Factors Affecting Farmland Markets - 2017 and Beyond

Land Values and Lease Trends
ISPFMRA
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Advancing Farmland Markets through Research and Information

TIAA Center for Farmland Research

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Goals: improve accuracy and understanding of asset class, and to provide unbiased research and useful tools for those involved with farmland investments.

Tools and articles at:

http://farmdocdaily.illinois.edu/

http://farmland.illinois.edu/

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Balance Sheet of Ag Sector -- US

Table 1. Selected Balance Sheet Characteristics of US Agricultural Sector

	1970	1980	1990	2000	2010	2012	2014	2016
	($ millions, except ratios - source ERS-USDA)							
Farm Assets	**278,823**	**1,000,422**	**840,609**	**1,203,215**	**2,170,832**	***2,638,243***	***2,949,243***	***2,848,679***
Real Estate	202,418	782,820	619,149	946,428	1,660,114	*2,073,664*	*2,383,150*	*2,383,688*
Non Real Estate	76,405	217,602	221,459	256,787	510,718	*564,579*	*566,092*	*464,990*
Farm Debt	**48,501**	**162,432**	**131,116**	**163,930**	**278,931**	***297,521***	***345,201***	***375,395***
Real Estate	27,238	85,272	67,633	84,724	154,065	*173,369*	*196,780*	*226,733*
Non Real Estate	21,263	77,160	63,483	79,206	124,865	*124,152*	*148,421*	*148,662*
Equity	**230,322**	**837,990**	**709,493**	**1,039,285**	**1,891,902**	***2,340,722***	***2,604,041***	***2,473,283***
Selected Indicators								
Debt/Equity	21.1%	19.4%	18.5%	15.8%	14.7%	*12.7%*	*13.3%*	*15.2%*
Debt/Assets	17.4%	16.2%	15.6%	13.6%	12.8%	*11.3%*	*11.7%*	*13.2%*
Real Estate/Equity	87.9%	93.4%	87.3%	91.1%	87.7%	*88.6%*	*91.5%*	*96.4%*
Real Estate/Assets	72.6%	78.2%	73.7%	78.7%	76.5%	*78.6%*	*80.8%*	*83.7%*
Real Estate D/Total I	56.2%	52.5%	51.6%	51.7%	55.2%	*58.3%*	*57.0%*	*60.4%*

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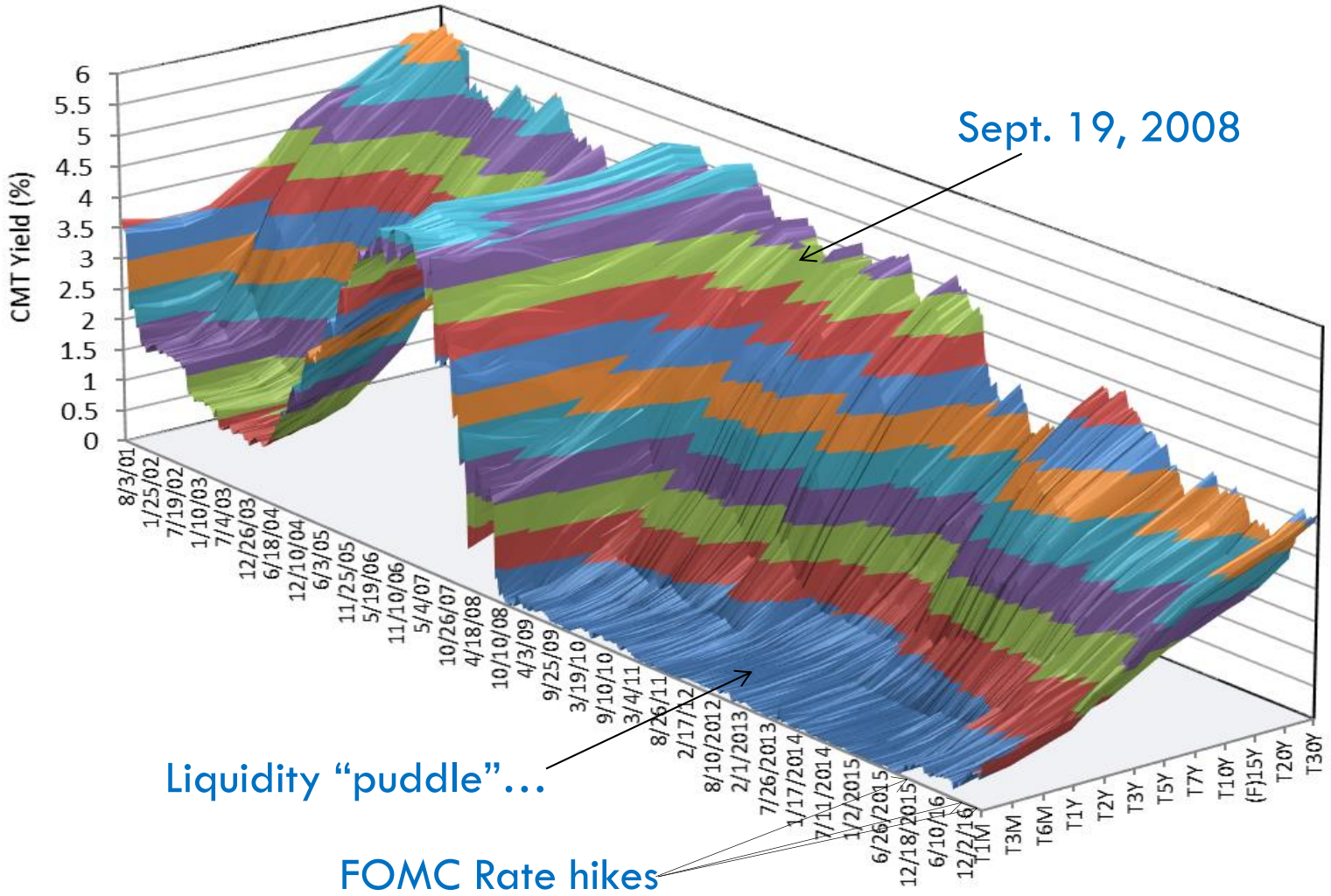
Ag Sector Balance Sheet -- US

- Farmland represents about 84% of farm assets
- Farm real estate debt only 60% of total farm debt
- Low aggregate leverage (approx. 13% D/A)
- Growth rates 1970-2016, continuous compounding:
  - Assets --5%
  - Real Estate -- 5.3%
  - Debt – 5%
  - Equity – 5%
- Absence of active equity market with "hedgeable" indices – key in future.
- Ag Balance sheet compared to corporate sector vastly different, especially in financial structure.
- Early stage "financialization" critical to improving efficiency of farmland market.

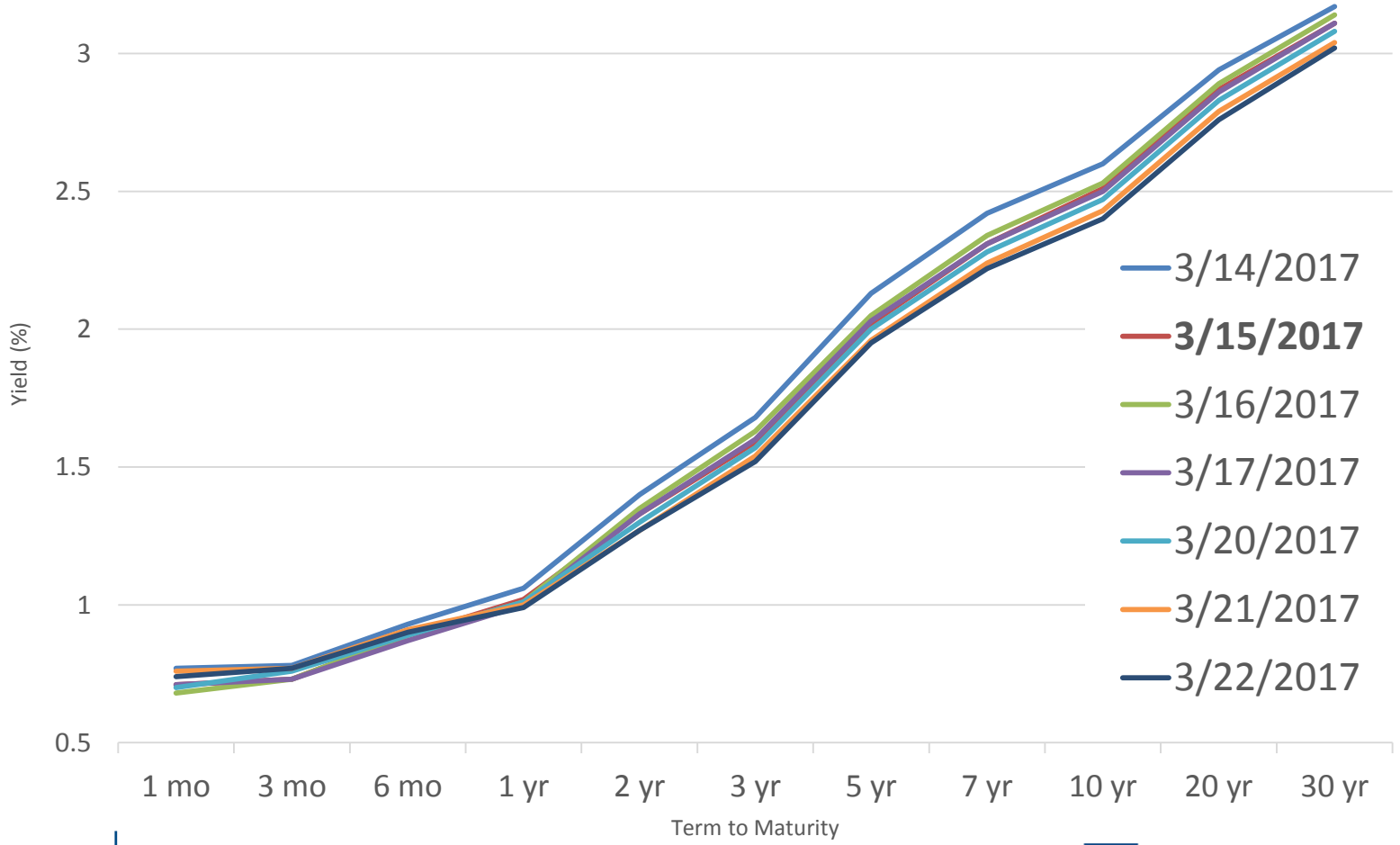
Remembering your Future's Past..

- Macro Market influences – *where to from here?*
  - Interest rates and strength of dollar, relative returns still attractive
  - Trade policy, world productivity changes, emerging market diets
- Agricultural Policy
  - Direct impacts (i.e., Farm Bill related, including crop insurance, conservation)
  - Indirect (Energy, RFS, nutrition, climate, and related)
- Efficiency vs consumer view of sustainability,
  - GMO and related debates reshaped into attribute demands
  - Water (policy and virtual trade) and locational usage by sector
  - Land Use, edge of field, 'downstream' liability, BMP and NMP
- Technological advances (more later)
- Emerging Financial Structures underlying modern production systems

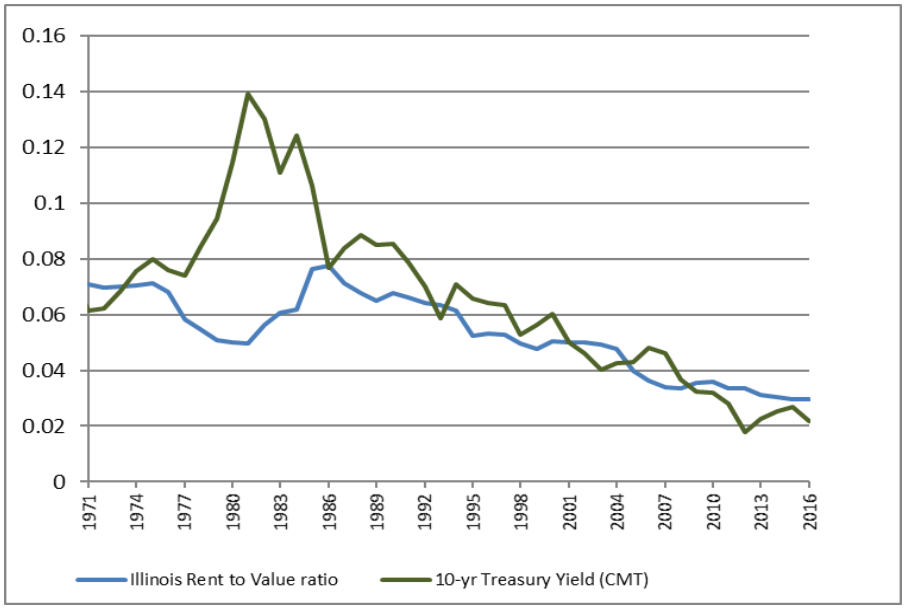
Yield Curve August 2001-March 17, 2017 (weekly)

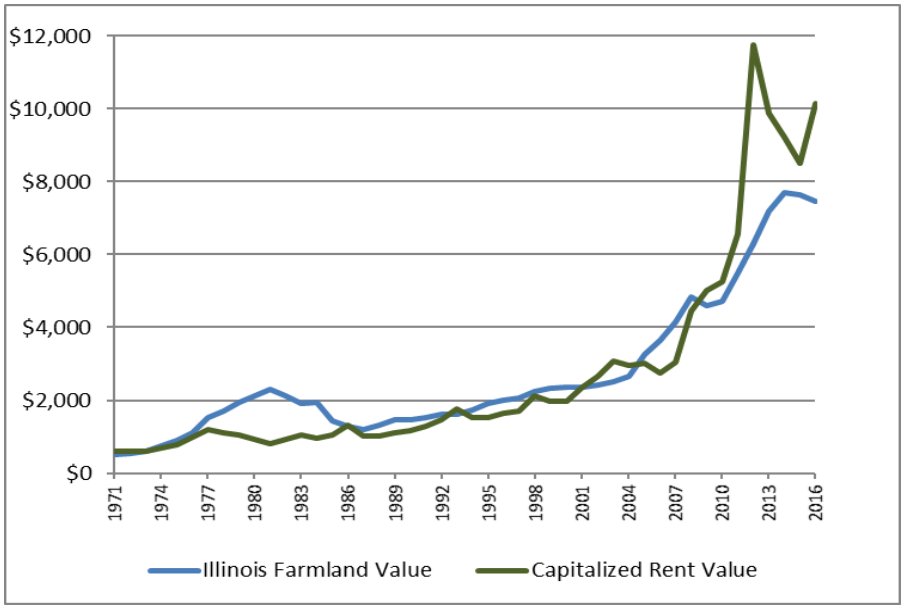


What rates did 'they' raise?



"Does the farmland market make sense?"





Historic comparison of implied cap rate and CMT-10 – One period in 1980's where conditions that might be considered "bubble" formation existed.

Implied asset value from capitalization of income to q2:16. Recent asset values show that the market did not consider income levels in recent years to be "permanent"

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Farmland Returns in context – 1970-2016

Table 1. Asset Return Characteristics

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	Correlation
		1970 - 2016		
US Ave Farm (all)	10.27%	6.48%	0.631	1
S&P500	6.79%	16.57%	2.440	-0.252
NASDAQ	9.63%	25.14%	2.611	-0.133
EAFE	6.04%	20.49%	3.394	-0.219
TCM10Y	6.57%	2.93%	0.447	0.140
AAA	7.70%	2.54%	0.330	0.070
Mort30F	8.25%	3.10%	0.376	0.095
All REITS	9.09%	20.11%	2.213	-0.136
Gold	7.41%	22.79%	3.075	0.306
CPI	3.95%	2.85%	0.721	0.659

Farmland Returns in context – 1980-2016

Table 2. Asset Return Characteristics

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	Correlation
		1980 - 2016		
US Ave Farm (all)	8.23%	5.29%	0.642	1
S&P500	8.19%	15.87%	1.936	-0.130
NASDAQ	9.63%	25.14%	2.611	-0.133
EAFE	6.11%	20.61%	3.375	-0.233
TCM10Y	6.32%	3.23%	0.510	0.023
AAA	7.56%	2.82%	0.374	-0.028
Mort30F	8.10%	3.40%	0.420	0.009
All REITS	10.29%	17.08%	1.659	-0.033
Gold	2.18%	16.09%	7.391	-0.086
CPI	3.10%	2.10%	0.679	0.410

Farmland Returns in context – 1990-2016

Table 3. Asset Return Characteristics

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	Correlation
		1990 - 2016		
US Ave Farm (all)	8.84%	3.88%	0.439	1
S&P500	6.84%	17.22%	2.519	-0.132
NASDAQ	9.15%	26.93%	2.942	-0.162
EAFE	1.76%	19.99%	11.377	0.060
TCM10Y	4.74%	1.85%	0.391	0.305
AAA	6.15%	1.57%	0.254	0.205
Mort30F	6.39%	1.76%	0.275	0.303
All REITS	9.74%	18.68%	1.918	-0.104
Gold	3.91%	14.29%	3.654	0.064
CPI	2.41%	1.13%	0.471	0.259

Farmland Returns in context – 2000-2016

Table 4. Asset Return Characteristics

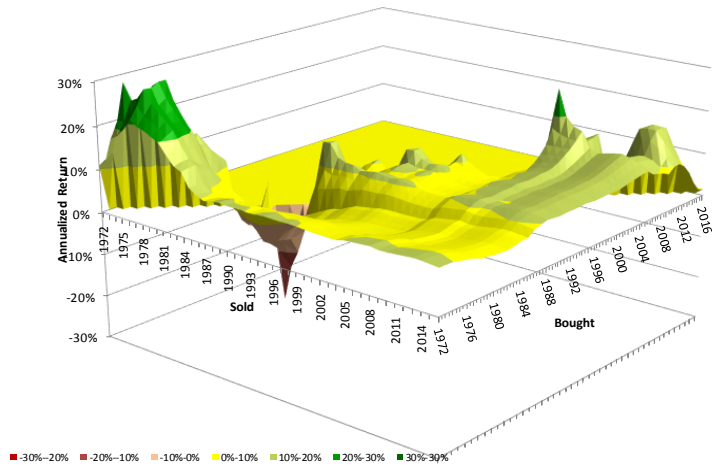
Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	Correlation
		2000 - 2016		
US Ave Farm (all)	8.58%	4.71%	0.549	1
S&P500	2.48%	18.31%	7.390	-0.157
NASDAQ	1.65%	26.69%	16.216	-0.225
EAFE	-0.26%	21.85%	-84.108	0.014
TCM10Y	3.60%	1.20%	0.334	0.470
AAA	5.23%	1.11%	0.212	0.253
Mort30F	5.37%	1.27%	0.237	0.429
All REITS	10.88%	19.19%	1.763	-0.118
Gold	8.08%	14.99%	1.855	0.075
CPI	2.12%	1.03%	0.487	0.344

Farmland: time and holding periods

Sell (end of year)

Buy (beginning of year)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1972	10.9%	12.3%	17.8%	18.9%	20.8%	23.3%	22.2%	21.6%	20.7%	19.7%	17.5%	15.5%	14.7%	11.6%	10.4%	9.7%	10.0%	10.3%	10.1%	10.0%	10.1%	9.9%	10.0%	10.1%	10.1%	10.0%	10.1%	10.0%	9.9%	9.7%	9.6%	9.6%	9.6%	10.0%	10.1%	10.2%	10.4%	10.1%	10.1%	10.2%	10.4%	10.5%	10.5%	10.3%	10.1%
1973		13.7%	21.4%	21.7%	23.4%	25.9%	24.1%	23.2%	22.0%	20.8%	18.2%	15.9%	15.1%	11.7%	10.4%	9.6%	9.9%	10.2%	10.0%	10.0%	10.0%	9.9%	10.0%	10.1%	10.1%	10.0%	10.1%	10.0%	9.8%	9.7%	9.6%	9.5%	9.5%	10.0%	10.1%	10.2%	10.4%	10.1%	10.1%	10.2%	10.4%	10.5%	10.5%	10.3%	10.1%
1974			29.7%	25.9%	26.8%	29.2%	26.4%	24.9%	23.2%	21.7%	18.7%	16.2%	15.2%	11.5%	10.2%	9.3%	9.7%	10.0%	9.8%	9.8%	9.8%	9.7%	9.8%	10.0%	9.9%	9.8%	9.9%	9.8%	9.7%	9.5%	9.4%	9.4%	9.4%	9.9%	10.0%	10.1%	10.3%	10.0%	10.0%	10.1%	10.3%	10.4%	10.4%	10.2%	10.0%
1975				22.1%	25.3%	29.0%	25.5%	24.0%	22.2%	20.6%	17.4%	14.7%	13.8%	10.0%	8.7%	7.9%	8.4%	8.8%	8.7%	8.7%	8.8%	8.7%	8.9%	9.1%	9.1%	9.1%	9.2%	9.1%	9.0%	8.9%	8.8%	8.7%	8.8%	9.3%	9.4%	9.6%	9.7%	9.5%	9.5%	9.6%	9.8%	10.0%	10.0%	9.8%	9.6%
1976					28.6%	32.6%	26.7%	24.4%	22.2%	20.3%	16.7%	13.8%	12.9%	8.8%	7.5%	6.8%	7.4%	7.9%	7.8%	7.9%	8.1%	8.0%	8.2%	8.5%	8.5%	8.5%	8.6%	8.6%	8.5%	8.4%	8.3%	8.3%	8.3%	8.9%	9.0%	9.2%	9.4%	9.1%	9.1%	9.3%	9.5%	9.7%	9.7%	9.5%	9.3%
1977						36.8%	25.7%	23.0%	20.7%	18.7%	14.8%	11.9%	11.1%	6.8%	5.6%	5.0%	5.8%	6.5%	6.5%	6.7%	6.9%	6.9%	7.2%	7.5%	7.6%	7.6%	7.8%	7.8%	7.7%	7.6%	7.6%	7.6%	7.7%	8.3%	8.4%	8.6%	8.8%	8.6%	8.6%	8.8%	9.0%	9.2%	9.2%	9.0%	8.8%
1978							15.6%	16.7%	15.7%	14.6%	10.9%	8.2%	7.9%	3.6%	2.6%	2.2%	3.4%	4.3%	4.5%	4.8%	5.2%	5.3%	5.7%	6.1%	6.2%	6.3%	6.6%	6.6%	6.6%	6.6%	6.6%	6.6%	6.7%	7.4%	7.6%	7.8%	8.0%	7.8%	7.8%	8.1%	8.3%	8.5%	8.5%	8.4%	8.2%
1979								17.8%	15.8%	14.3%	9.7%	6.8%	6.6%	2.0%	1.1%	0.9%	2.2%	3.3%	3.6%	4.0%	4.5%	4.6%	5.1%	5.5%	5.7%	5.9%	6.1%	6.2%	6.2%	6.2%	6.2%	6.3%	6.4%	7.1%	7.3%	7.5%	7.8%	7.6%	7.6%	7.9%	8.1%	8.3%	8.3%	8.2%	8.0%
1980									13.8%	12.5%	7.2%	4.2%	4.5%	-0.5%	-1.1%	-1.1%	0.6%	2.0%	2.4%	3.0%	3.5%	3.7%	4.3%	4.8%	5.1%	5.2%	5.6%	5.7%	5.7%	5.7%	5.7%	5.8%	6.0%	6.7%	6.9%	7.2%	7.5%	7.2%	7.3%	7.6%	7.8%	8.1%	8.1%	7.9%	7.7%
1981										11.3%	4.0%	1.2%	2.4%	-3.1%	-3.3%	-3.0%	-0.9%	0.7%	1.3%	2.0%	2.7%	3.0%	3.7%	4.3%	4.5%	4.8%	5.1%	5.3%	5.3%	5.4%	5.5%	5.6%	6.4%	6.7%	7.0%	7.2%	7.0%	7.1%	7.4%	7.7%	7.9%	7.9%	7.8%	7.6%
1982											-2.8%	-3.5%	-0.5%	-6.4%	-6.0%	-5.2%	-2.6%	-0.5%	0.3%	1.1%	2.0%	2.3%	3.1%	3.8%	4.1%	4.4%	4.8%	5.0%	5.0%	5.0%	5.1%	5.2%	5.4%	6.2%	6.5%	6.8%	7.1%	6.9%	6.9%	7.2%	7.5%	7.8%	7.8%	7.7%	7.5%
1983												-4.3%	0.7%	-7.6%	-6.8%	-5.7%	-2.5%	-0.2%	0.7%	1.6%	2.5%	2.8%	3.6%	4.3%	4.6%	4.9%	5.3%	5.4%	5.5%	5.5%	5.5%	5.6%	5.8%	6.6%	6.9%	7.2%	7.5%	7.2%	7.3%	7.6%	7.9%	8.2%	8.2%	8.0%	7.8%
1984													6.0%	-9.2%	-7.7%	-6.1%	-2.2%	0.5%	1.4%	2.3%	3.2%	3.5%	4.3%	5.0%	5.3%	5.5%	5.9%	6.1%	6.1%	6.0%	6.1%	6.1%	6.3%	7.1%	7.4%	7.7%	8.0%	7.7%	7.8%	8.0%	8.4%	8.6%	8.6%	8.4%	8.2%
1985														22.2%	-13.8%	-9.8%	-4.1%	-0.5%	0.6%	1.8%	2.9%	3.3%	4.2%	4.9%	5.3%	5.5%	5.9%	6.1%	6.1%	6.0%	6.1%	6.2%	6.3%	7.2%	7.5%	7.8%	8.1%	7.8%	7.8%	8.1%	8.4%	8.7%	8.7%	8.5%	8.3%
1986															-4.6%	-2.9%	2.8%	5.7%	5.9%	6.5%	7.1%	7.0%	7.6%	8.1%	8.2%	8.2%	8.5%	8.4%	8.3%	8.1%	8.0%	8.0%	8.1%	8.9%	9.2%	9.4%	9.6%	9.3%	9.2%	9.5%	9.8%	10.0%	9.9%	9.7%	9.4%
1987																-1.1%	6.7%	9.4%	8.7%	8.9%	9.2%	8.7%	9.2%	9.6%	9.6%	9.5%	9.6%	9.5%	9.3%	9.0%	8.9%	8.8%	8.8%	9.7%	9.9%	10.1%	10.3%	9.9%	9.9%	10.1%	10.4%	10.6%	10.5%	10.2%	9.9%
1988																	15.0%	15.1%	12.2%	11.5%	11.3%	10.5%	10.8%	11.1%	10.8%	10.6%	10.7%	10.5%	10.1%	9.8%	9.6%	9.4%	9.4%	10.3%	10.5%	10.7%	10.9%	10.4%	10.4%	10.6%	10.9%	11.1%	11.0%	10.6%	10.3%
1989																		15.2%	10.9%	10.4%	10.4%	9.6%	10.1%	10.5%	10.3%	10.1%	10.2%	10.0%	9.7%	9.4%	9.2%	9.1%	9.1%	10.0%	10.3%	10.5%	10.7%	10.2%	10.2%	10.4%	10.7%	10.9%	10.8%	10.5%	10.1%
1990																			6.7%	8.0%	8.9%	8.2%	9.1%	9.8%	9.6%	9.5%	9.7%	9.5%	9.2%	8.9%	8.7%	8.7%	8.7%	9.7%	10.0%	10.2%	10.5%	10.0%	9.9%	10.2%	10.5%	10.7%	10.6%	10.3%	10.0%
1991																				9.4%	10.0%	8.7%	9.7%	10.4%	10.1%	9.9%	10.1%	9.9%	9.5%	9.1%	8.9%	8.8%	8.8%	9.9%	10.2%	10.4%	10.7%	10.1%	10.1%	10.4%	10.7%	10.9%	10.8%	10.5%	10.1%
1992																					10.7%	8.4%	9.9%	10.6%	10.3%	10.0%	10.2%	9.9%	9.5%	9.1%	8.9%	8.8%	8.8%	9.9%	10.2%	10.5%	10.8%	10.2%	10.1%	10.4%	10.7%	11.0%	10.9%	10.5%	10.1%
1993																						6.2%	9.4%	10.6%	10.2%	9.8%	10.1%	9.8%	9.3%	8.9%	8.7%	8.6%	8.6%	9.9%	10.2%	10.5%	10.8%	10.2%	10.1%	10.4%	10.7%	11.0%	10.9%	10.5%	10.1%
1994																							12.8%	12.9%	11.5%	10.8%	10.9%	10.4%	9.8%	9.3%	9.0%	8.8%	8.9%	10.2%	10.5%	10.8%	11.1%	10.4%	10.3%	10.6%	11.0%	11.2%	11.1%	10.7%	10.3%
1995																								13.0%	10.9%	10.1%	10.4%	10.0%	9.3%	8.8%	8.5%	8.4%	8.5%	10.0%	10.3%	10.6%	10.9%	10.2%	10.2%	10.5%	10.9%	11.2%	11.0%	10.6%	10.2%
1996																									8.8%	8.7%	9.6%	9.2%	8.6%	8.1%	7.9%	7.8%	8.0%	9.7%	10.1%	10.4%	10.8%	10.1%	10.0%	10.4%	10.8%	11.1%	10.9%	10.5%	10.0%
1997																										8.5%	10.0%	9.4%	8.5%	7.9%	7.7%	7.7%	7.9%	9.8%	10.2%	10.6%	11.0%	10.2%	10.1%	10.5%	10.9%	11.2%	11.0%	10.6%	10.1%
1998																											11.4%	9.8%	8.5%	7.8%	7.6%	7.6%	7.8%	9.9%	10.4%	10.8%	11.2%	10.3%	10.2%	10.6%	11.0%	11.4%	11.2%	10.7%	10.2%
1999																												8.1%	7.1%	6.6%	6.6%	6.8%	7.2%	9.7%	10.3%	10.7%	11.2%	10.2%	10.1%	10.5%	11.0%	11.3%	11.2%	10.6%	10.1%
2000																													6.0%	5.8%	6.1%	6.5%	7.0%	10.0%	10.6%	11.0%	11.5%	10.4%	10.3%	10.8%	11.2%	11.6%	11.4%	10.8%	10.2%
2001																														5.6%	6.2%	6.6%	7.3%	10.8%	11.4%	11.8%	12.2%	10.9%	10.7%	11.2%	11.7%	12.0%	11.8%	11.1%	10.5%
2002																															6.8%	7.1%	7.9%	12.1%	12.6%	12.8%	13.2%	11.6%	11.3%	11.8%	12.3%	12.6%	12.3%	11.5%	10.8%
2003																																7.5%	8.4%	14.0%	14.0%	14.1%	14.3%	12.3%	11.9%	12.3%	12.8%	13.1%	12.7%	11.9%	11.1%
2004																																	9.3%	17.4%	16.3%	15.8%	15.7%	13.1%	12.5%	13.0%	13.4%	13.7%	13.2%	12.3%	11.4%
2005																																		26.0%	20.0%	18.0%	17.4%	13.9%	13.0%	13.5%	13.9%	14.2%	13.6%	12.5%	11.6%
2006																																			14.3%	14.2%	14.6%	11.0%	10.6%	11.5%	12.3%	12.8%	12.3%	11.3%	10.3%
2007																																				14.2%	14.8%	9.9%	9.7%	11.0%	12.0%	12.6%	12.1%	11.0%	10.0%
2008																																					15.3%	7.9%	8.2%	10.2%	11.6%	12.3%	11.8%	10.6%	9.5%
2009																																						0.9%	4.9%	8.5%	10.6%	11.7%	11.2%	9.9%	8.8%
2010																																							9.0%	12.6%	14.1%	14.6%	13.3%	11.5%	10.0%
2011																																								16.2%	16.7%	16.5%	14.5%	12.0%	10.1%
2012																																									17.2%	16.7%	13.9%	10.9%	8.9%
2013																																										16.2%	12.3%	8.9%	7.0%
2014																																											8.4%	5.4%	4.1%
2015																																												2.5%	2.0%
2016																																													1.4%



(Illinois 1970-2016)

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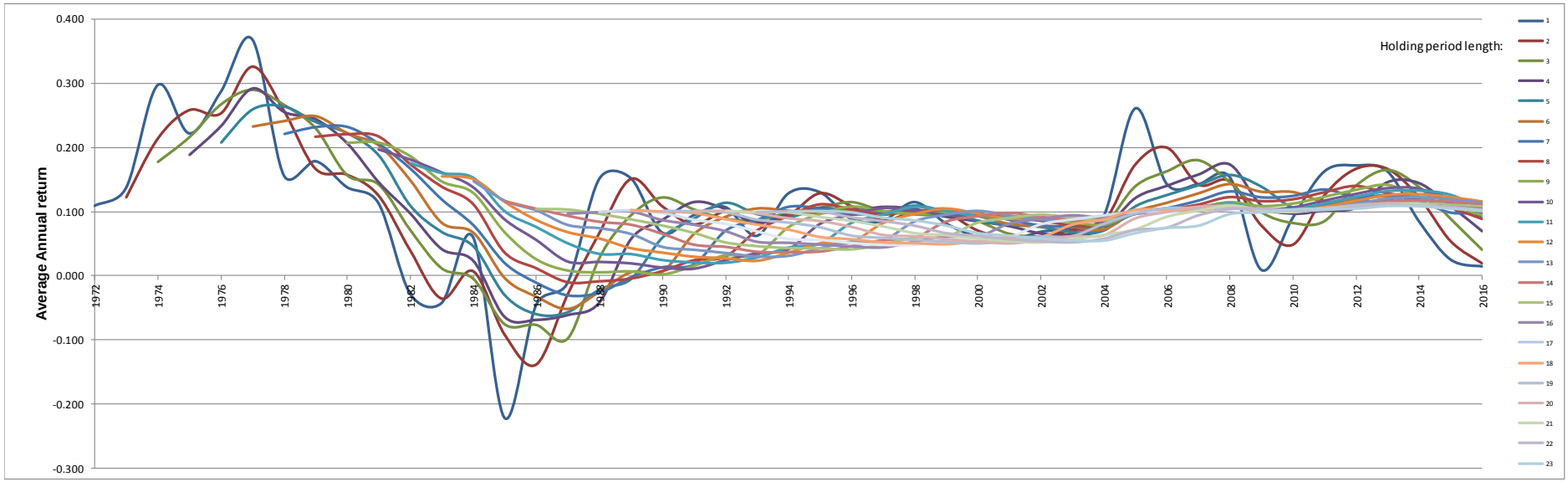
Farmland risk stability measures



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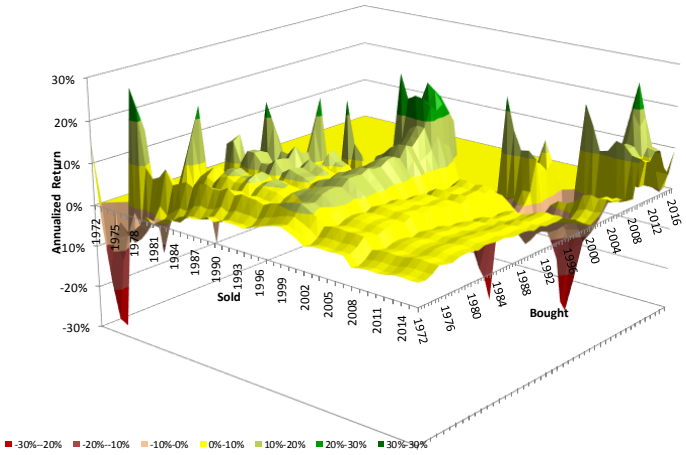
S&P 500: time and holding periods

S&P500

Sell (end of year)

Buy (beginning of year)	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1972	14.5%	-3.7%	-15.7%	-6.5%	-2.1%	-3.9%	-3.2%	-1.5%	1.0%	-0.2%	1.0%	2.2%	2.1%	3.5%	4.2%	4.0%	4.5%	5.5%	4.8%	5.6%	5.6%	5.6%	5.3%	6.2%	6.7%	7.4%	8.0%	8.3%	7.6%	6.8%	5.5%	6.0%	6.1%	6.0%	6.2%	6.1%	4.1%	4.5%	4.7%	4.5%	4.7%	5.2%	5.3%	5.2%	5.3%
1973		-19.1%	-27.6%	-12.6%	-5.9%	-7.2%	-5.9%	-3.5%	-0.6%	-1.7%	-0.3%	1.1%	1.1%	2.7%	3.4%	3.3%	3.9%	4.9%	4.3%	5.2%	5.1%	5.2%	4.9%	5.9%	6.4%	7.1%	7.7%	8.1%	7.3%	6.5%	5.2%	5.7%	5.8%	5.7%	5.9%	5.9%	3.8%	4.2%	4.4%	4.3%	4.5%	5.0%	5.1%	5.0%	5.1%
1974			-35.3%	-9.2%	-1.0%	-4.0%	-3.0%	-0.7%	2.4%	0.7%	2.1%	3.4%	3.2%	4.8%	5.4%	5.2%	5.6%	6.7%	5.8%	6.7%	6.6%	6.6%	6.2%	7.2%	7.6%	8.4%	9.0%	9.3%	8.5%	7.6%	6.2%	6.7%	6.8%	6.6%	6.8%	6.7%	4.5%	4.9%	5.1%	5.0%	5.2%	5.7%	5.8%	5.6%	5.7%
1975				27.4%	22.4%	9.5%	7.4%	8.2%	10.5%	7.3%	8.1%	8.9%	8.1%	9.4%	9.8%	9.2%	9.3%	10.3%	9.1%	9.9%	9.6%	9.4%	8.9%	9.8%	10.1%	10.8%	11.3%	11.6%	10.6%	9.6%	8.1%	8.6%	8.6%	8.4%	8.5%	8.3%	6.0%	6.4%	6.6%	6.4%	6.5%	7.0%	7.1%	6.9%	6.9%
1976					17.5%	1.6%	1.4%	3.9%	7.4%	4.3%	5.6%	6.8%	6.2%	7.8%	8.3%	7.8%	8.1%	9.1%	8.0%	8.9%	8.6%	8.5%	8.0%	9.0%	9.4%	10.1%	10.7%	11.0%	10.0%	9.0%	7.4%	7.9%	8.0%	7.8%	7.9%	7.8%	5.4%	5.8%	6.0%	5.8%	6.0%	6.5%	6.6%	6.4%	6.5%
1977						-12.2%	-5.8%	-0.3%	5.0%	1.8%	3.7%	5.4%	4.9%	6.8%	7.4%	6.9%	7.3%	8.5%	7.4%	8.4%	8.1%	8.0%	7.5%	8.5%	9.0%	9.8%	10.4%	10.7%	9.7%	8.7%	7.0%	7.6%	7.6%	7.5%	7.6%	7.5%	5.0%	5.5%	5.7%	5.5%	5.7%	6.2%	6.3%	6.1%	6.2%
1978							1.1%	6.2%	11.5%	5.6%	7.2%	8.6%	7.5%	9.4%	9.9%	9.1%	9.3%	10.5%	9.0%	10.0%	9.6%	9.4%	8.8%	9.8%	10.2%	11.0%	11.6%	11.9%	10.8%	9.6%	7.9%	8.4%	8.4%	8.2%	8.4%	8.2%	5.7%	6.1%	6.3%	6.1%	6.3%	6.8%	6.9%	6.7%	6.7%
1979								11.6%	17.1%	7.2%	8.8%	10.2%	8.7%	10.7%	11.0%	10.0%	10.2%	11.4%	9.7%	10.7%	10.2%	10.0%	9.3%	10.3%	10.8%	11.6%	12.2%	12.4%	11.2%	10.0%	8.2%	8.7%	8.7%	8.5%	8.7%	8.5%	5.8%	6.3%	6.5%	6.3%	6.4%	6.9%	7.0%	6.8%	6.9%
1980									22.9%	5.0%	7.9%	9.8%	8.1%	10.5%	10.9%	9.8%	10.0%	11.3%	9.5%	10.6%	10.1%	9.9%	9.1%	10.3%	10.7%	11.6%	12.2%	12.5%	11.2%	9.9%	8.0%	8.6%	8.6%	8.4%	8.6%	8.4%	5.6%	6.1%	6.3%	6.1%	6.3%	6.8%	6.9%	6.7%	6.8%
1981										-10.2%	1.1%	5.8%	4.7%	8.2%	9.1%	8.0%	8.5%	10.1%	8.3%	9.6%	9.1%	9.0%	8.2%	9.5%	10.0%	10.9%	11.6%	11.9%	10.7%	9.4%	7.4%	8.0%	8.1%	7.9%	8.0%	7.9%	5.1%	5.6%	5.8%	5.6%	5.8%	6.4%	6.5%	6.3%	6.3%
1982											13.8%	14.8%	10.2%	13.3%	13.4%	11.4%	11.5%	13.0%	10.6%	11.8%	11.1%	10.7%	9.7%	11.0%	11.5%	12.4%	13.1%	13.3%	11.9%	10.4%	8.3%	9.0%	8.9%	8.7%	8.8%	8.6%	5.7%	6.2%	6.4%	6.2%	6.4%	6.9%	7.0%	6.8%	6.9%
1983												15.9%	8.4%	13.2%	13.3%	10.9%	11.1%	12.8%	10.2%	11.6%	10.8%	10.5%	9.4%	10.8%	11.4%	12.3%	13.0%	13.3%	11.8%	10.3%	8.0%	8.7%	8.7%	8.5%	8.6%	8.4%	5.4%	5.9%	6.1%	5.9%	6.1%	6.7%	6.8%	6.6%	6.7%
1984													1.4%	11.8%	12.4%	9.7%	10.1%	12.3%	9.4%	11.0%	10.3%	9.9%	8.8%	10.4%	11.0%	12.1%	12.8%	13.1%	11.6%	10.0%	7.6%	8.4%	8.4%	8.1%	8.3%	8.1%	5.0%	5.5%	5.8%	5.6%	5.8%	6.4%	6.6%	6.3%	6.4%
1985														23.4%	18.4%	12.7%	12.4%	14.7%	10.8%	12.5%	11.4%	10.9%	9.6%	11.3%	11.8%	12.9%	13.7%	14.0%	12.2%	10.5%	8.0%	8.8%	8.8%	8.5%	8.7%	8.4%	5.1%	5.7%	5.9%	5.7%	6.0%	6.6%	6.7%	6.5%	6.6%
1986															13.6%	7.7%	9.0%	12.6%	8.4%	10.8%	9.8%	9.5%	8.2%	10.1%	10.9%	12.1%	13.0%	13.3%	11.5%	9.7%	7.2%	8.0%	8.0%	7.8%	8.0%	7.8%	4.4%	5.0%	5.3%	5.1%	5.4%	6.0%	6.2%	6.0%	6.1%
1987																2.0%	6.7%	12.2%	7.1%	10.2%	9.2%	8.9%	7.5%	9.7%	10.6%	12.0%	12.9%	13.3%	11.4%	9.5%	6.8%	7.7%	7.7%	7.5%	7.7%	7.5%	4.0%	4.7%	5.0%	4.8%	5.1%	5.8%	5.9%	5.7%	5.8%
1988																	11.7%	17.7%	8.9%	12.4%	10.7%	10.1%	8.3%	10.7%	11.6%	13.0%	14.0%	14.3%	12.1%	10.0%	7.1%	8.0%	8.1%	7.8%	8.0%	7.8%	4.1%	4.8%	5.1%	4.9%	5.2%	5.9%	6.1%	5.8%	5.9%
1989																		24.1%	7.6%	12.6%	10.5%	9.7%	7.8%	10.6%	11.6%	13.2%	14.2%	14.5%	12.2%	9.9%	6.8%	7.8%	7.9%	7.6%	7.8%	7.6%	3.7%	4.5%	4.8%	4.6%	4.9%	5.7%	5.9%	5.6%	5.7%
1990																			-6.8%	7.2%	6.3%	6.4%	4.8%	8.5%	9.9%	11.9%	13.1%	13.6%	11.1%	8.8%	5.5%	6.7%	6.9%	6.6%	7.0%	6.8%	2.7%	3.6%	4.0%	3.8%	4.2%	5.0%	5.2%	5.0%	5.1%
1991																				23.4%	13.5%	11.2%	7.9%	11.9%	12.9%	14.8%	15.9%	16.1%	13.1%	10.3%	6.6%	7.8%	7.9%	7.6%	7.9%	7.6%	3.3%	4.2%	4.5%	4.3%	4.7%	5.5%	5.7%	5.5%	5.6%
1992																					4.4%	5.6%	3.2%	9.2%	11.0%	13.5%	14.9%	15.2%	12.0%	9.1%	5.2%	6.6%	6.8%	6.5%	6.9%	6.7%	2.2%	3.2%	3.6%	3.4%	3.9%	4.8%	5.0%	4.8%	5.0%
1993																						6.8%	2.5%	10.8%	12.7%	15.4%	16.7%	16.9%	13.0%	9.6%	5.3%	6.9%	7.0%	6.7%	7.1%	6.9%	2.1%	3.1%	3.6%	3.4%	3.8%	4.8%	5.1%	4.8%	5.0%
1994																							-1.6%	12.8%	14.7%	17.6%	18.8%	18.7%	13.9%	10.0%	5.2%	6.9%	7.0%	6.7%	7.1%	6.9%	1.8%	2.9%	3.4%	3.2%	3.7%	4.7%	5.0%	4.7%	4.9%
1995																								29.3%	23.8%	24.8%	24.5%	23.2%	16.7%	11.8%	6.0%	7.8%	7.9%	7.5%	7.9%	7.5%	2.0%	3.2%	3.7%	3.5%	4.0%	5.0%	5.3%	5.0%	5.2%
1996																									18.5%	22.7%	23.0%	21.7%	14.4%	9.1%	3.1%	5.4%	5.8%	5.5%	6.1%	5.9%	0.2%	1.5%	2.2%	2.1%	2.7%	3.8%	4.2%	3.9%	4.2%
1997																										27.0%	25.3%	22.8%	13.4%	7.3%	0.7%	3.7%	4.3%	4.1%	5.0%	4.8%	-1.2%	0.3%	1.1%	1.1%	1.7%	3.0%	3.4%	3.2%	3.5%
1998																											23.6%	20.7%	9.2%	2.9%	-3.9%	0.2%	1.4%	1.6%	2.8%	2.8%	-3.4%	-1.6%	-0.6%	-0.6%	0.3%	1.7%	2.2%	2.0%	2.4%
1999																												17.8%	2.6%	-3.3%	-9.7%	-3.9%	-1.9%	-1.2%	0.4%	0.8%	-5.8%	-3.6%	-2.4%	-2.2%	-1.2%	0.4%	1.0%	0.9%	1.3%
2000																													-10.7%	-12.3%	-17.4%	-8.7%	-5.4%	-4.1%	-1.9%	-1.2%	-8.1%	-5.5%	-4.1%	-3.7%	-2.6%	-0.8%	0.0%	-0.1%	0.4%
2001																														-14.0%	-20.5%	-8.0%	-4.1%	-2.7%	-0.3%	0.2%	-7.8%	-5.0%	-3.4%	-3.1%	-1.9%	0.0%	0.8%	0.7%	1.2%
2002																															-26.6%	-4.8%	-0.5%	0.3%	2.7%	2.8%	-6.9%	-3.8%	-2.1%	-1.9%	-0.7%	1.3%	2.0%	1.8%	2.3%
2003																																23.4%	15.8%	11.3%	11.7%	10.0%	-3.1%	0.0%	1.5%	1.3%	2.4%	4.3%	4.8%	4.4%	4.7%
2004																																	8.6%	5.7%	8.0%	6.9%	-7.7%	-3.4%	-1.3%	-1.2%	0.3%	2.6%	3.3%	3.0%	3.4%
2005																																		3.0%	7.8%	6.3%	-11.4%	-5.6%	-2.9%	-2.5%	-0.7%	1.9%	2.8%	2.5%	3.0%
2006																																			12.8%	8.0%	-15.7%	-7.7%	-4.0%	-3.4%	-1.2%	1.8%	2.8%	2.4%	3.0%
2007																																				3.5%	-27.1%	-13.6%	-7.8%	-6.3%	-3.4%	0.3%	1.6%	1.3%	2.1%
2008																																					-48.6%	-21.1%	-11.3%	-8.6%	-4.7%	-0.2%	1.3%	1.1%	1.9%
2009																																					21.1%	16.5%	10.7%	11.2%	14.0%	13.4%	11.3%	11.0%
2010																																						12.0%	5.8%	8.0%	12.3%	12.0%	9.7%	9.7%
2011																																							0.0%	6.1%	12.3%	11.9%	9.3%	9.3%
2012																																								12.6%	19.1%	16.2%	11.7%	11.2%
2013																																									25.9%	18.1%	11.5%	10.9%
2014																																										10.8%	4.9%	6.3%
2015																																											-0.7%	4.1%
2016																																												9.1%



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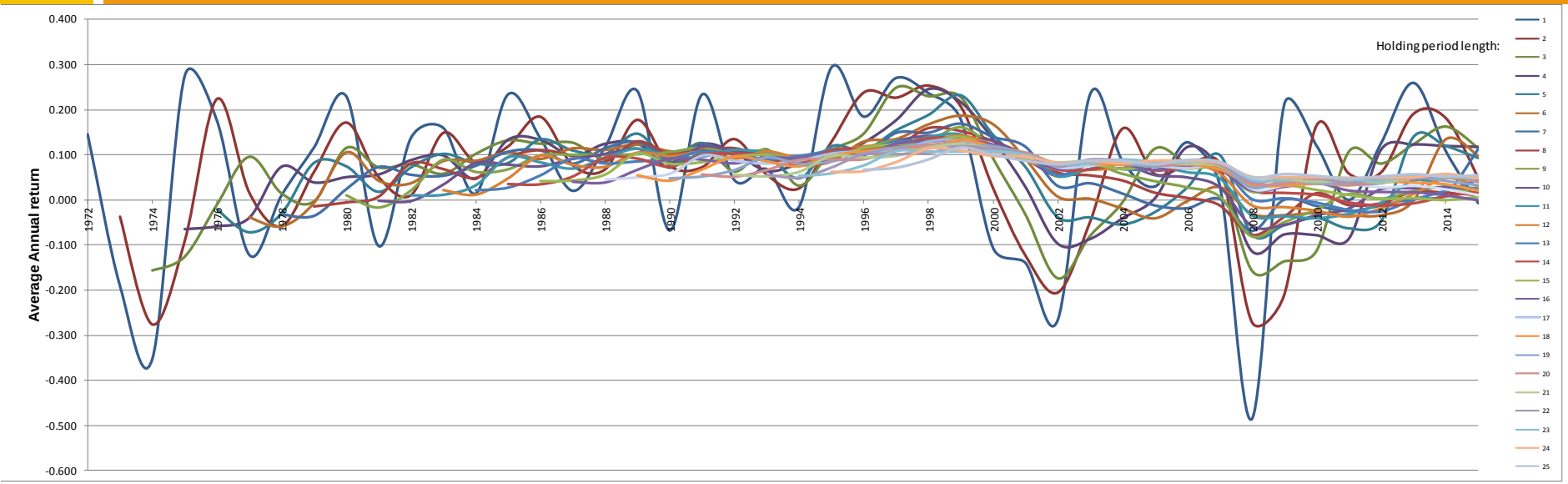
S&P 500 risk stability measures



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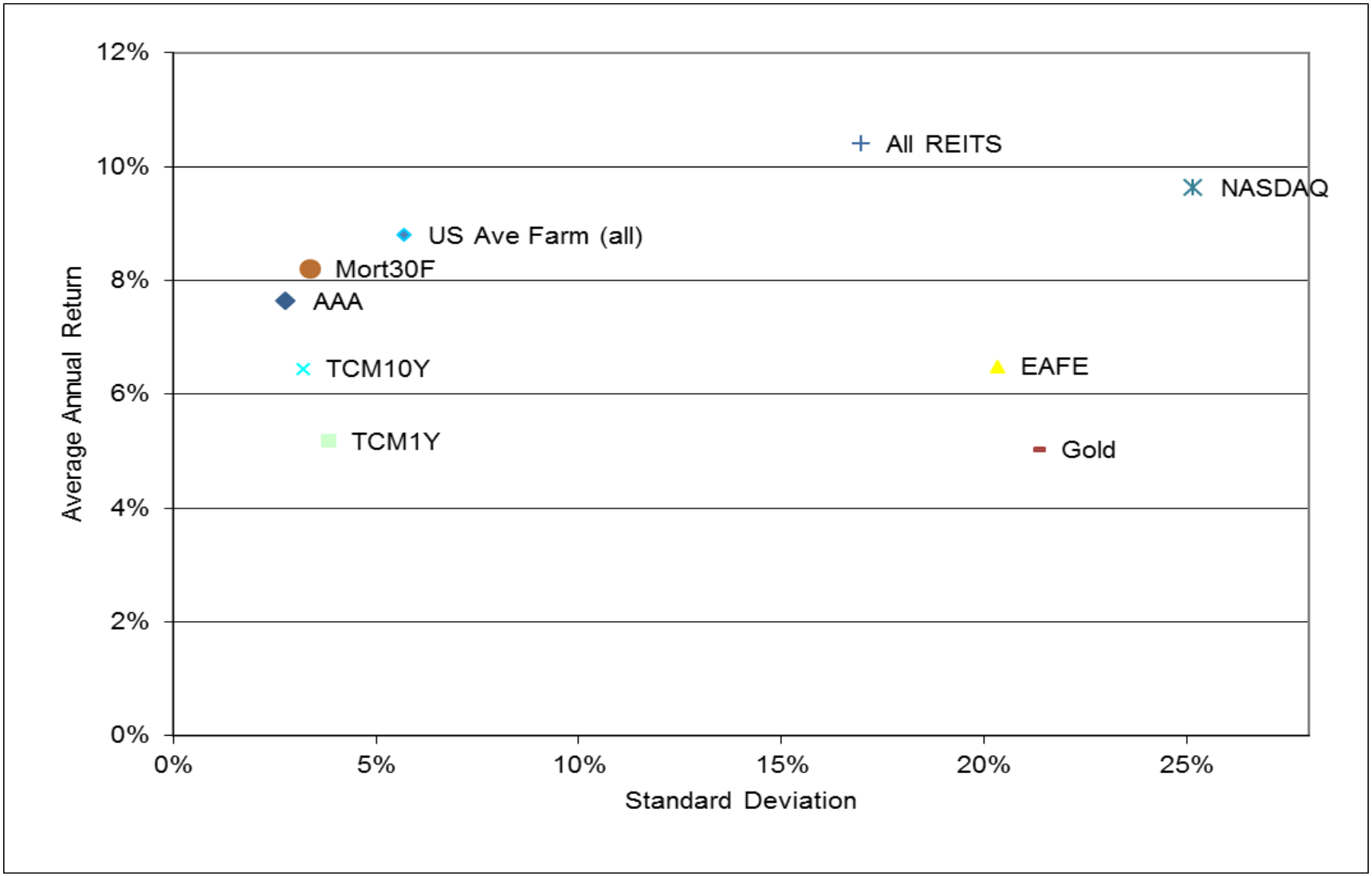
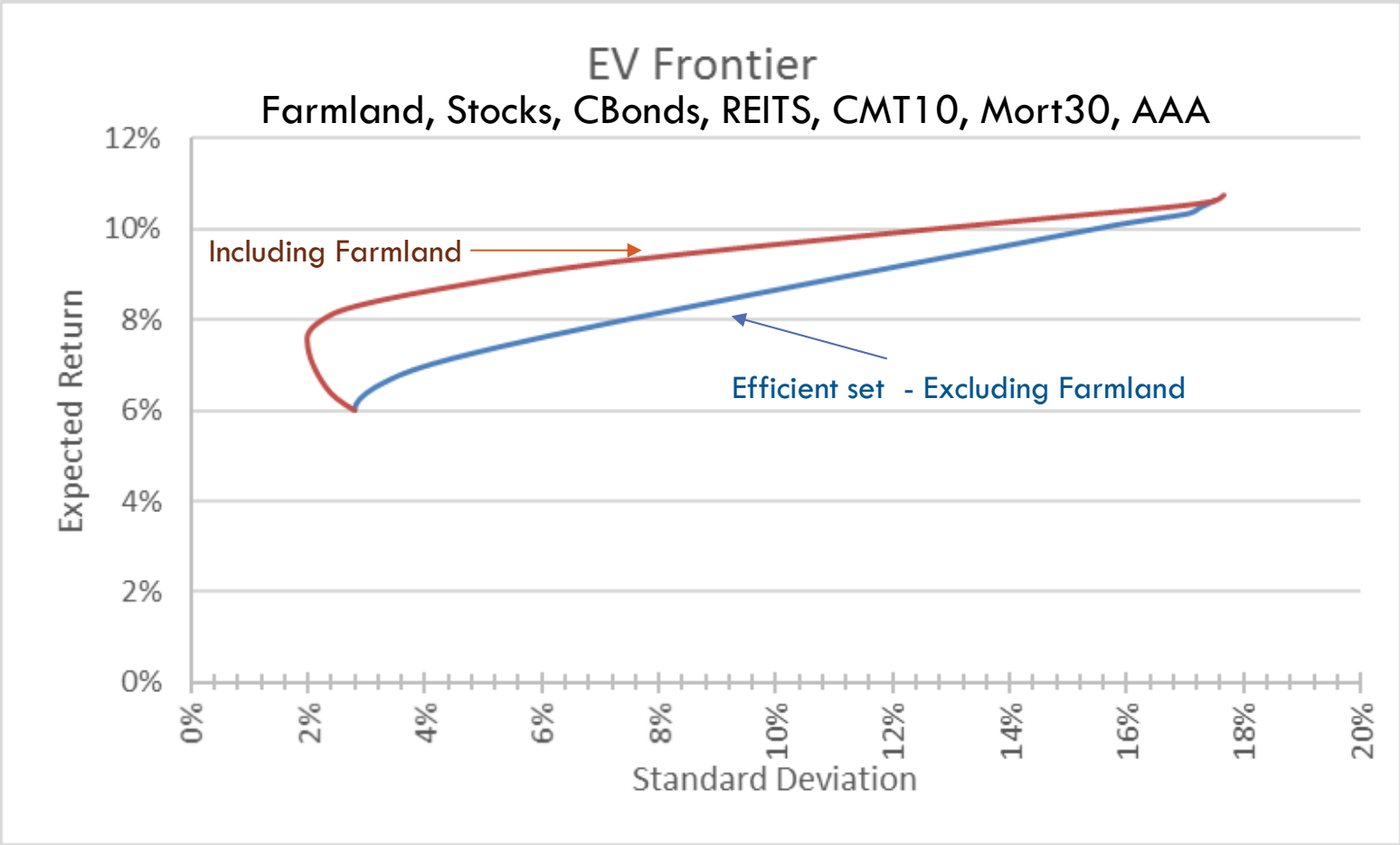
Role in Mixed Asset Portfolio



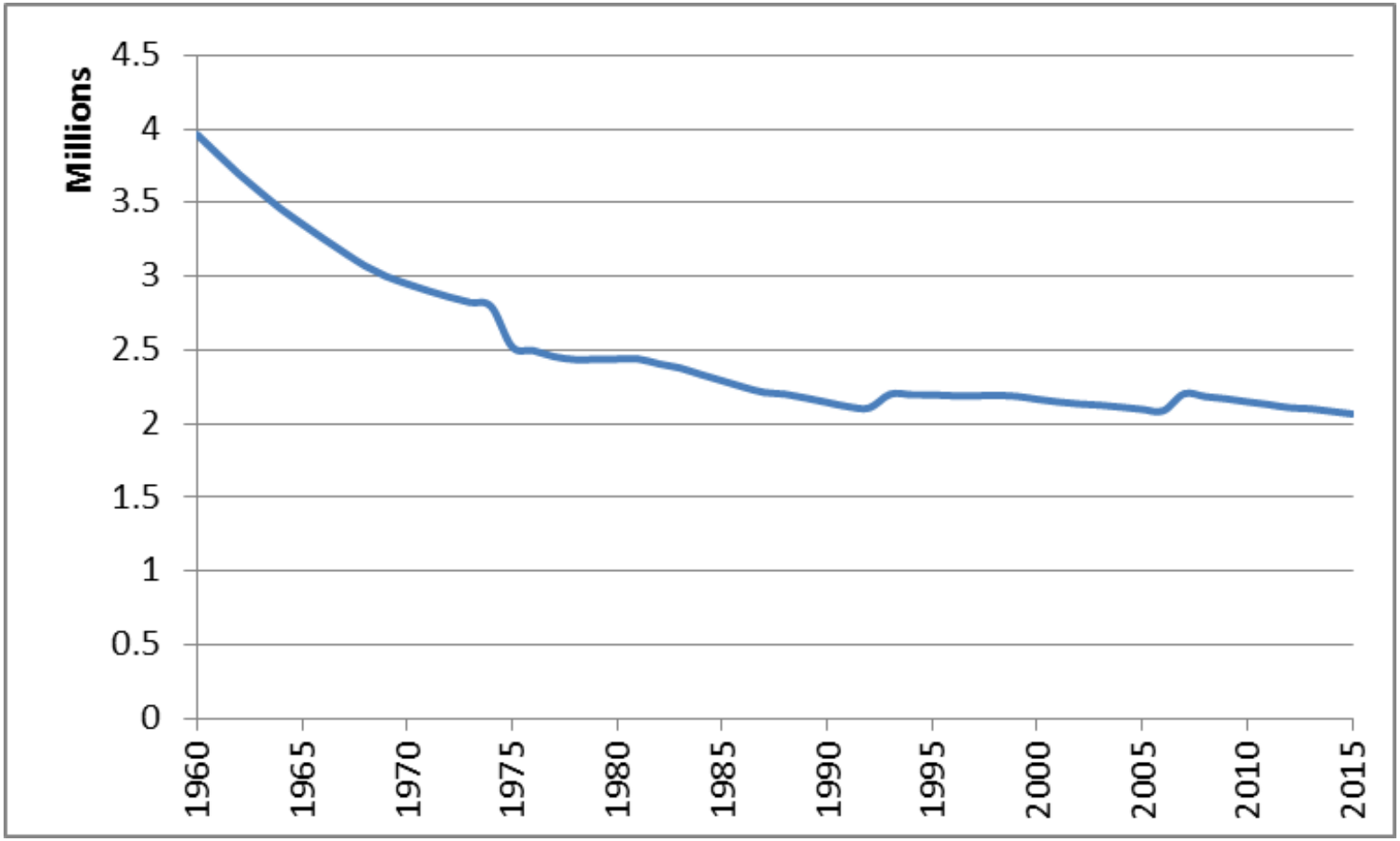
Role in Mixed Asset Portfolio



Farmland impacts on portfolio efficiency

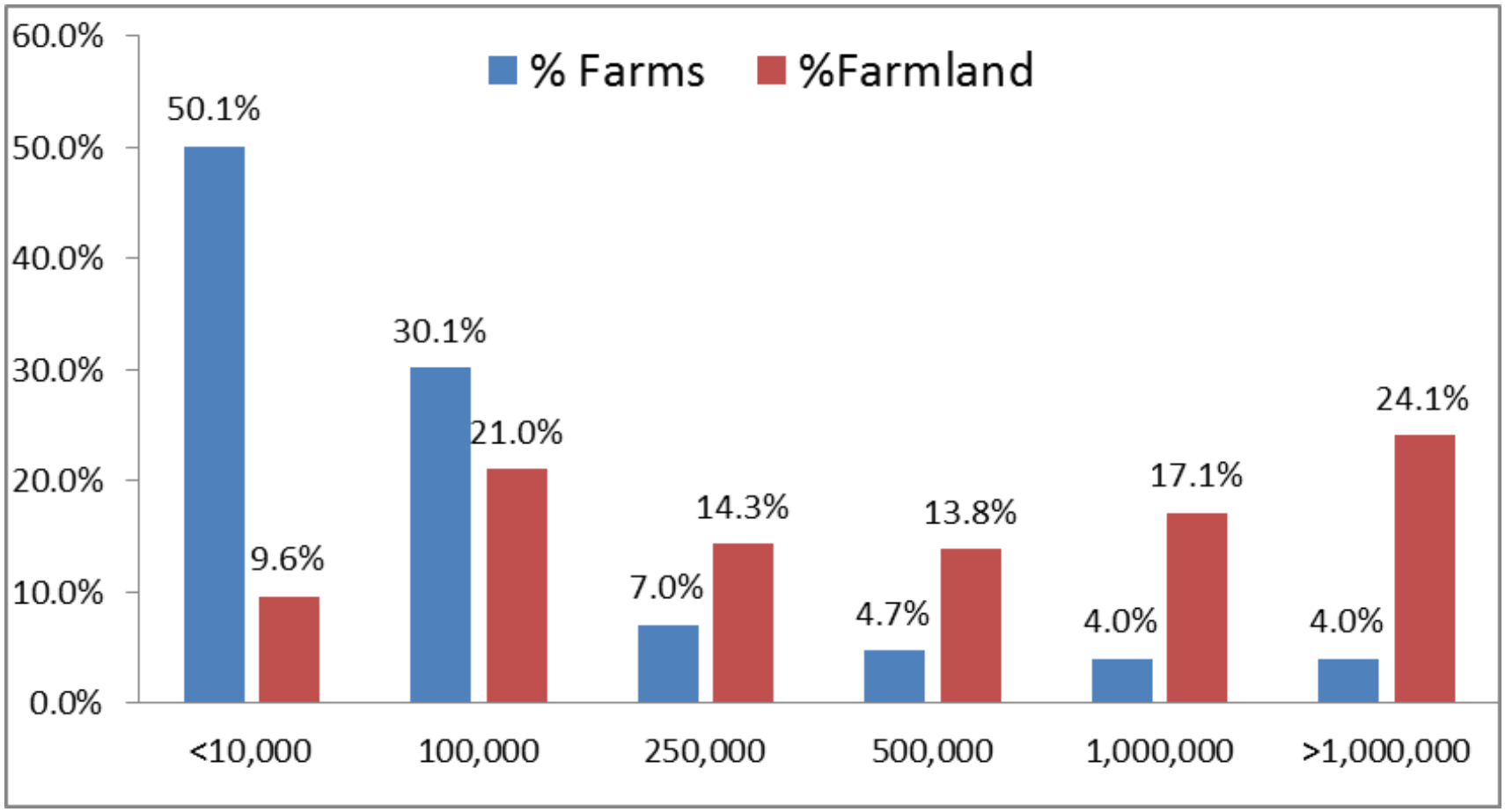
- Diversification effect drives inclusion in efficient portfolios including real assets and farmland – key driver in institutional interest
- Higher shares are "optimal" than normally found in holdings
  - Thin markets, high transactions costs, variance smoothing bias
  - Holding period effects differ from other assets
- Improves Sharpe ratio significantly- See TIAA report
- Fairly robust to time periods examined (including present…)
- Other real assets may do similarly, but tend to have less diversification benefit, more idiosyncratic risk (e.g. timber).
- How to "move the needle" in funds remains difficult.
- High net worth individuals often have greatest benefit

Number of Farms 1960-present



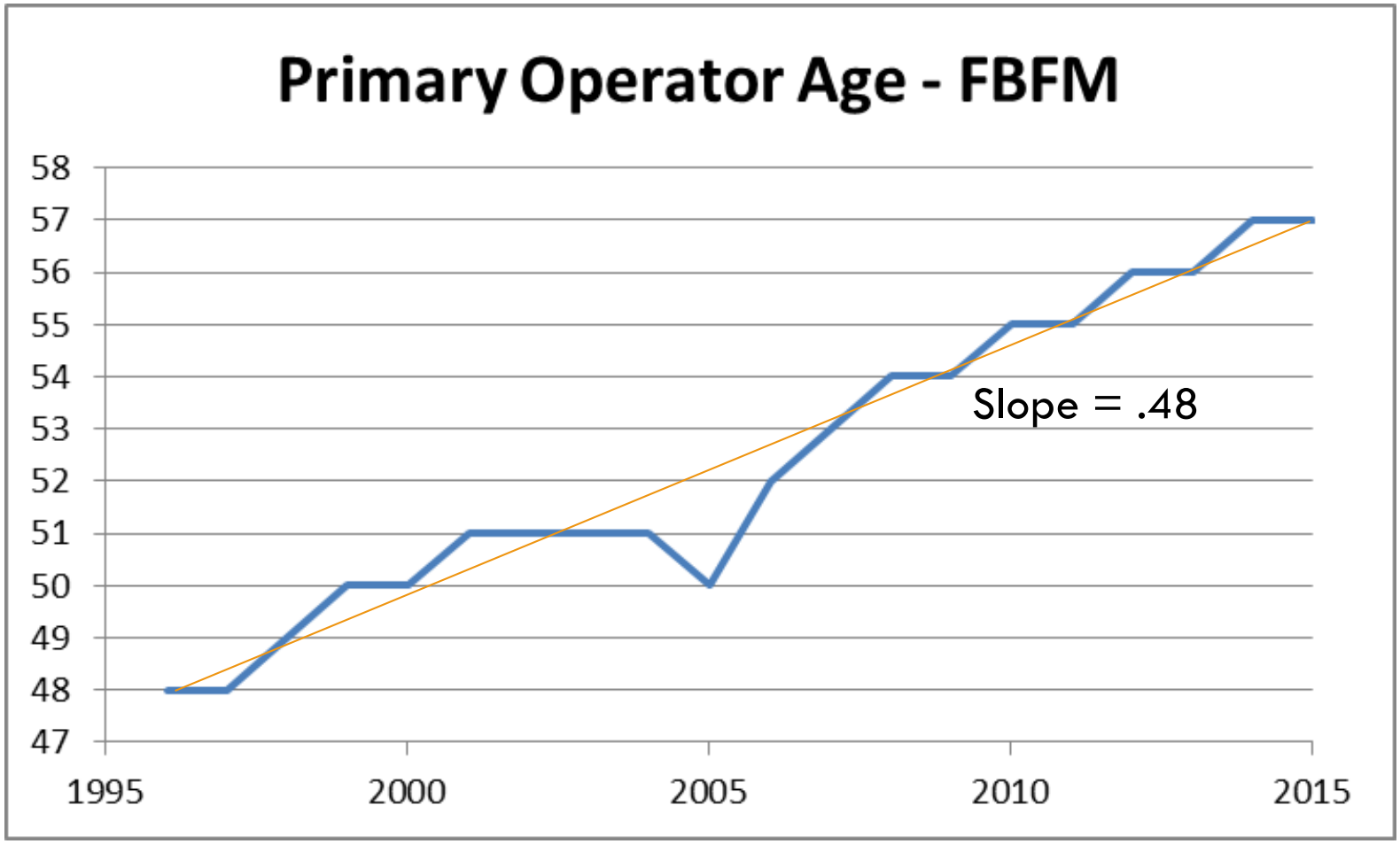
ERS-USDA

Distribution by Sales Class

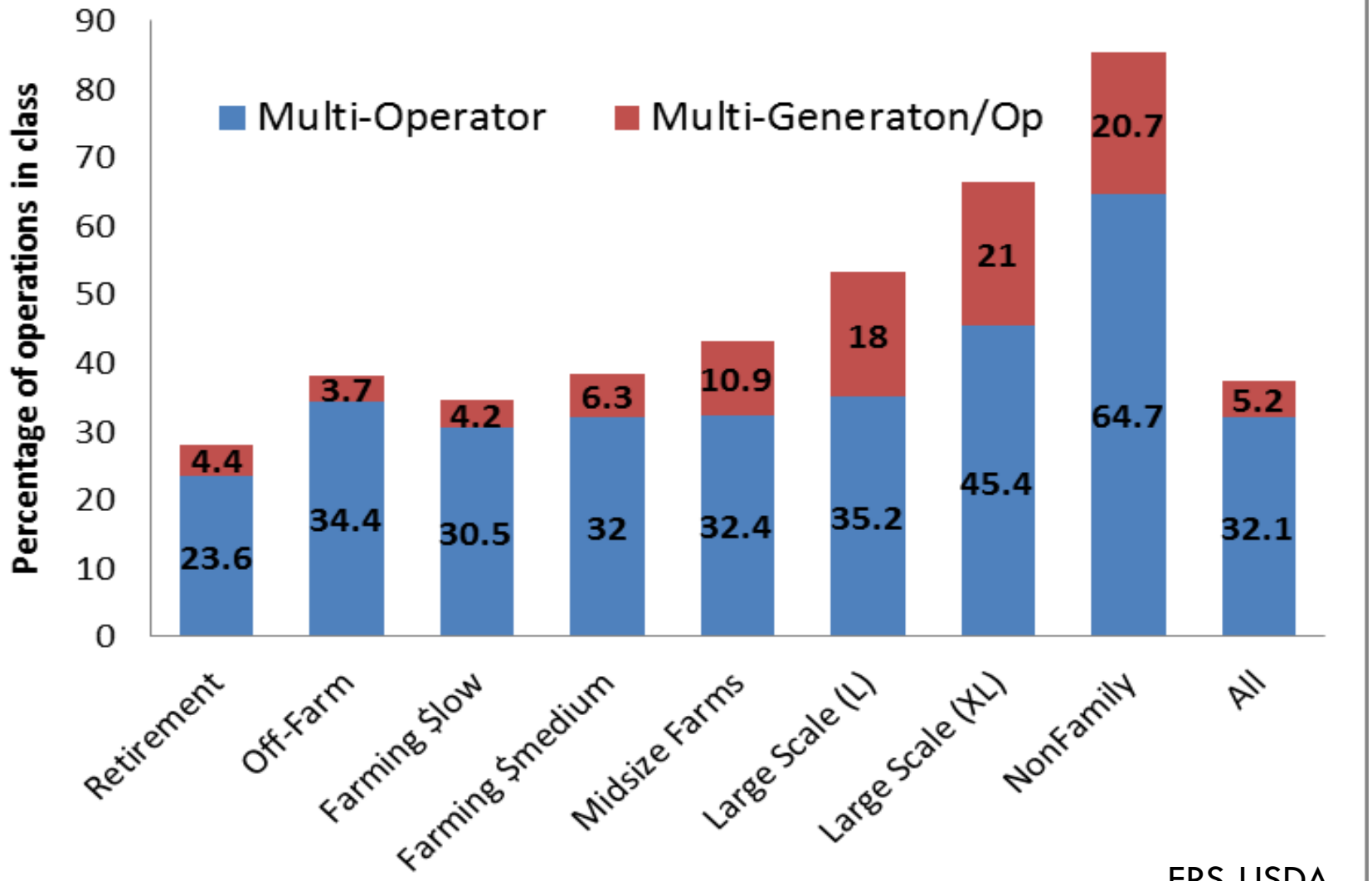


ERS-USDA

Age – *(it's complicated…)*



More complex ops than ownership



ERS-USDA

Ownership and Operations

- Increasingly separable, but risk profile changes
- Tax advantaged asset to own into estate
- Crop Insurance and farm program incentives – mixed and increasingly targeted
- Most corporate farms are family farms – age of "stockholders" may not be meaningful number
- 2032a and 1031 – not ag-specific
- Fairly concentrated relative to most other sectors
- "Degrees of separation" may matter
- More Management opportunities, more competing technologies. *(Cell Phones and Travel Agencies…)*

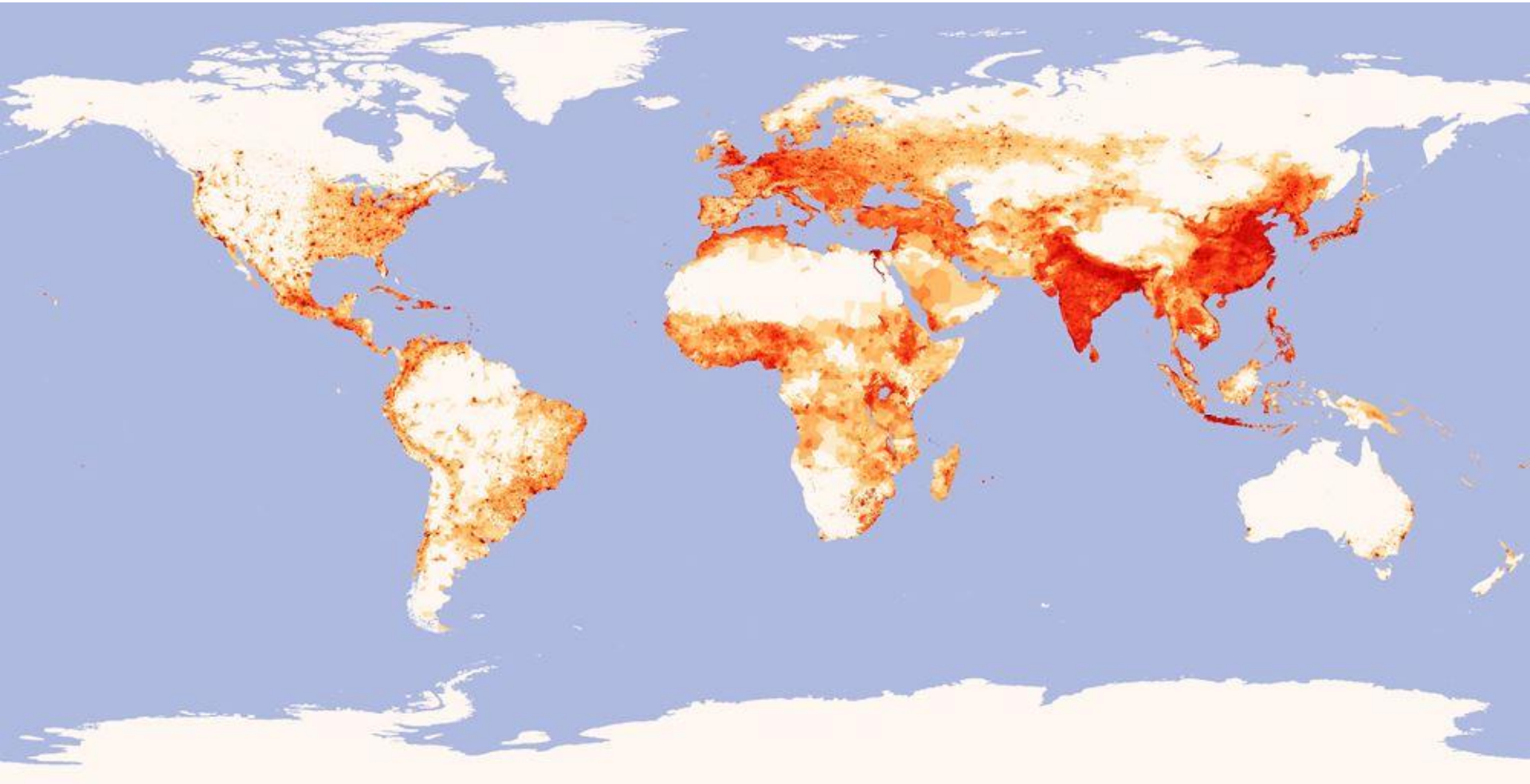
Crop Insurance safety net through time

	2011	2012	2013	2014	2015	2016	2017
Corn							
Projected Price	6.01	5.68	**5.65**	**4.62**	**4.15**	**3.86**	3.96
Harvest Price	**6.32**	**7.50**	4.39	3.49	3.82	3.49	?
Soybeans							
Projected Price	**13.49**	12.55	12.87	**11.36**	**9.74**	8.85	10.19
Harvest Price	12.14	**15.39**	12.87	9.65	8.91	**9.75**	?

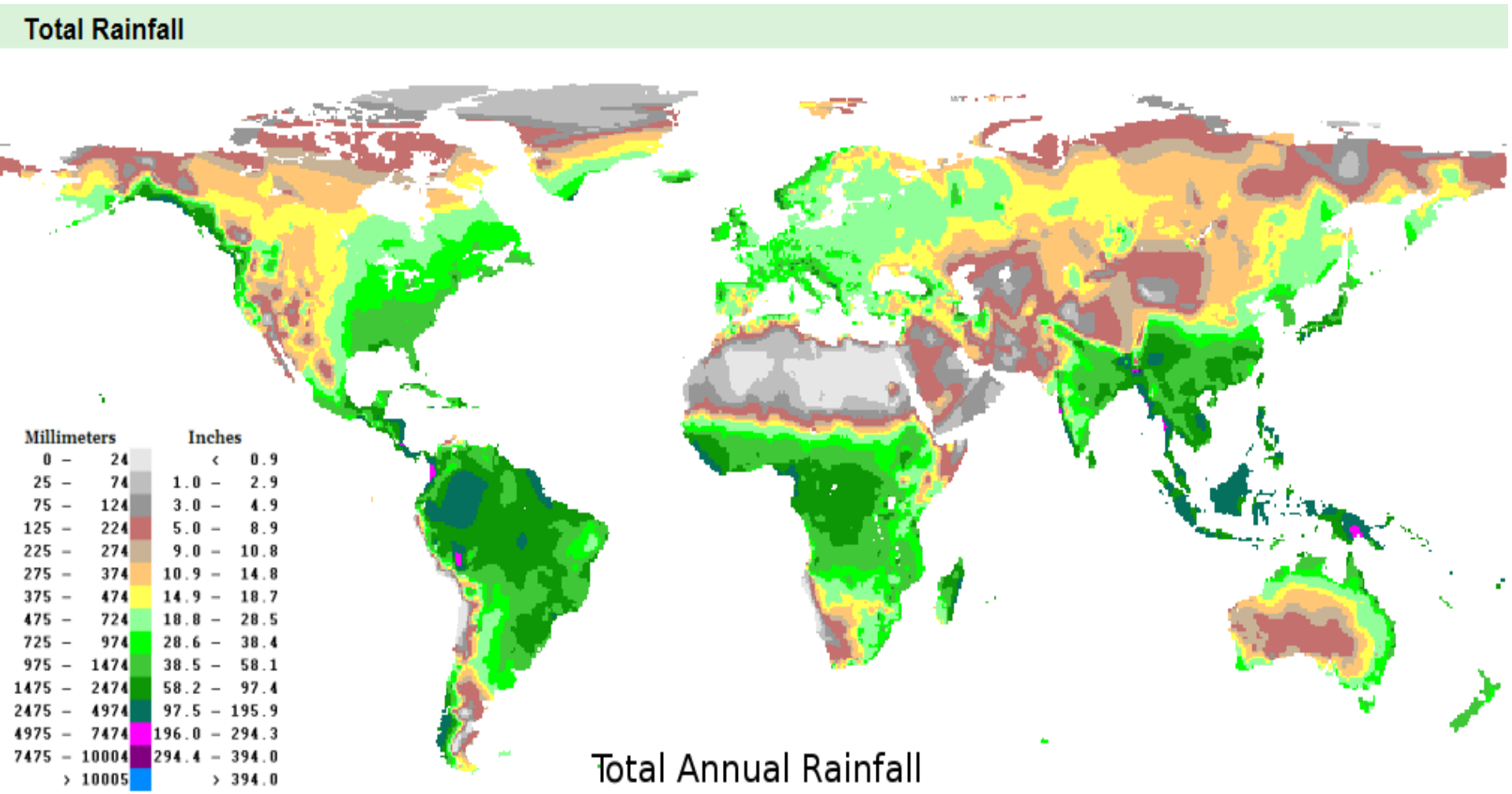
Tailwinds and supporting factors…..

- Long term thesis for food consumption is quite strong
  - "World Virtual Water Trade" network intact
  - Stable relationship between calories and income, SOI curve
- Low leverage, very low turnover rates, thin markets
- Low correlation with financials, and positive correlation with inflation make farmland a good portfolio anchor asset.
- Tax advantages (both income and basis related)
- Strong collateral and B/S positions from prior years
- Crop insurance countercyclicality, ARC payments
- Low interest rates – at point on YC that matters
- Technology-related output improvements (factor productivity), and new "analytics" based efforts

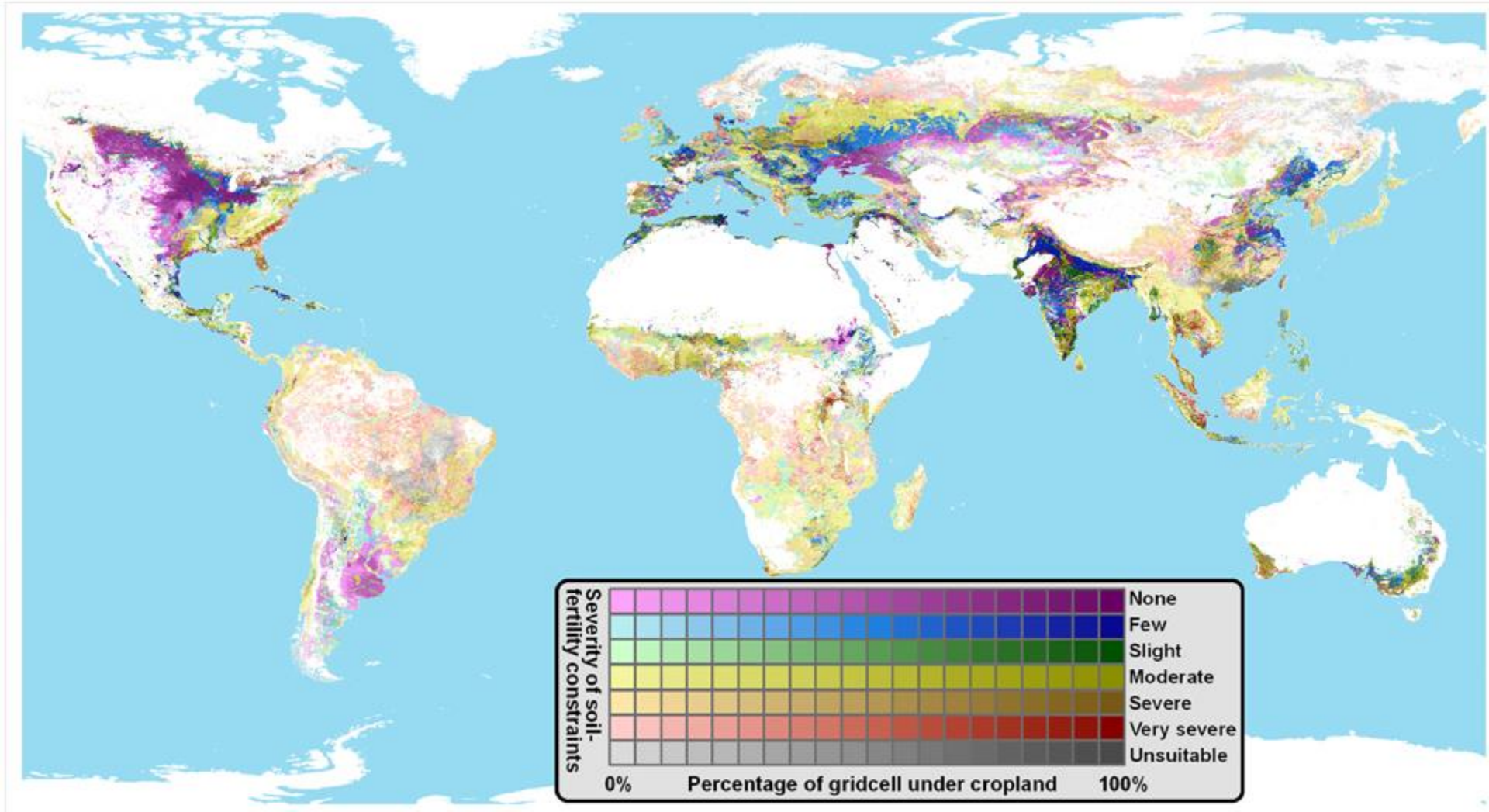
Where do people live?



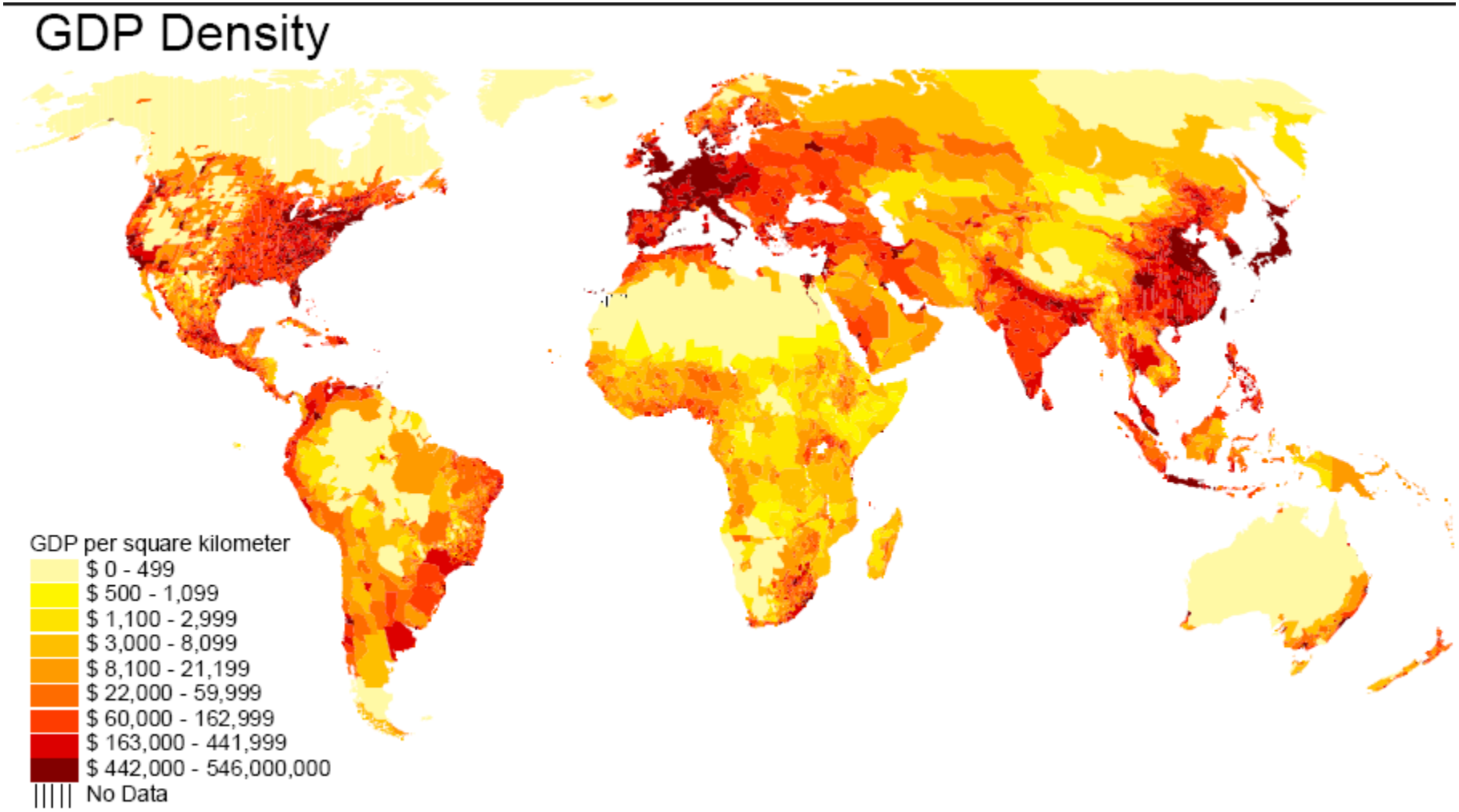
Where does rain fall?



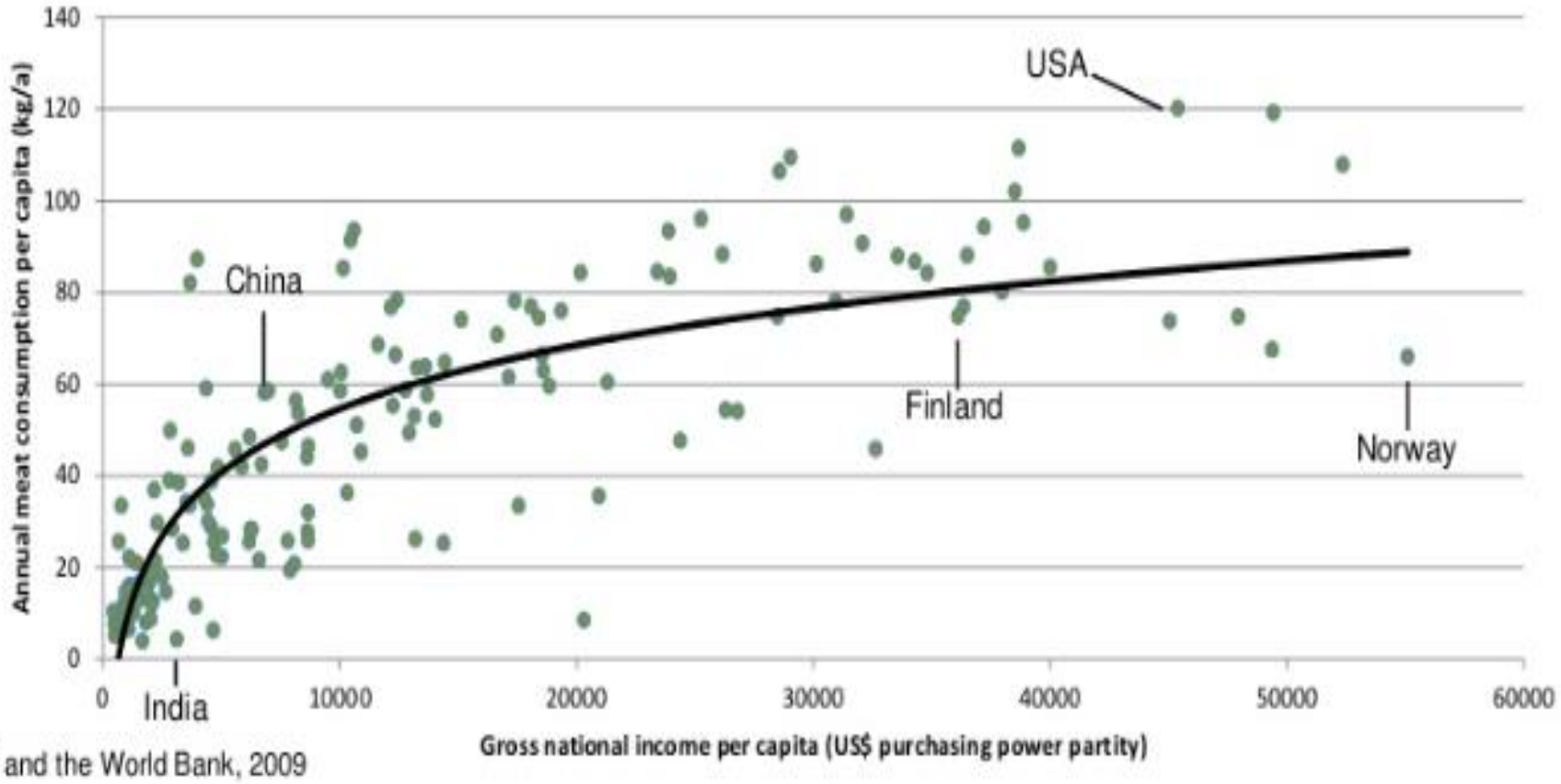
Where are crop suitable soils?



Where is purchasing power?



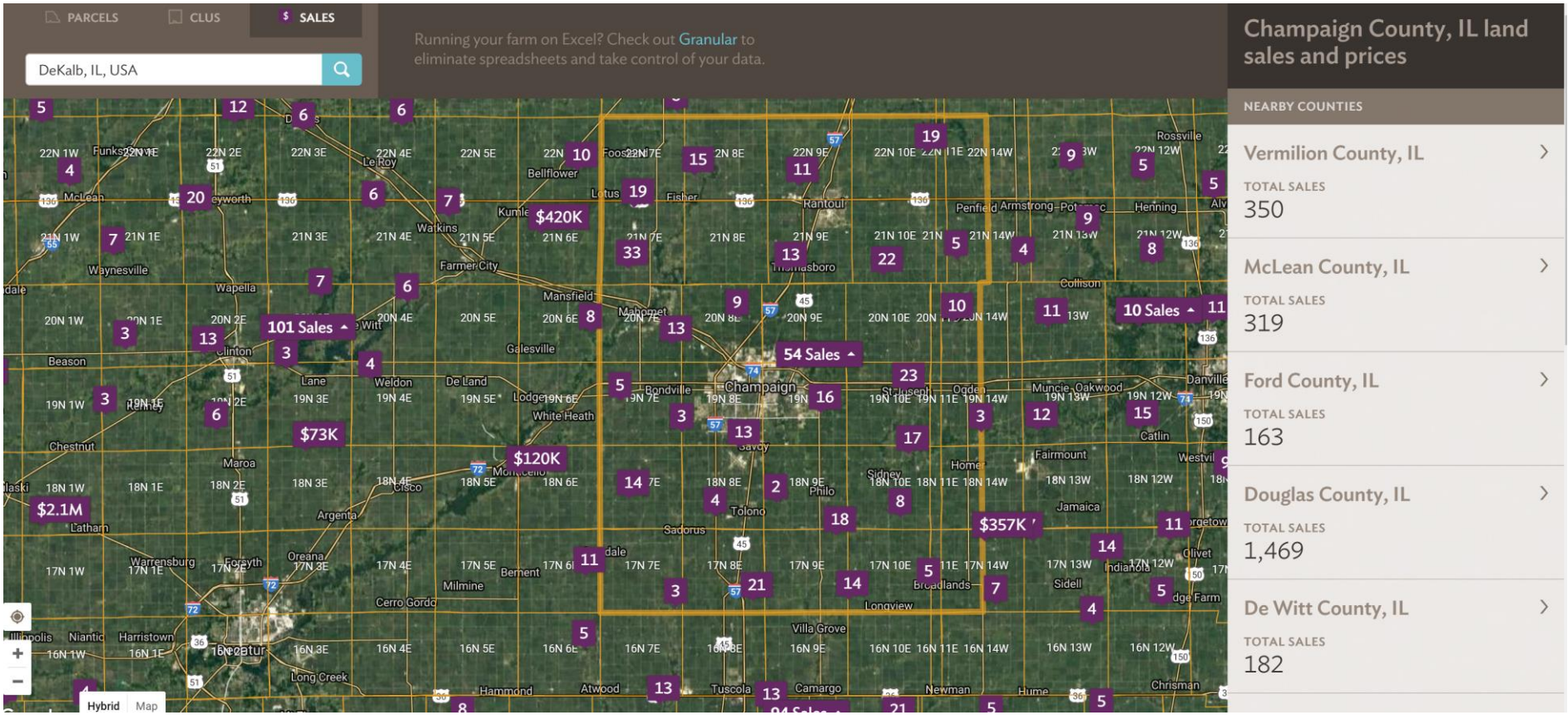
Income increases calories and quality



Source: FAO and the World Bank, 2009

Remember these?

"Technology - Times they are a changin'.."



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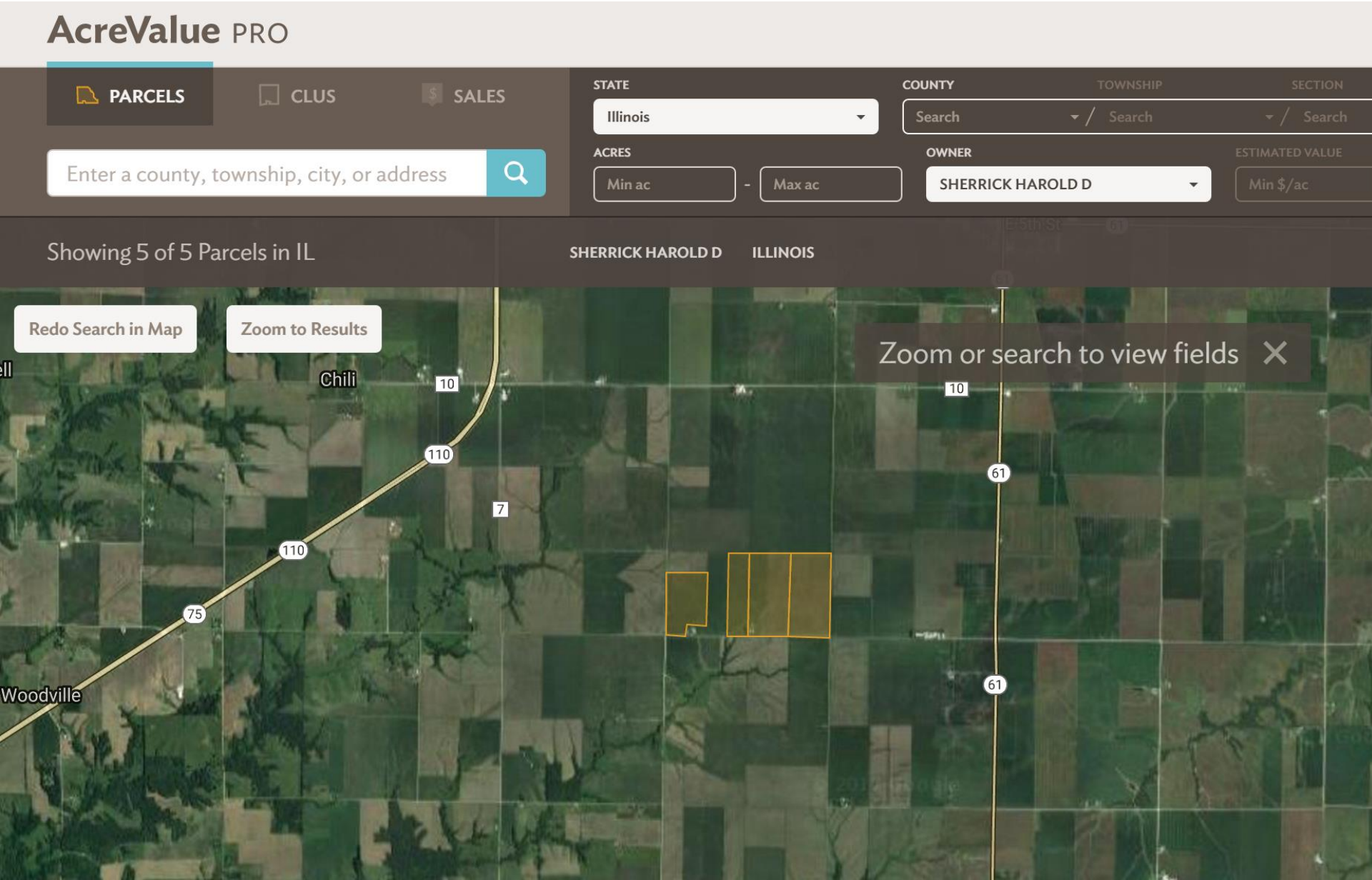
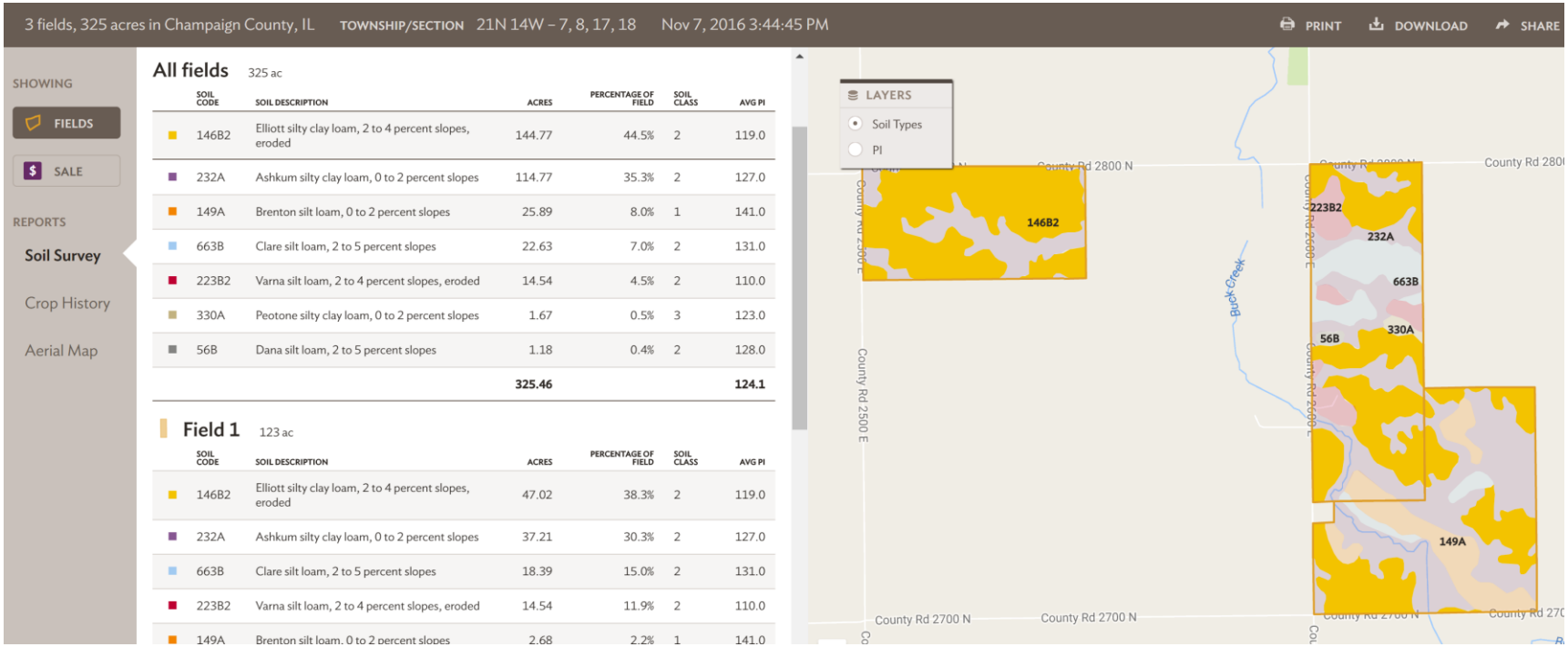
Long lost relatives?

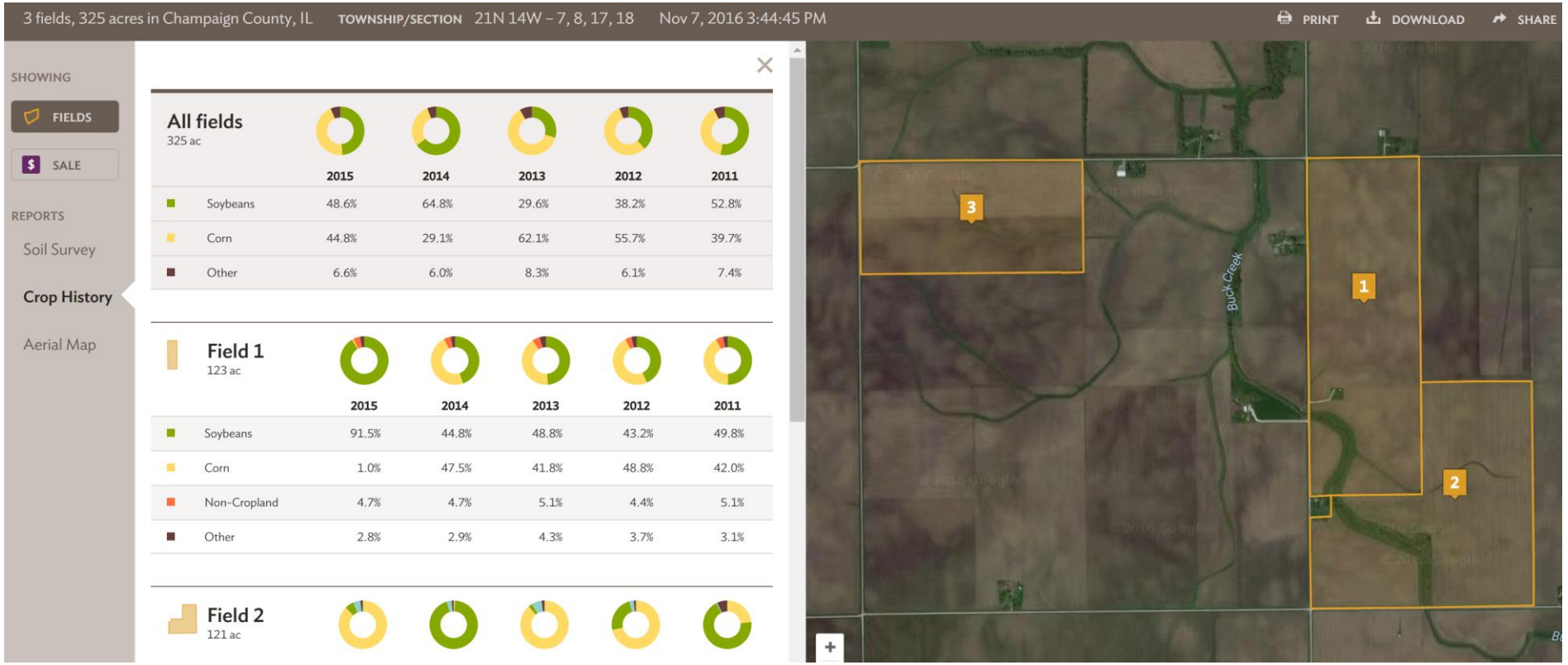


Soil map units and acreage (free…)



(I actually wondered how to compare to the others in the area that I knew…)

Crop Histories (free…)



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“Valuation” app. (free…)

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Opportunities/Threats- both/neither

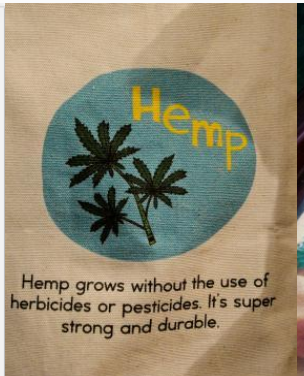
Some conversation starters:

- How to use tools for competitive advantage?
- Other likely "apps" that will appear
  - Uber-drone analogs to limit machinery transport, reorganized custom activities
  - Water resource monitoring/mapping
  - "Case-Shiller" and Zillow for Ag would be incredibly useful
  - Efficient capitalization with retained ownership of income from specific assets but pooled risk
  - Transmission of attribute demand information

Changing consumer attribute demand

- Farm to fork movement - many channels
- Natural, local, fresh, low impact, etc. competing with certification programs (Organic, GMO-free, gluten free)
- Lack of standardization in measure of importance (healthfulness, toxicity, taste) and proxy production characteristics
- Limited impact in short term on prod. systems

Attribute demand: Varied interpretations, confusion, anti-logos



Futurecasting

- "Financialization" likely to continue for the sector. Equity & indexing vehicles very positive developments
- Rationalization of recent incomes, lower cap rates, WACC
- Attribute Demand (e.g., non-GMO) becomes more direct public signal, but marginally impacts production – key
- Some positive outcomes for capital providers likely, balance sheet effects unlikely to trigger "bubble", low cap rates remain for some time (economy wide, not ag-specific)
- "*What asset would you rather own*" remains important

Questions/Discussion

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Find us on the web at:

http://farmdocdaily.illinois.edu/

http://farmdoc.illinois.edu/cropins/

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