Agricultural Land Values: Is this Too Good too be True?

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Conference of State Bank Supervisors
CSBS State-Federal Supervisory Forum
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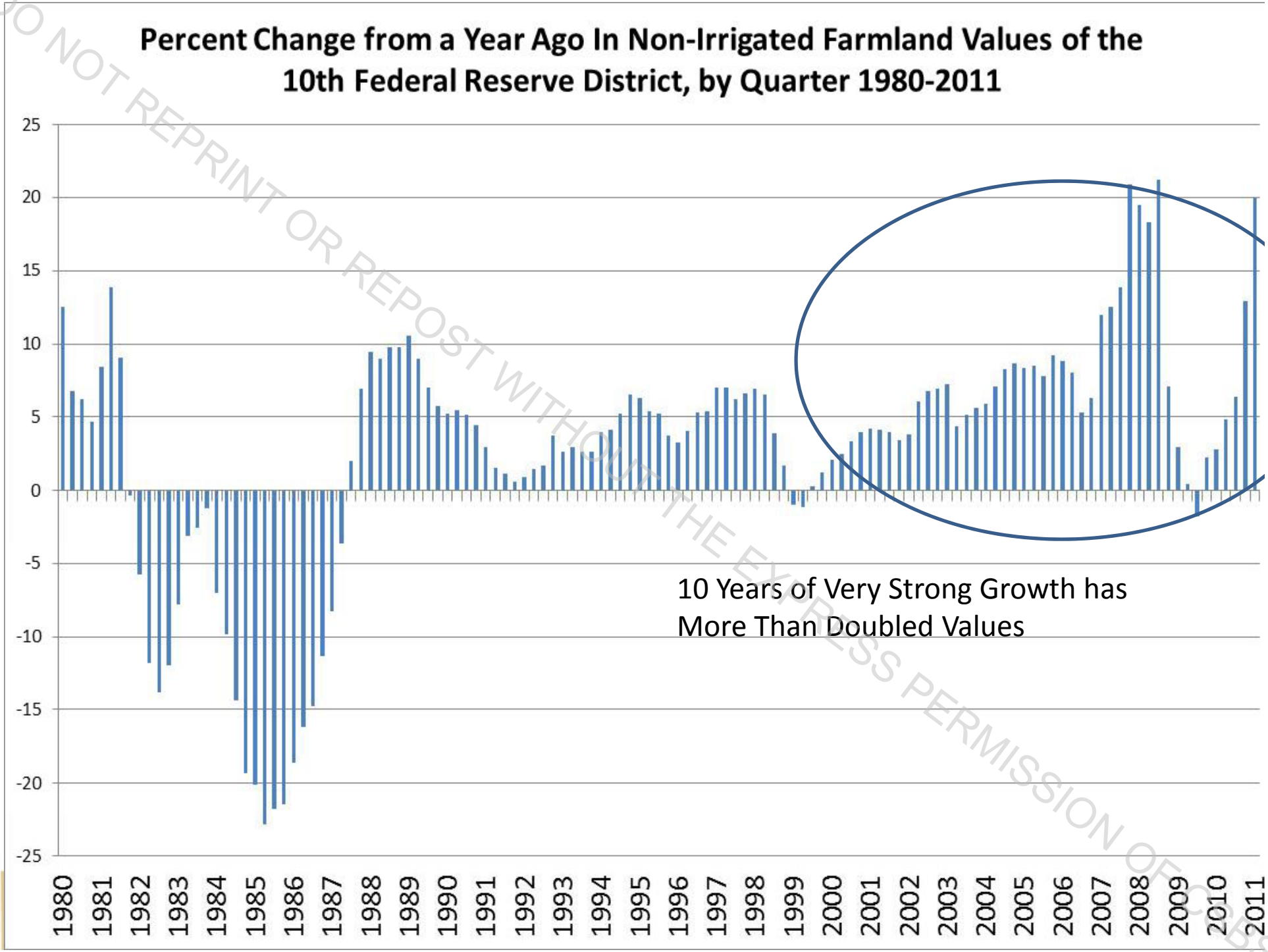
Agenda

- Background
  - What causes bubbles?
  - Valuation basics
- How did we get here?
  - Crop returns and income
  - Interest rates
- Are land values reasonable?
- What are the risks?

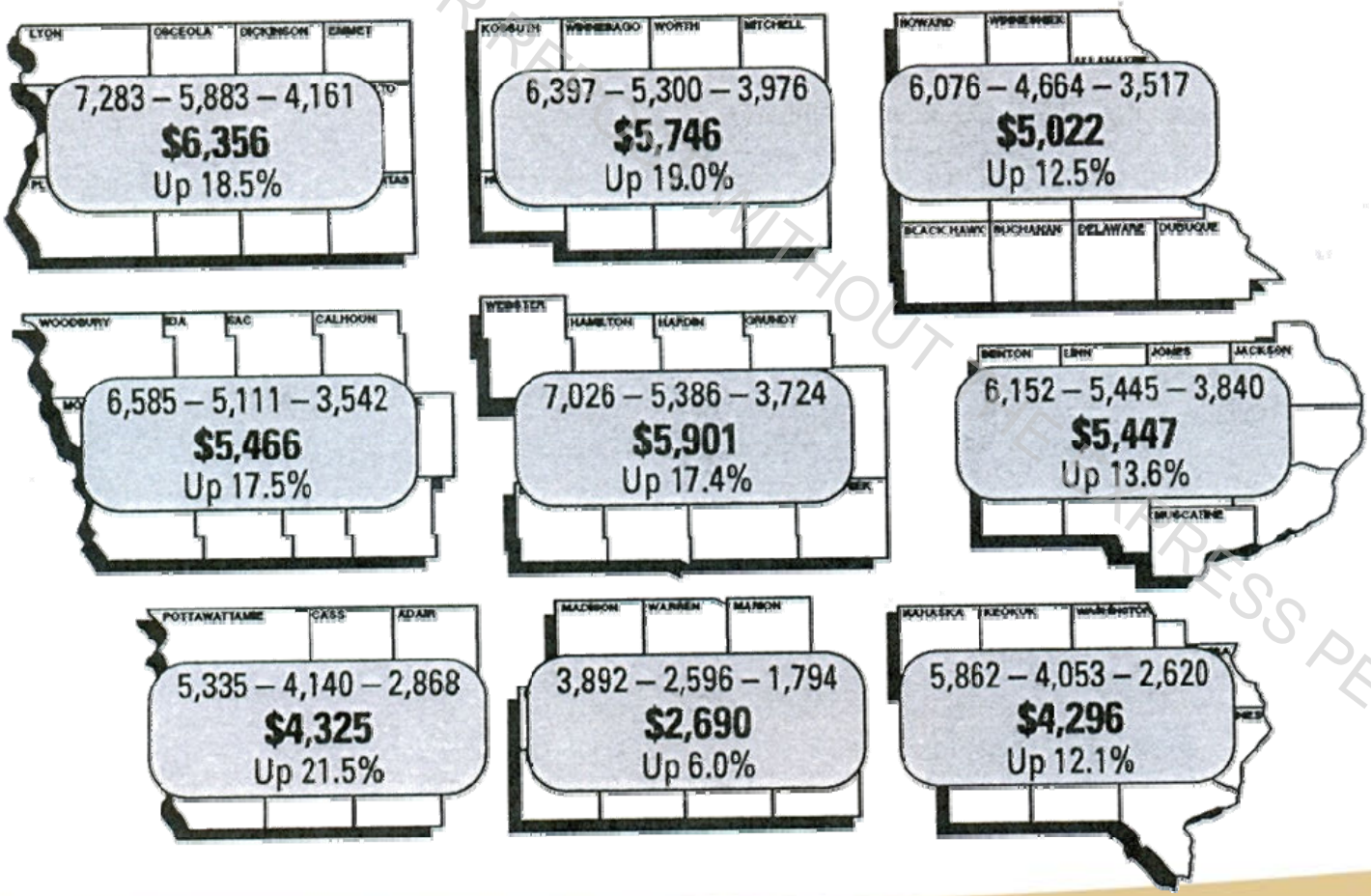
Current Land Market

Characterized by:

- Rapidly rising values
  - Iowa up 16% in 2010 $1,857 in 2000 today $5,064 (CAGR of 11% for last 10 years) (even stronger this year)
  - 10th Fed district 7% CAGR last 10 years
  - Generally thin market – turnover approx. 1.5% according to NE study
  - Headline sales that may or may not be representative
  - Investor interest
  - General sense of optimism



Estimates of average dollar value per acre as Nov. 1, 2010, by Iowa crop reporting districts from IA State Survey.



First line:
high-, medium-, and low-grade farmland values.

Second line:
district average.

Third line:
average percentage change since Nov. 1, 2009.

Price per Acre for Average Quality Indiana Farmland, 1975-2010

Setting the Stage

1. Is it possible that land values could be significantly (20-30%-40%) lower 3-5 years than today?
2. Is there a bubble in the land market?

A bubble implies irrationality in the market and/or a short-term structural issue that impacts market transactions

- People buying/selling in a panic because prices only go up/down
- People forced to sell due to sudden liquidity crisis
- People encouraged to buy, take risk with massive amounts of OPM (liquidity glut)
- Asset prices diverge from any reasonable view of economic fundamentals

What Drives Value?

- General idea of purchasing capital assets
  - Obtain the rights to future earnings for a price less than the real earnings that it will produce
- Capital asset values are determined by *EXPECTATIONS* of the level of future earnings and their present value
  - Earnings are difficult to forecast
  - Interest rates and inflation drive present values and are equally difficult to forecast
- It is very difficult to understand when expectations are misinformed
  - Compounded by the fact that farmland is an infinite life asset with relatively low rates of turnover

A Conceptual Base for Farmland Prices

A Simple Model of Farmland Values

The income capitalization model:

$$Farmland\ Value = \frac{Income}{discount\ rate\ (\%) - growth\ rate\ (\%)}$$

Important points:

↑ Income ⟶ land value ↑

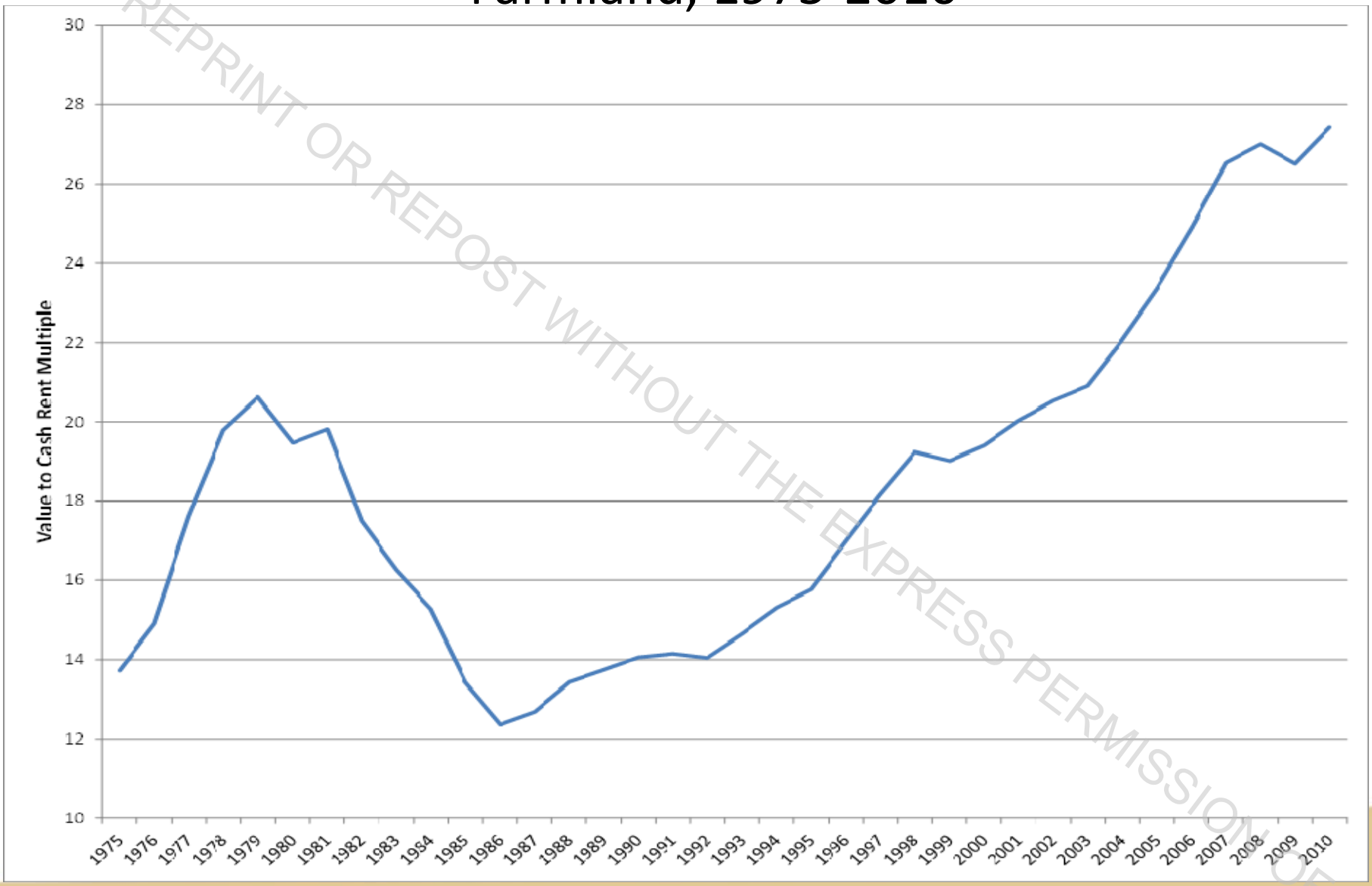
↑ Discount rate ⟶ land value ↓

↑ Income growth rate ⟶ land value ↑

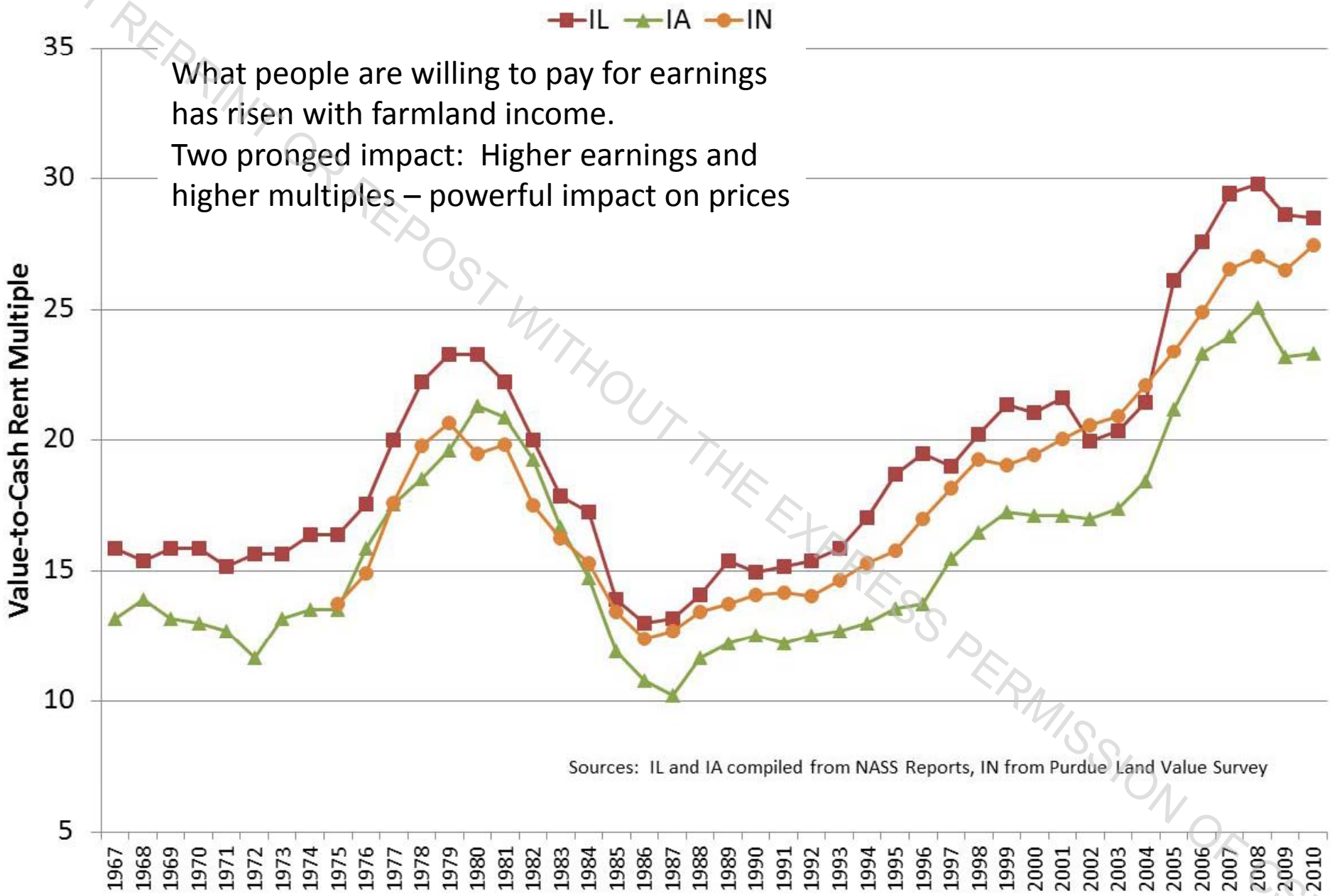
6% discount rate less 1% growth = 5% "cap rate"

Cash rent multiple is the inverse of the cap rate

Value-to-Rent Multiple for Average Quality IN Farmland, 1975-2010



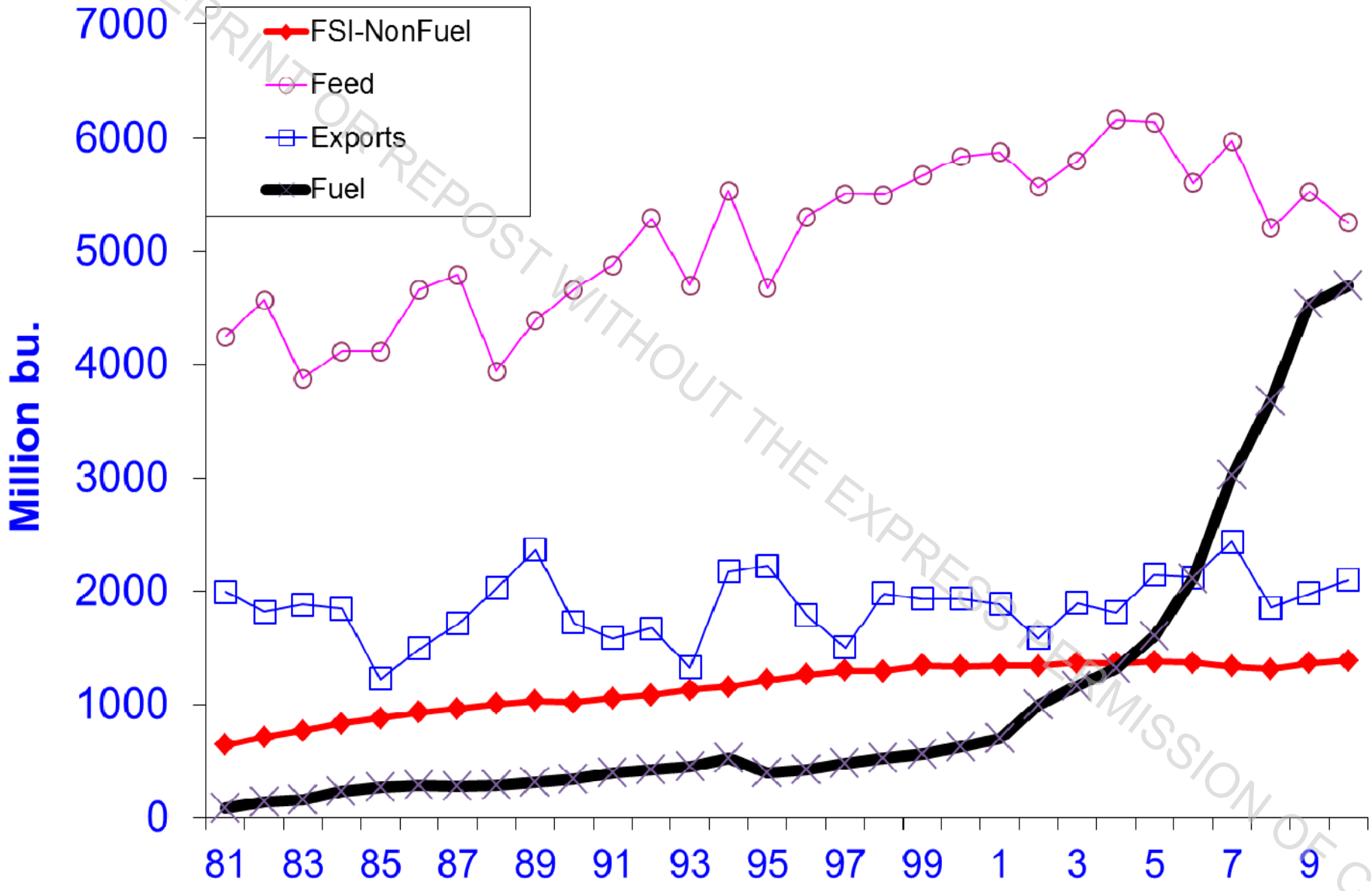
Value-to-Cash Rent Multiple for IA, IL, IN Cropland, 1967-2010

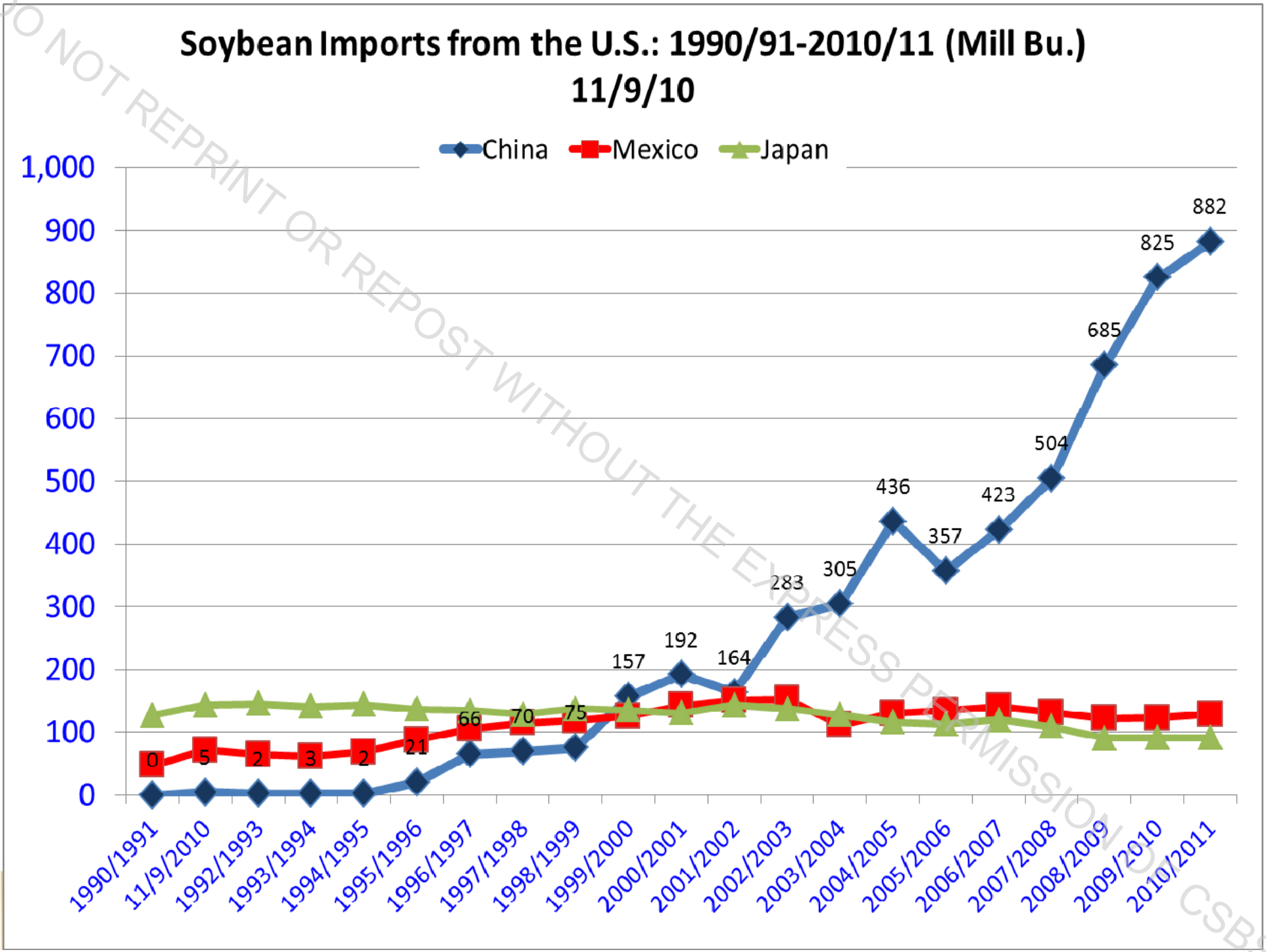


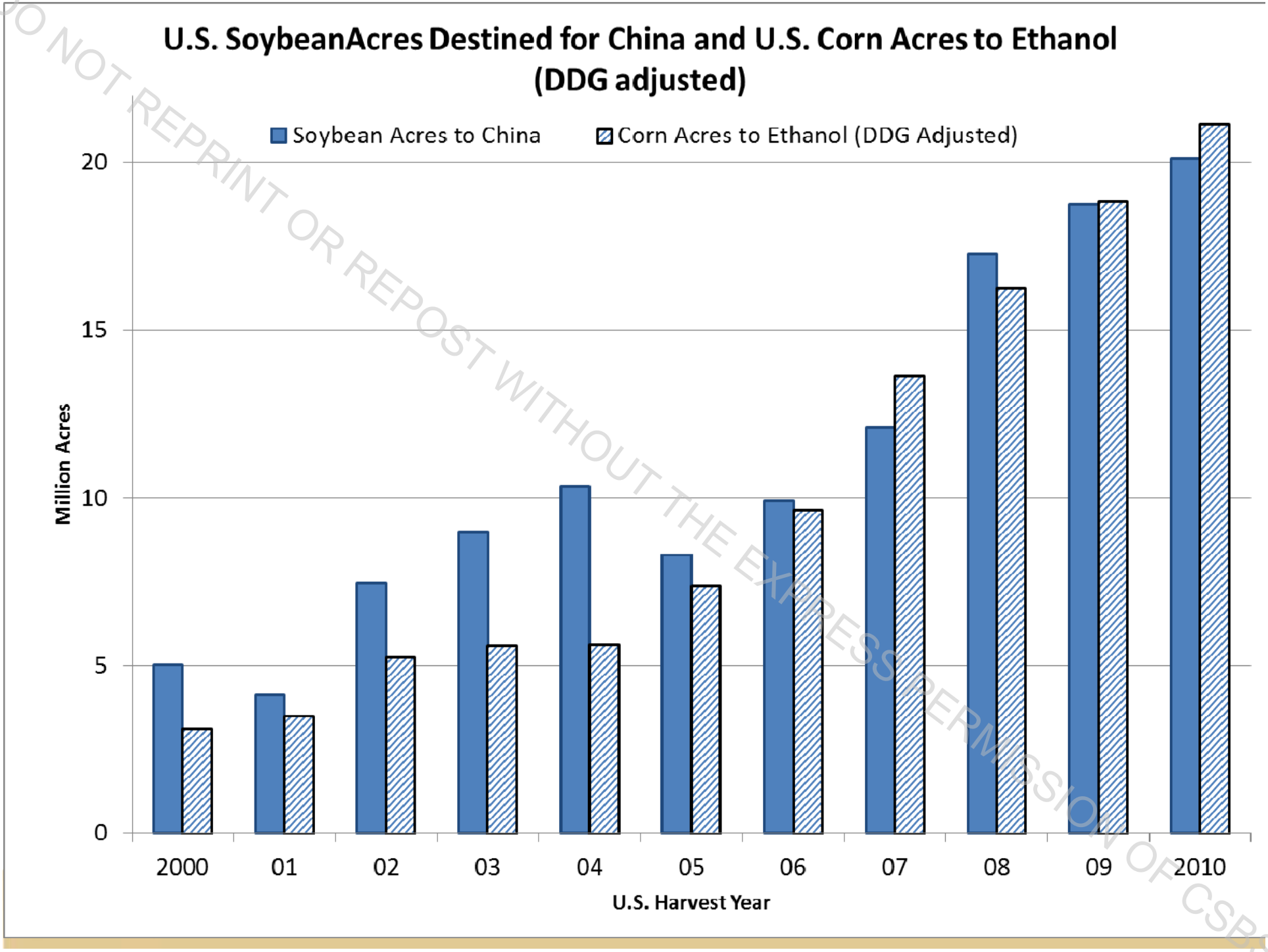
So How Did We Get Here?

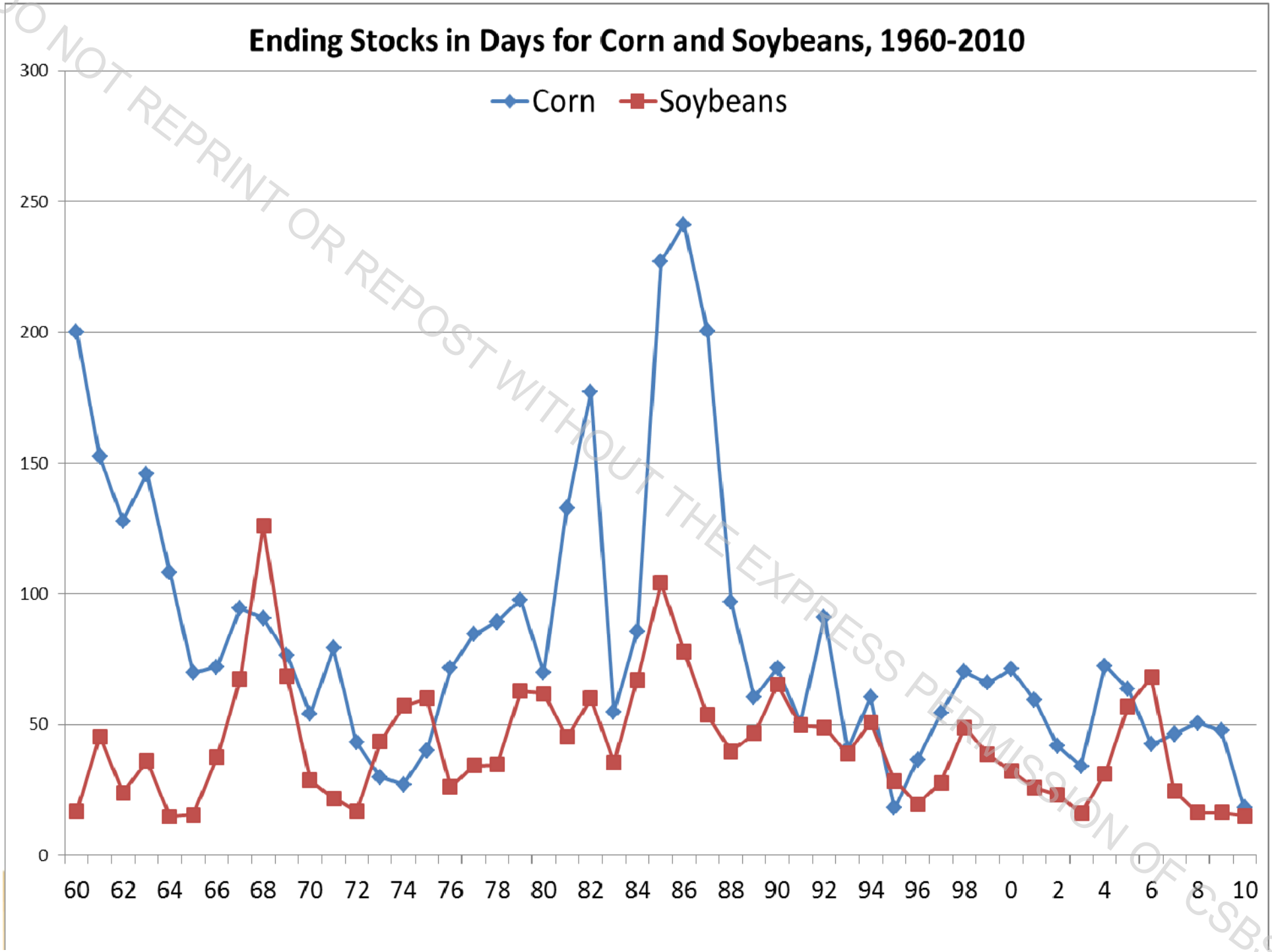
- Returns
  - Biofuel demand
  - Strong demand from emerging markets
  - Weather shocks/poor yields
- Generally decreasing interest rate environment
  - Rates at 30 year lows

Corn Use



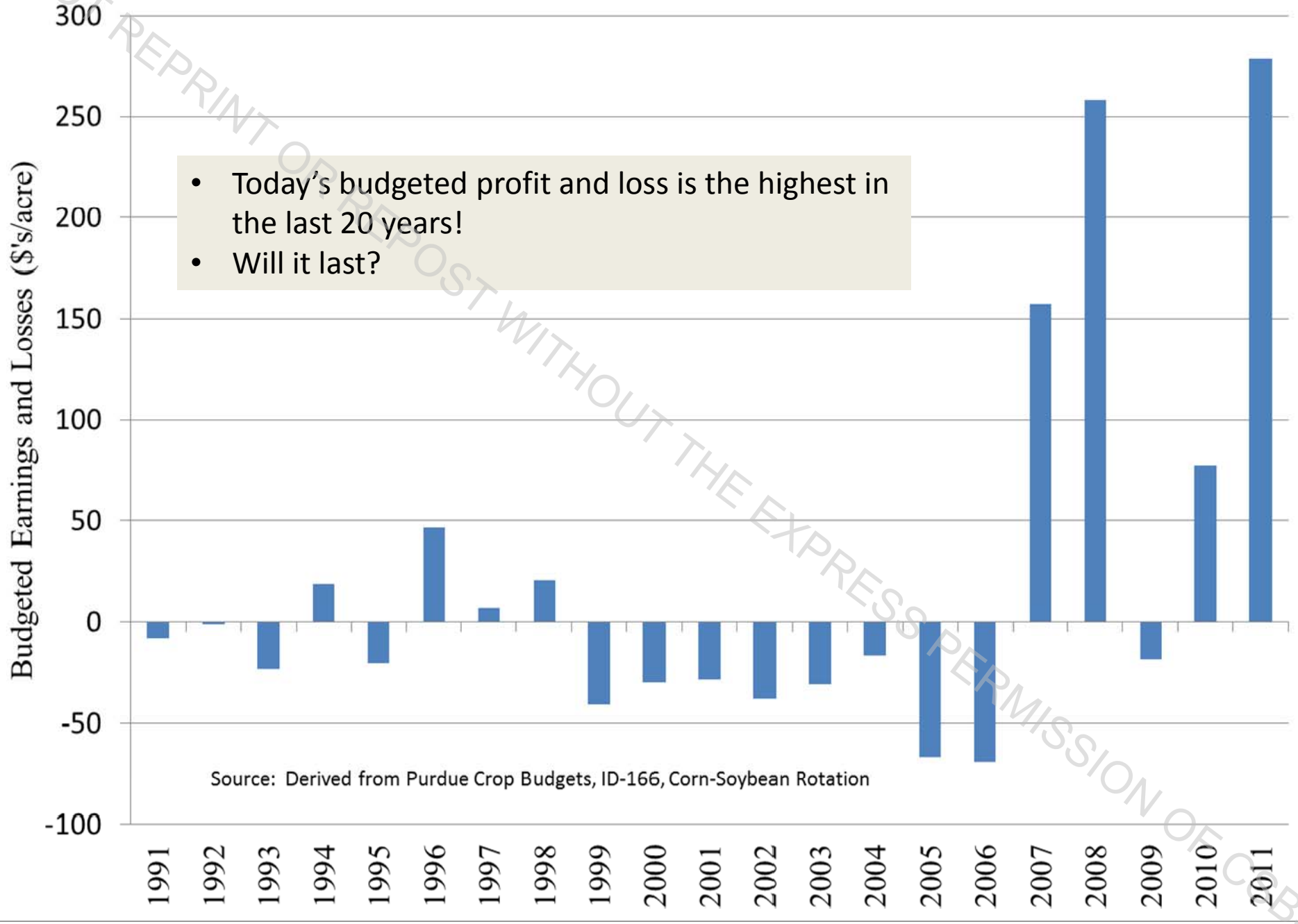




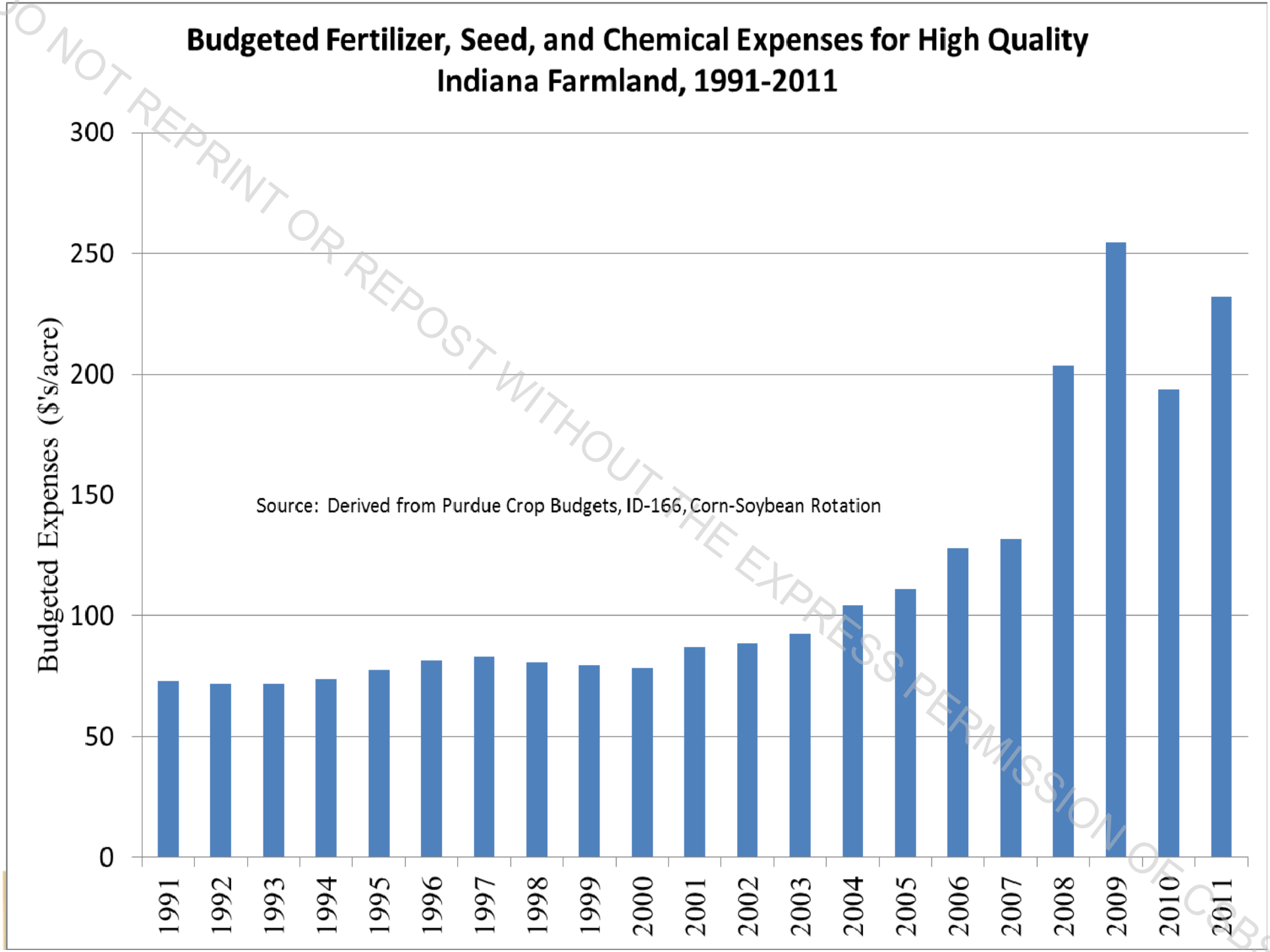


Budgeted Profit and Loss for High Quality Indiana Farmland, 1991-2011

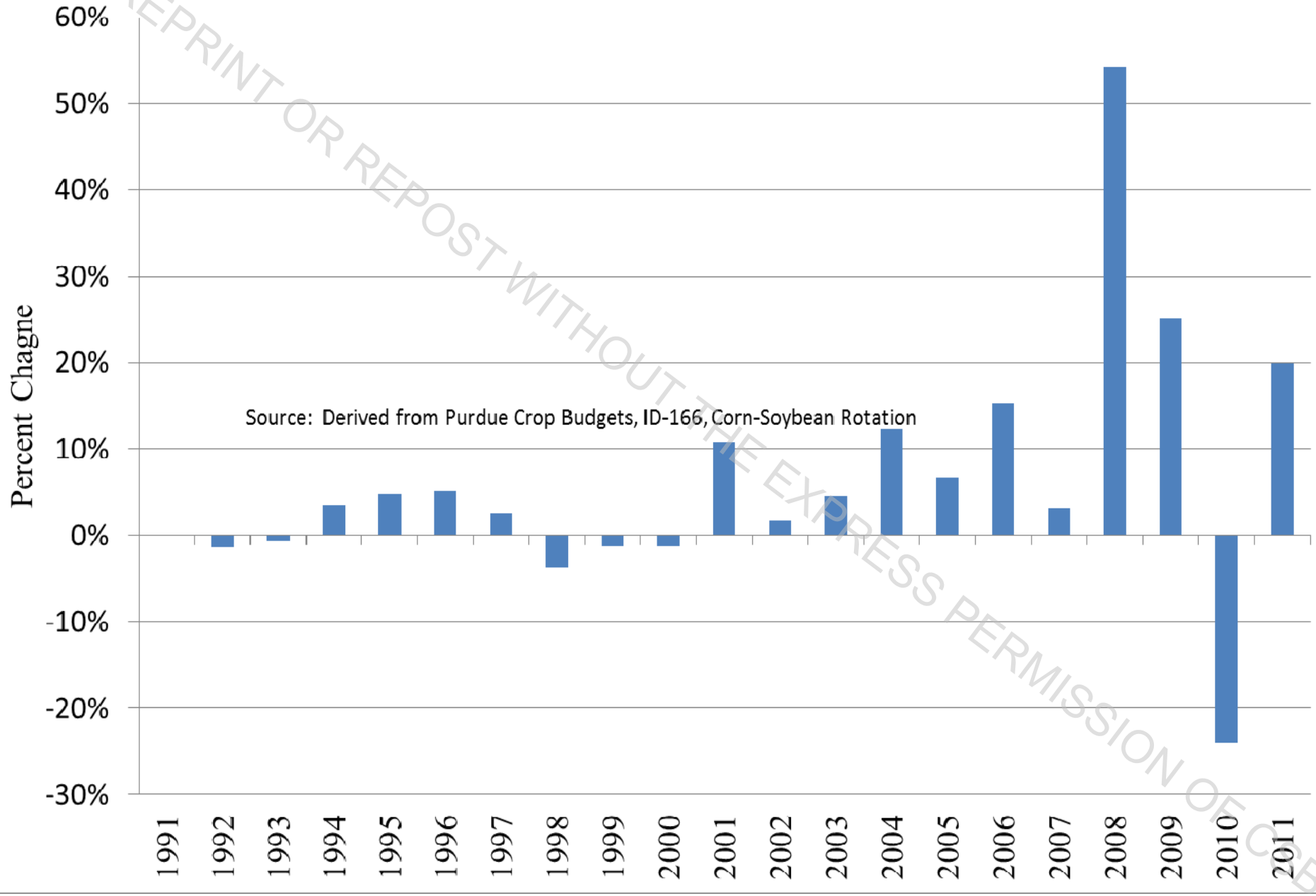
- Today's budgeted profit and loss is the highest in the last 20 years!
- Will it last?

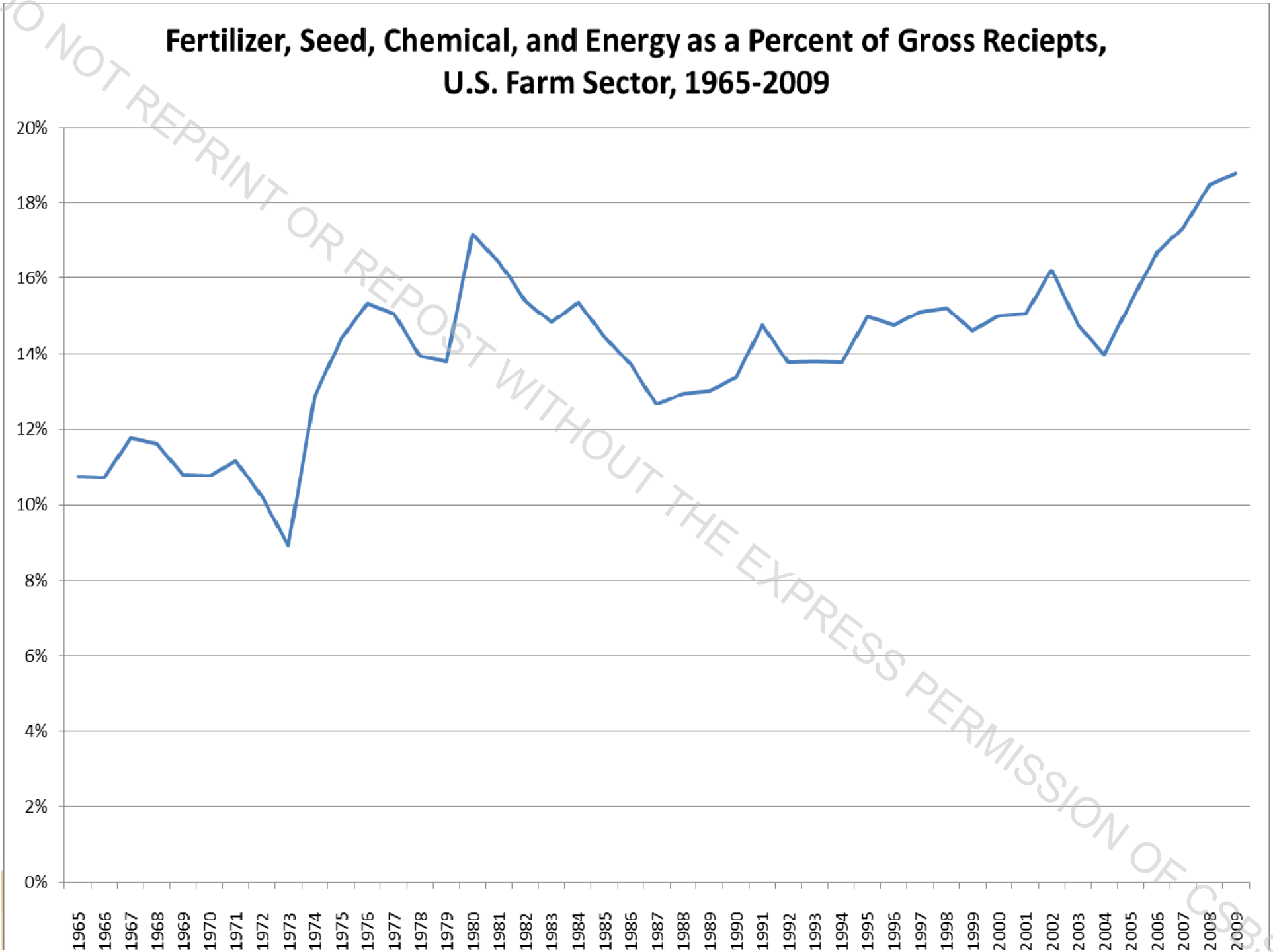


Source: Derived from Purdue Crop Budgets, ID-166, Corn-Soybean Rotation

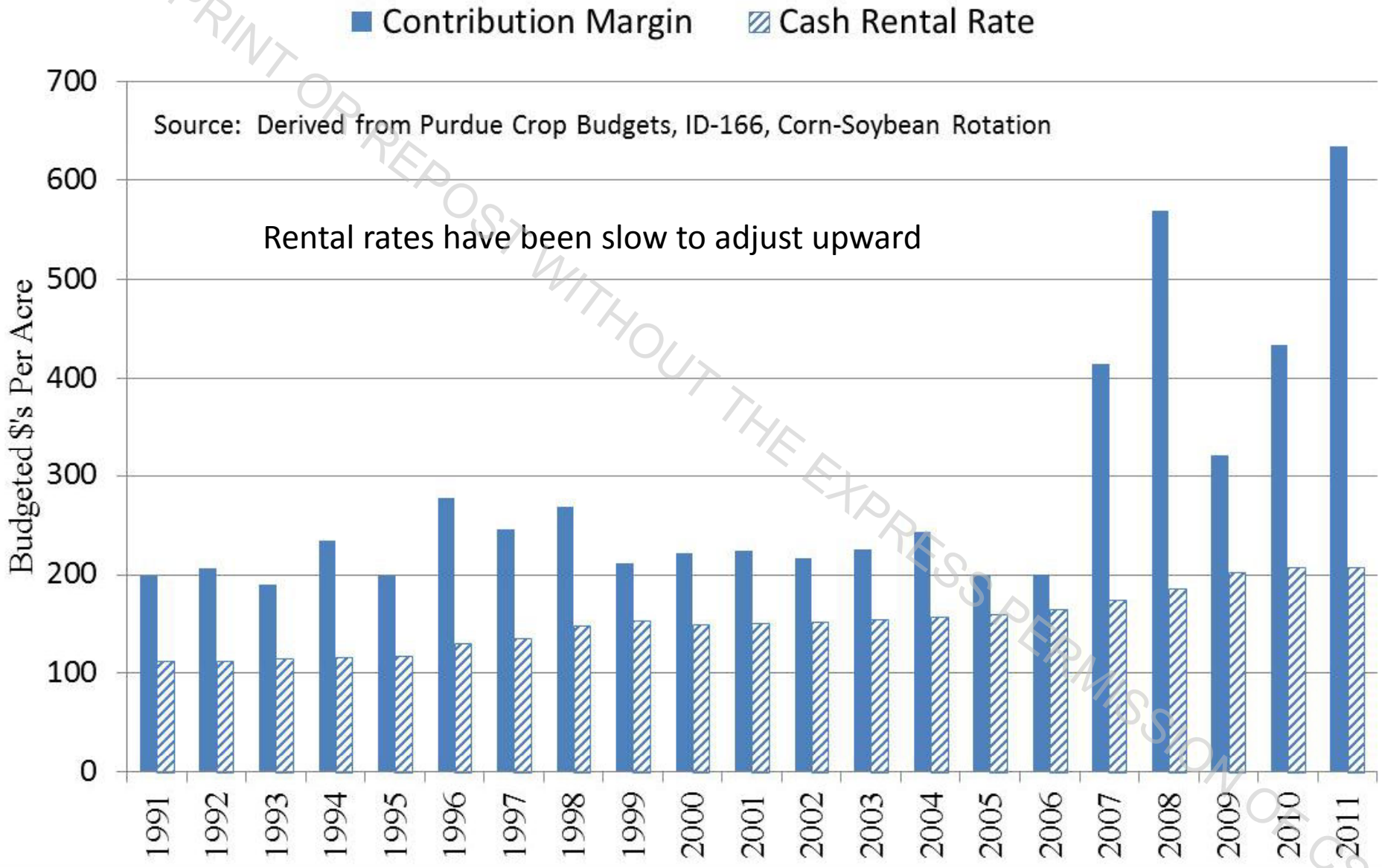


Percent Change in Budgeted Fertilizer, Seed, and Chemical Expenses for High Quality Indiana Farmland, 1991-2011

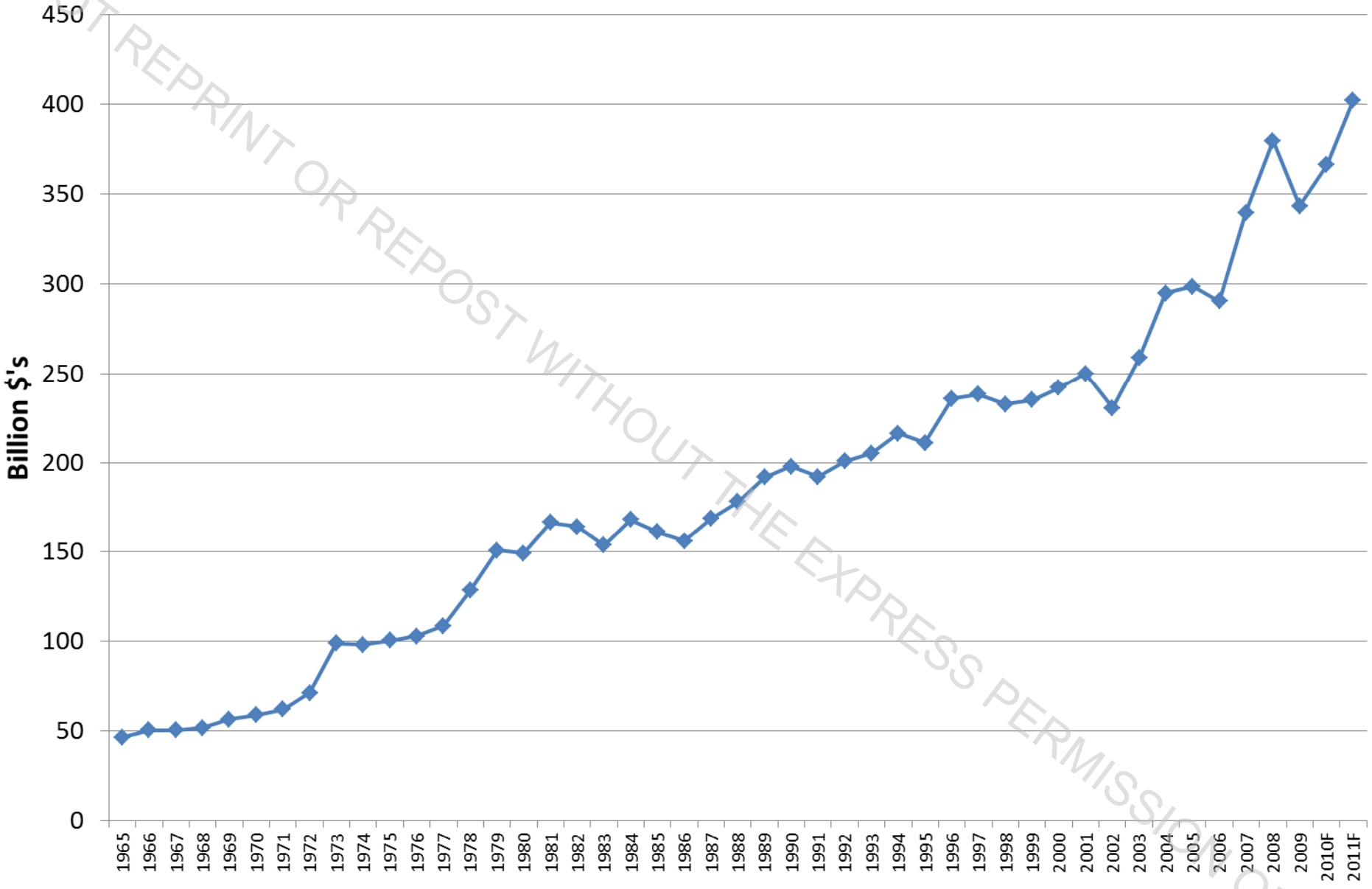




Budgeted Contribution Margin and Cash Rental Rate for High Quality Indiana Farmland, 1991-2011



U.S. Gross Farm Income, 1965-2011



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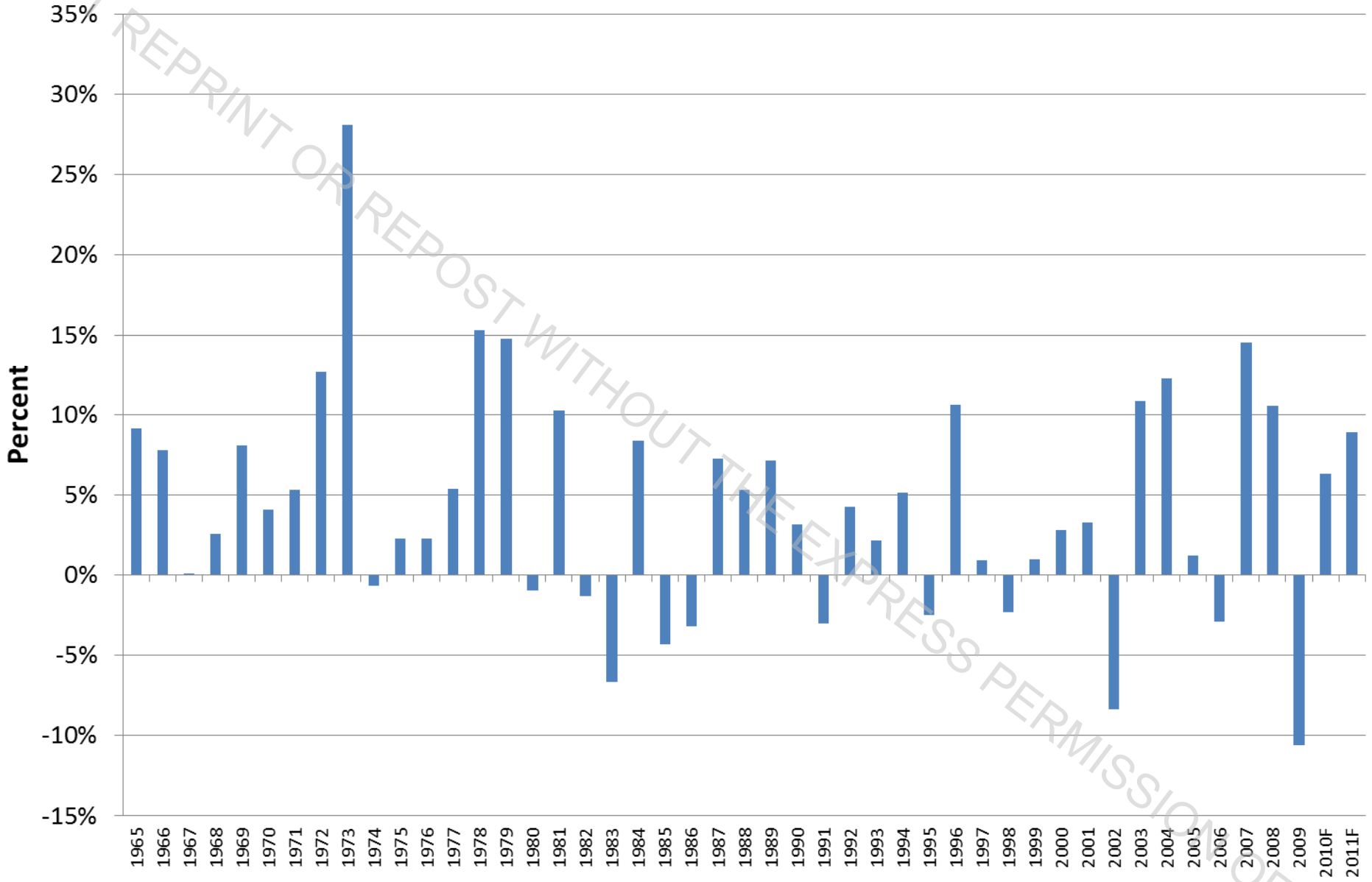
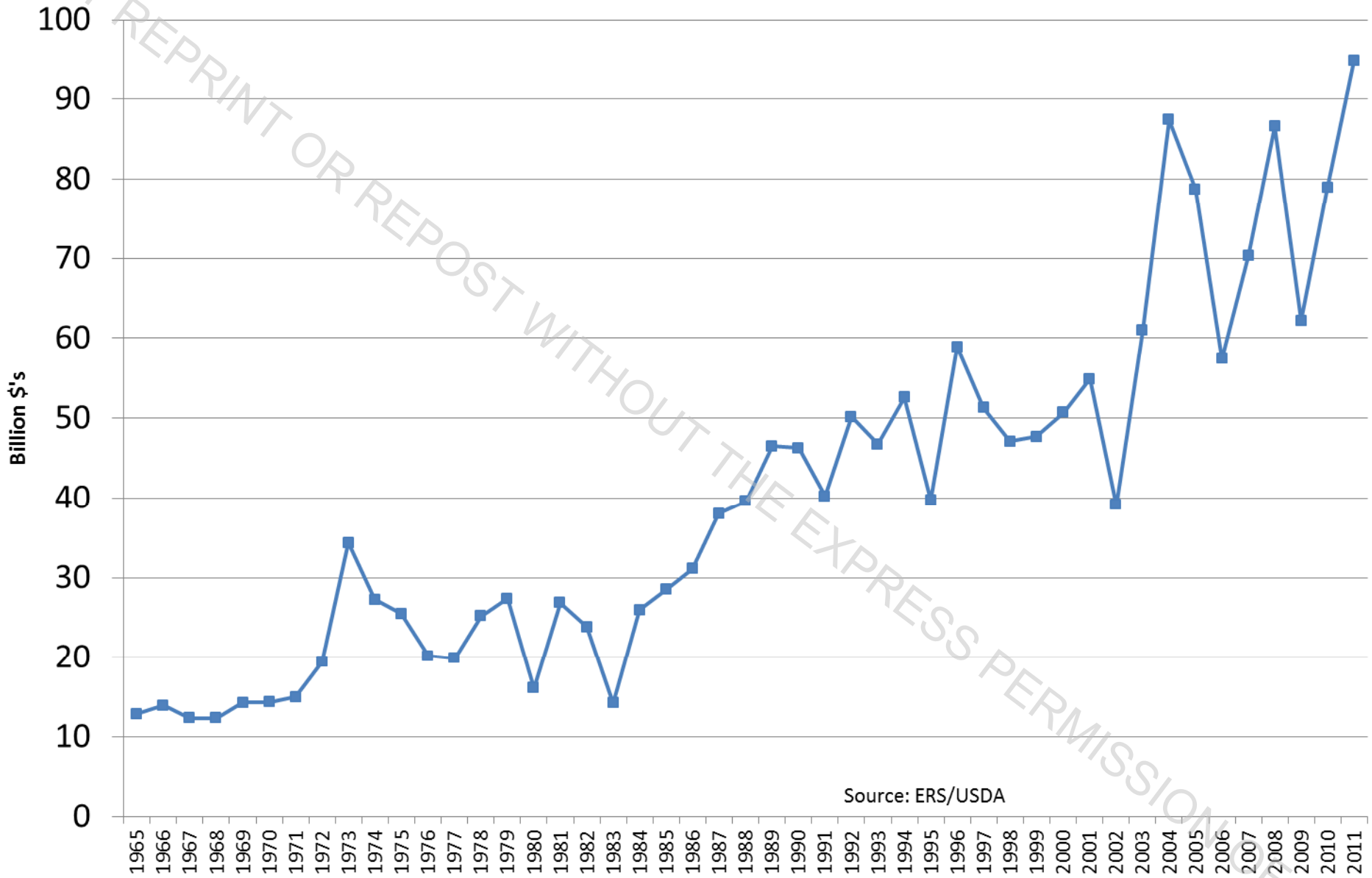
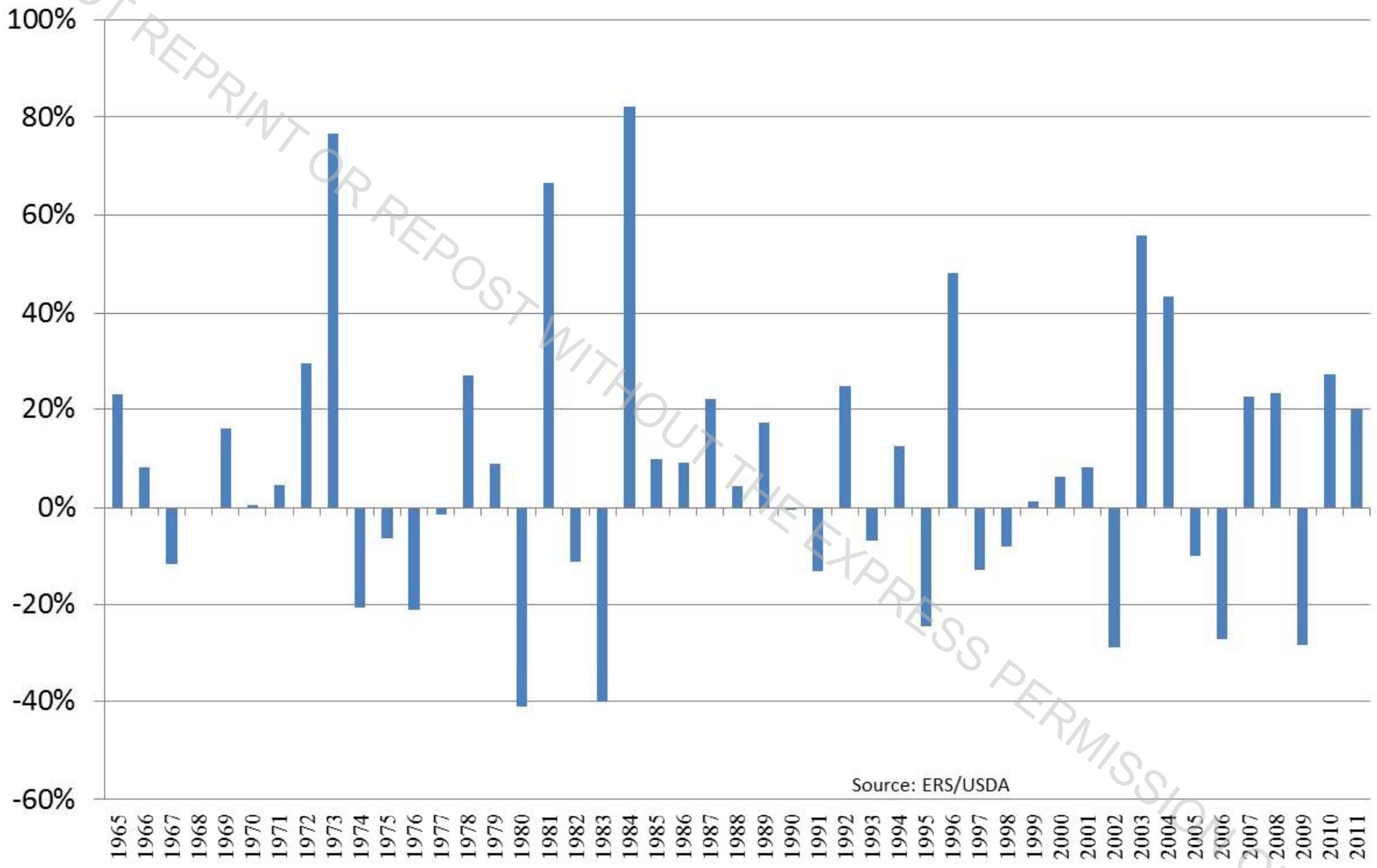


U.S. Net Farm Income, 1965-2011



Annual Percent Change in U.S. Net Farm Income, 1965-2011

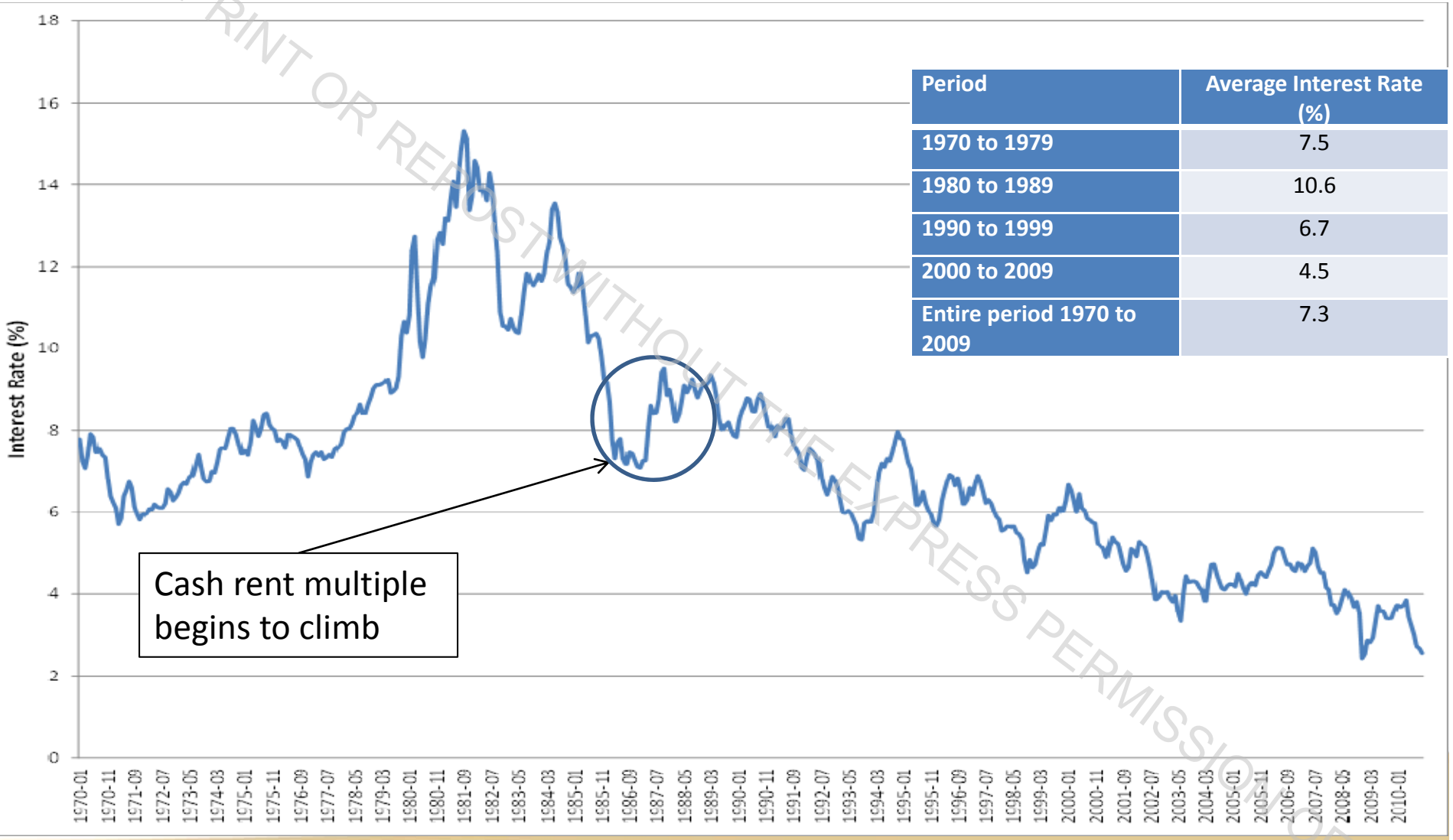


Many Factors Underlie the High Rent-to-Value Ratio

- Interest rates have gone down dramatically over roughly the same period that the multiple has increased
  - Recall denominator is the discount rate less growth expectations
  - Discount rate approximately equal to risk free return + risk premium, i.e., cap rate is:

Cap rate = Risk free return + risk premium - growth

Interest Rate on 10-Year Treasury Bonds, 1970 to 2010

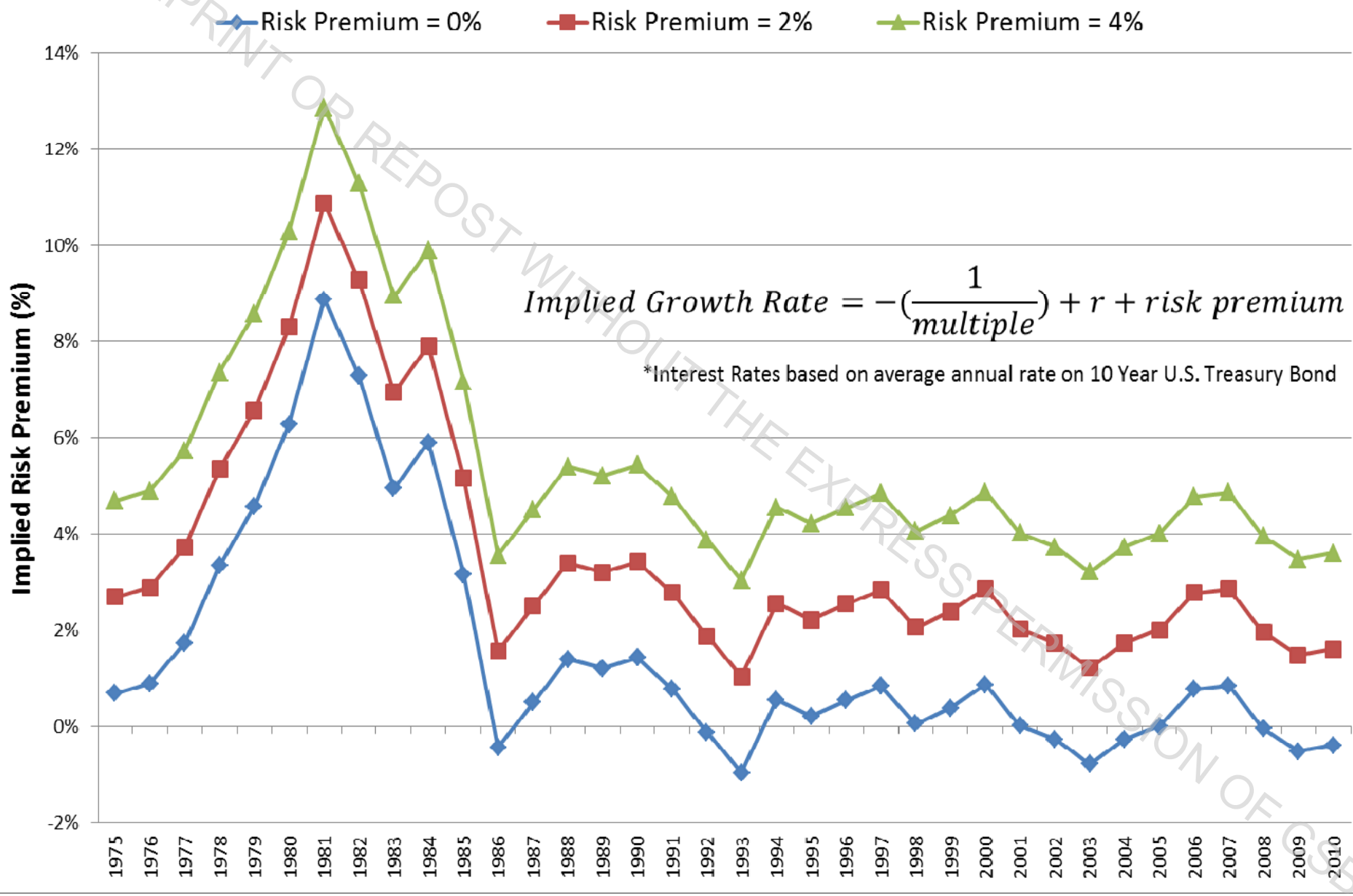


Period	Average Interest Rate (%)
1970 to 1979	7.5
1980 to 1989	10.6
1990 to 1999	6.7
2000 to 2009	4.5
Entire period 1970 to 2009	7.3

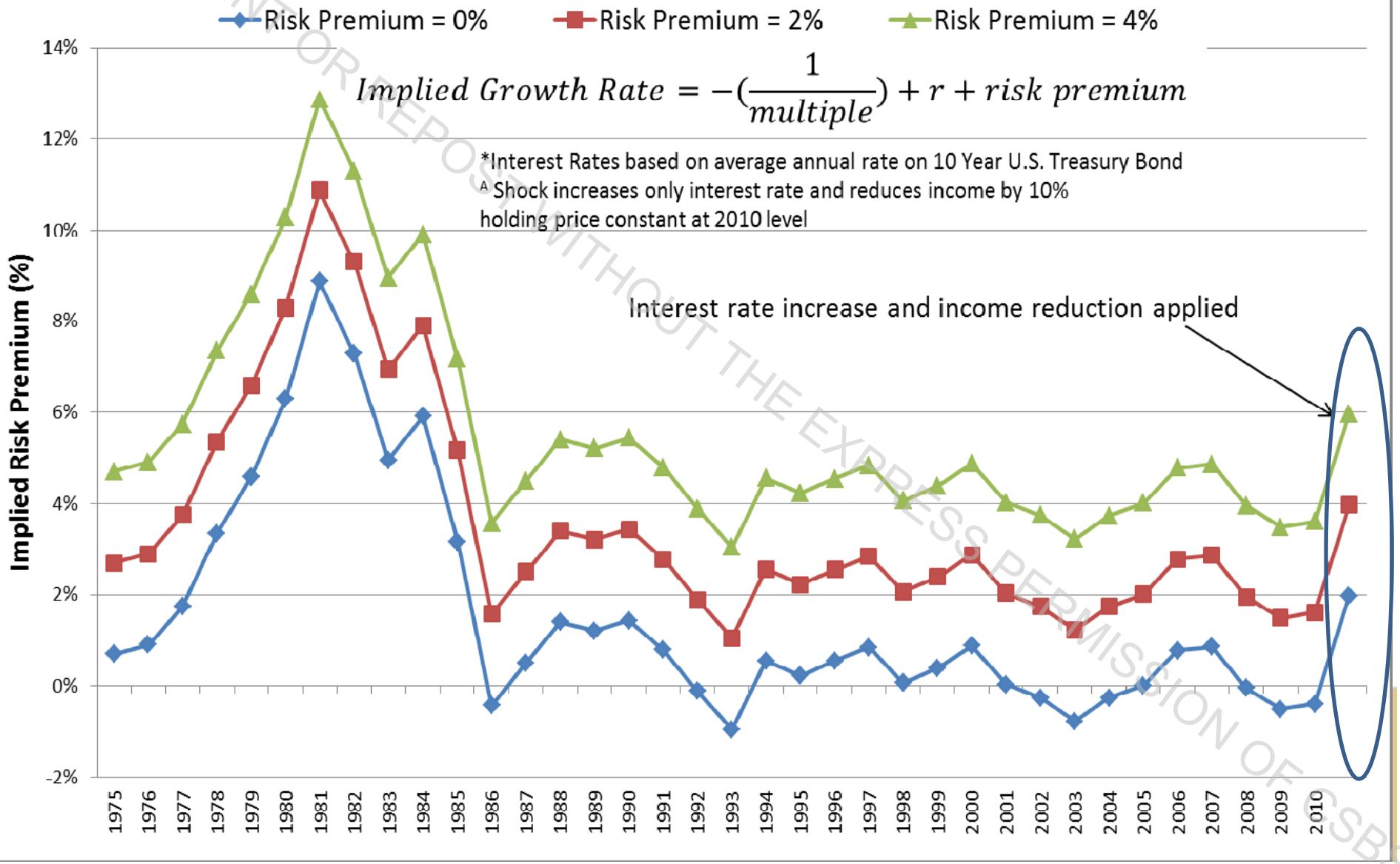
Many Factors Underlie the High Rent-to-Value Ratio

- Interest rates have gone down dramatically over roughly the same period that the multiple has increased
  - Has reduced risk free return component of cap rate
  - What has happened to risk premium component?
- Incomes strong and growing
  - Are cash rent surveys reflective of income?
  - Could reflect high levels of growth expectations

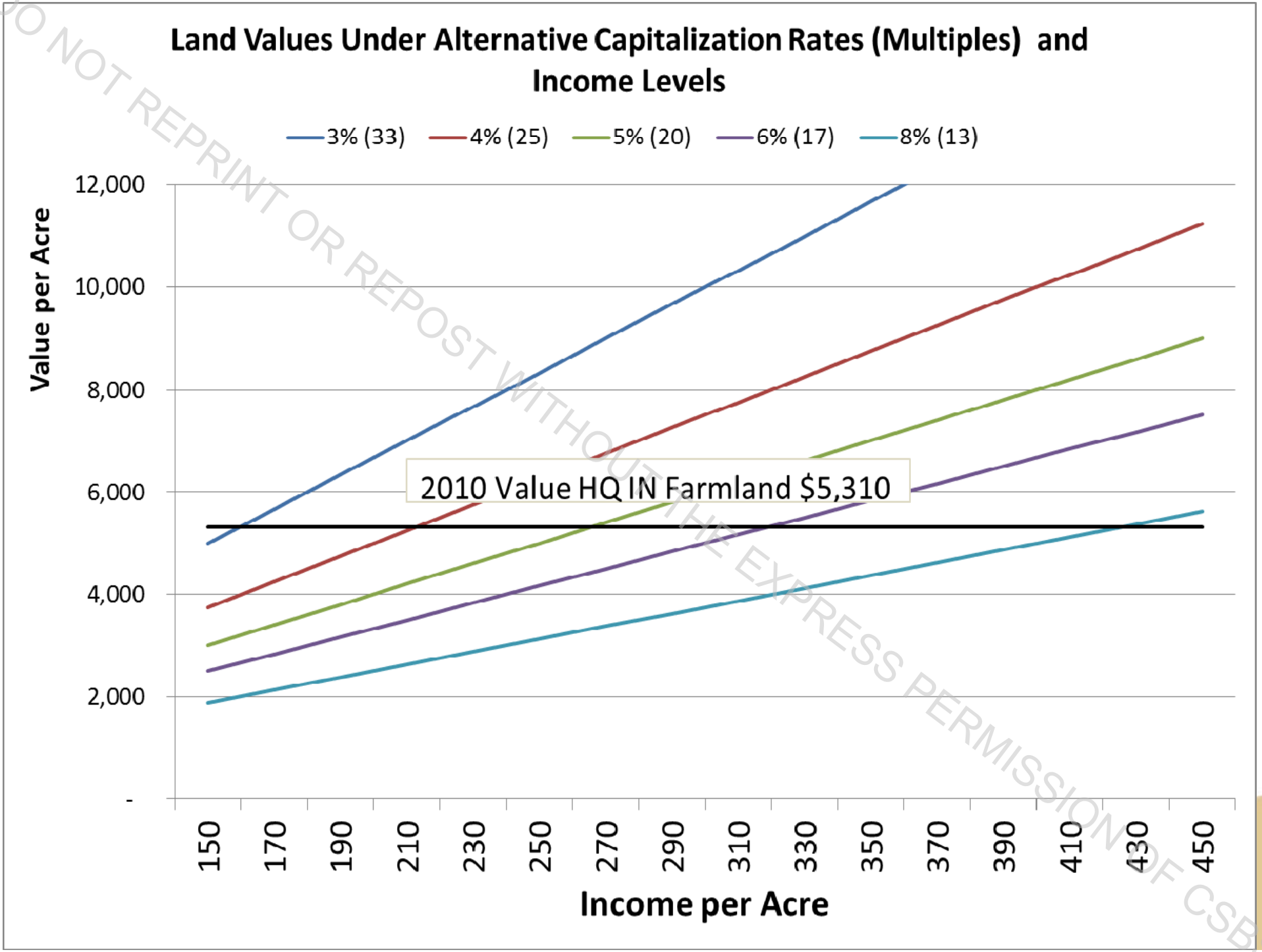
Implied Income Growth Under Various Risk Premium Assumptions, Average Quality IN Farmland, 1975-2010*

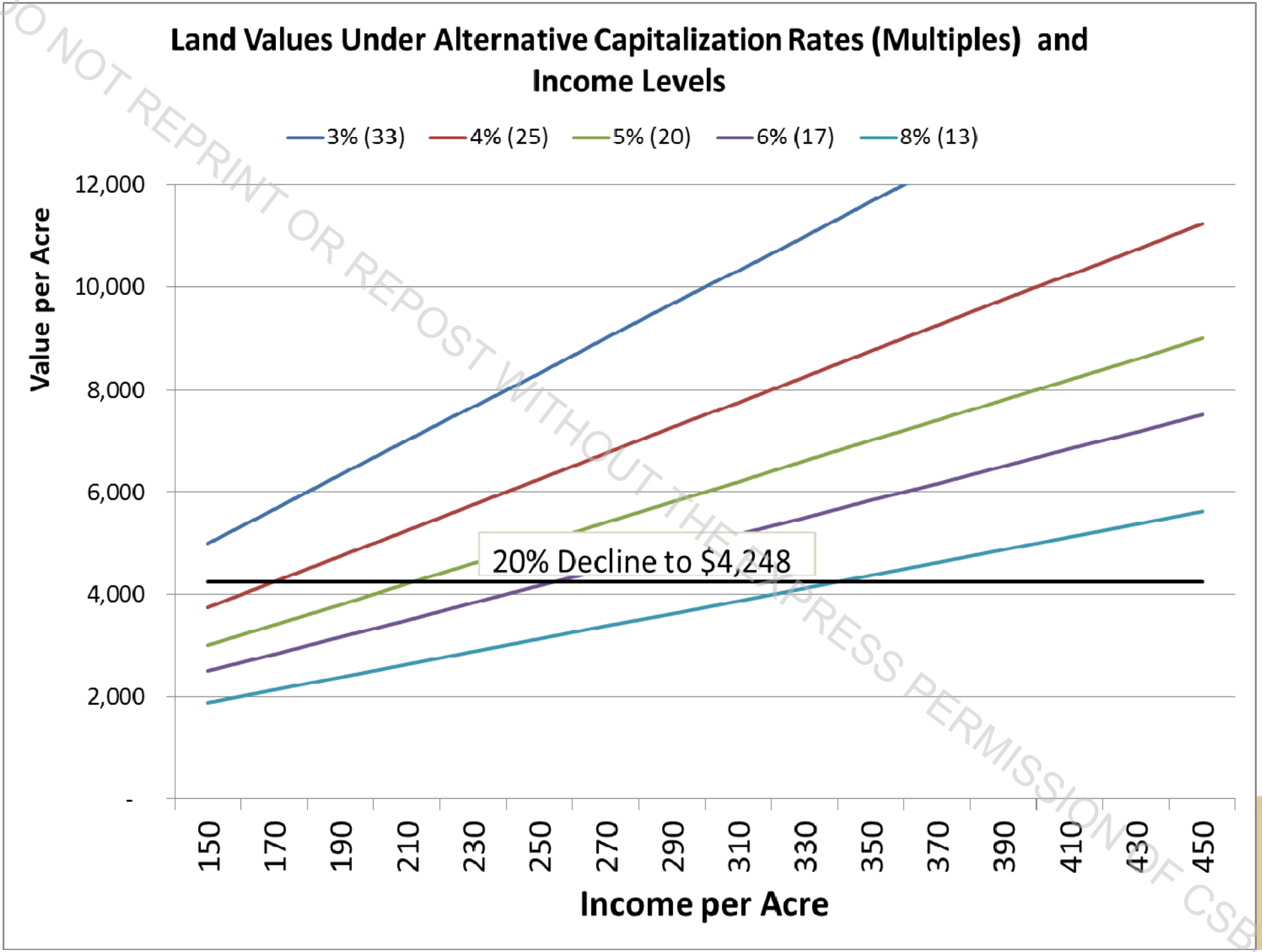


Growth Needed in Future for 200 BP Interest Rate Increase and 10% Income Level Reduction *



Some Scenarios





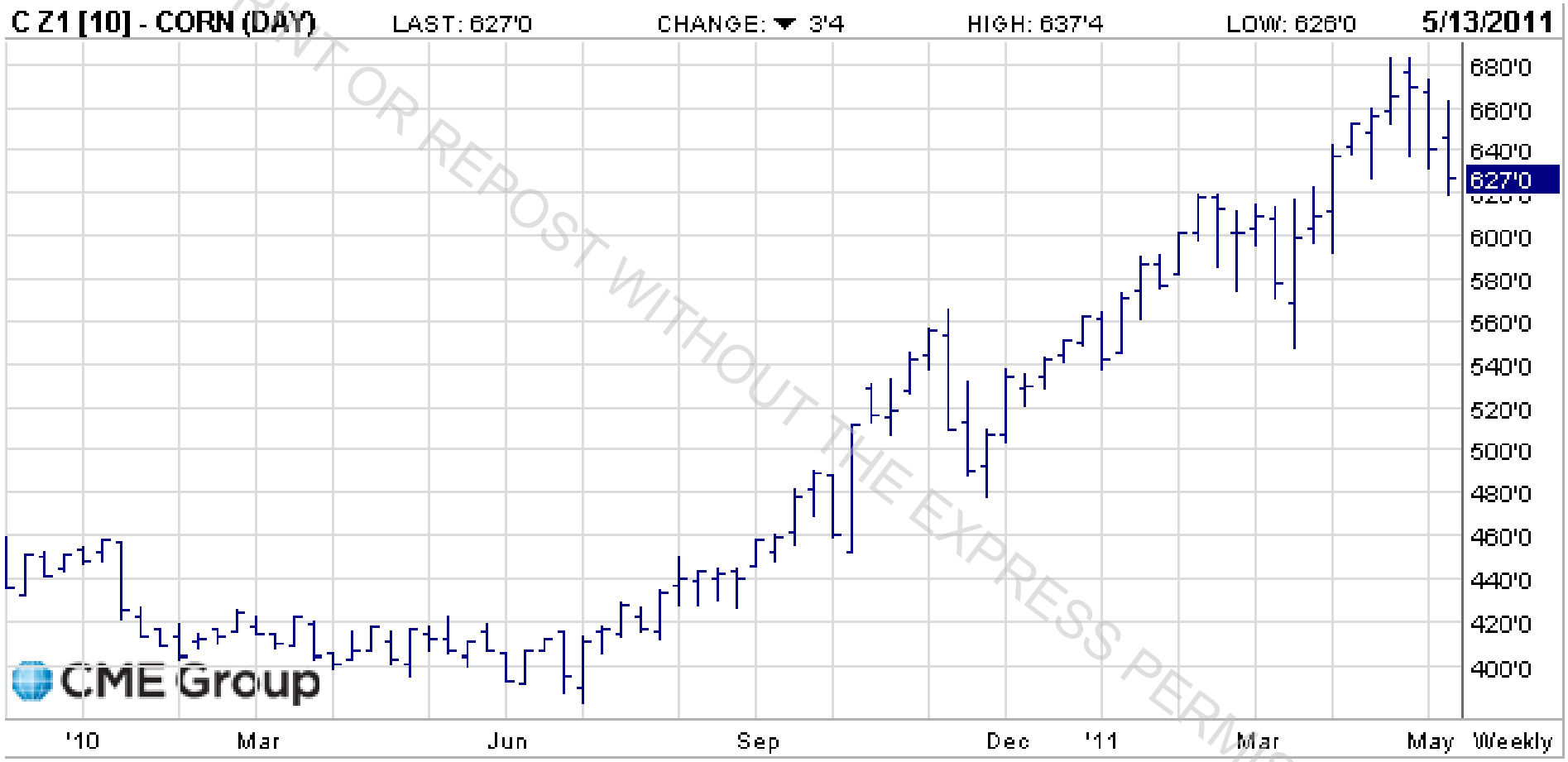
Current Land Values

- Land values appear to reflect current high returns in agriculture
  - Not obviously overvalued, do not appear to have diverged from reality
  - This DOES NOT mean that a downward movement is impossible
- Values are dependent upon interest rates remaining low and/or sustained growth in agricultural incomes
- It is possible that a bubble is in early stages of formation
- Substantial increases from here would be based upon optimistic scenarios for future growth and/or reduced real rates

Things That Tend to Fuel Bubbles

- Easy access to credit for the purchase of the capital asset with someone willing to accept lots of risk (liquidity glut)
- **Widespread uncertainty about the level of economic fundamentals and their future outlook and the magnitude of the risk misunderstood by market participants**
- Markets that allow participants to easily capture capital gains along the way and/or roll capital gains into ever bigger bets
- New demand (uninformed market participants wanting to enter the market)

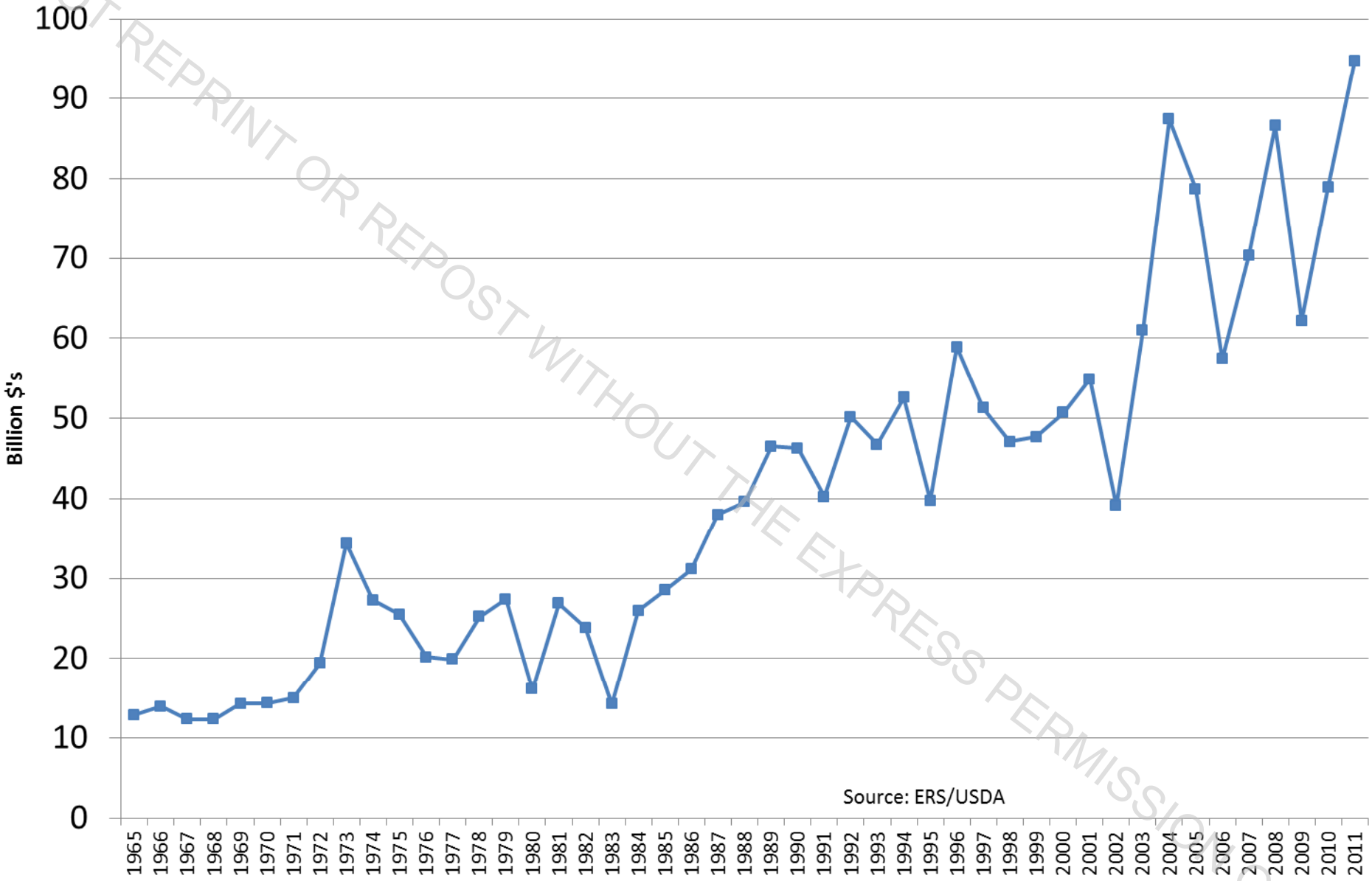
Dec 2011 Weekly Corn Prices



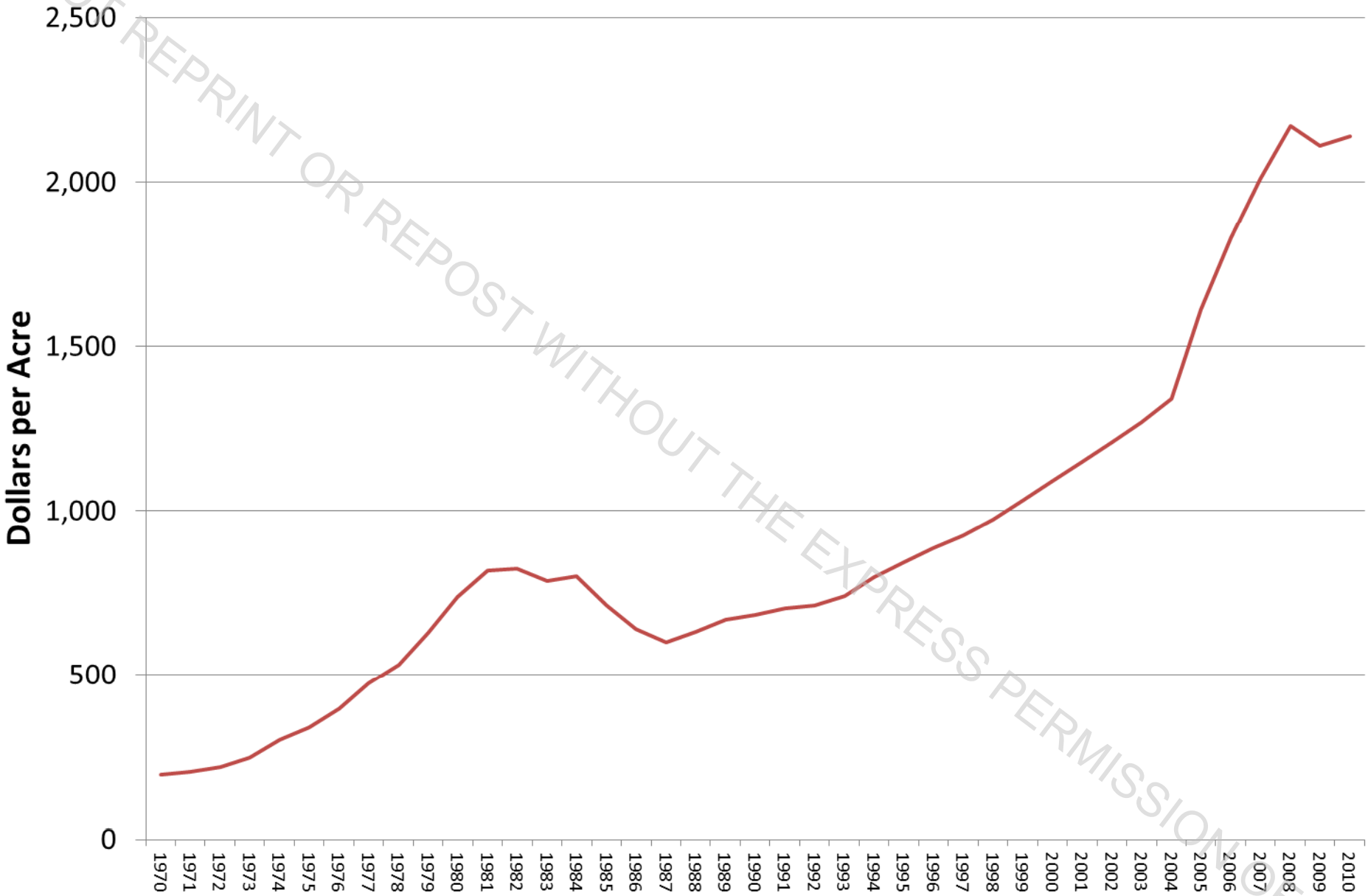
Price Risk is Substantial

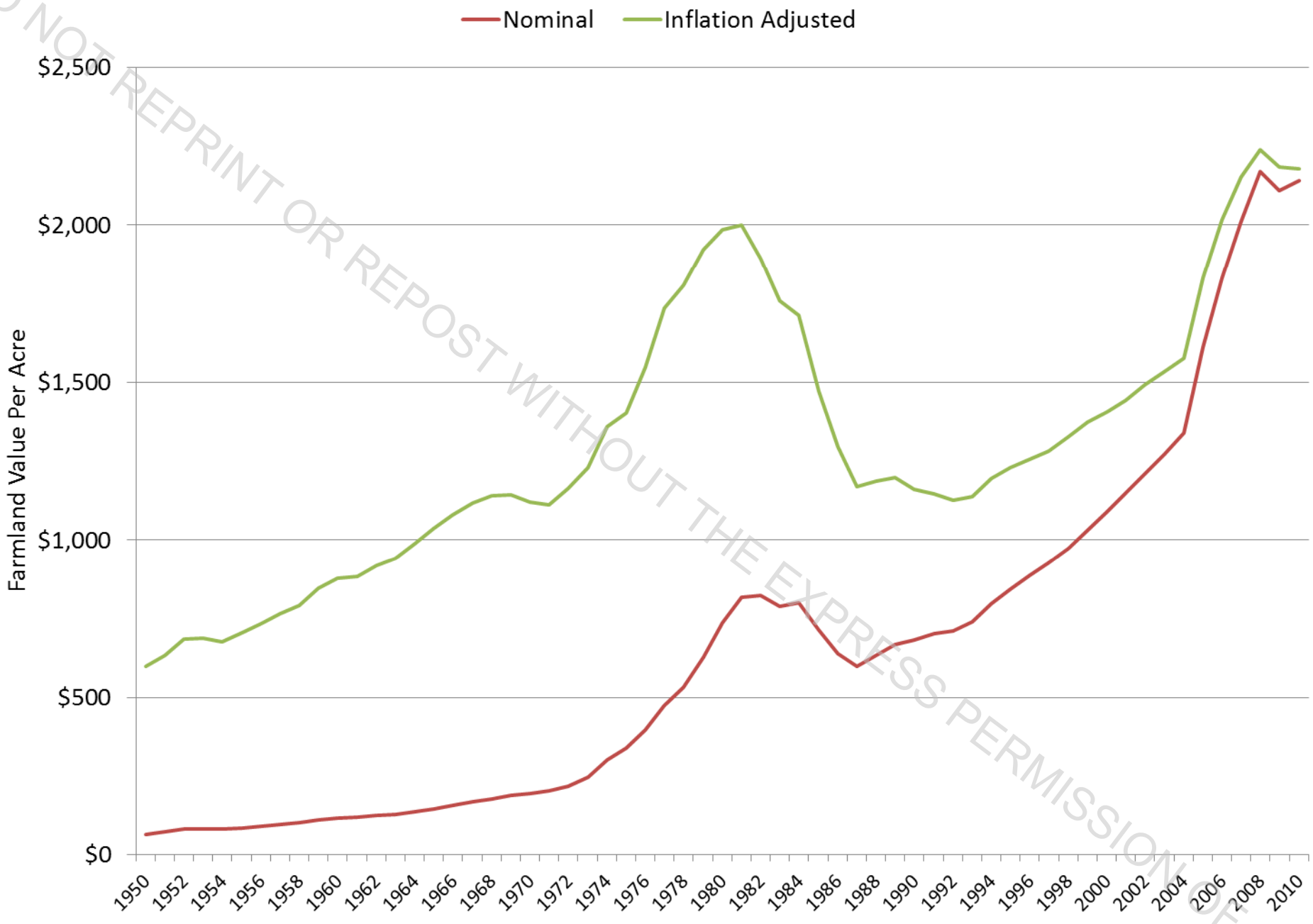
Weekly Nearby Corn Futures Contract Prices, 2006-2011

U.S. Net Farm Income, 1965-2011



Nominal Farmland Values United States, 1970-2010





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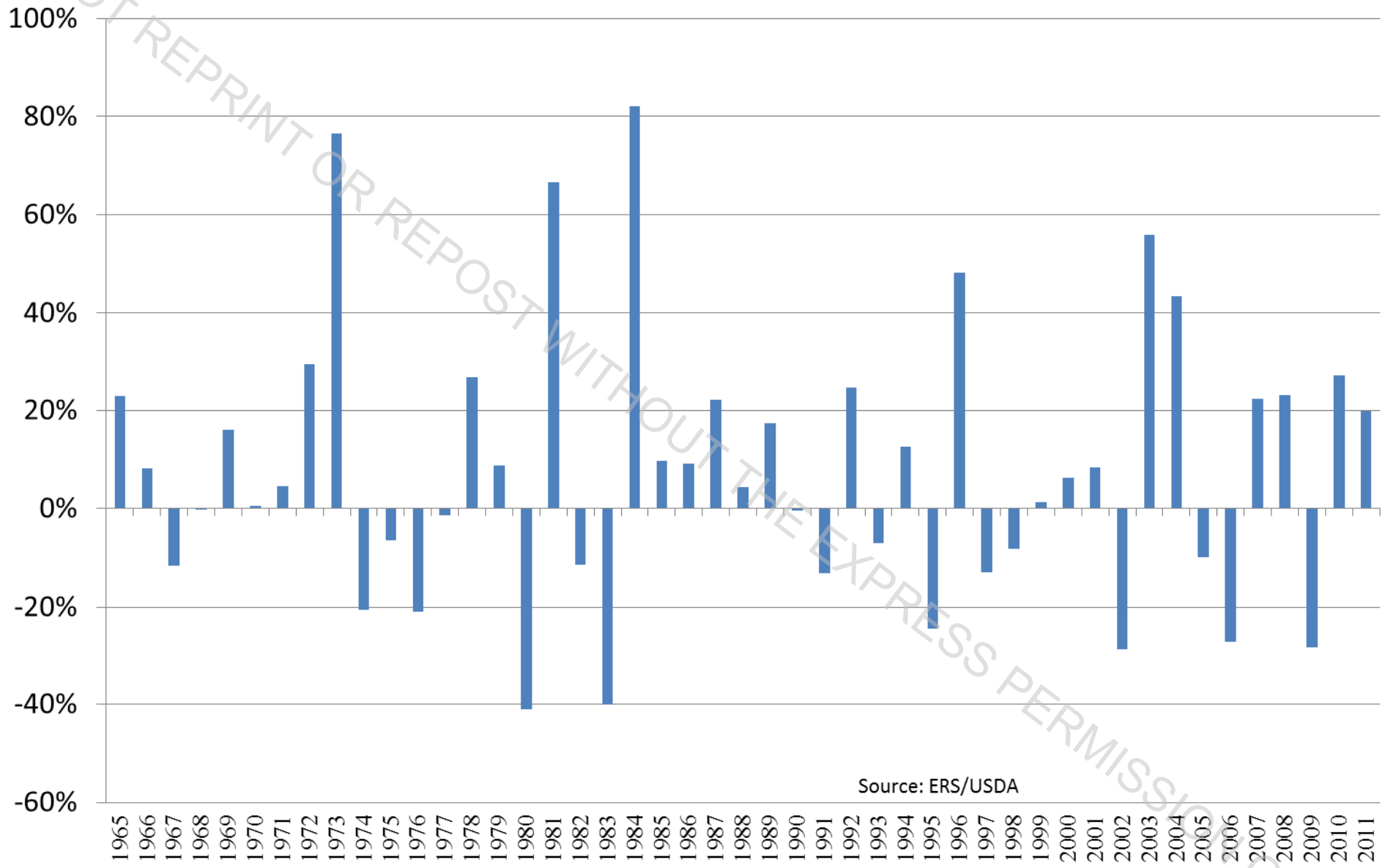
Annual Percent Change in U.S. Net Farm Income, 1965-2011



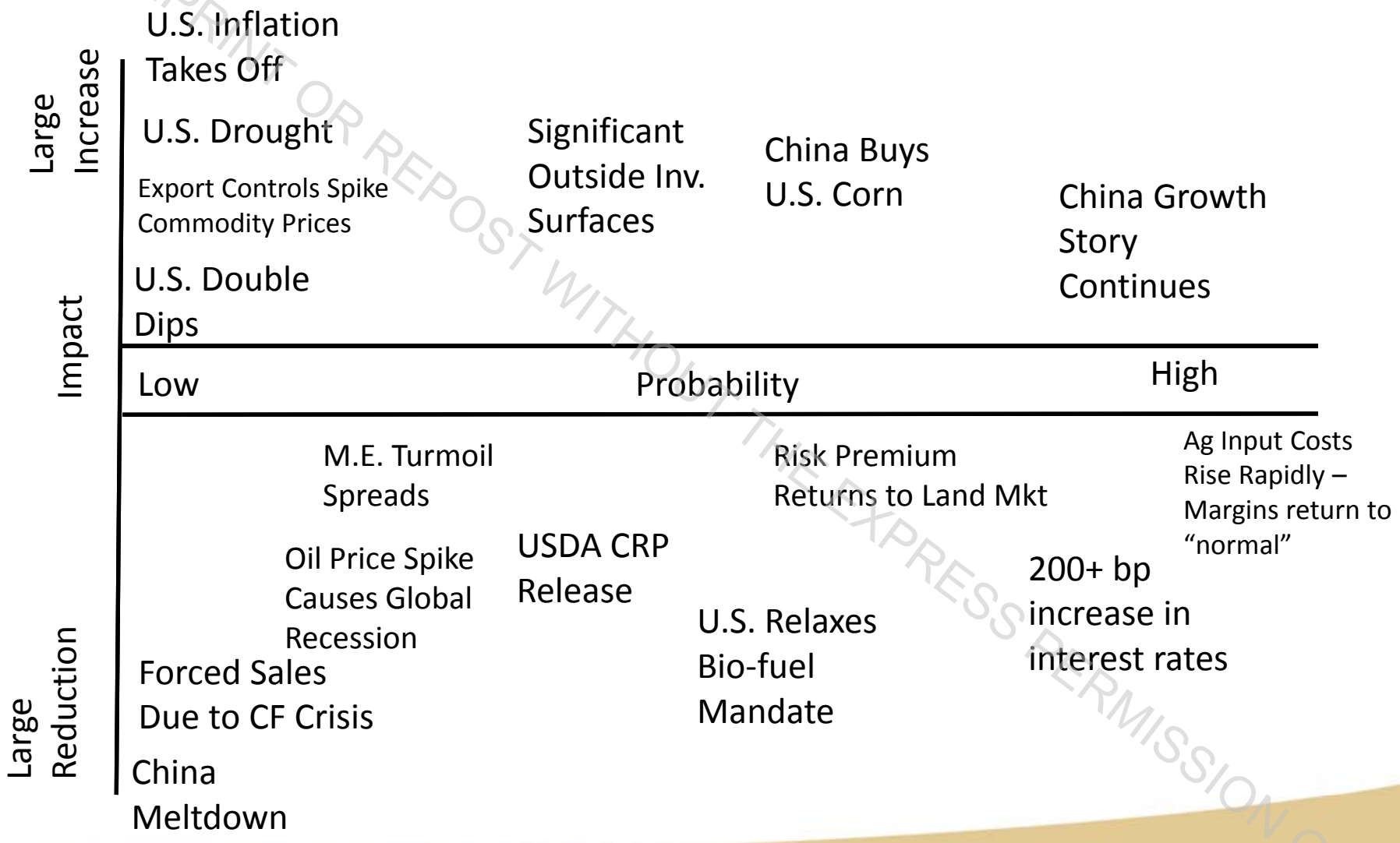
Key Questions

- What factors would potentially stimulate bubble formation?
- What factors would reduce land values from current levels?
  - How likely are these factors?

Factors that Could Stimulate Bubble Formation

- The wealth effect starts operating in ag
  - Borrowing based "consumption" and investment backed by high net worth – treating land values as the ATM
  - Accommodative lending practices
- Continued high levels of uncertainty over crop returns
  - Price spikes based on confluence of demand growth, weather events, and geopolitical influences
- Continued low rates
- Market value balance sheet updates based on limited market transactions

Risk Matrix for Land Value 1-5 Years



Summary

- The risks to farmland values are highly non-linear
  - We are operating in the tails of the distribution
  - Do not get there with just one or two trends
  - These confluence of events make projecting income difficult
  - Set the stage for bubble formation and potential correction
- There is great uncertainty about the level at which farmland will trade in 5 years
- It is not clear to me that on balance land is dramatically overvalued at present
  - That can change rapidly

Questions?

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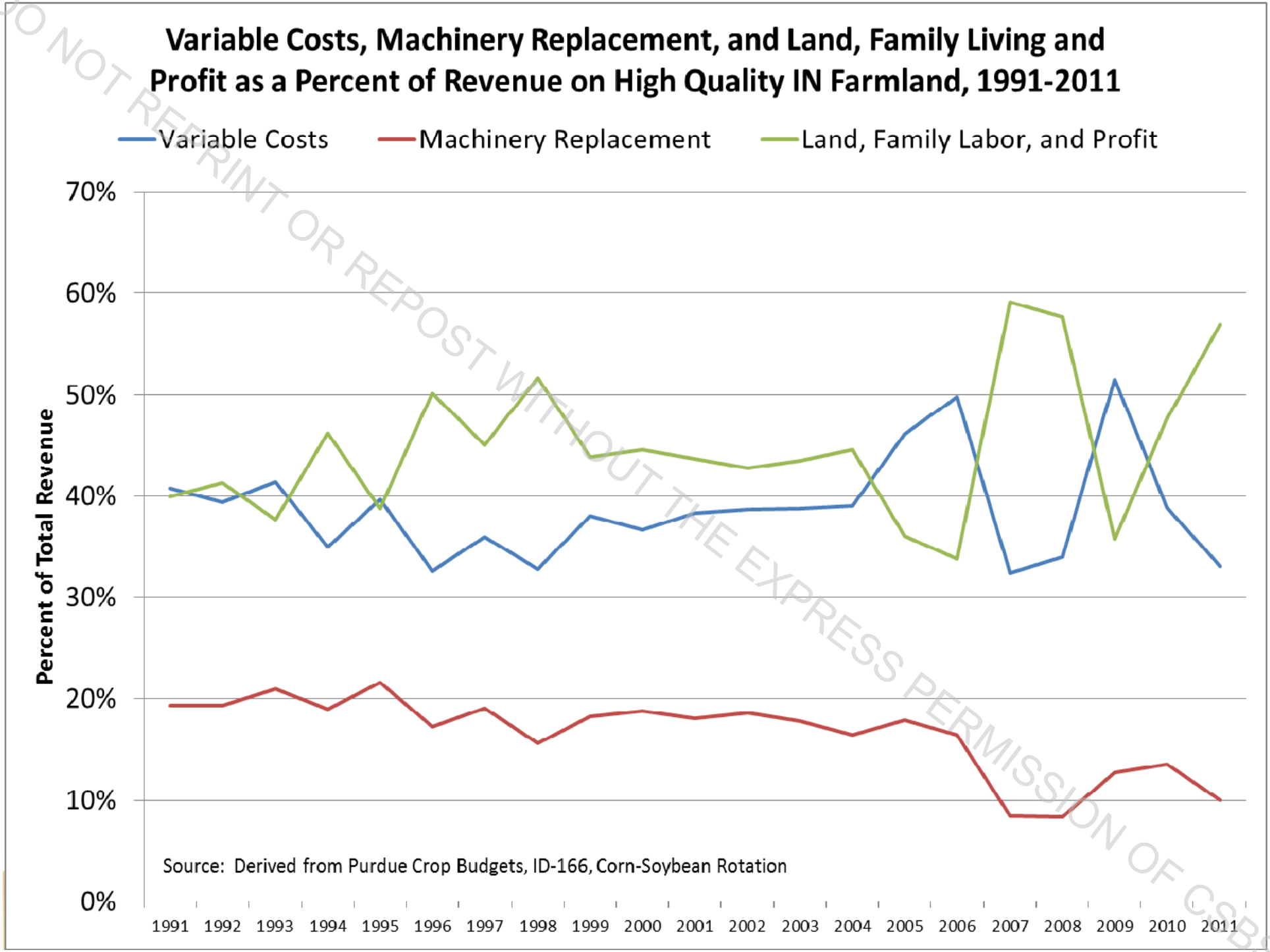
A Simple Model of Farmland Values

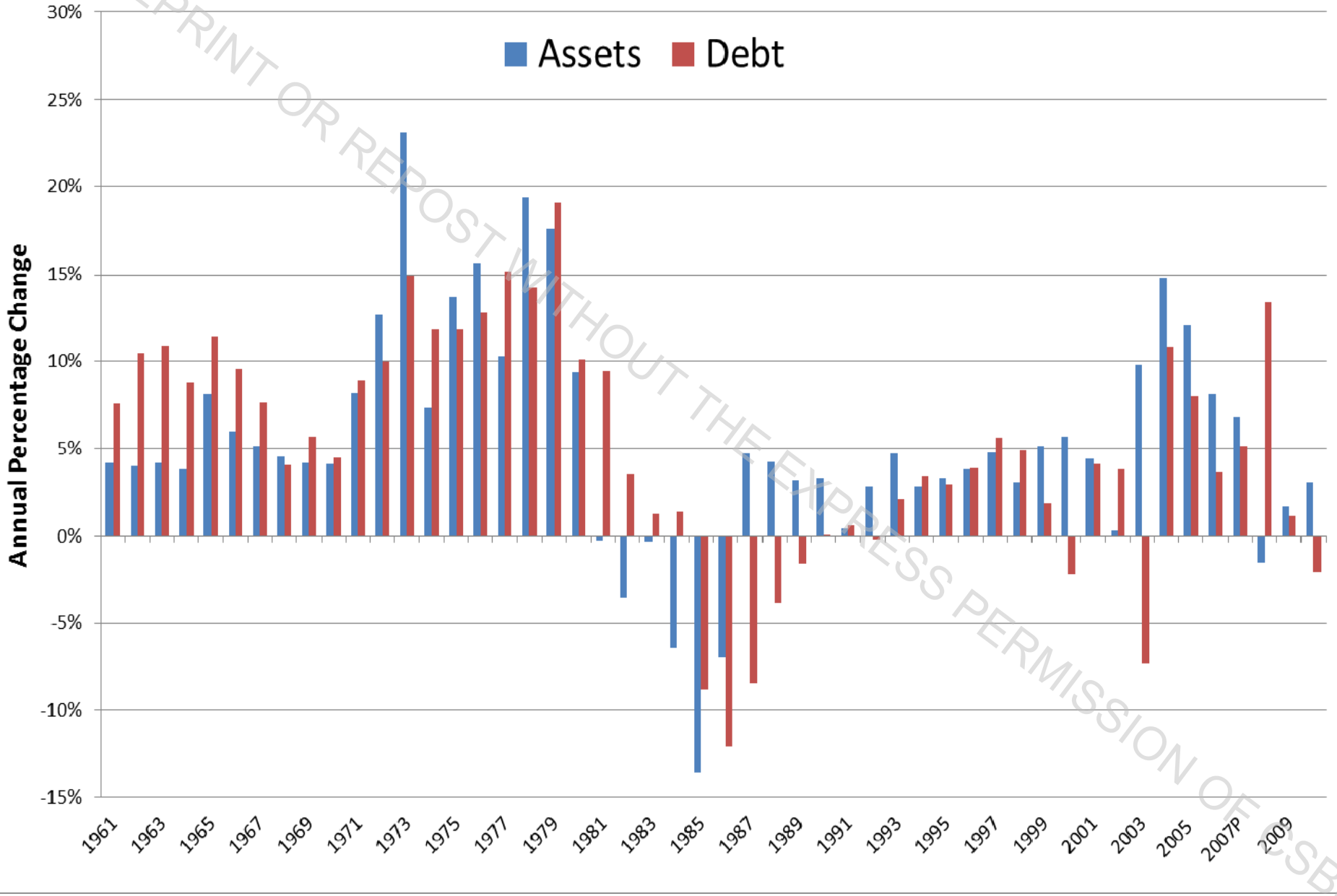
The income capitalization model:

$$Farmland\ Value = \frac{Income}{discount\ rate\ (\%) - growth\ rate\ (\%)}$$

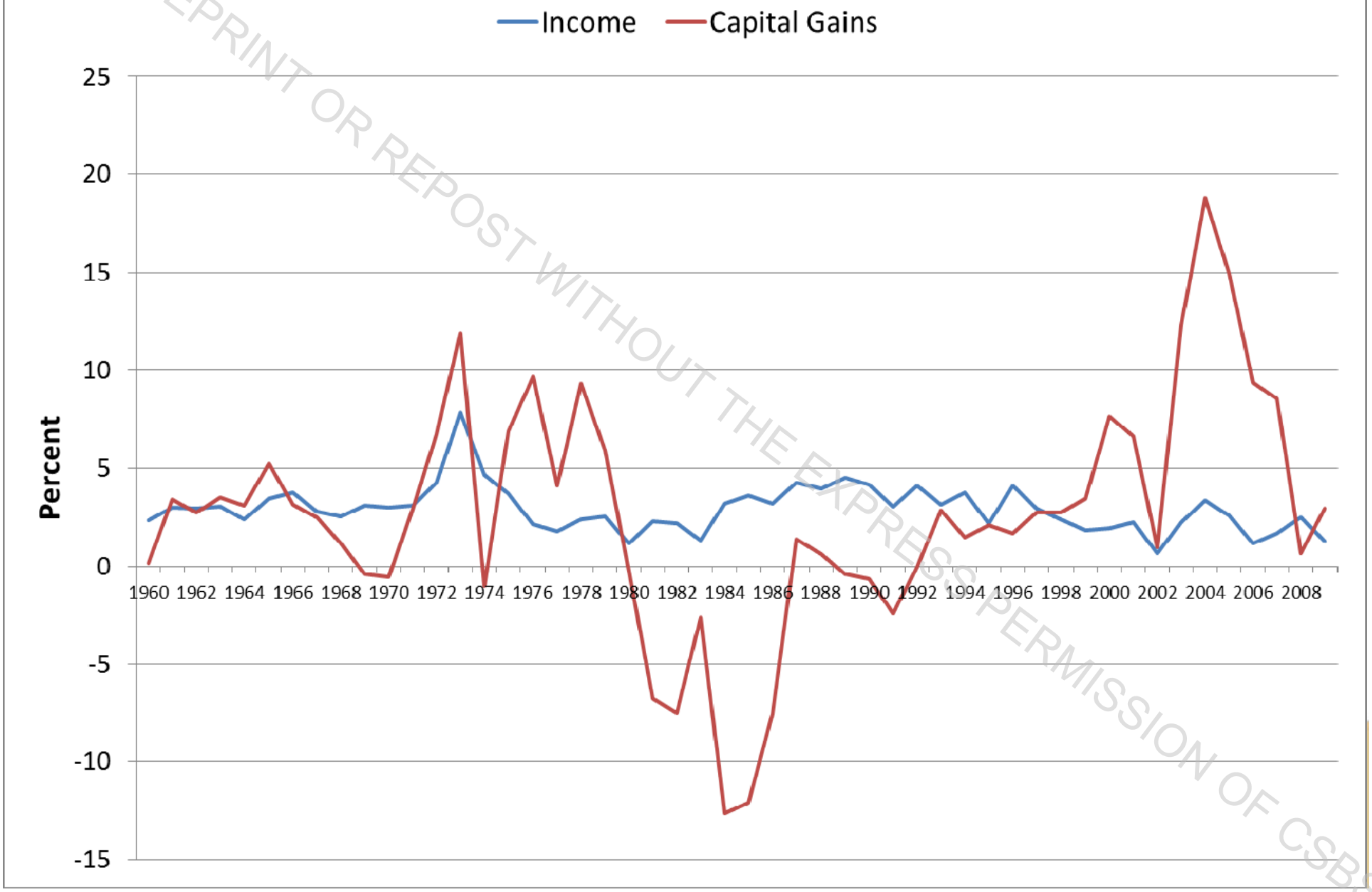
- Denominator often called the "capitalization rate"
- The earnings multiple is then the inverse of the cap rate
  - 6% discount rate less 1% growth = 5% cap rate
  - each dollar of income is worth $20 today
  - Often called the cash rent multiple

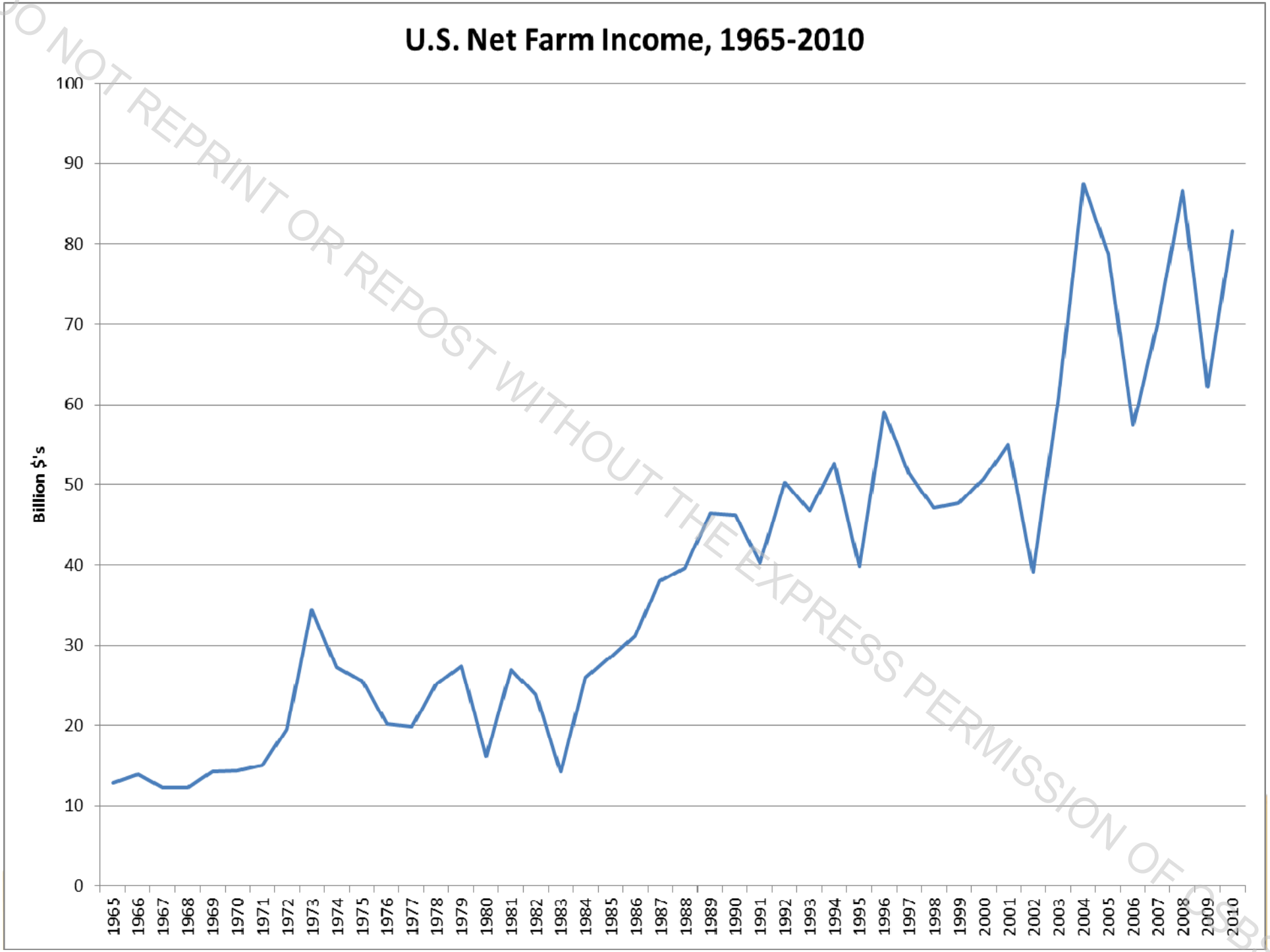


Annual Percent Change in Debt and Asset Levels, US Farm Balance Sheet, 1960-2010

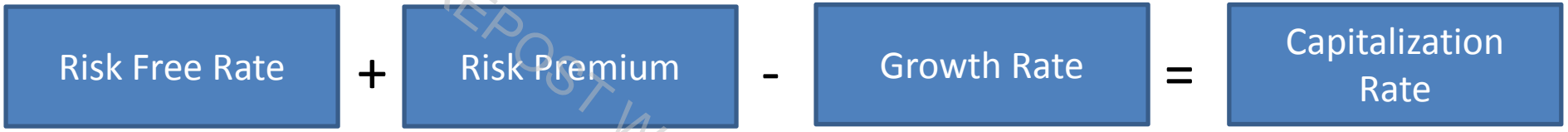


Rate of Return on Assets from Current Income and Capital Gains, U.S. Farm Sector 1960-2009

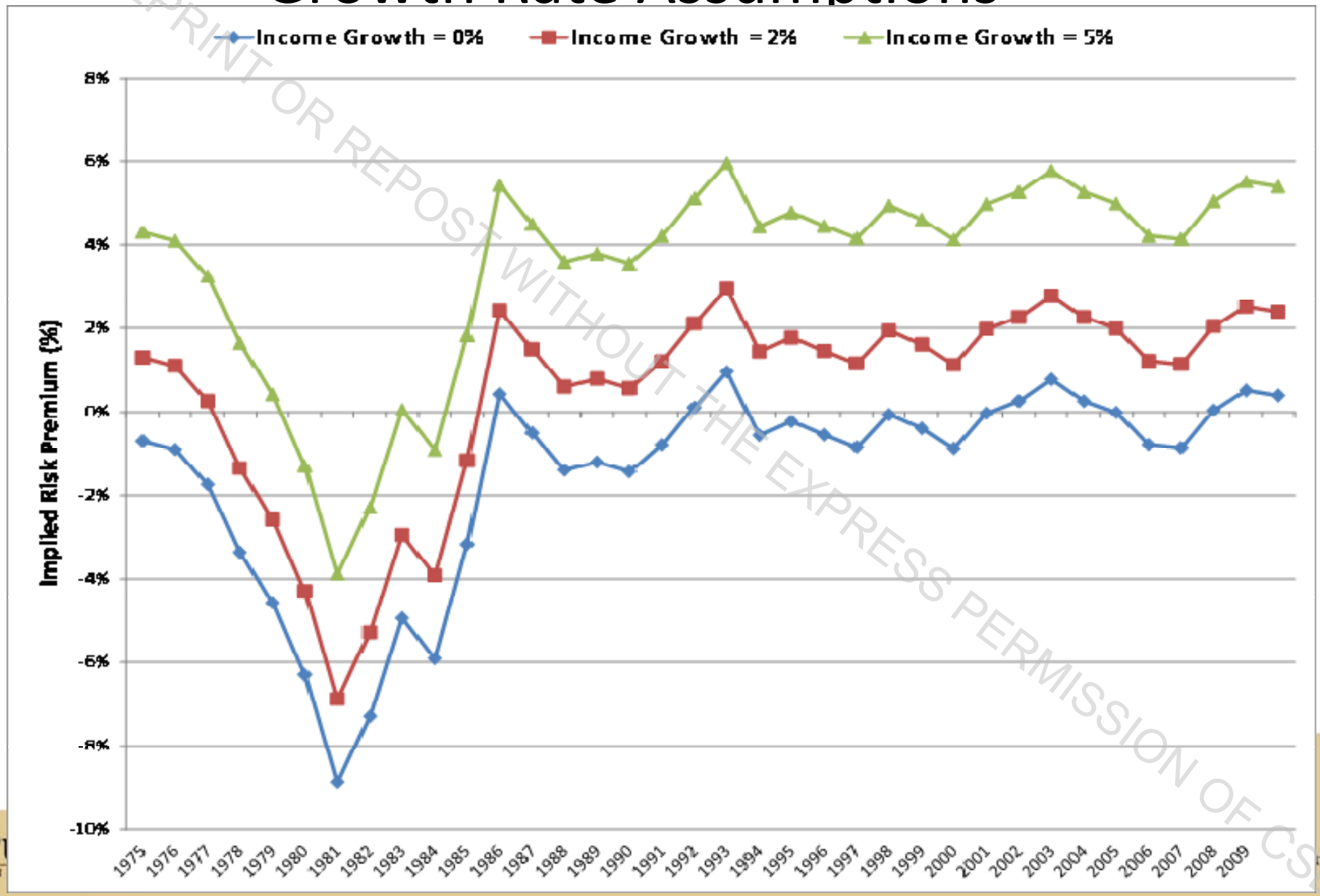




Capitalization Rates



Implied Risk Premium Under Various Growth Rate Assumptions



Growth Needed in Future for 200 BP Interest Rate Increase *