
Lag 3									0.0000131
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.0146	0.0255	0.0169	0.0031	0.0009	0.0037	0.0018	0.0015	-0.0004

*Significant of $p<.0001$

Results

| Variables | Model 4: Owner Equity Percent | | | | | | | | |
| | Section 179 Deduction | | | Bonus Depreciation | | | Capital Investment | | |
	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	0.00002836*								
Lag 2		0.00002785*							
Lag 3			0.00002809						
Bonus Depreciation:									
Lag 1				0.00000838					
Lag 2					0.00003581				
Lag 3						0.00004838			
Capital Investment:									
Lag 1							-0.00000505		
Lag 2								-0.00000704	
Lag 3									-0.00000794
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.016	0.0137	0.014	-0.0003	-0.0005	-0.0004	0.0023	0.0046	0.0053

*Significant of $p<.0001$

Results

Section 179 Deduction ⬆   Owner Equity Percent ⬆

	Model 4: Owner Equity Percent								
	Section 179 Deduction			Bonus Depreciation			Capital Investment		
Variables	Variation 1	Variation 2	Variation 3	Variation 4	Variation 5	Variation 6	Variation 7	Variation 8	Variation 9
Section 179 Deduction:									
Lag 1	0.00002836*								
Lag 2		0.00002785*							
Lag 3			0.00002809						
Bonus Depreciation:									
Lag 1				0.00000838					
Lag 2					0.00003581				
Lag 3						0.00004838			
Capital Investment:									
Lag 1							-0.00000505		
Lag 2								-0.00000704	
Lag 3									-0.00000794
Number of Observations	1,605	1,284	963	1,605	1,284	963	1,605	1,284	963
Adjusted R-squared	0.016	0.0137	0.014	-0.0003	-0.0005	-0.0004	0.0023	0.0046	0.0053

*Significant of $p<.0001$

Conclusion

- Created a panel data set with 518 farms using depreciation and financial data from KFMA from 2014 to 2019
- Estimated five models with nine variations each to explain the effects of capital investment, Section 179 deduction and bonus depreciation levels on farm financial ratios
  - Variations include lag variables for one-, two- and three-years

Conclusion

Working Capital Ratio ⬇

Probability of Default ⬇

Section 179 Deduction ⬆

Capital Debt Repayment Capacity ⬆

Owner Equity Percent ⬆

Thank you!
Questions?