

# Agricultural Asset Values: Monitoring and Stress Testing

Ron Feldman

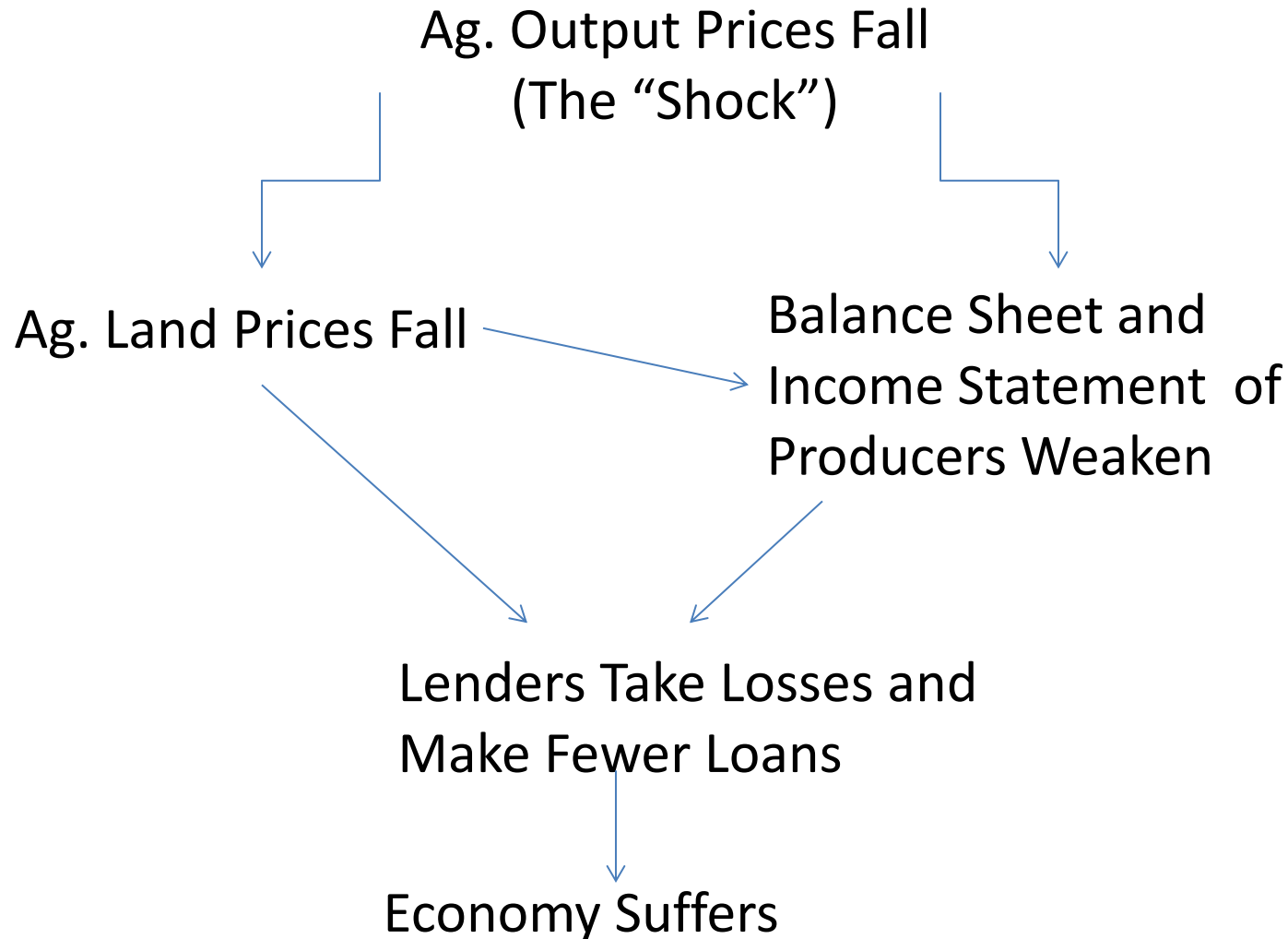
Federal Reserve Bank of Minneapolis

June 3, 2014

# Disclaimer

- My Views
- Not Necessarily Those Of Anyone Else in the Federal Reserve

# The Financial Stability Interest in Ag. One “Story”



# Bottom Lines

- Ag. Output Prices At Middle of Distribution
- Ag. Land Values At Record Levels
- Producers Look Strong
  - Could Conditions Quickly Change?
- Ag. Banks Look Strong
  - But Are Some Warning Signs
- Most Banks Strong Under Stressed Land Values
  - But Stress Tests Can Be Wrong!

# Context

- The Federal Reserve Systematically Monitors Asset Values
  - Monitoring Is Part Of the Federal Reserves Efforts To Support Financial Stability
- Agricultural Asset Values Receive Attention Under This Monitoring
- Agricultural Land Values Have Been Highlighted In This Monitoring

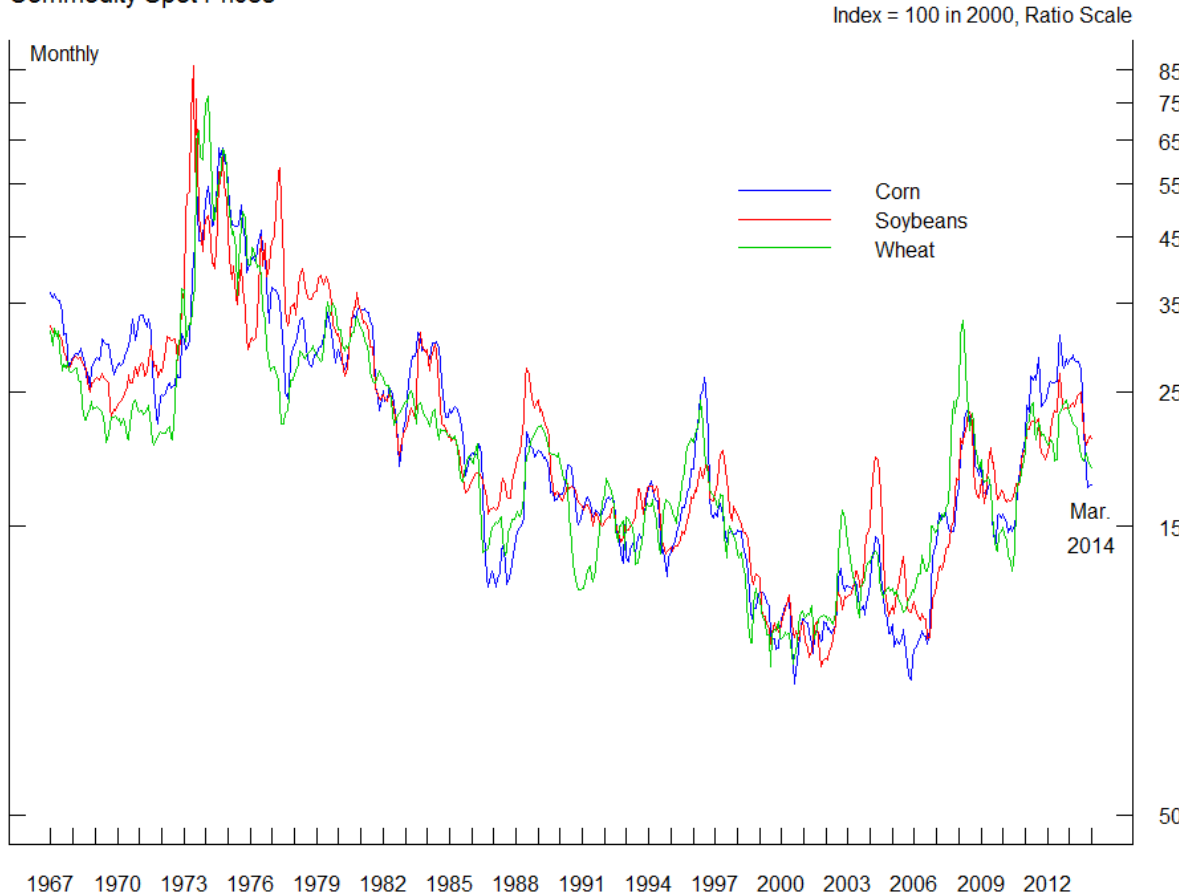
# Context

CORKER: And as you're looking -- and I'm gonna run out of time and our chairman is very punctual -- have you found anything yet that gives you concern? And do we have -- do you have a tool with the zero interest rate policy to address that if you do?

YELLEN: I would say at this stage broadly I don't see concerns. But there are pockets, a few things that we've identified that do concern us....there are a few areas within asset price evaluations, broadly speaking. I wouldn't worry, but there are a few areas where I would be concerned. **Many people have emphasized farm land as a concern, farm land prices....**

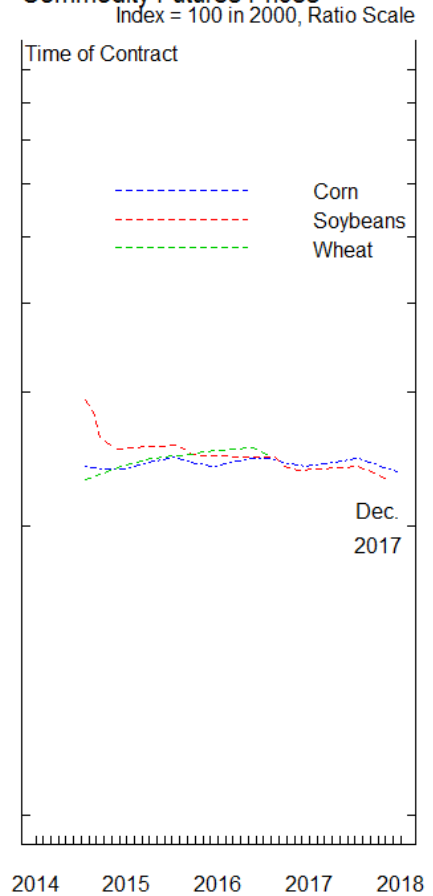
# Crop Prices Now Near Middle of Historical Distribution

Commodity Spot Prices



Source: University of Illinois at Urbana-Champaign

Commodity Futures Prices

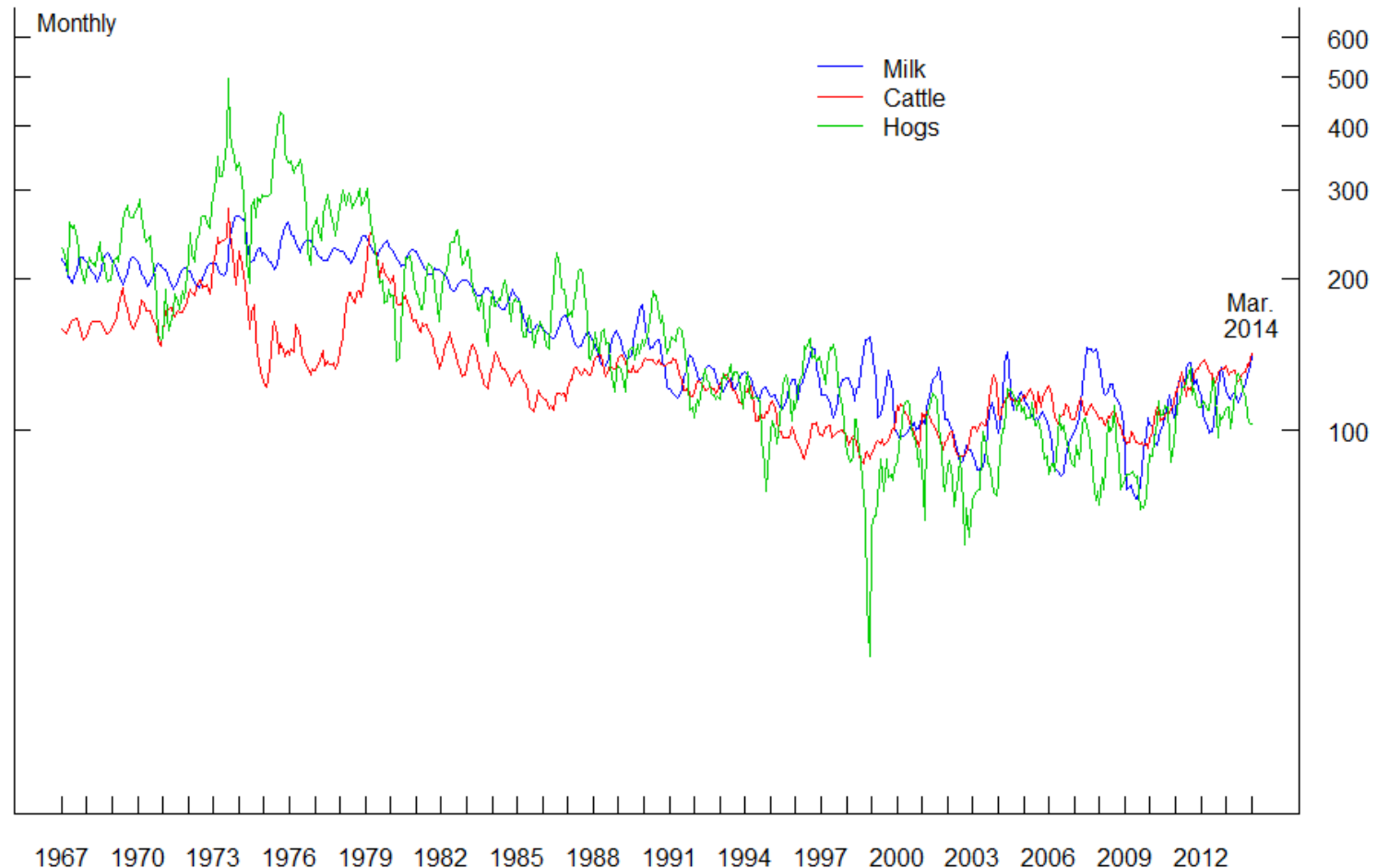


Source: Bloomberg

# Hogs and Dairy Prices Near Median; Cattle Far Above

Animal Product Spot Prices

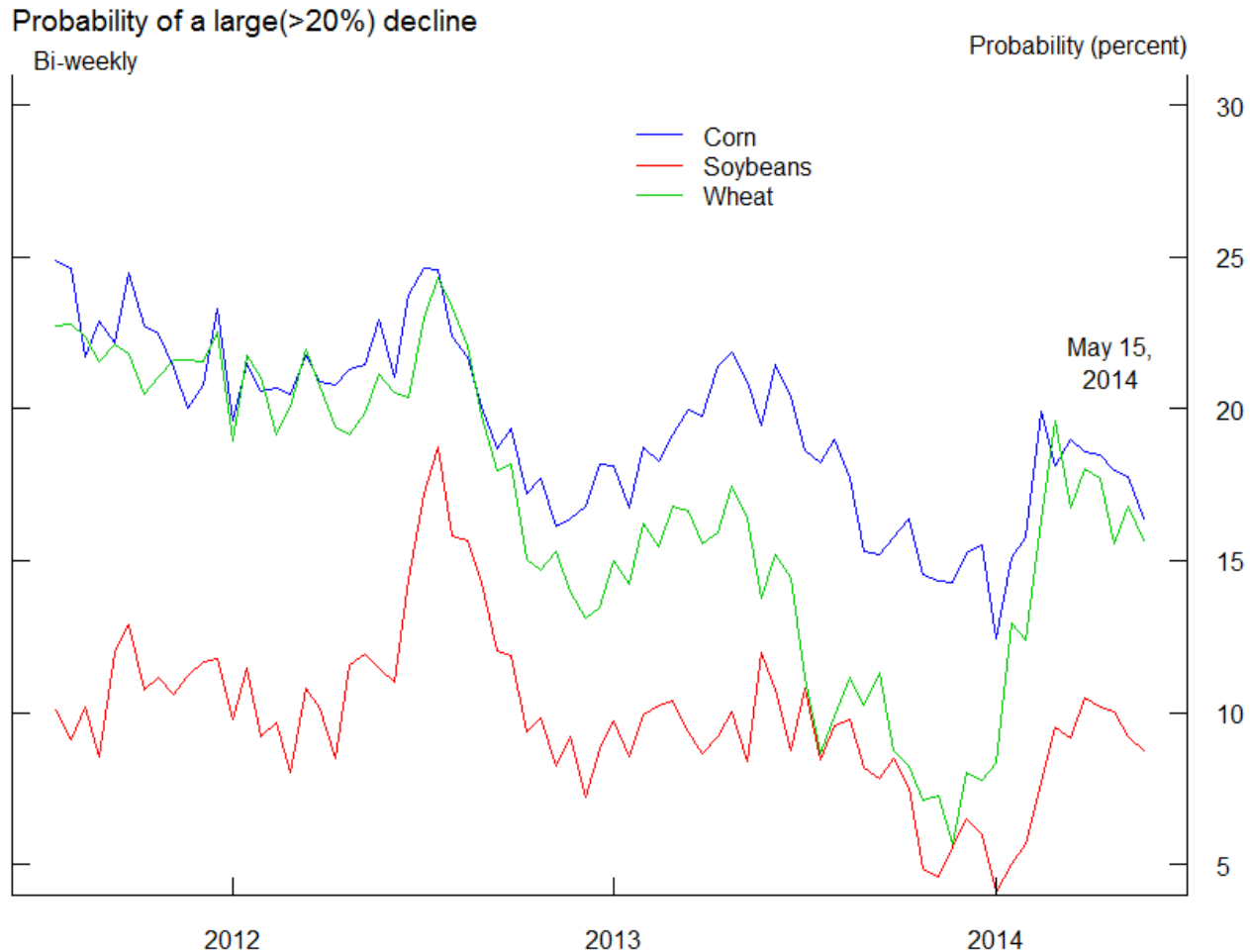
Index = 100 in 2000, Ratio Scale



Source: University of Illinois at Urbana-Champaign

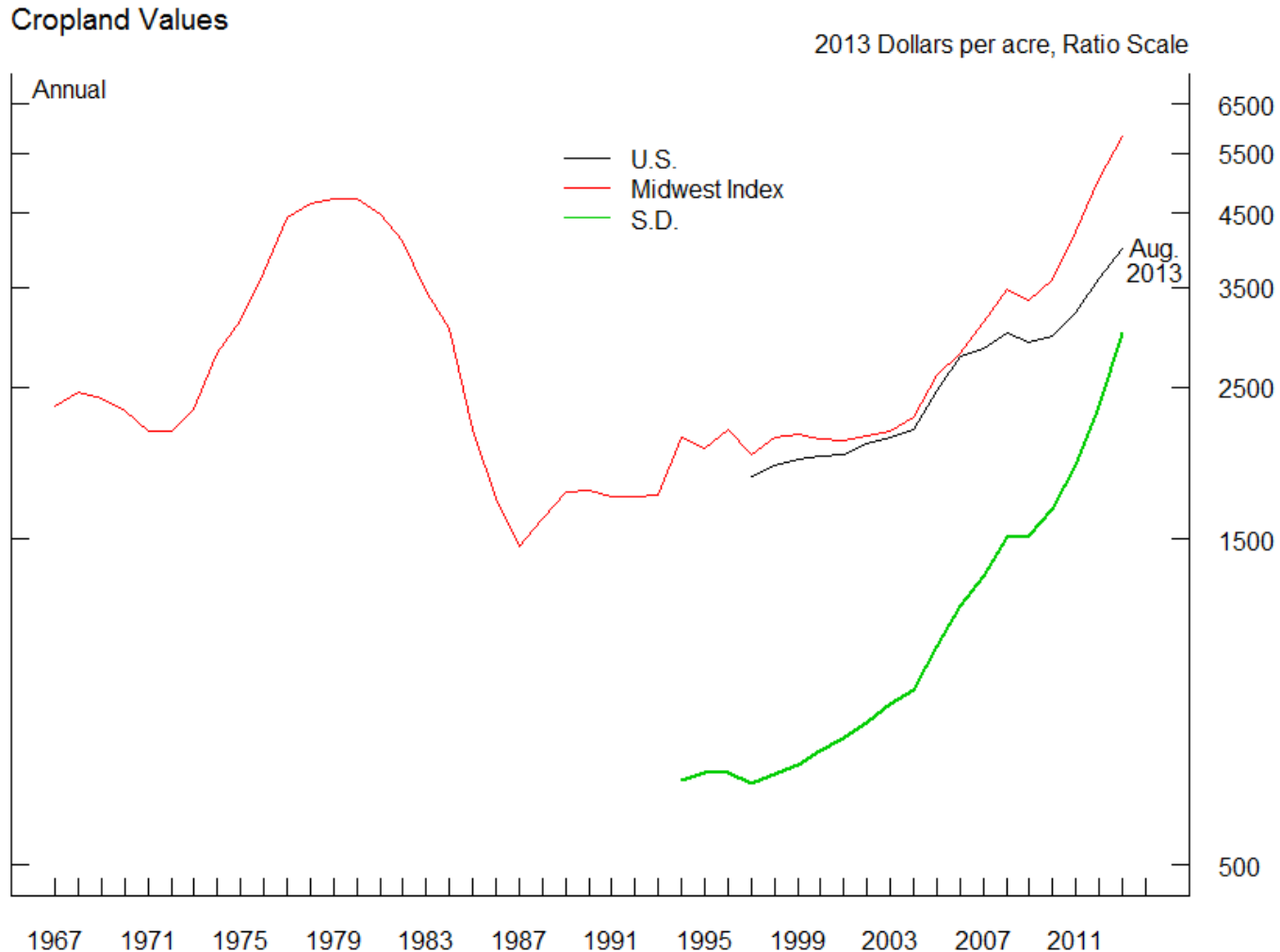


# “Normal” Level Of “Concern” About “Tail Event Price Decline”



Source: Federal Reserve Bank of Minneapolis. Notes: Six-month time horizon, option-implied. For details, see [Minneapolisfed.org](http://Minneapolisfed.org)

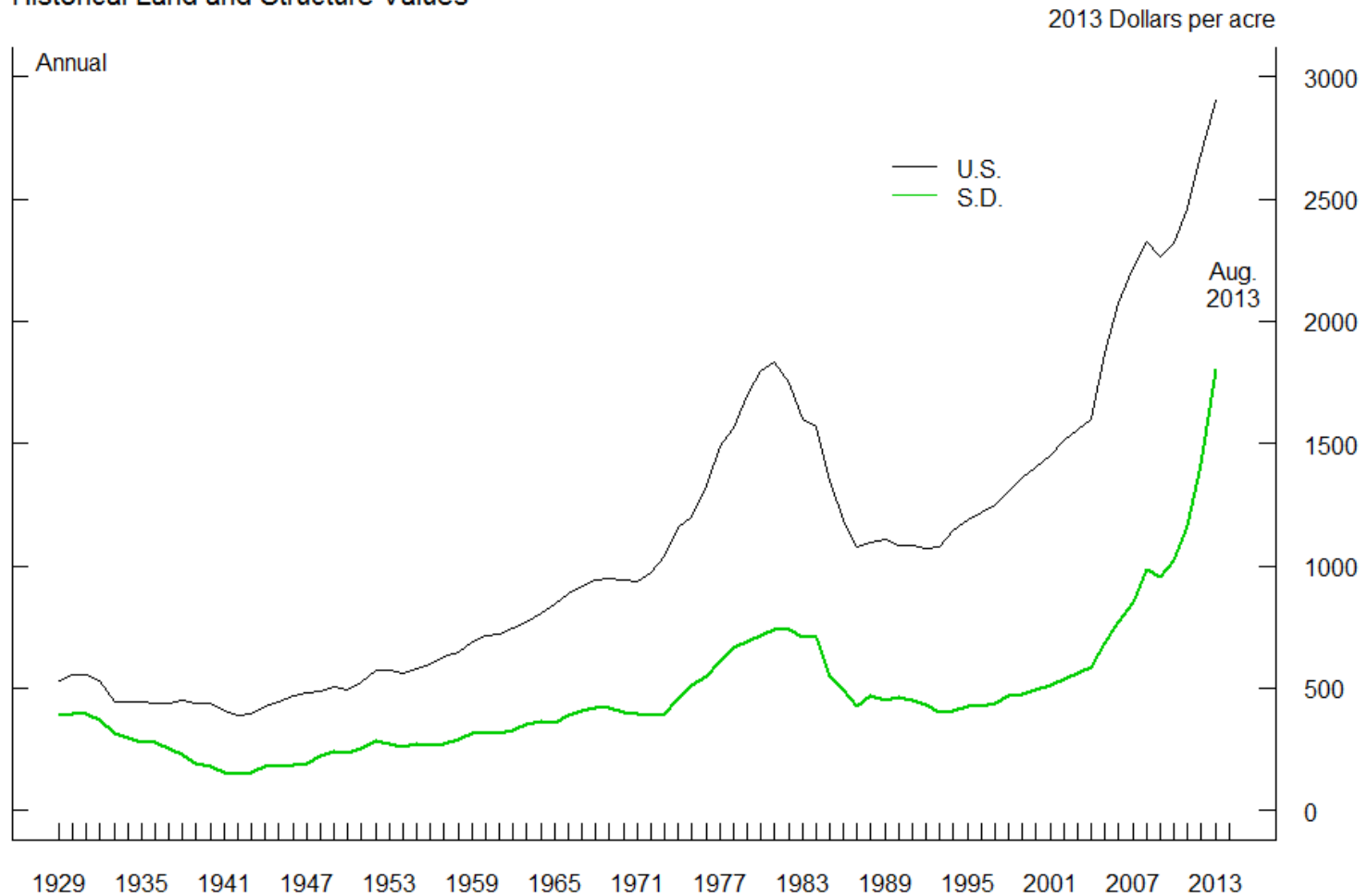
# Land Values Are At All Time Historic Highs



Source: USDA. Notes: Midwest Index is a weighted average of Cornbelt and Great Plains states. Dots represent quarterly estimates using District Reserve Bank Surveys.

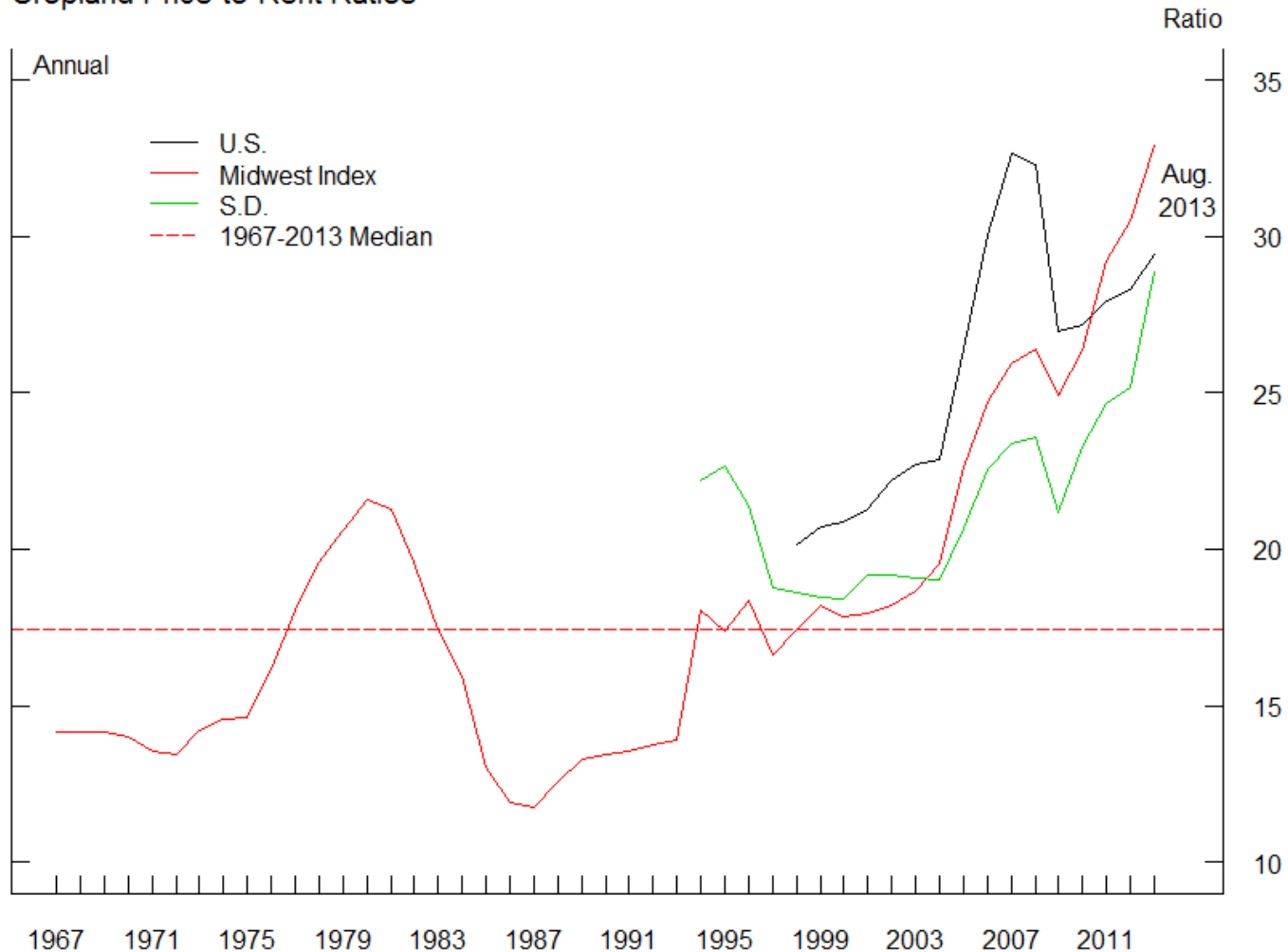
# Land+Structure Values At Record Highs (Since 1929!)

Historical Land and Structure Values



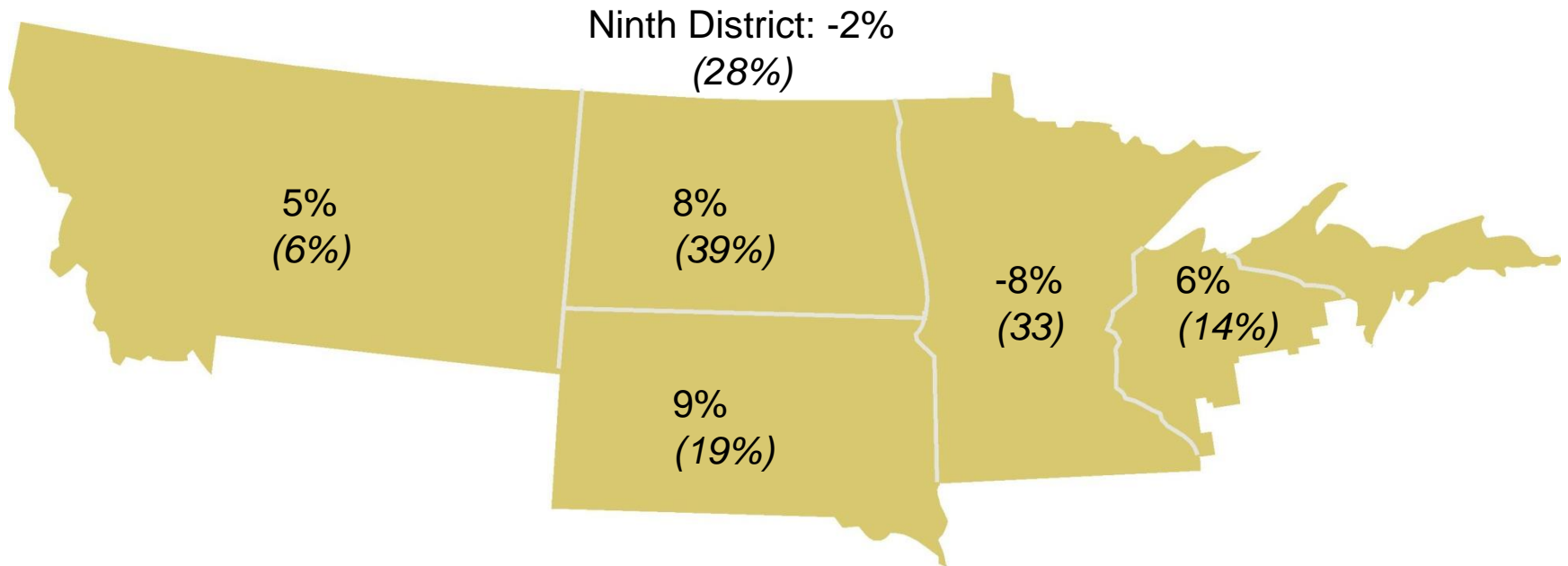
# Midwest Price To Rent Ratio At Historic Highs; US Ratio High

Cropland Price-to-Rent Ratios



# Recent Survey Data Shows Slow Down In Farmland Price Growth

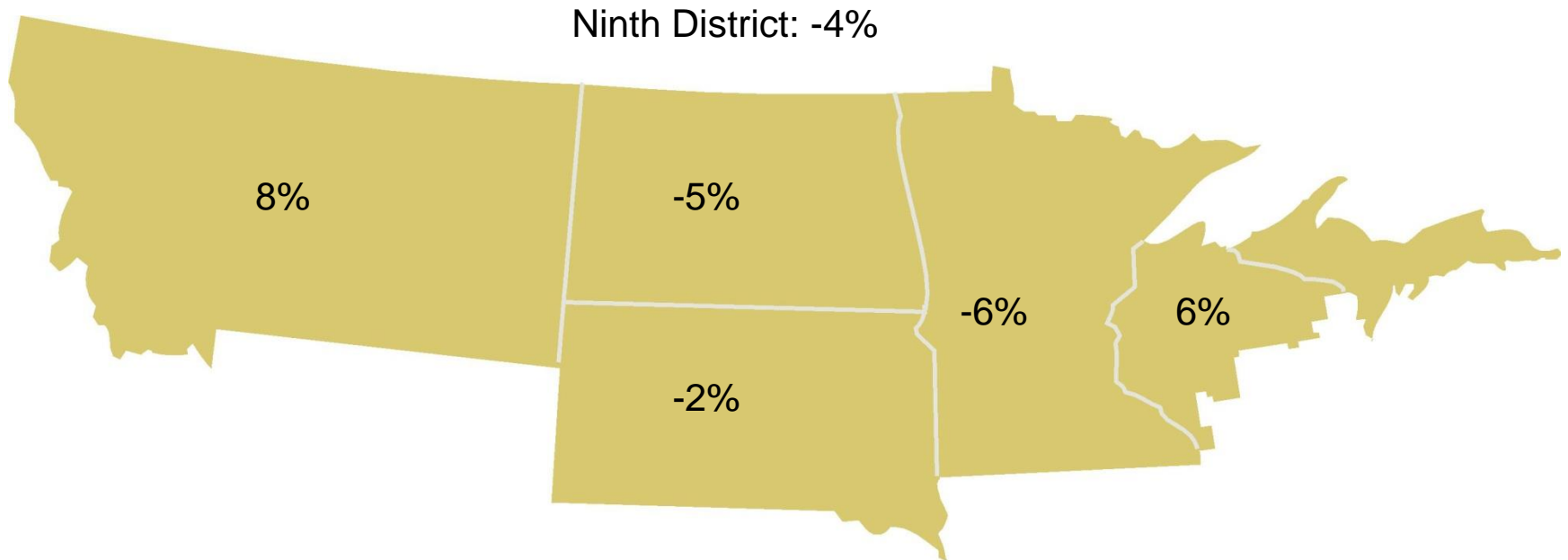
Average change in price of non-irrigated farmland, 2013Q1-2014Q1  
(2012Q1-2013Q1 change in parenthesis)



Source: Federal Reserve Bank of Minneapolis, Agricultural Credit Conditions Survey

# Recent Survey Data Shows Falling Rents

Average change in cash rents for non-irrigated farmland, 2013Q1-2014Q1

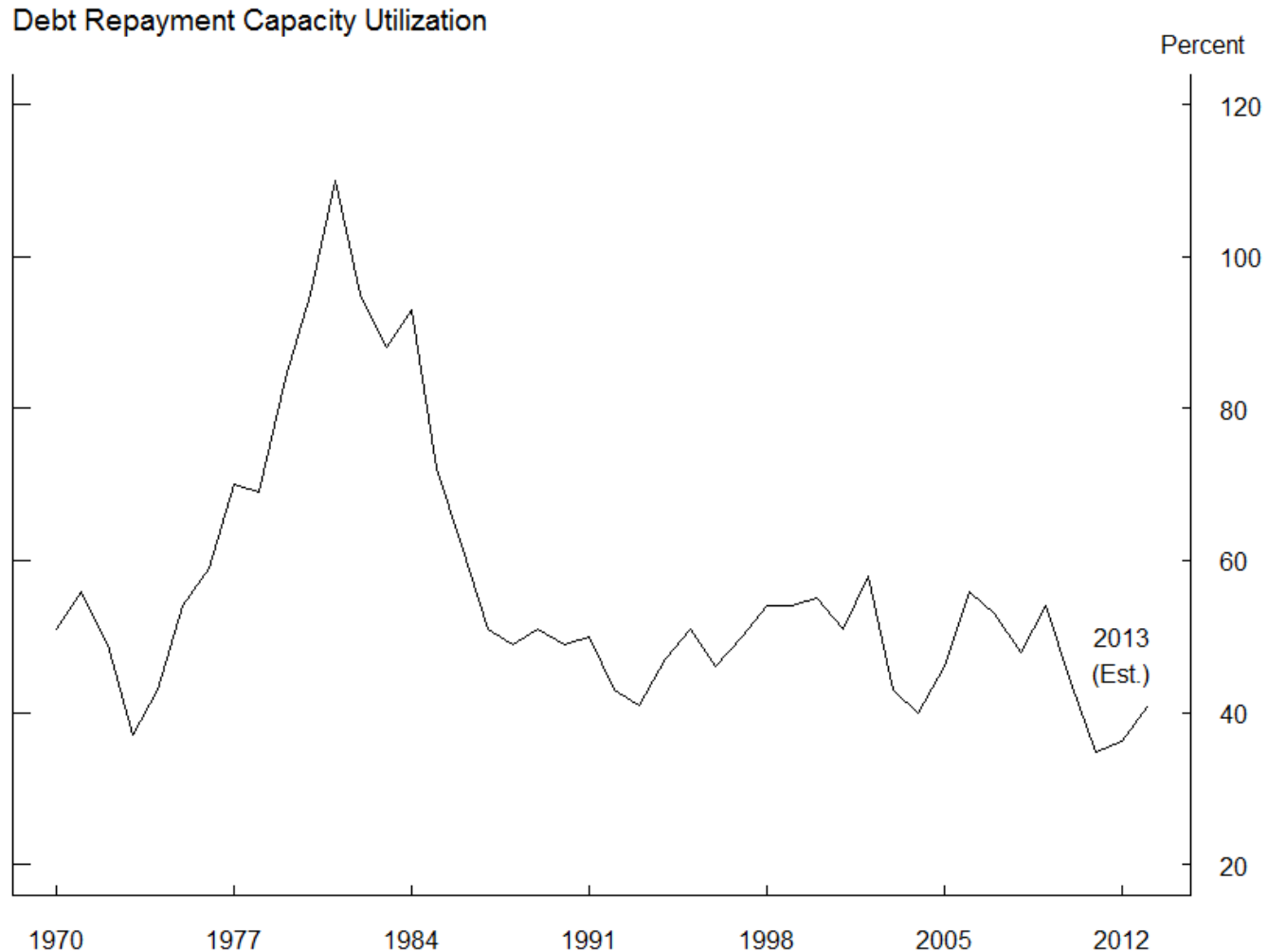


Source: Federal Reserve Bank of Minneapolis, Agricultural Credit Conditions Survey

# Bottom Lines

- Ag. Output Prices At Middle of Distribution
- Ag. Land Values At Record Levels
- Producers Look Strong
  - Could Conditions Quickly Change?
- Ag. Banks Look Strong
  - But Are Some Warning Signs
- Most Banks Strong Under Stressed Land Values
  - But Stress Tests Can Be Wrong!

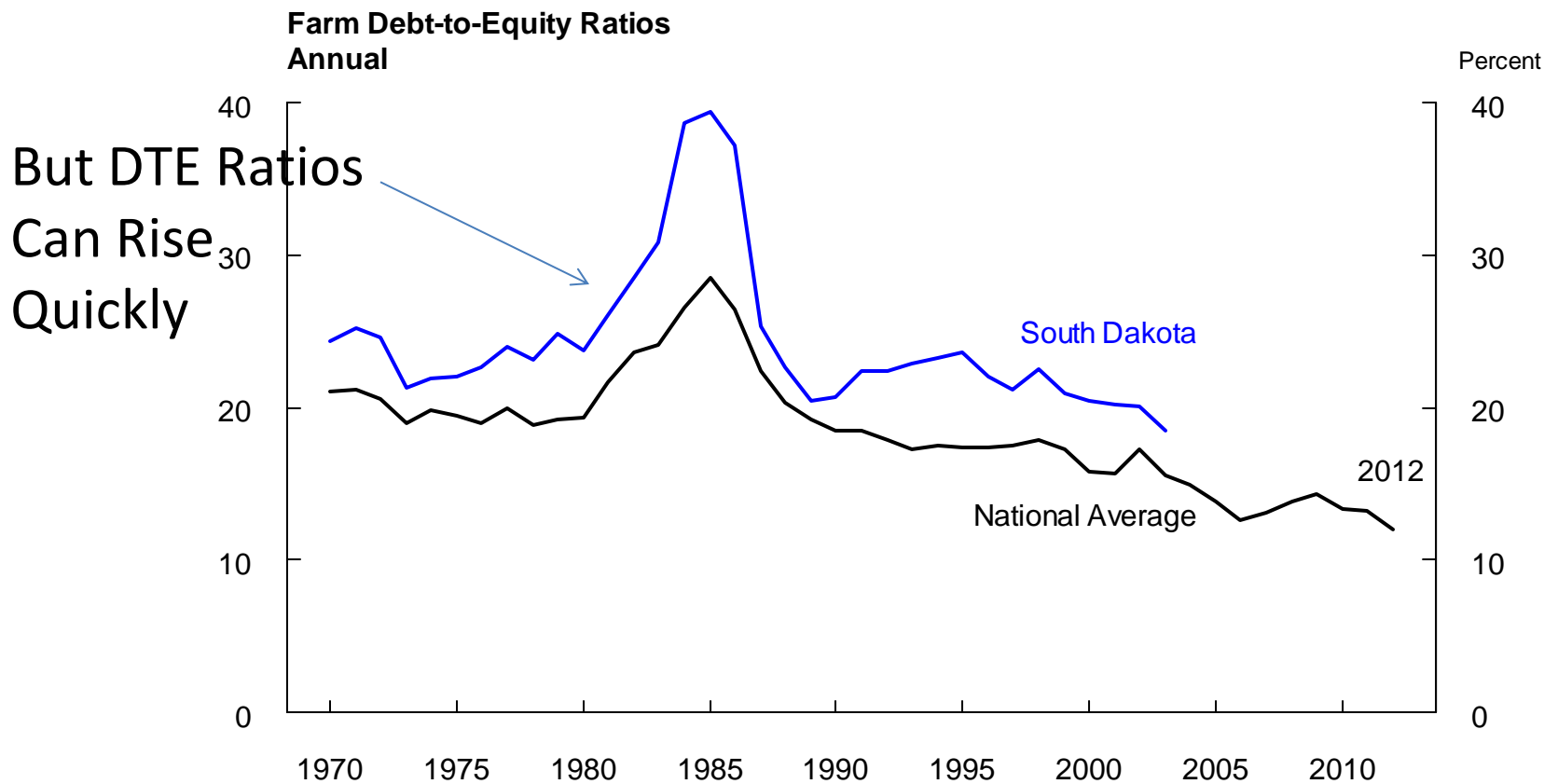
# Producers Have Strong “DRCU”



Source: USDA. Notes: Estimates of share of total feasible debt load currently in use by farm households, based on income projections.



# Producers Have Low Debt-to-Equity (DTE) Ratios



Source: USDA ERS, Farm Income and Wealth Statistics

Notes: The South Dakota series was discontinued after 2003.

# DTEs If Land Values Fall?

2012  
Producer  
Balance Sheet

	2012
<b>Farm sector assets</b>	2,811,255,180
Financial	123,278,934
Inventories	126,790,438
Real estate	2,310,559,977
Value of machinery and motor vehicles	250,625,831
<b>Farm sector debt</b>	300,314,965
Real estate	173,018,503
Nonreal estate	127,296,462
<b>Farm sector equity</b>	2,510,940,215
<b>Leverage Ratios</b>	<i>Percent</i>
Debt/asset ratio	10.68
Debt/equity ratio	11.96

Assets Fall to  
\$1.9 Trillion

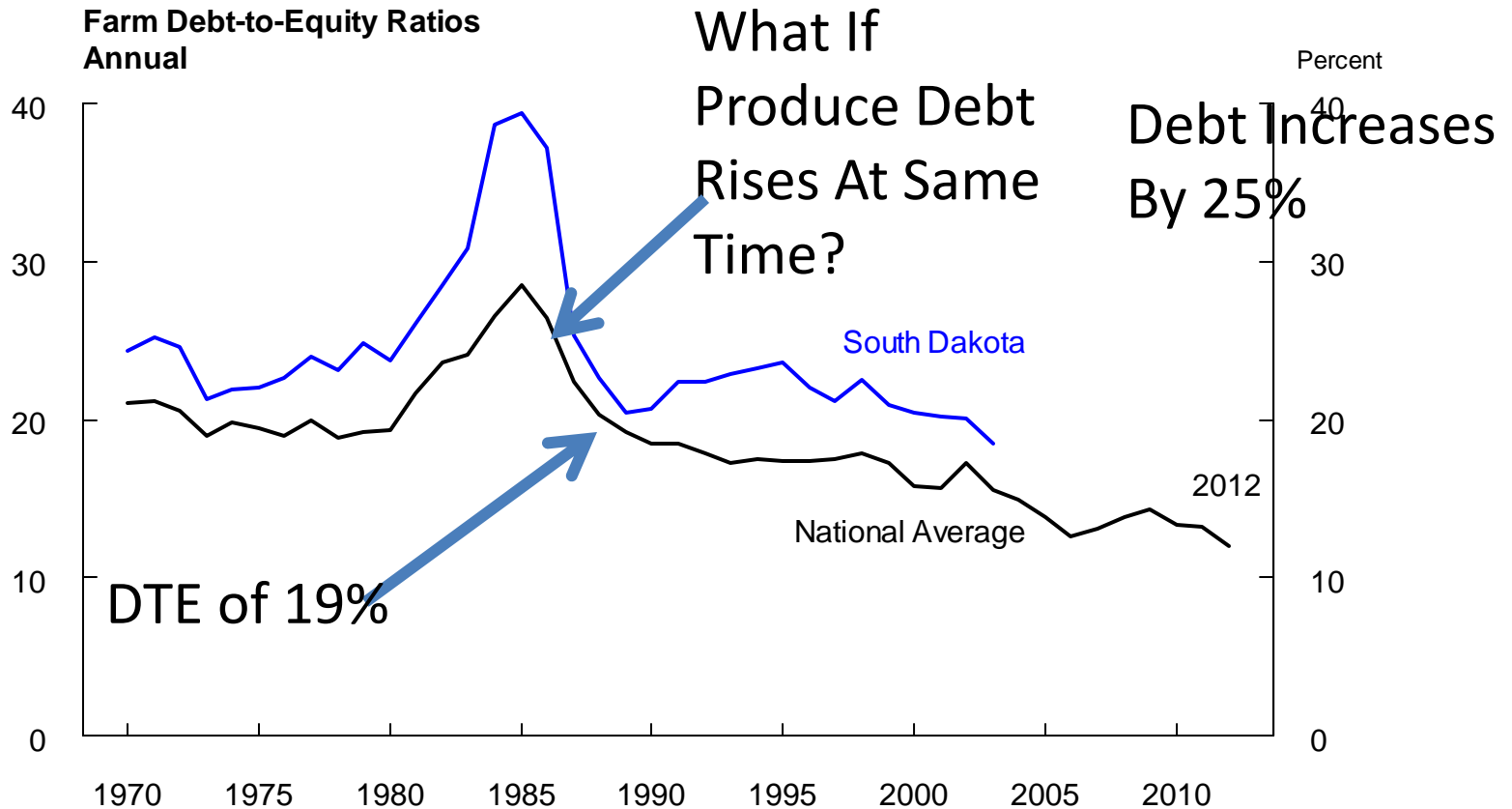
Land Values  
Fall by 40%

Hold Debt  
Fixed

DTE Rises to  
19%

Source: USDA ERS, Farm Income and Wealth Statistics  
Notes: All values are in units of \$1,000 (nominal) except for ratios

# DTE Post Simulated Land Value Fall Are Around Pre/Post Farm Crisis Levels



Source: USDA ERS, Farm Income and Wealth Statistics

Notes: The South Dakota series was discontinued after 2003.

**DTE Rises To  
25%**

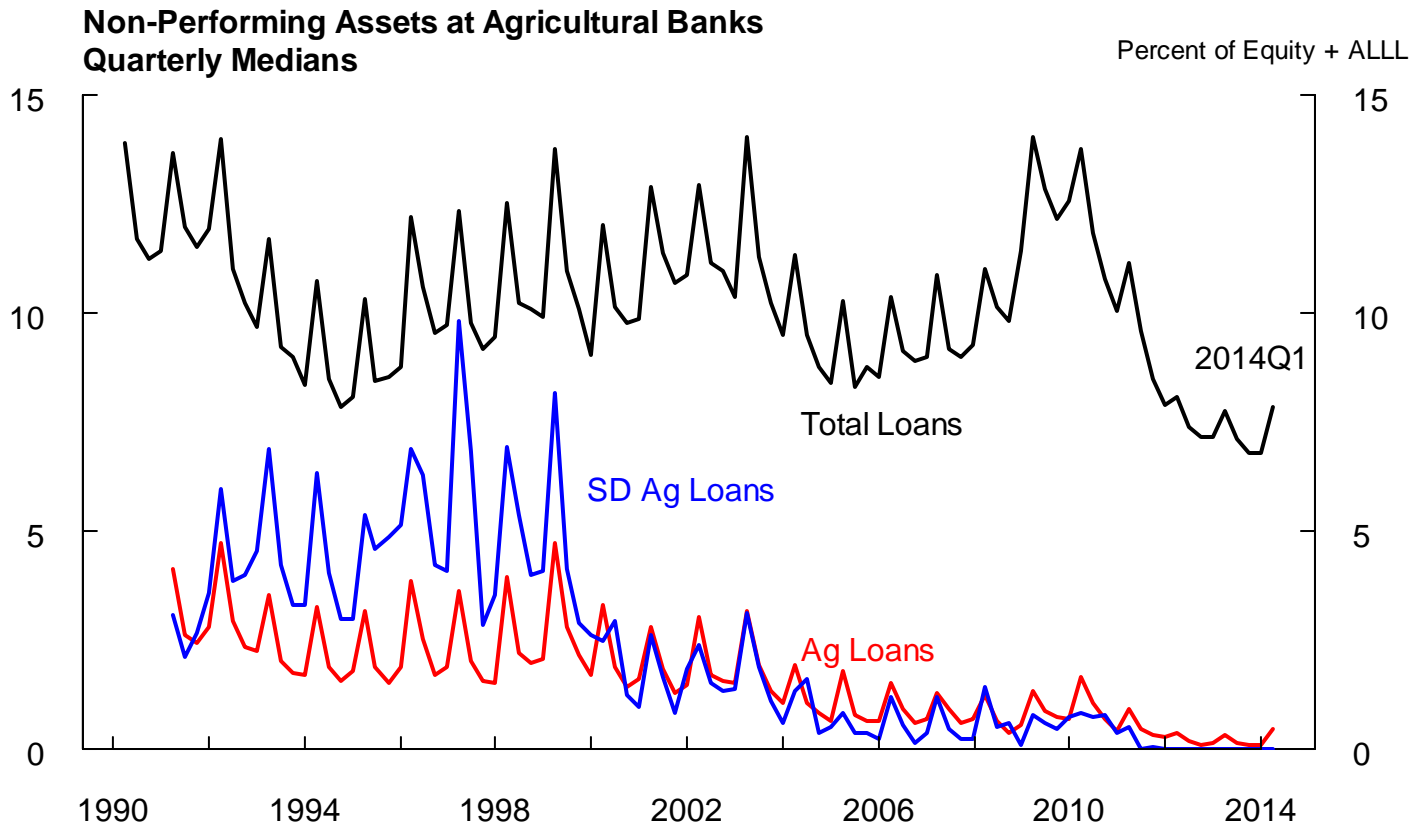
# Most Recent Data Suggest Farm Incomes Falling

- District wide, 58% of lenders said farm incomes decreased Q1 2014; In S.D. it was 52%
- 62% reported flat household spending (45% in S.D.)
- 55% noted decreased capital spending, (45% in S.D.)
- USDA forecasts a 27 percent decrease in farm incomes in 2014 nationally.

# Bottom Lines

- Ag. Output Prices at Middle of Distribution
- Ag. Land Values At Record Levels
- Producers Look Strong
  - Could Conditions Quickly Change?
- Ag. Banks Look Strong
  - But Are Some Warning Signs
- Most Banks Strong Under Stressed Land Values
  - But Stress Tests Can Be Wrong!

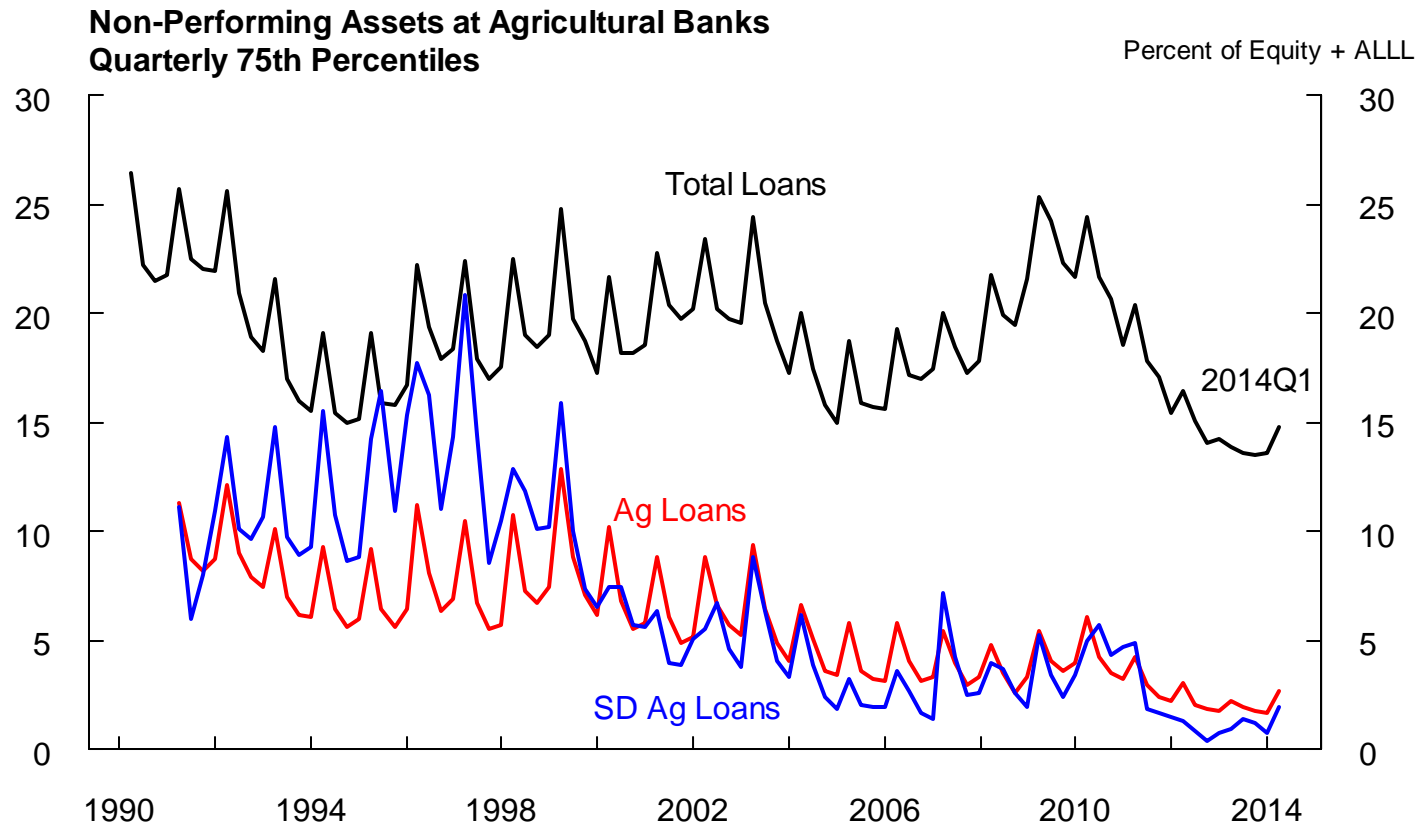
# Asset Quality Of Ag Banks Is Strong



Source: Call Report

Notes: Agricultural banks are defined as commercial banks where agricultural loans are at least 25% of total loans

# Even Asset Quality Of “Weak” Ag Banks Is Strong



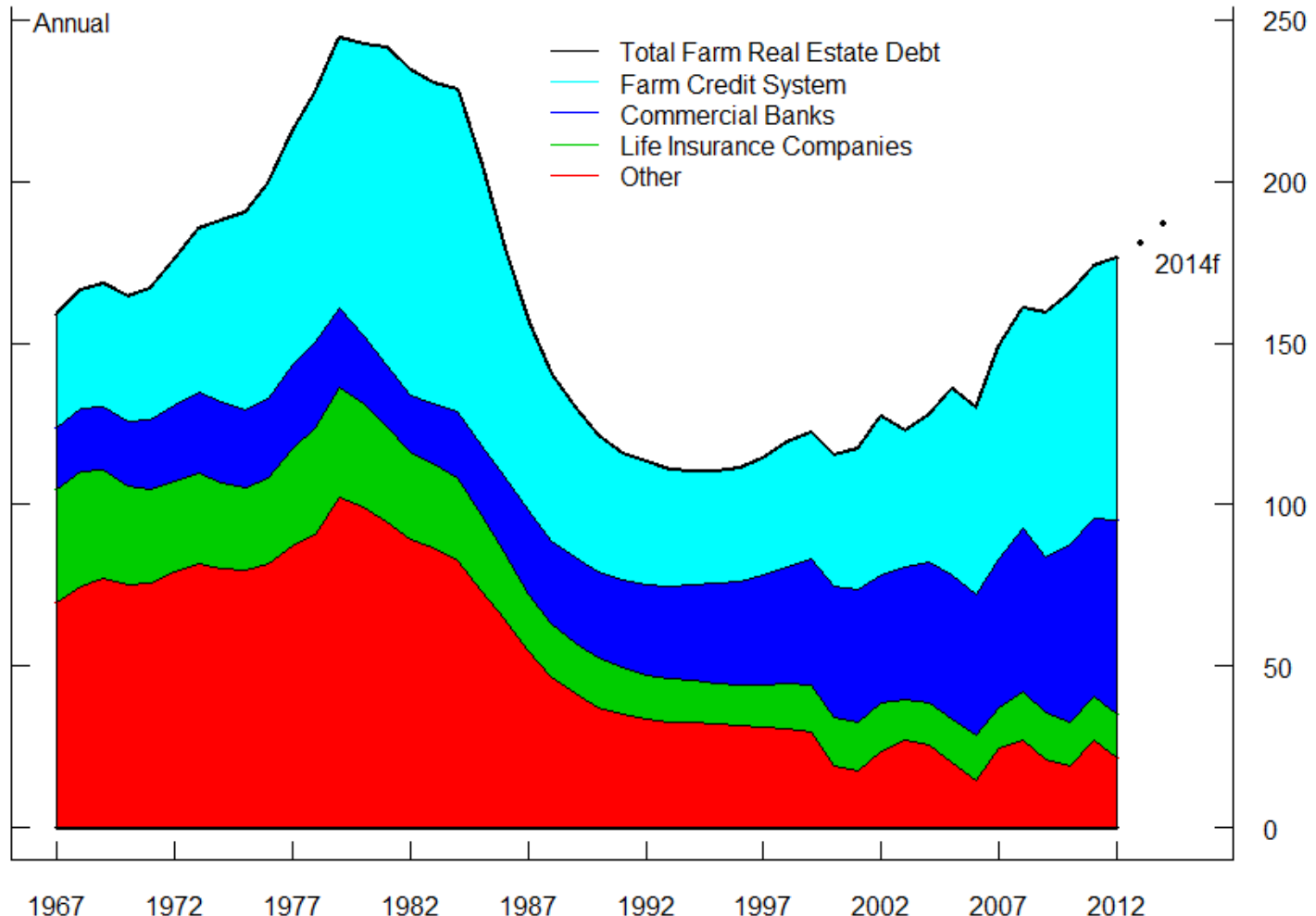
Source: Call Report

Notes: Agricultural banks are defined as commercial banks where agricultural loans are at least 25% of total loans

# Overall Farm Real Estate Debt Up

Farm Real Estate Debt Outstanding

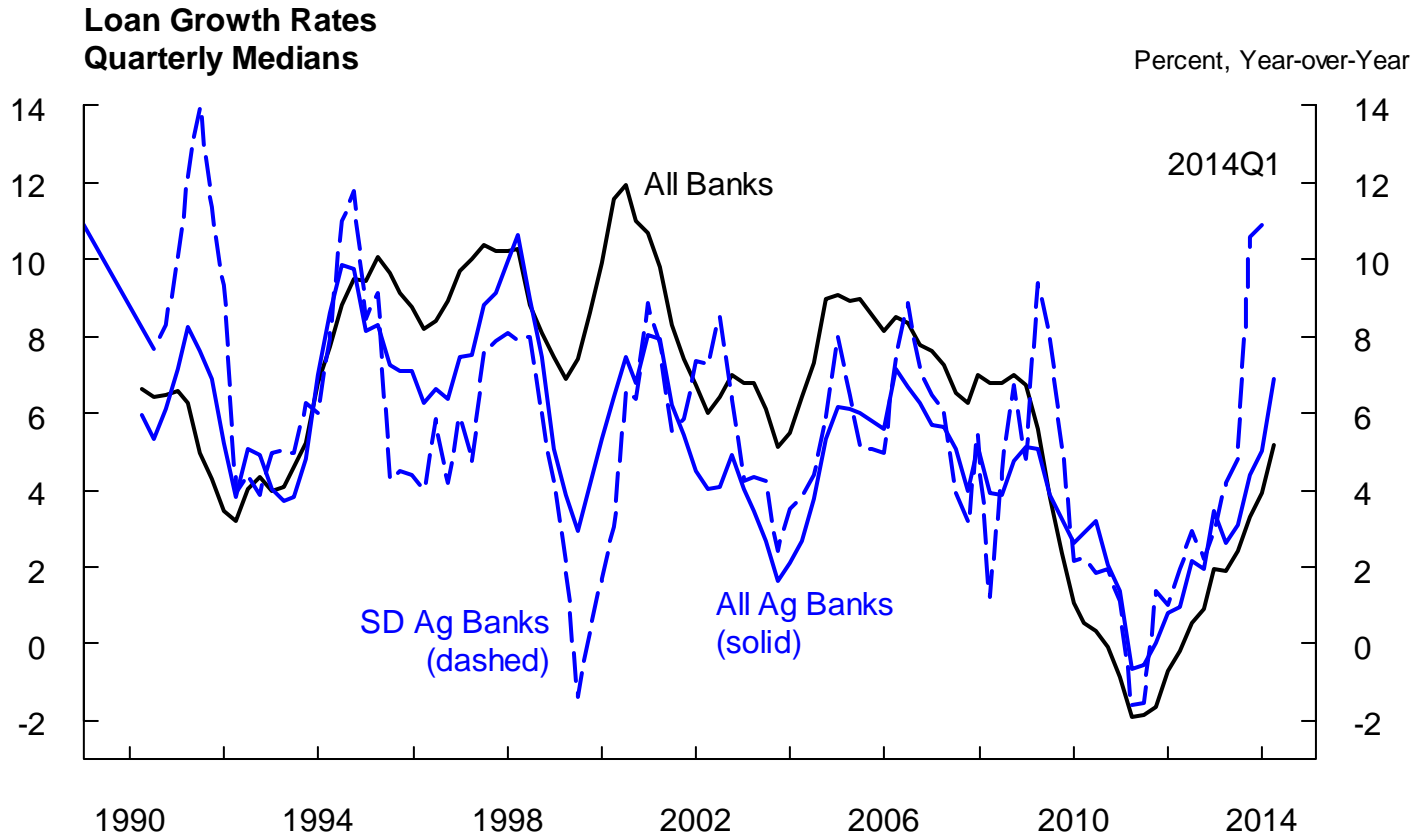
2013 Dollars, Billions



Source: USDA. Notes: Dots are USDA Forecasts. Other includes: Farm Service Agency; Farmer Mac; Individuals and Others; and Storage Facility Loans.



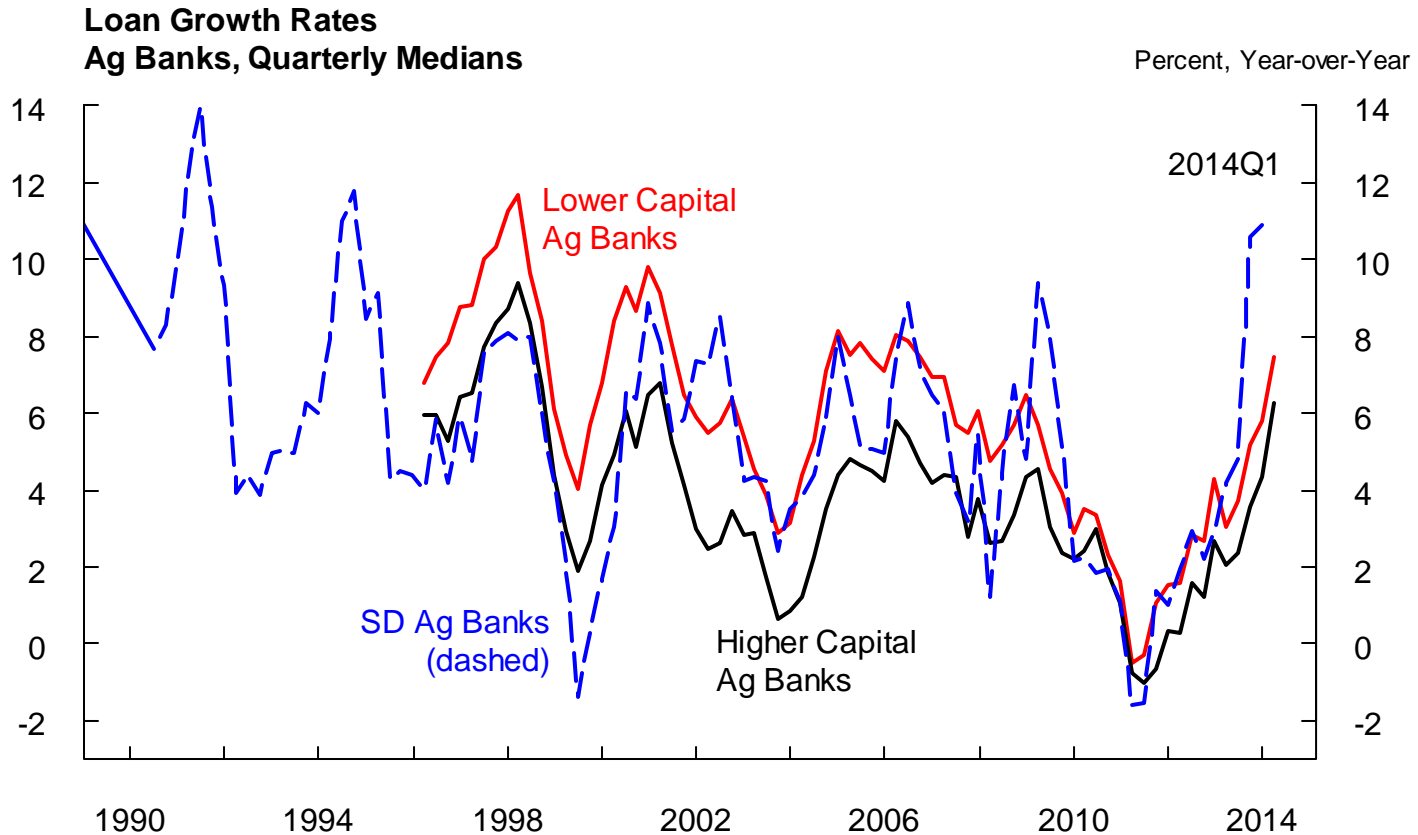
# Strong Loan Growth From Ag. Banks



Source: Call Report

Notes: Agricultural banks are defined as commercial banks where agricultural loans are at least 25% of total loans

# Ag. Banks With Less Capital Growing Faster; SD Ag. Banks Growing Fastest

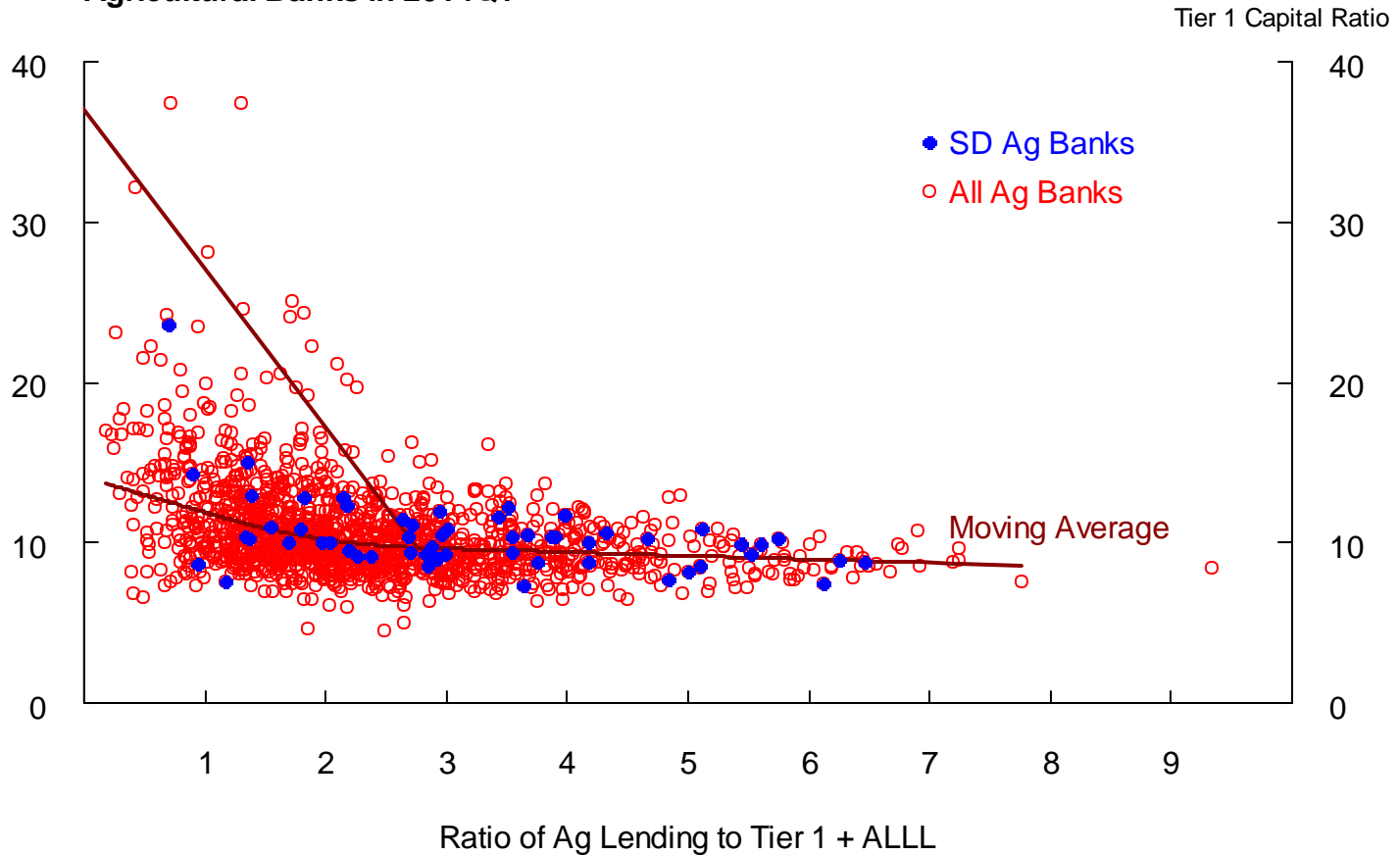


Source: Call Report

Notes: Ag Banks are defined as commercial banks where agricultural loans are at least 25% of total loans; 'Lower Capital' refers to banks with Tier 1 capital ratios below the national median, 'Higher Capital' for those with Tier 1 capital ratios above

# Most Concentrated Ag. Banks Have Lower Capital

Tier 1 Capital and Ag Concentration  
Agricultural Banks in 2014Q1



Source: Call Report

Notes: Agricultural Banks are defined as commercial banks where agricultural loans are at least 25% of total loans

# Bottom Lines

- Ag. Output Prices at Middle of Distribution
- Ag. Land Values Way Above Distribution
- Producers Look Strong
  - But Conditions Can Quickly Change
- Ag. Banks Look Strong
  - But Are Some Warning Signs
- Most Banks Strong Under Stressed Land Values
  - But Stress Tests Can Be Wrong!

# “Stress Testing” Ag. Banking Sector to A Fall in Ag. Land Values

- Developed three models to examine impact of land price declines on agricultural banks
  - “Benchmark”
  - “Systems”
  - “Distributional”

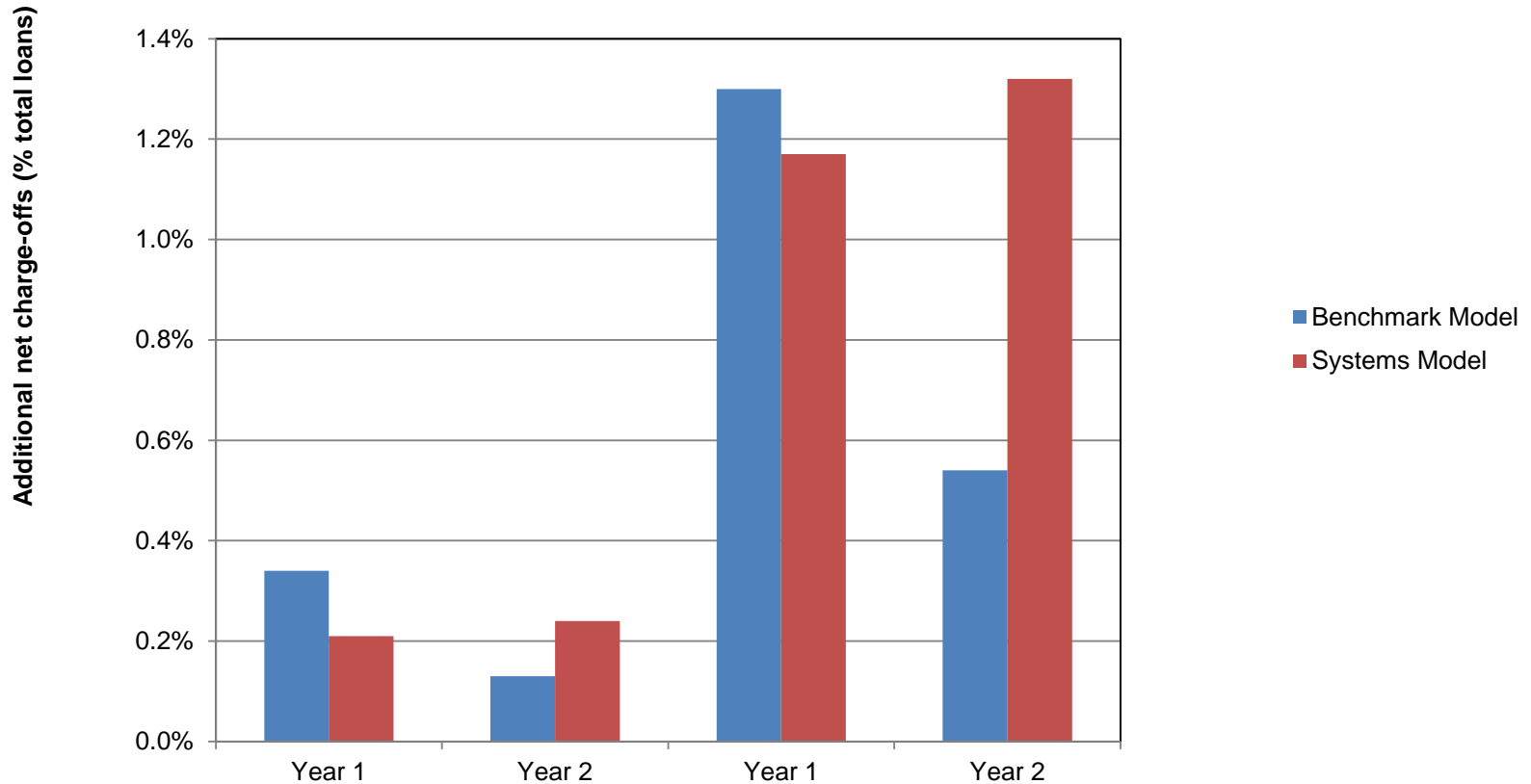
# “Stress Testing” Ag. Banking Sector to A Fall in Ag. Land Values

- Ran two “what if” scenarios
  - Historic scenario: ~5% drop in real land values
  - Severe scenario: 26% drop in real land values
- Accounted for other variables (e.g., farm debt-to-equity)

# Results: Net charge-off forecasts for the average agricultural bank

**Historic Scenario**  
5% drop in land prices

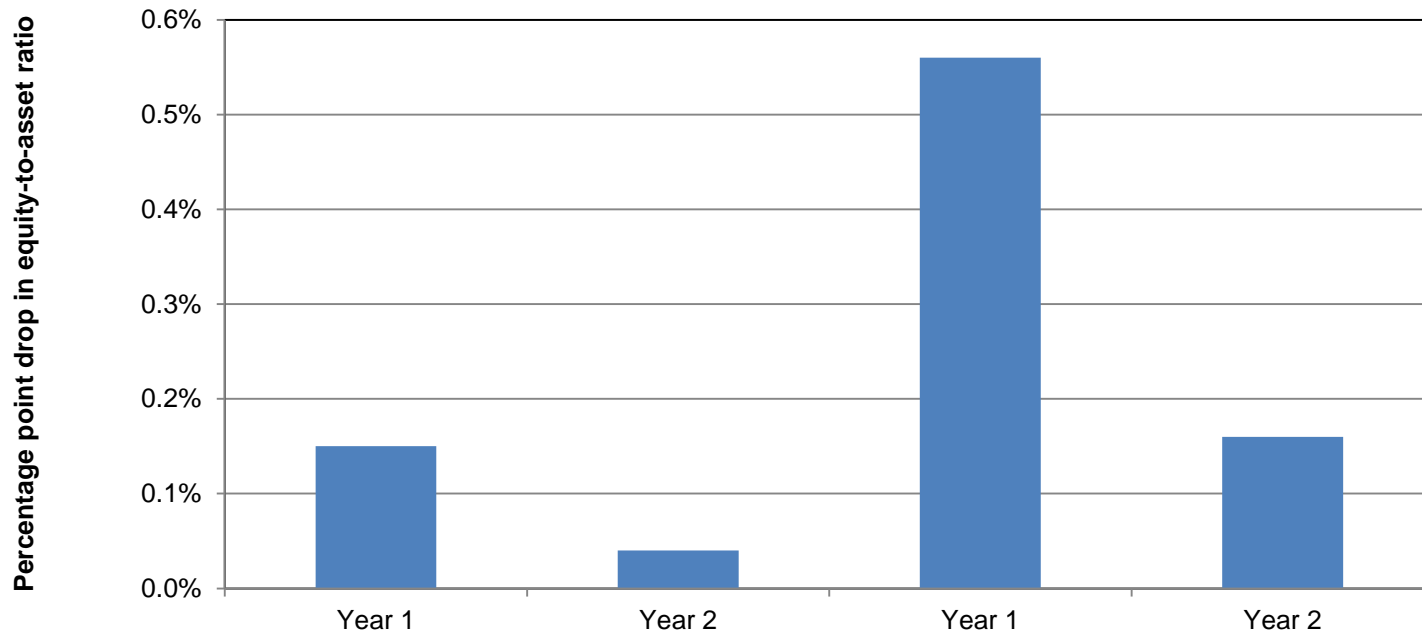
**Severe Scenario**  
26% drop in land prices



# Results: Equity-to-asset ratio forecasts for the average agricultural bank

**Historic Scenario**  
5% drop in land prices

**Severe Scenario**  
26% drop in land prices



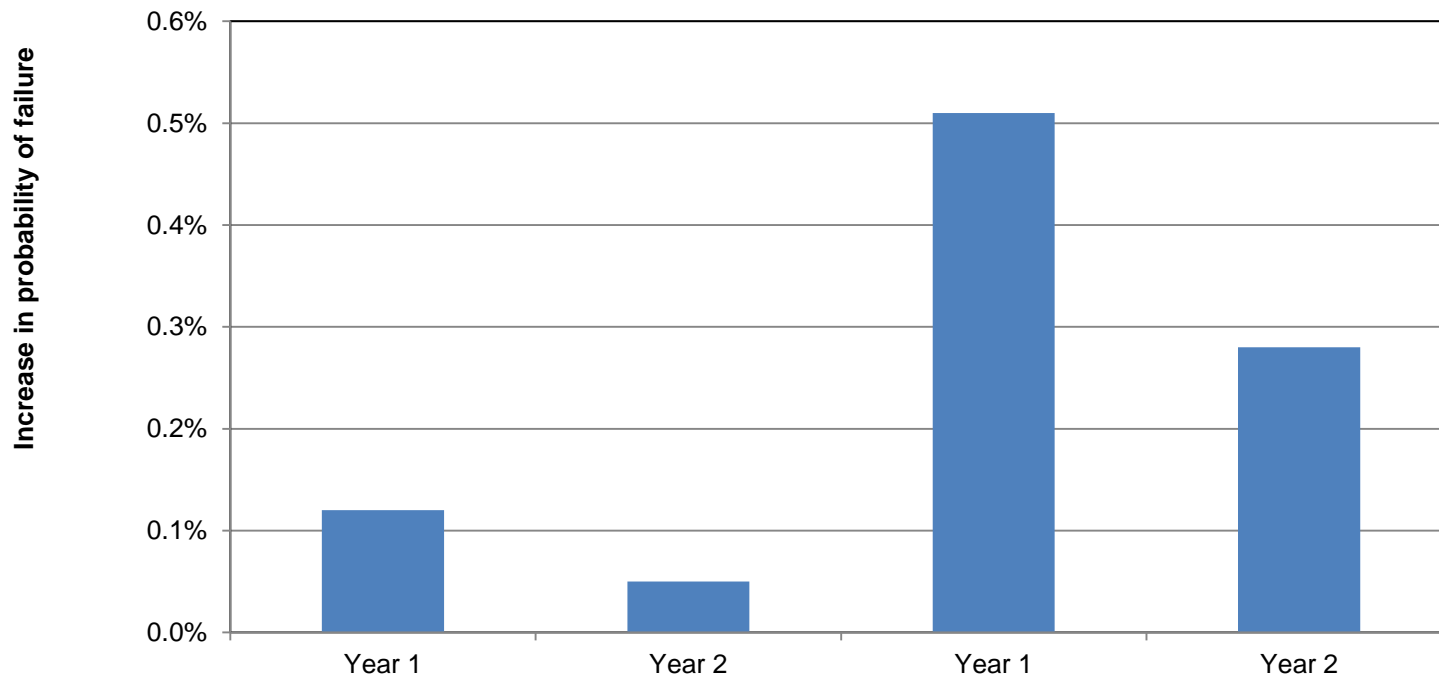
*\* Only includes the benchmark model*



# Results: Probability of failure forecasts for the average agricultural bank

**Historic Scenario**  
5% drop in land prices

**Severe Scenario**  
26% drop in land prices



*\* Only includes the benchmark model*

# “Average” Does Not Tell the Whole Story

- We Looked at distributional outcomes
- Minority of ag banks (30%) suffer the majority of loan losses
- Impact is very high in the “most sensitive” 5%
  - Equity-to-asset ratios fall by 1.2 percentage points in the first and 1 percentage point in the second year
  - Probability of failure increases by over 3%

# Farm Credit System Stability Questions

- What Losses Would FCS Take If Land Values/Producer Incomes Fall?
- How Would Market Funders of FCS Respond To Actual or Expected Land Value/Producer Incomes Decline?