Tracking Consolidation in U.S. Agriculture

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Farm Size and Productivity: A Global Look
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USDA United States Department of Agriculture, Economic Research Service

U.S. Agricultural Production Has Been Shifting to Large Farms

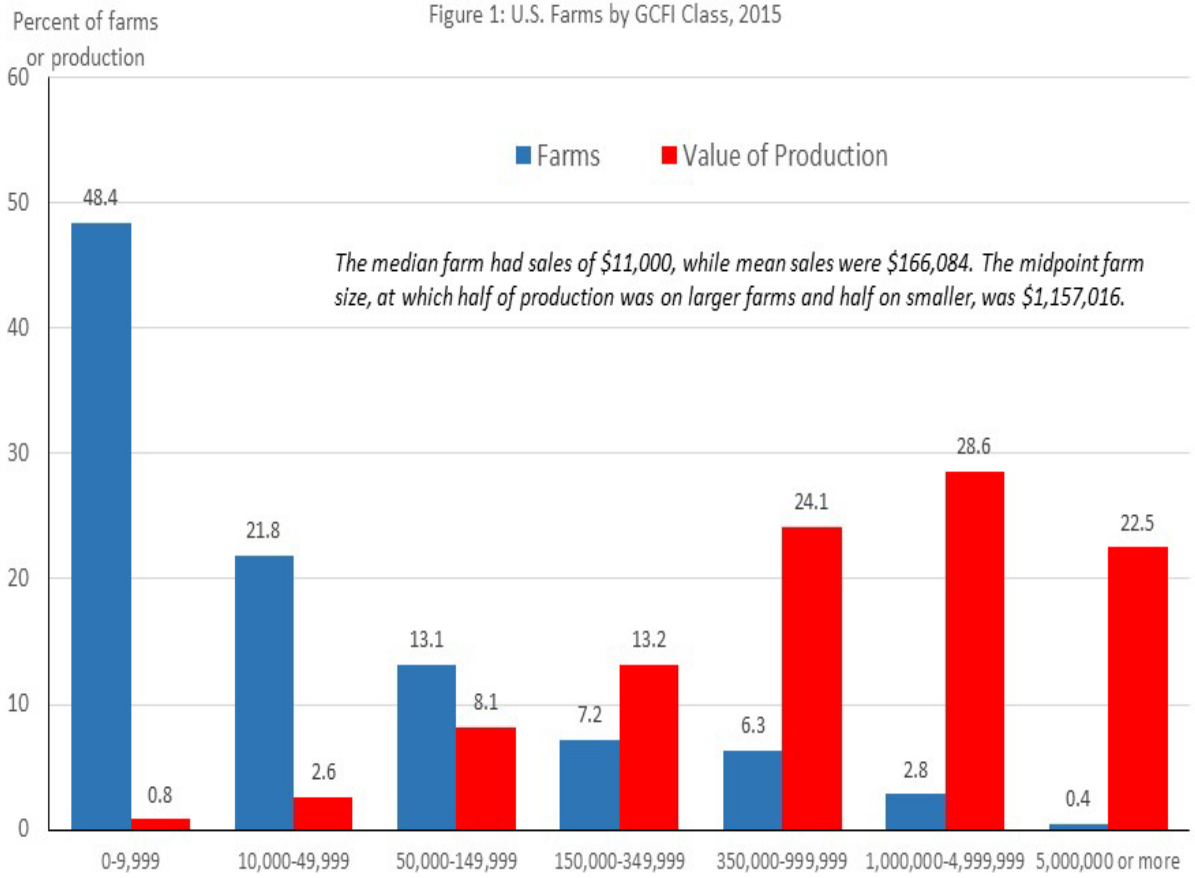
- The shift is large, but can be obscured in common size measures because the farm size distribution is highly skewed.
- We detail the shifts to larger farms
- A primary focus on crops, but with a contrast to observed patterns in livestock

Our work extends, to more years and commodities, work done in an earlier ERS report— *Farm Size and the Organization of U.S. Crop Farming* (ERR-152), by MacDonald, Korb, and Hoppe.

This presentation also serves as a long introduction to Nigel Key's paper.

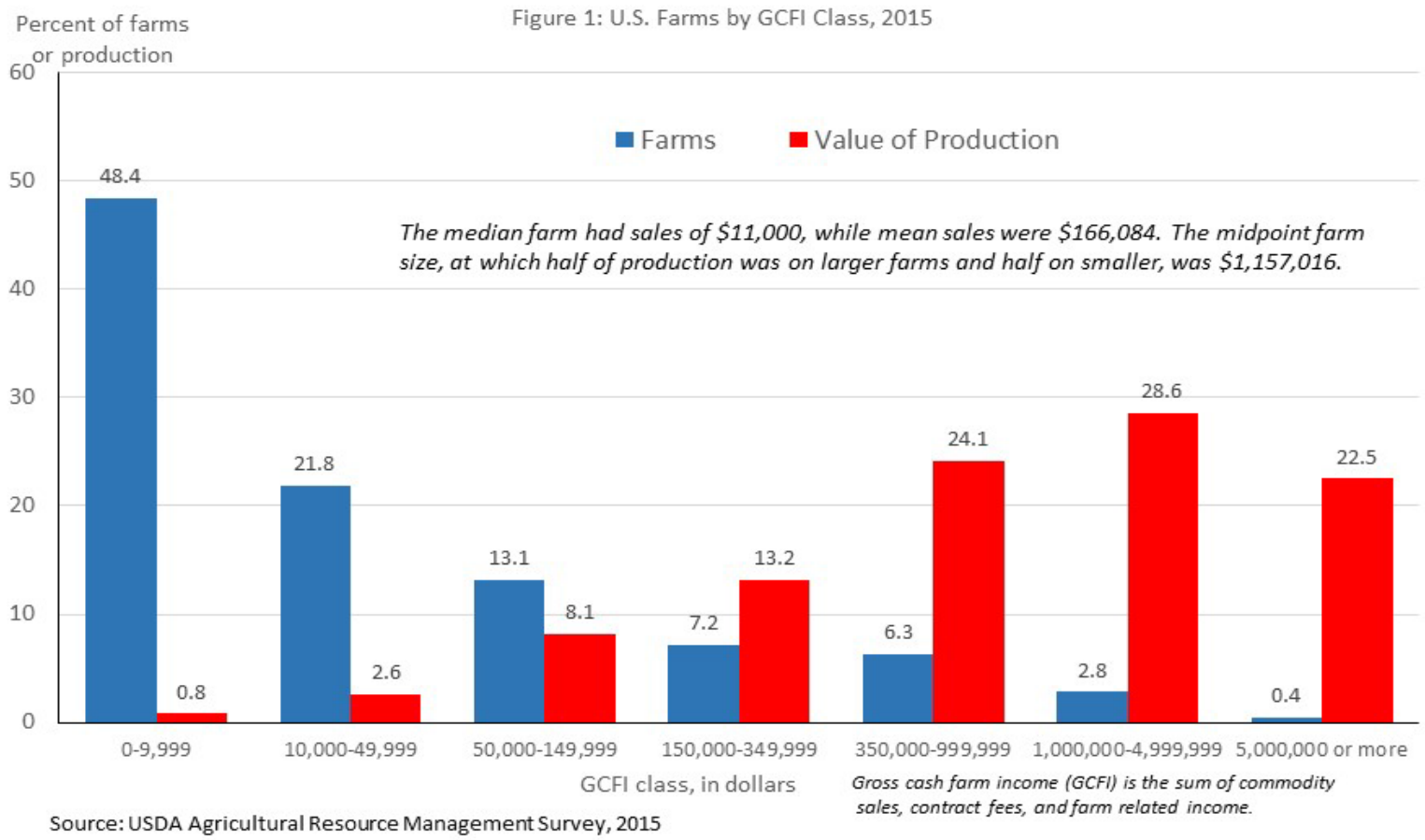
Farm Size Distributions Are Highly Skewed: Gross Cash Farm Income (GCFI)

Figure 1: U.S. Farms by GCFI Class, 2015



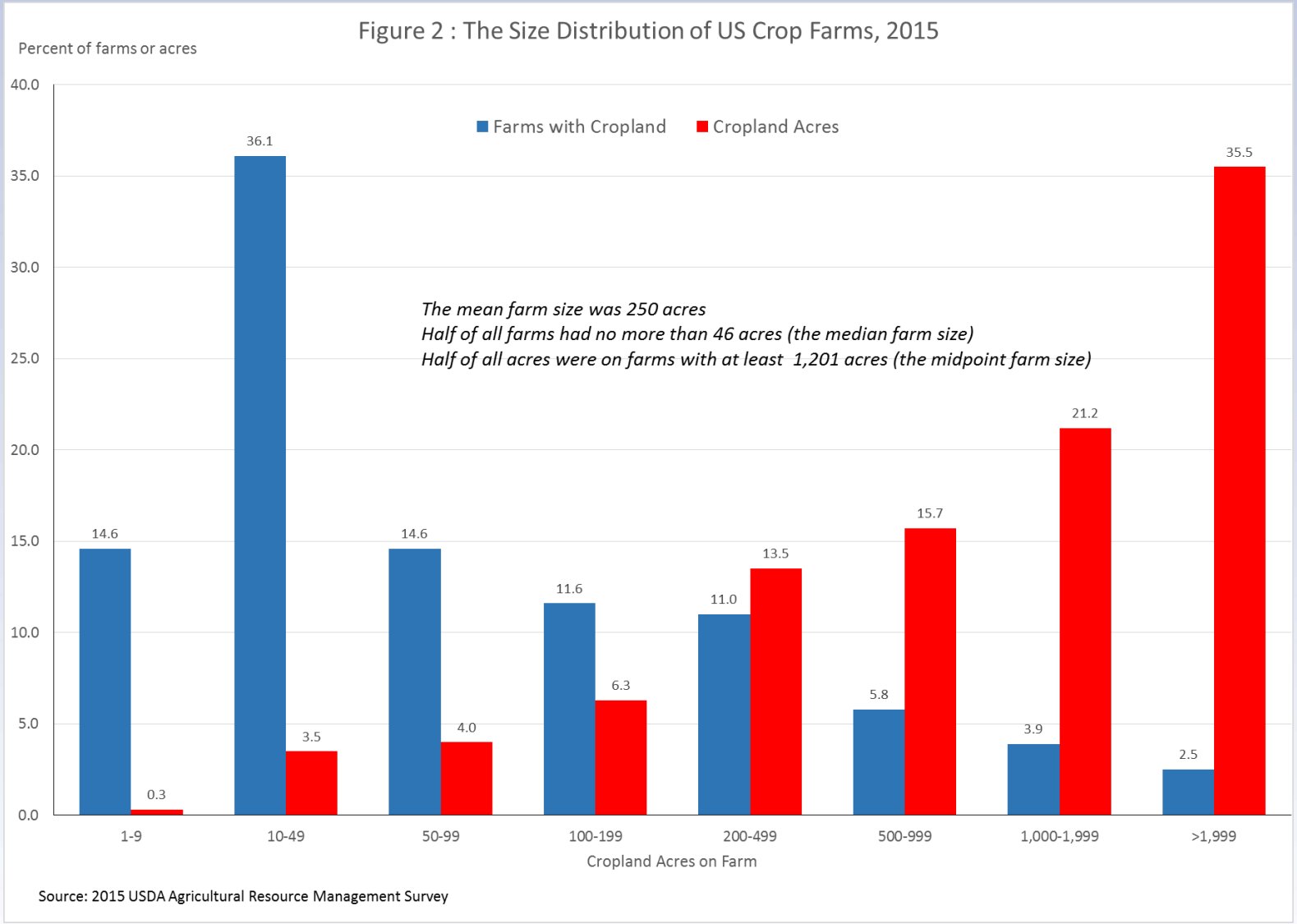
Source: USDA Agricultural Resource Management Survey, 2015

Farm Size Distributions Are Highly Skewed: GCFI

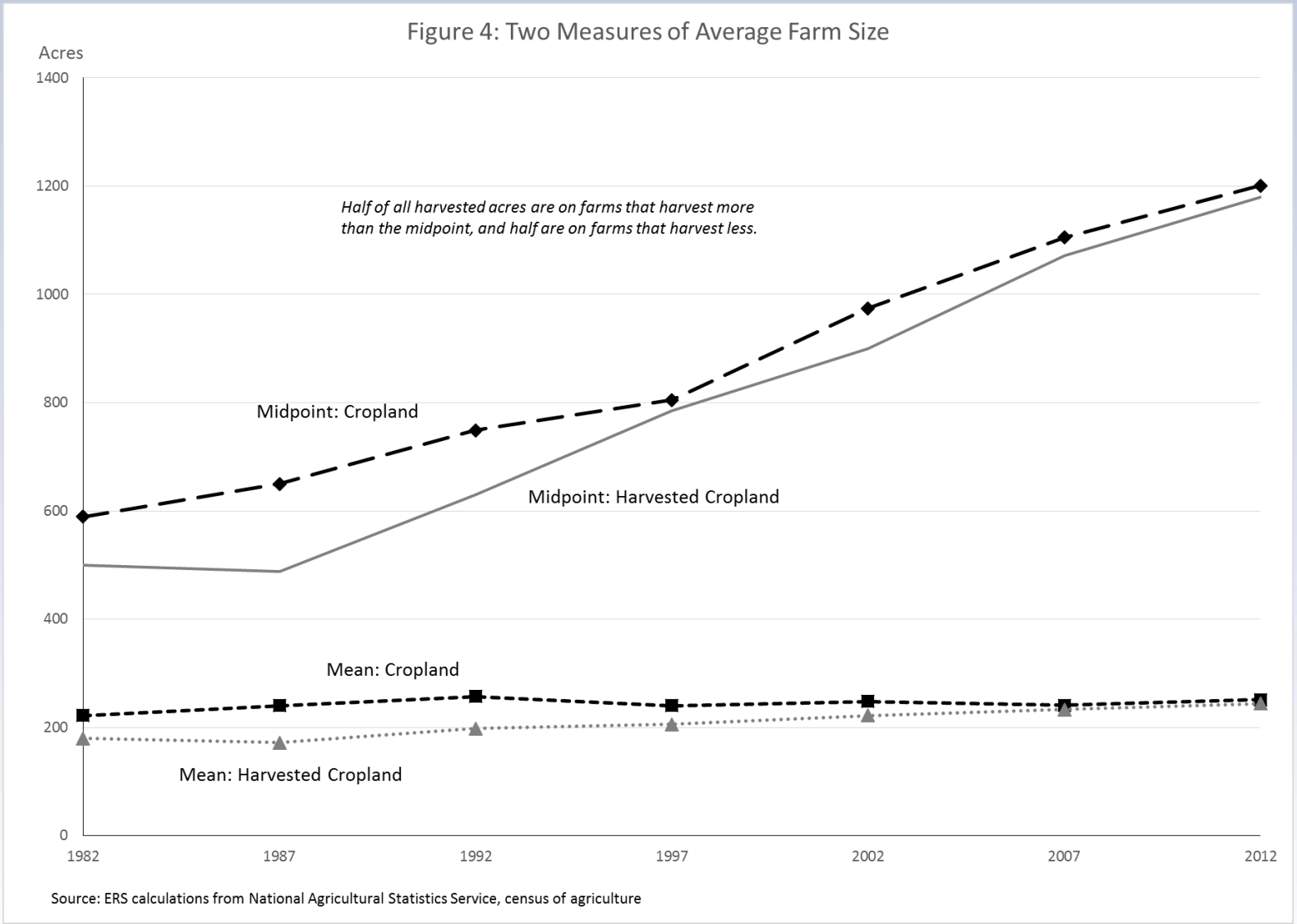


Source: USDA Agricultural Resource Management Survey, 2015

Farm Size Distributions Are Highly Skewed: Cropland



The Midpoint Captures Land Consolidation



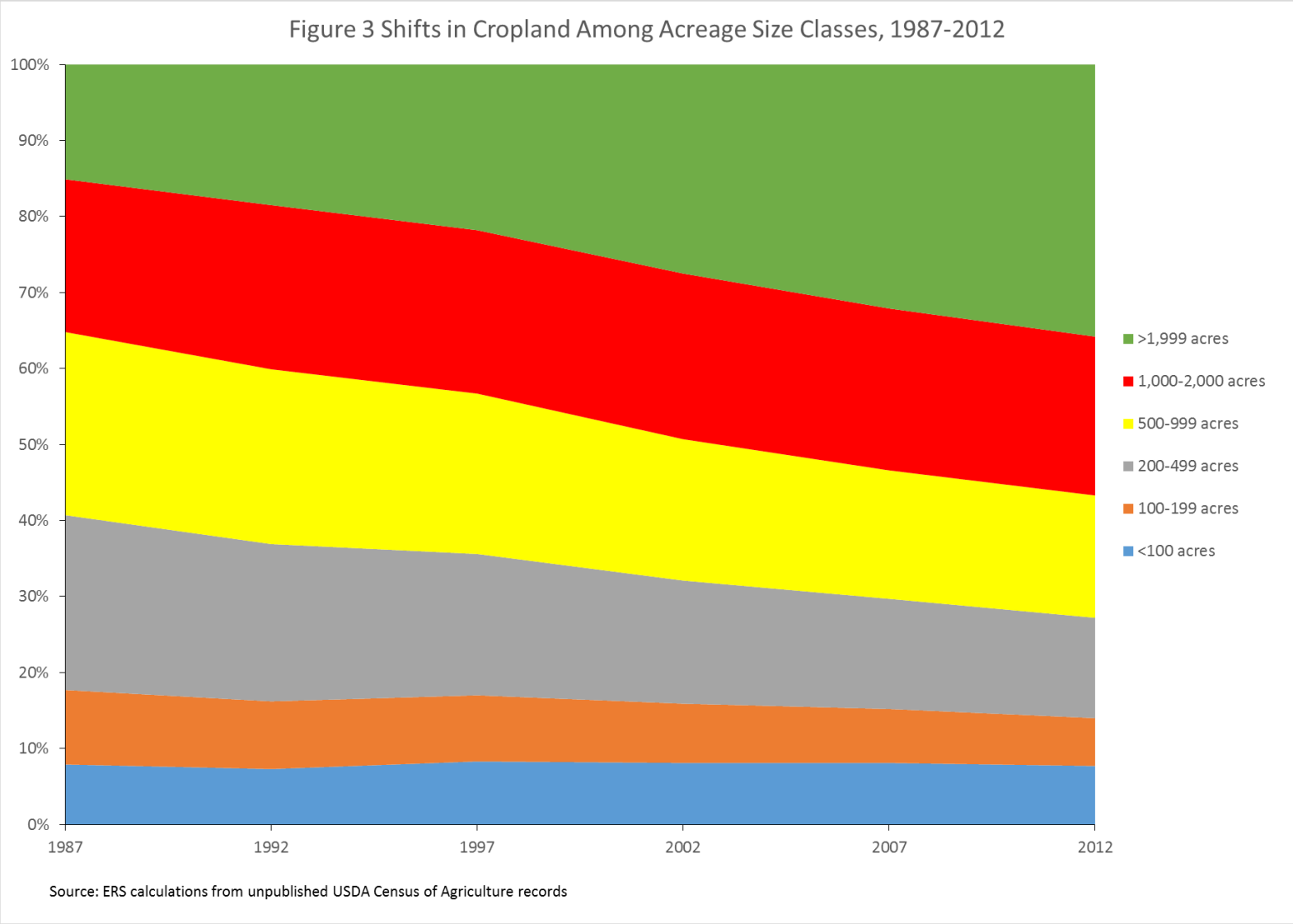
Why is the mean stable? Growing numbers of very large and very small farms.

Cropland acres operated	1987	2012
	Number of farms	
Any cropland	1,848,574	1,551,654
1-9	186,761	250,394
10-49	486,778	547,273
50-99	302,671	225,321
100-999	785,180	431,300
1,000-1,999	66,546	59,161
>1,999	20,638	38,205
	Number of acres	
Total Cropland	445,362,028	389,690,414

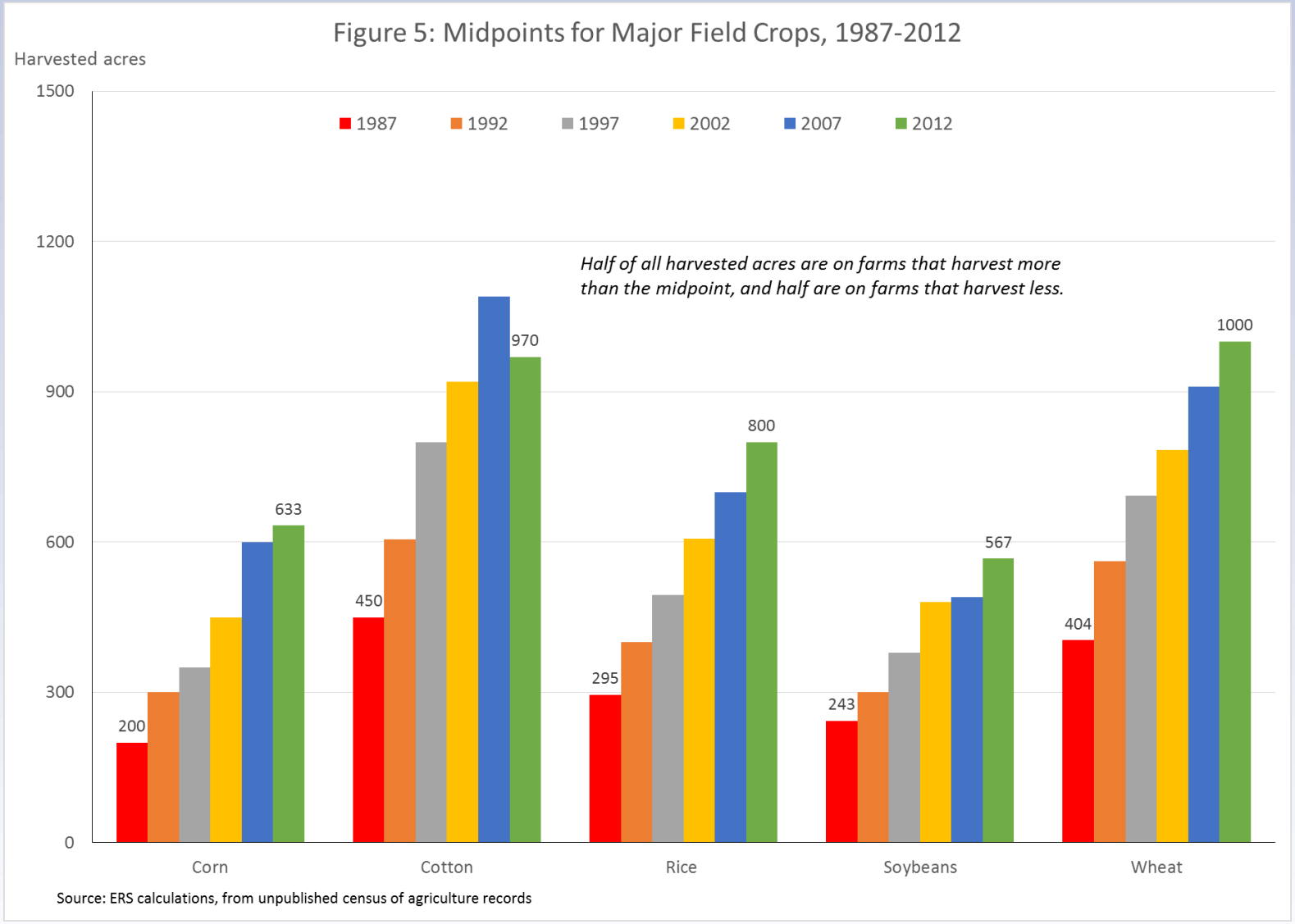
Source: National Agricultural Statistics Service, census of agriculture

But land keeps shifting to larger size classes

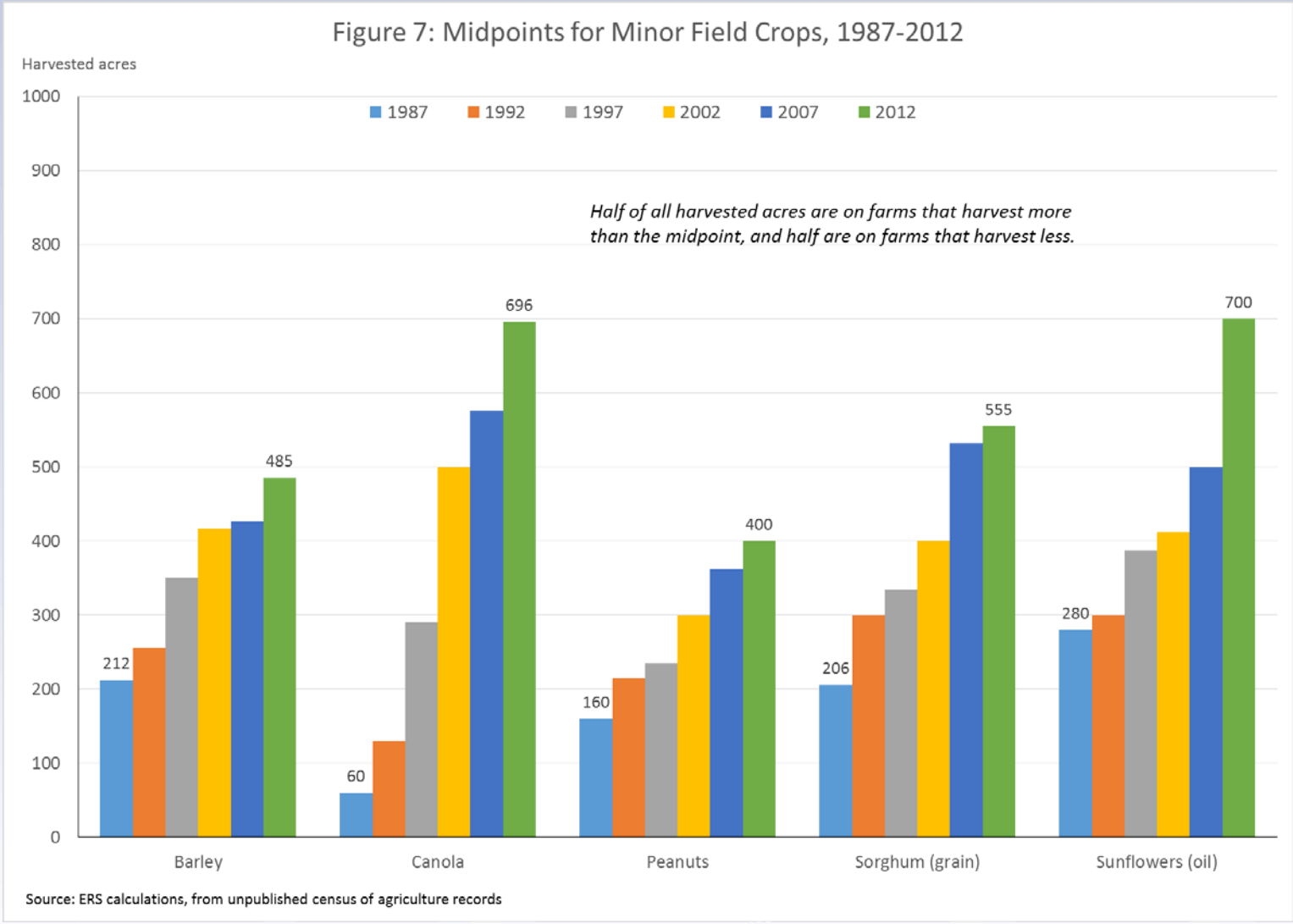
Cropland Acreage Has Been Shifting to Larger Farms



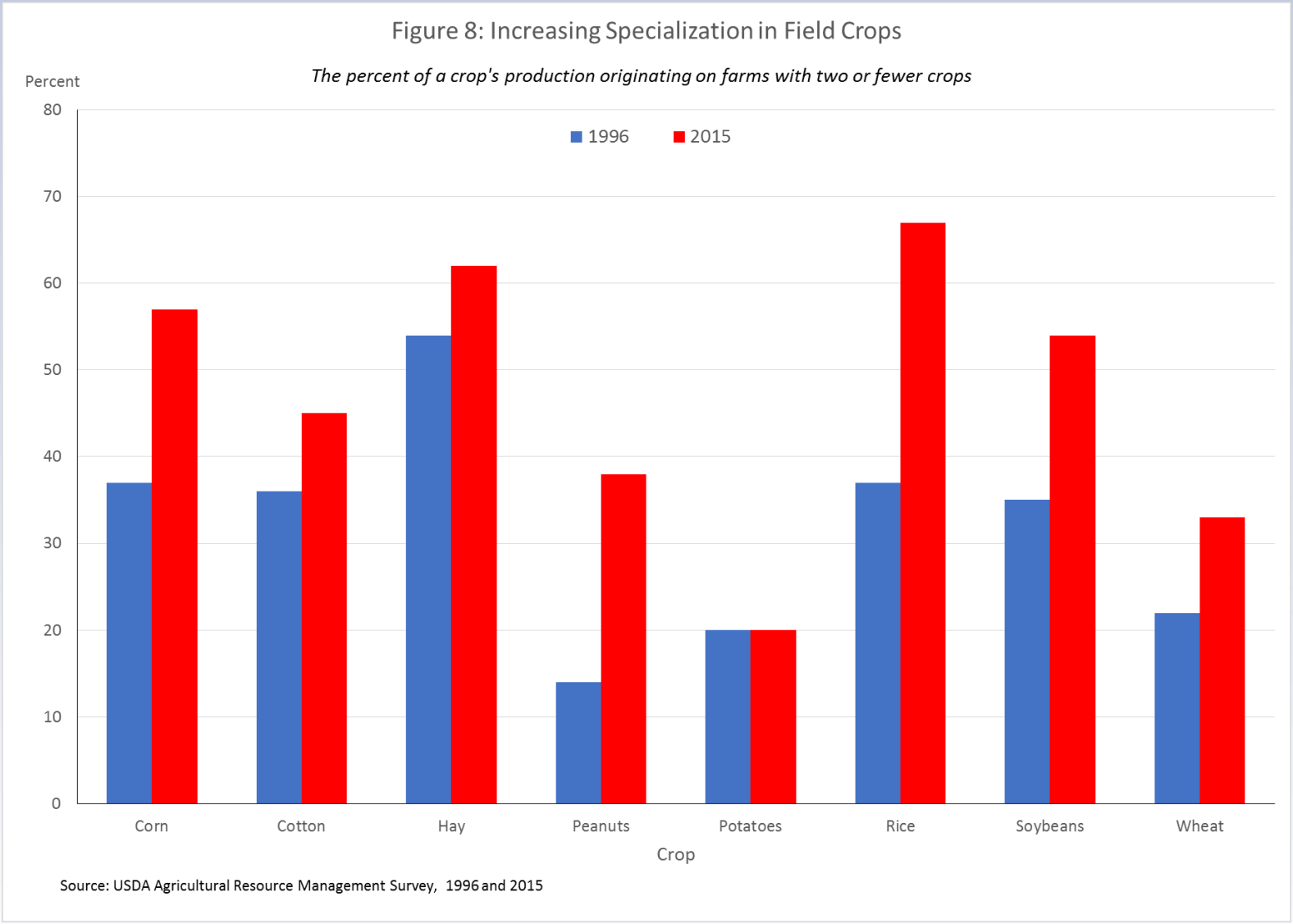
Major Field Crops: Midpoint Shifts are Large and Persistent



Minor Field Crops: Midpoint Shifts Are Large and Persistent



Increasing Farm Size, And Increasing Specialization



Consolidation is Ubiquitous: Vegetable and Melon Crops

	Midpoints: harvested acreage		
Crop	1987	2007	2012
Vegetables			
Asparagus	160	240	200
Beans, Snap	221	323	318
Broccoli	440	1,000	1,050
Cabbage	113	300	300
Carrots	350	600	1,053
Cauliflower	240	400	425
Cucumber	115	505	450
Lettuce, all	949	1,815	1,275
Onions, Dry	115	320	348
Peas	100	179	198
Peppers, Bell	88	300	210
Potatoes	350	990	1,054
Pumpkins	20	30	40
Squash	35	72	75
Sweet Corn	100	250	300
Sweet Potatoes	140	474	560
Tomatoes	400	820	930
Melons			
Cantaloupe	400	388	350
Watermelons	80	150	200

Only cantaloupes show a 1987-2012 decline.

Bell peppers is the median % increase

More variation in the 2007-12 short run.

Source: ERS calculations from unpublished records, National Agricultural Statistics Service, census of agriculture

Consolidation is Ubiquitous: Fruit, Nut, and Berry Crops

	Midpoint crop acreage		
Crop	1987	2007	2012
Non-citrus fruits			
Apples	83	146	179
Avocadoes	40	40	50
Cherries, Sweet	32	65	80
Cherries, Tart	65	150	175
Grapes	205	320	420
Nectarines	70	186	239
Peaches	92	120	130
Pears	50	75	76
Plums & prunes	179	160	300
Citrus fruits			
Grapefruit	320	556	573
Lemons	176	176	147
Oranges	450	1113	961
Tree nuts			
Almonds	203	450	547
Pecans	102	117	272
Pistachios	465	627	926
Walnuts	85	172	240
Berries			
Blueberries	50	75	100
Cranberries	90	99	120
Strawberries	24	120	180

Only lemons show a decline in 1987-2012.

The median % increase is in blueberries

Source: ERS calculations from unpublished records, National Agricultural Statistics Service, census of agriculture

Cropland Consolidation is Widespread Across States

2012 cropland midpoint exceeded the 1982 midpoint in 47 of 50 states (declines only in CT, HI, MA)

Growth is persistent. In 6 intercensal periods between 1982 and 2012, the cropland midpoint increased in each period in 24 states with 77% of cropland

Increases	States	Cropland acres
6	AR ID IL IN IA KS KY LA MD MI MN MS MO MT NE NY NC ND OH OR SD TN WA WI (24)	298,518,197 (76.6%)
5	CA CO DE FL GA ME NJ OK PA SC TX VT VA (13)	78,698,559 (20.2%)
4	AK AZ UT WY (4)	5,300,054 (1.4%)
3	CT NV (2)	907,996 (0.2%)
2	AL HI NH NM RI WV (6)	5,834,119 (1.5%)
0	MA (1)	160,789 (0.04%)

Summarizing Crop Consolidation

- Ubiquitous: covering almost all crops and locations
- Persistent: increasing steadily across 5-year census periods
- Large: a doubling or more of midpoints over 1982(87)-2012.
  - Statistical analysis (in paper): provides tests in support of these assertions
- Linked to specialization: livestock and crops are steadily separating; number of crops on a farm is declining
- Livestock differs in important ways

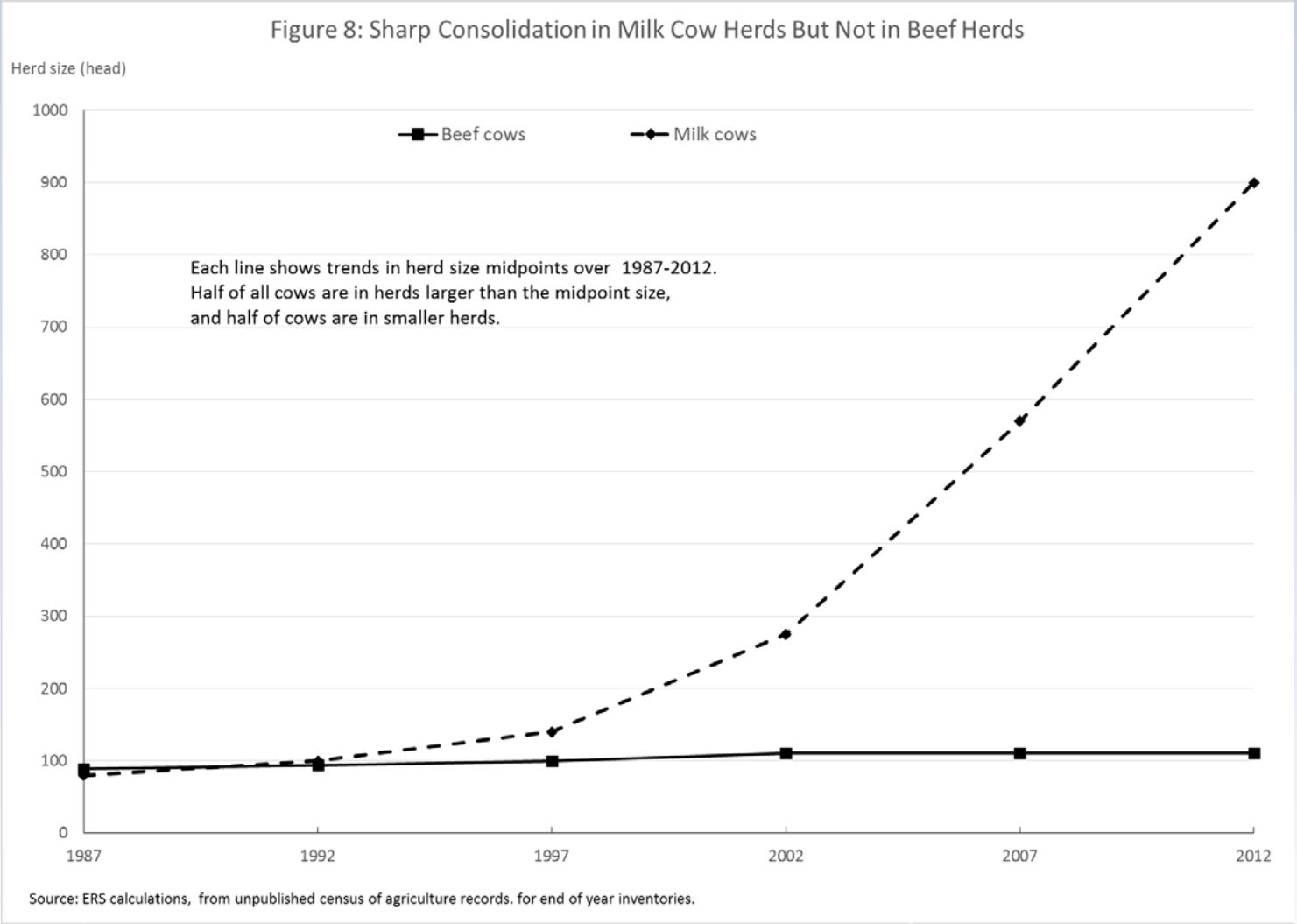
Consolidation in Livestock Has Been Episodic, and Often Revolutionary

Commodity	1987	1997	2007	2012
	Sales Midpoint: number of head sold or removed in year			
Broilers	300,000	480,000	681,600	680,000
Fed cattle	17,532	38,000	35,000	38,369
Hogs and pigs	1,200	11,000	30,000	40,000
	Inventory Midpoint: Number of head in herd/flock			
Beef cows	89	100	110	110
Egg layers	117,839	300,000	872,500	925,975
Milk cows	80	140	570	900

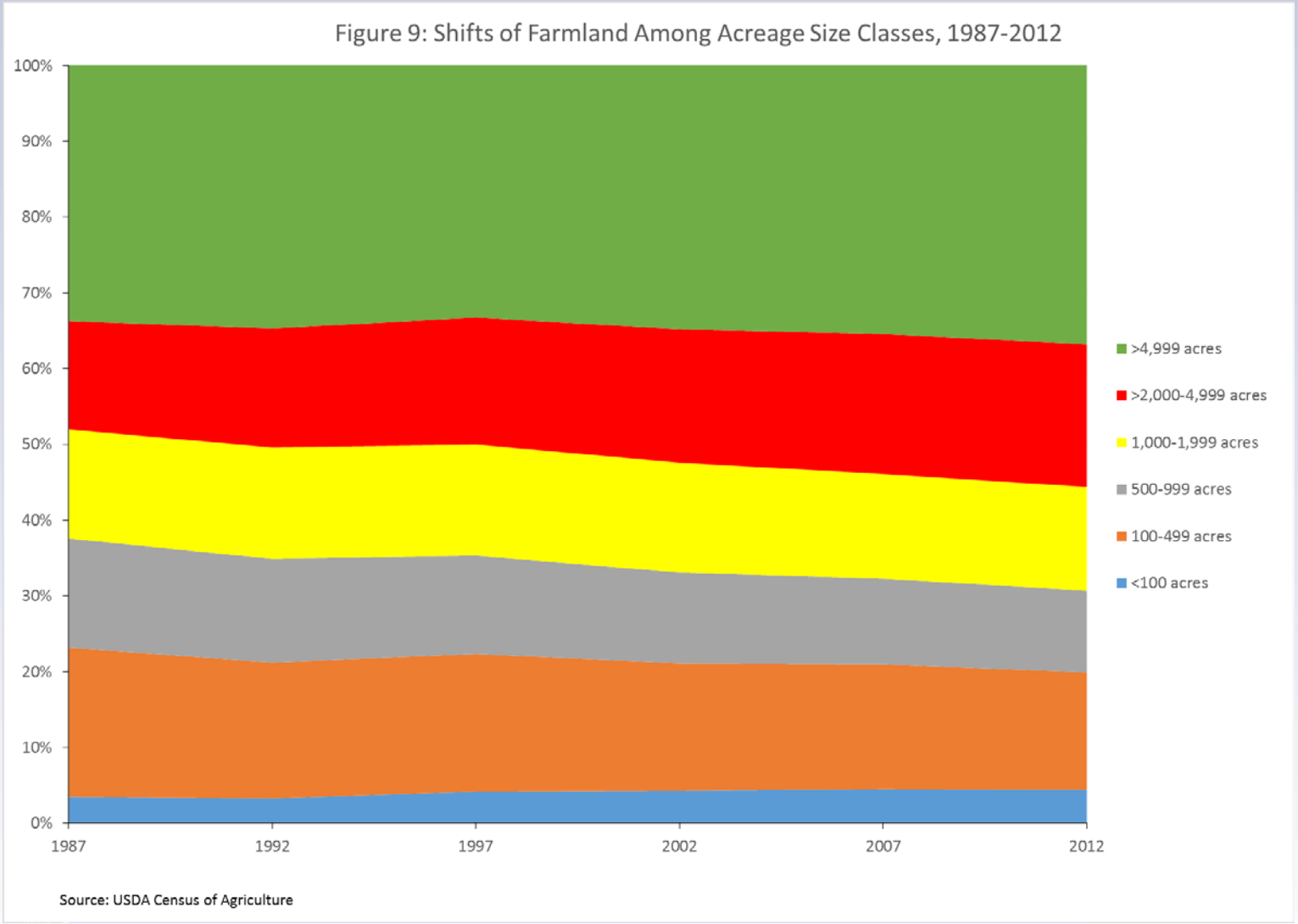
Source: ERS calculations from unpublished records, National Agricultural Statistics Service, census of agriculture

Contrast Beef (Cow-Calf) and Dairy

And Consider Role of Beef in Farmland other than Cropland



Only Modest Consolidation Evident in Farmland



ERS Research Tells a Story for Livestock

- New scale economies matter in hogs, dairy, poultry
  - Key and McBride; Mosheim and Lovell; MacDonald, Cessna, Mosheim; MacDonald and Wang
- Reorganization (task specialization, vertical control) also matters in hogs, poultry, cattle feeding, dairy
- Structural change facilitated productivity growth, cost reduction, increased international competitiveness.
  - Analyses made easier by relatively specialized operations, more limited role of weather

Crops are More Challenging

- Soil quality, rotations, weather & risks, multi-output production all make for greater challenges in estimating farm-level scale and productivity in crops

- However, persistent and widespread pattern of consolidation suggests common factors at play across crops
  - Labor-saving substitution and technical change has been at the heart of models of consolidation in crops.

A Summary

- Consolidation in the crop sector has been large, persistent, and near-ubiquitous across states and crops.

- Consolidation in livestock has been episodic, dramatic in several instances, and associated with far-reaching reorganization