



The Declining Average Size of Establishments: Evidence and Explanations

Eleanor J. Choi
James R. Spletzer

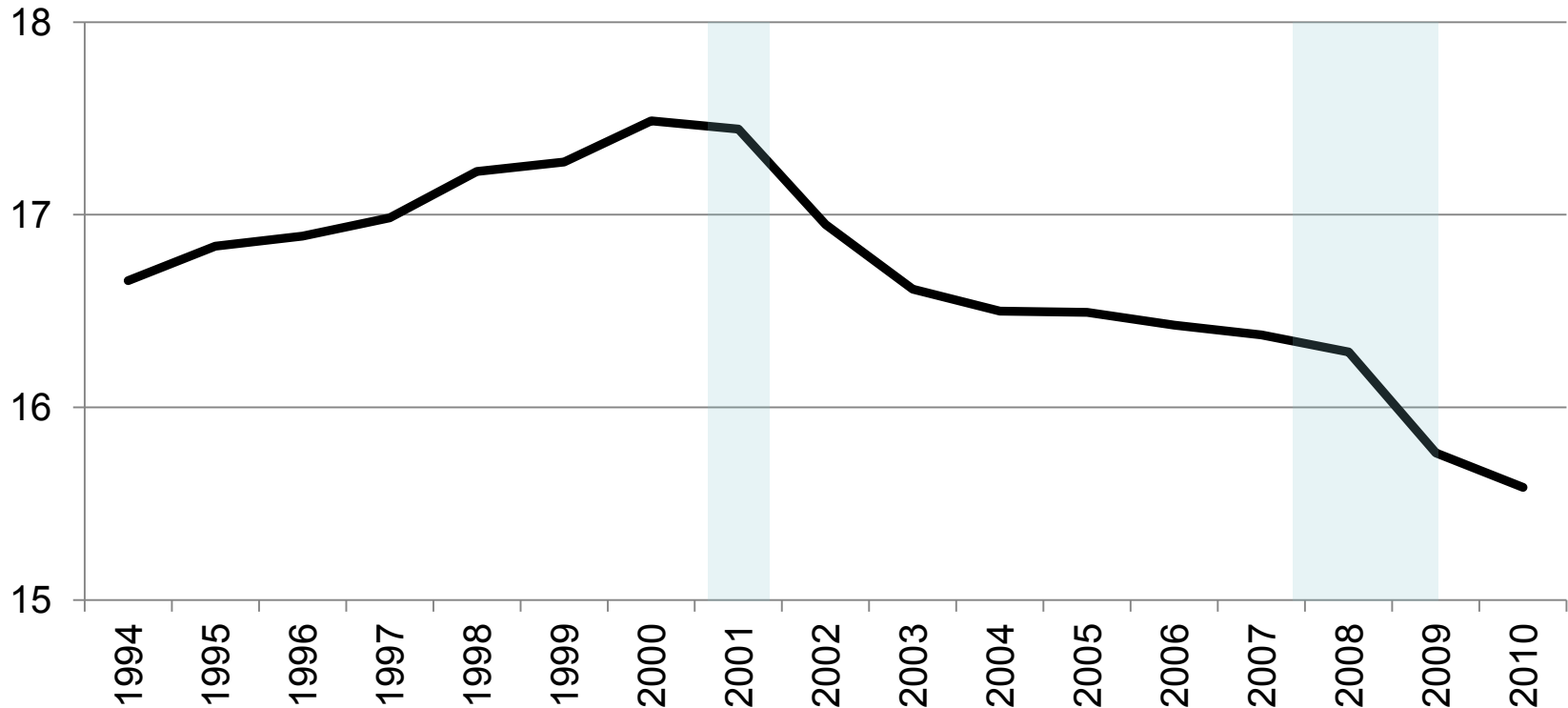
Bureau of Labor Statistics

November 9, 2011

Conference on Small Business and Entrepreneurship
during an Economic Recovery



The Average Size of Establishments



- Research question: understand the change in trend in the average size of establishments during the last two decades



Preview of Findings

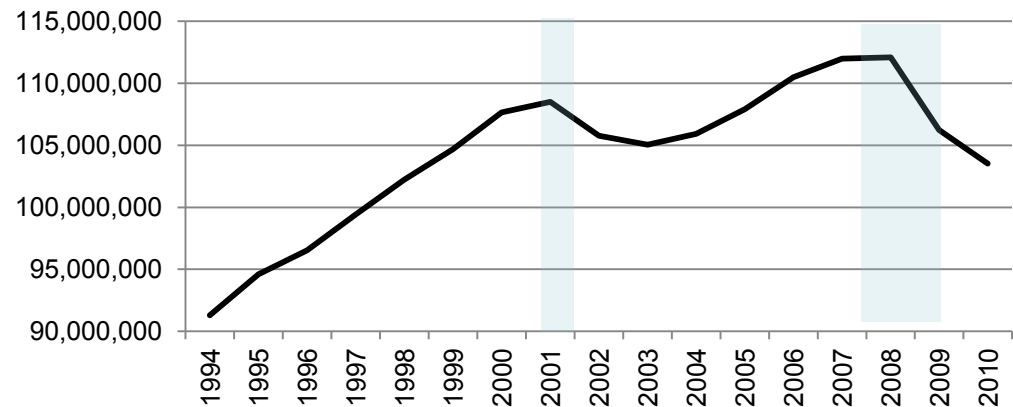
- Robust empirical facts
 - Establishments & Firms, BLS & Census Data, Historical trend
- The change in trend occurs in almost all industries
 - Shifts in industry composition accounts for 50% of the downward trend during the 2000s expansion
- The decrease during the 2000s expansion can be explained by the age of establishments
 - establishment births are starting smaller and staying smaller
 - 7.6 in 1990s, 6.8 in 2001, 4.9 in 2010



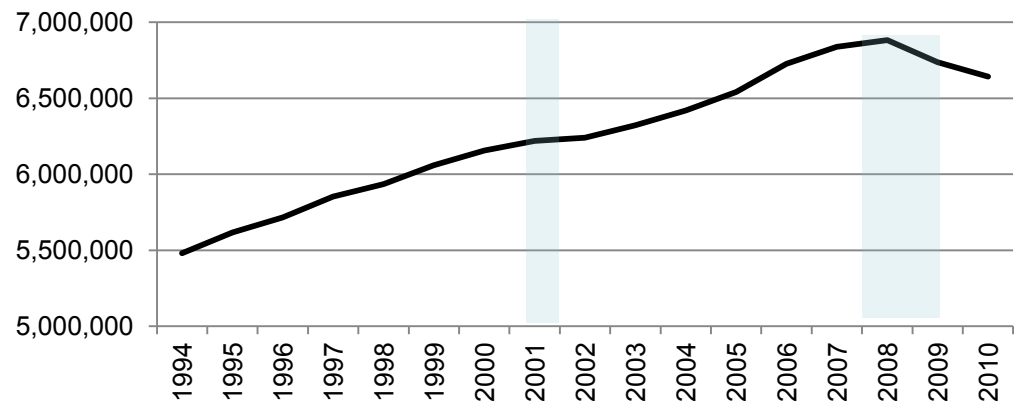
Basic Empirical Facts

- Business Employment Dynamics (BED) statistics from BLS
 - Constructed by longitudinally linking the Quarterly Census of Employment and Wages (QCEW) microdata
 - QCEW: employment and wage info for establishments covered by State and Federal UI laws (98% of US jobs)

Private Sector Employment



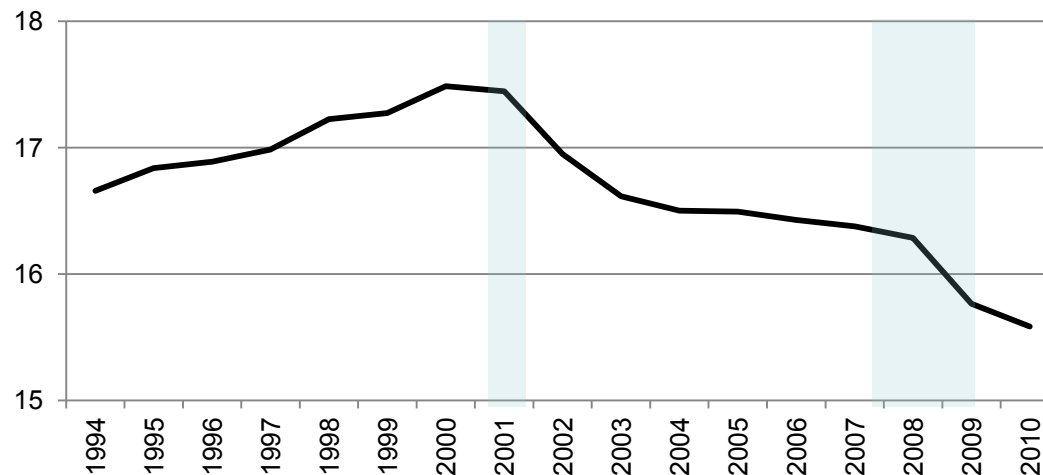
Number of Establishments, Private Sector





Basic Empirical Facts

Average Size of Establishments, Private Sector



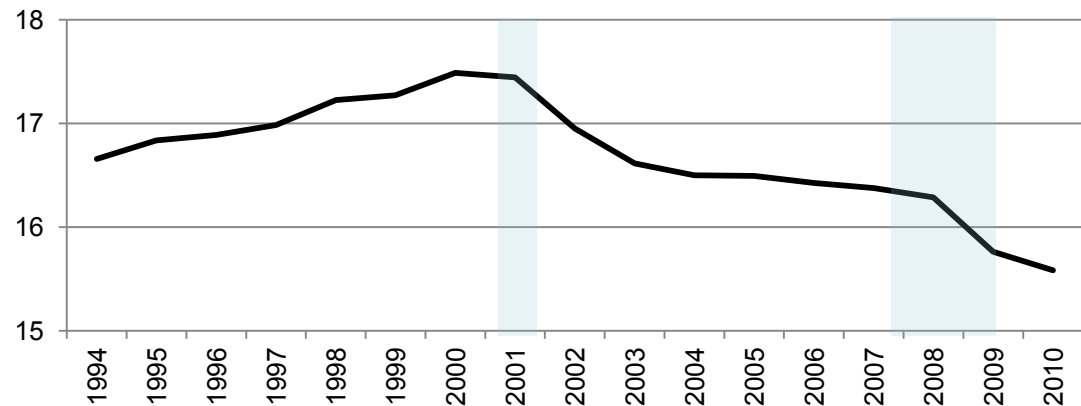
- 90s expansion: 16.7 in March 94 to 17.5 in March 00
- 01 recession: 17.5 in March 00 to 16.6 in March 03
- 00s expansion: 16.6 in March 03 to 16.4 in March 07
- 07-09 recession: 16.4 in March 07 to 15.6 in March 10



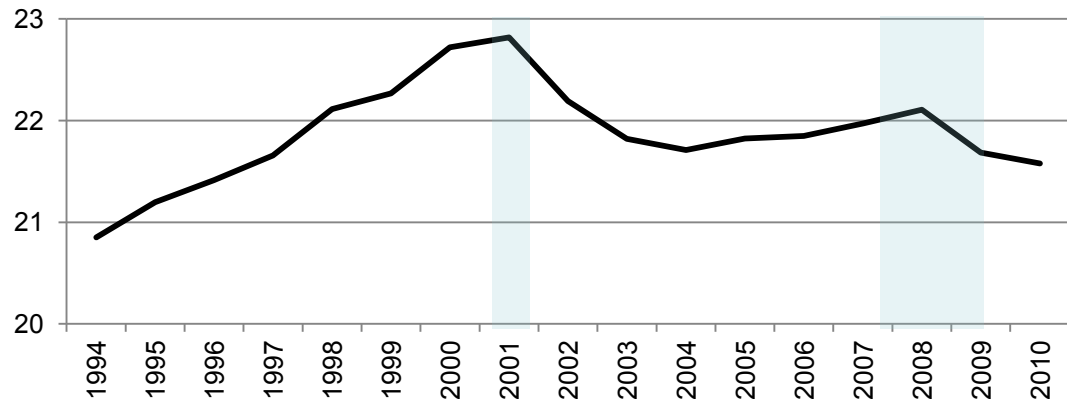
Establishments vs. Firms

- Establishment size and Firm size show similar time series patterns
- 90s expansion: average size of firms rise more rapidly
- 00s expansion:
 - Firm size rises by 0.4
 - Establishment size falls by 0.2

Average Size of Establishments, Private Sector



Average Size of Firms, Private Sector

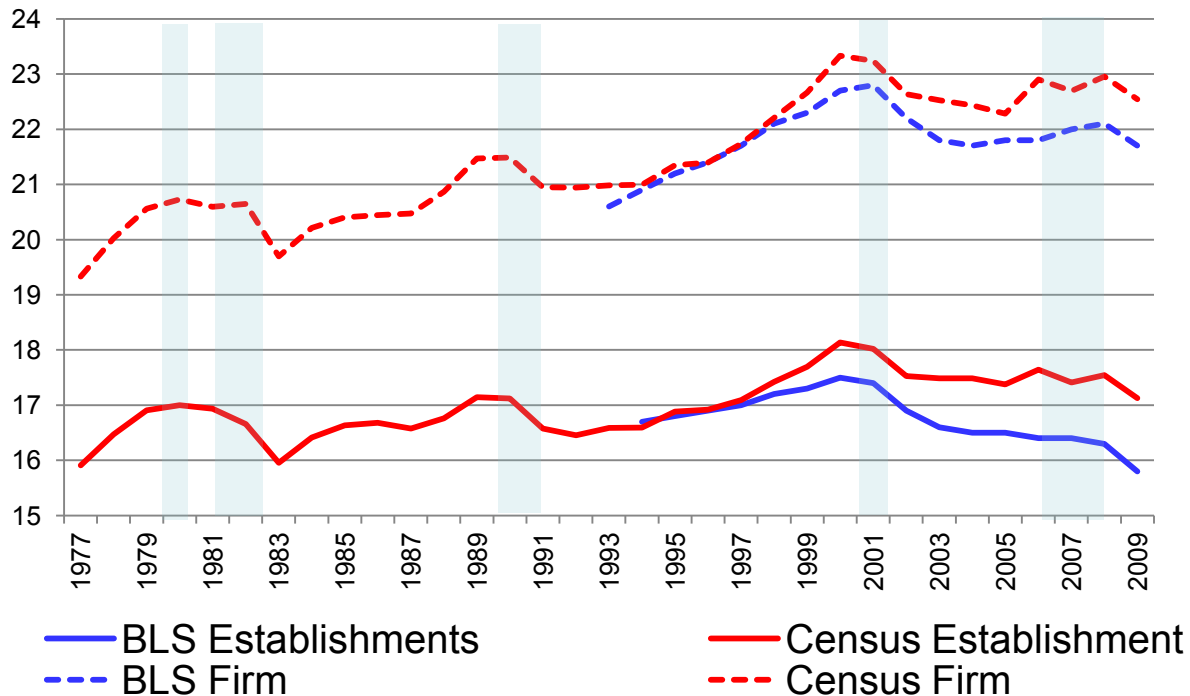




Historical Trend

- Census measure of average size from Business Dynamics Statistics extends back to 1977
- Average size of businesses decline during recessions and increase during expansions of the 70s, 80s, 90s; 00s atypical

Average Size of Businesses, Private Sector





The Size Distribution: Findings

- Where in the size distribution is the changing trend of average size originating?
 - Smallest establishments and firms play a role
- 90s expansion: employment and establishment shares shift from small to medium-large sized businesses
- 00s expansion: employment share in the smallest size category constant, share of businesses in the smallest size category increased



Changes in Industry Composition

- Decline of Manufacturing

	1994	2000	2003	2007
Employment Share	18.3%	16.1%	13.9%	12.4%
Establishment Share	6.6%	6.0%	5.4%	4.8%

- Offset by increase in Services

- Construction; Professional, Scientific and Technical Services; Administrative and Support Services; and Health Care and Social Assistance.

- Large establishments in Manufacturing
Small establishments in Services

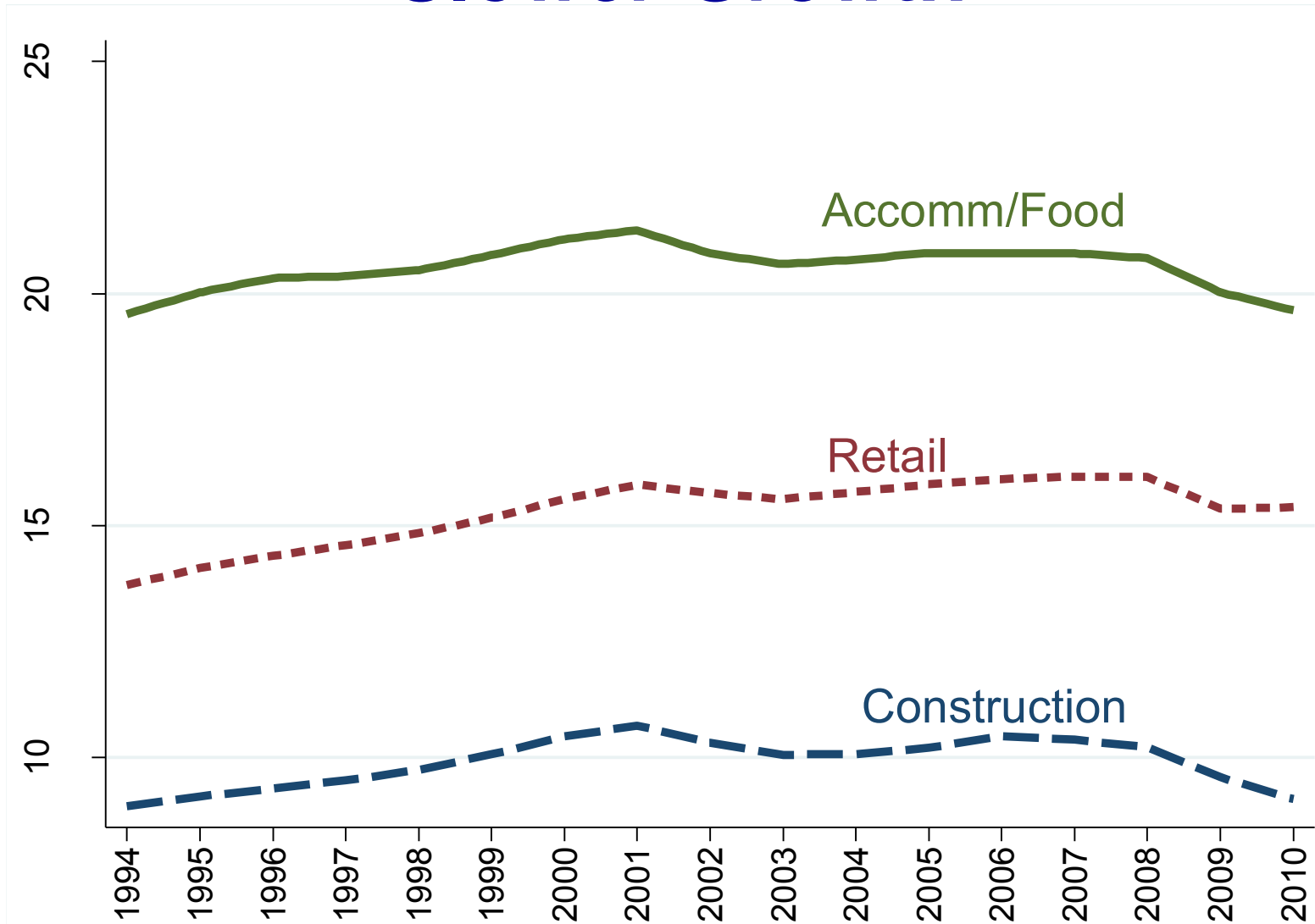


Establishment Size by Industry

- Composition effect is important, but what's going on within industries?
- Changing trend of average size in almost all industries
- Slower growth or accelerated decline of average size after the 2001 recession

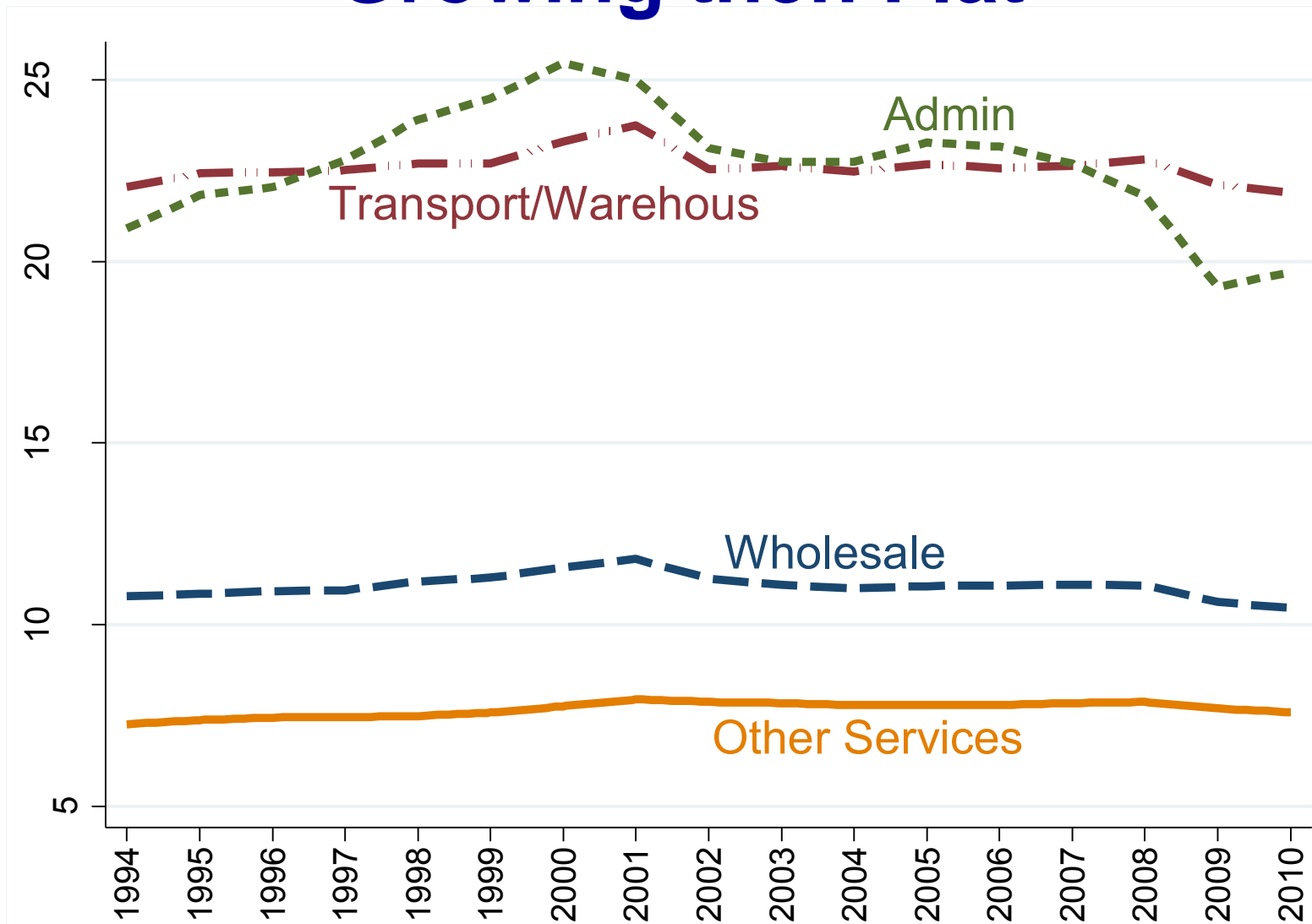


Slower Growth



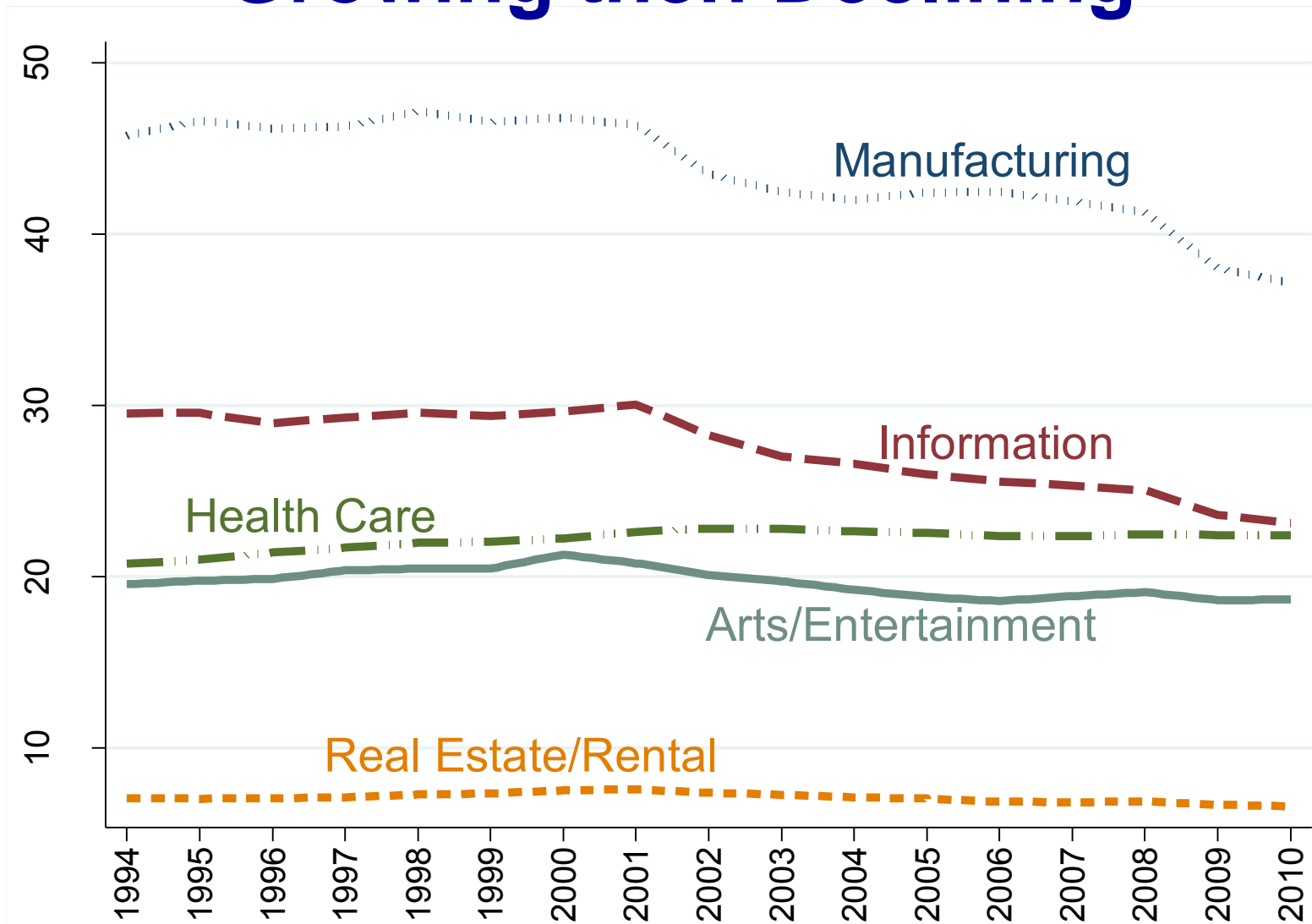


Growing then Flat



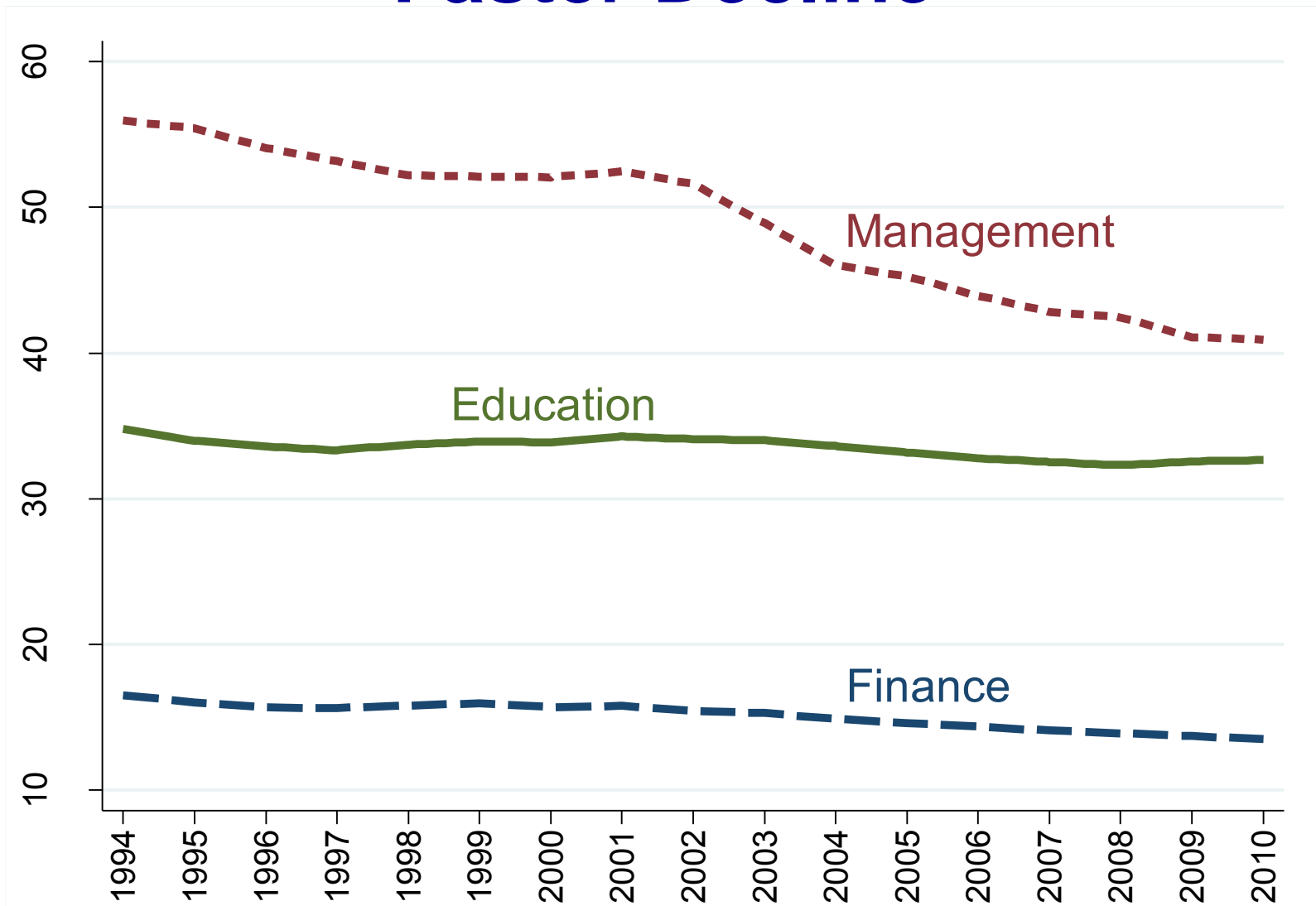


Growing then Declining





Faster Decline





Industry Decomposition

$$\Delta S_t = \underbrace{\sum_i \Delta S_{it} \bar{\lambda}_{it}}_{\text{Average size effect}} + \underbrace{\sum_i \Delta \lambda_{it} \bar{S}_{it}}_{\text{Establishment share effect}}$$

$\Delta S_{it} = S_{it_1} - S_{it_0}$: Change in establishment size in industry i over $t=[t_0, t_1]$

$\bar{\lambda}_{it} = (\lambda_{it_1} + \lambda_{it_0}) / 2$: Average of industry i's establishment share at t_0 and t_1

$\Delta \lambda_{it} = \lambda_{it_1} - \lambda_{it_0}$: Change in establishment share in industry i over $t=[t_0, t_1]$

$\bar{S}_{it} = (S_{it_1} + S_{it_0}) / 2$: Average of industry i's establishment size at t_0 and t_1



Industry Decomposition

- 94-00 expansion (Average Size \uparrow by 0.8)
 - Average size \uparrow by 1.04 due to changes in industry-specific average sizes (Average size effect = 130%)
 - Average size \downarrow by 0.24 due to changes in establishment shares across industries (Establishment share effect = -30%)
- 03-07 expansion (Average Size \downarrow by 0.3)
 - Average size \downarrow by 0.14 due to changes in industry-specific average sizes (Average size effect = 46%)
 - Average size \downarrow by 0.16 due to changes in establishment shares across industries (Establishment share effect = 54%)



Age Analysis

- Older establishments are larger in all years
 - Growth and selection effects
- 7+ year old establishments are >50% of all establishments, and employ >70% of workers
 - Establishments and employment become more concentrated in 7+ years category in the last decade
- Average size decreased in every age category except the oldest (7+ years) between 03 & 07

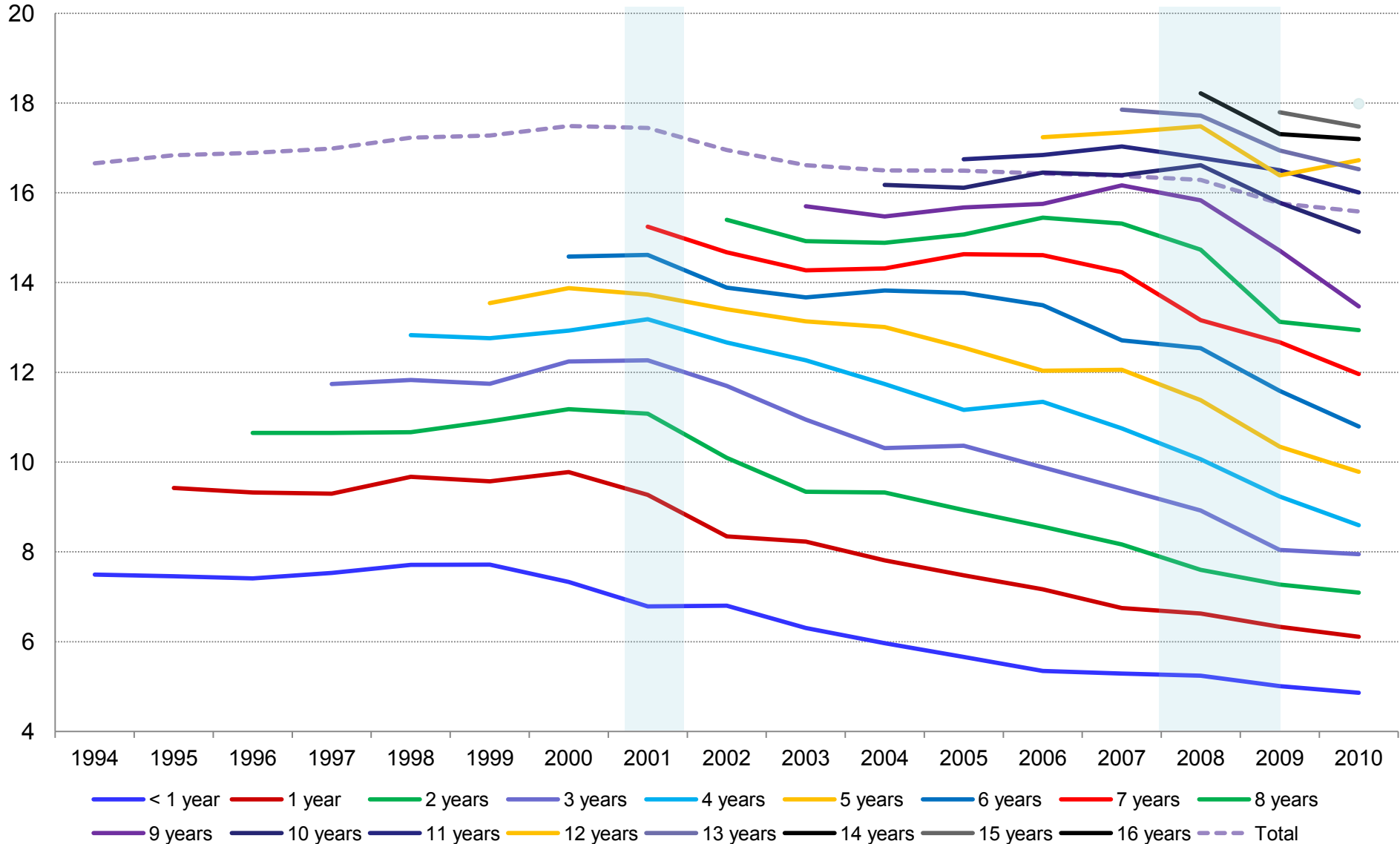


Average Size of Establishments by Age

Age Class	1994	2000	2003	2007
< 1 year	7.5	7.3	6.3	5.3
1 year	-	9.8	8.2	6.7
2 years	-	11.2	9.3	8.2
3 years	-	12.2	10.9	9.4
4 years	-	12.9	12.3	10.8
5 years	-	13.9	13.1	12.1
6 years	-	14.6	13.7	12.7
7+ years	-	22.8	21.8	22.2
Total	16.7	17.5	16.6	16.4

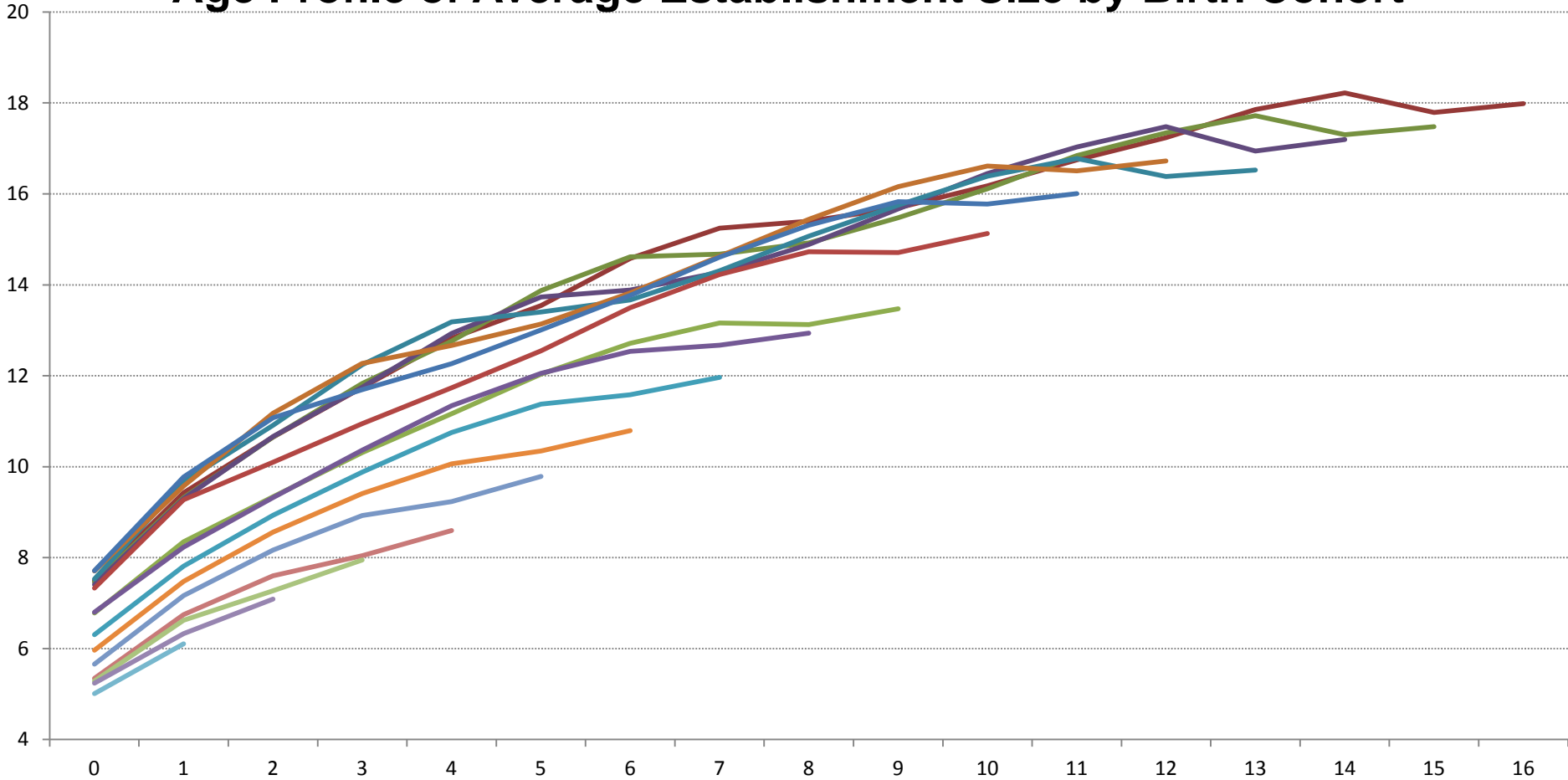


Time Series Profile of Average Establishment Size by Establishment Age





Age Profile of Average Establishment Size by Birth Cohort



- Born in 1993
- Born in 1994
- Born in 1995
- Born in 1996
- Born in 1997
- Born in 1998
- Born in 1999
- Born in 2000
- Born in 2001
- Born in 2002
- Born in 2003
- Born in 2004
- Born in 2005
- Born in 2006
- Born in 2007
- Born in 2008
- Born in 2009



Age Analysis: Findings

- Recent births are starting smaller and staying smaller
 - Monotonically declining starting around the 01 recession
 - Within almost all industries
 - Declining size of establishment births: Sadeghi (2008), Reedy and Litan (2011), Robertson (2011)
- Older establishments are increasing their average size
- Decomposition by age group (03-07 expansion)
 - Average size effect = 151% driven by the youngest age categories of 1-6 years old
 - Establishment share effect = -51% from changing share towards older cohorts



Summary of Findings

- Average annual growth of establishment size is smaller in the 2000s expansion than in the 1990s expansion
- Both BLS & Census data show that the average size of businesses (both establishments and firms) is growing slower in the 2000s than in the 1990s
 - The 1990s resembles the 1980s and the 1970s
- Establishment births are smaller in the 2000s than in the 1990s, and stay smaller as the surviving cohort ages

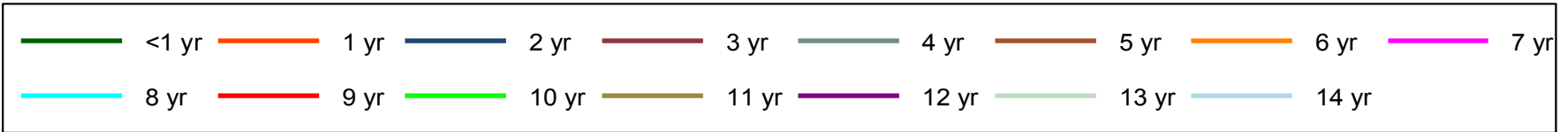
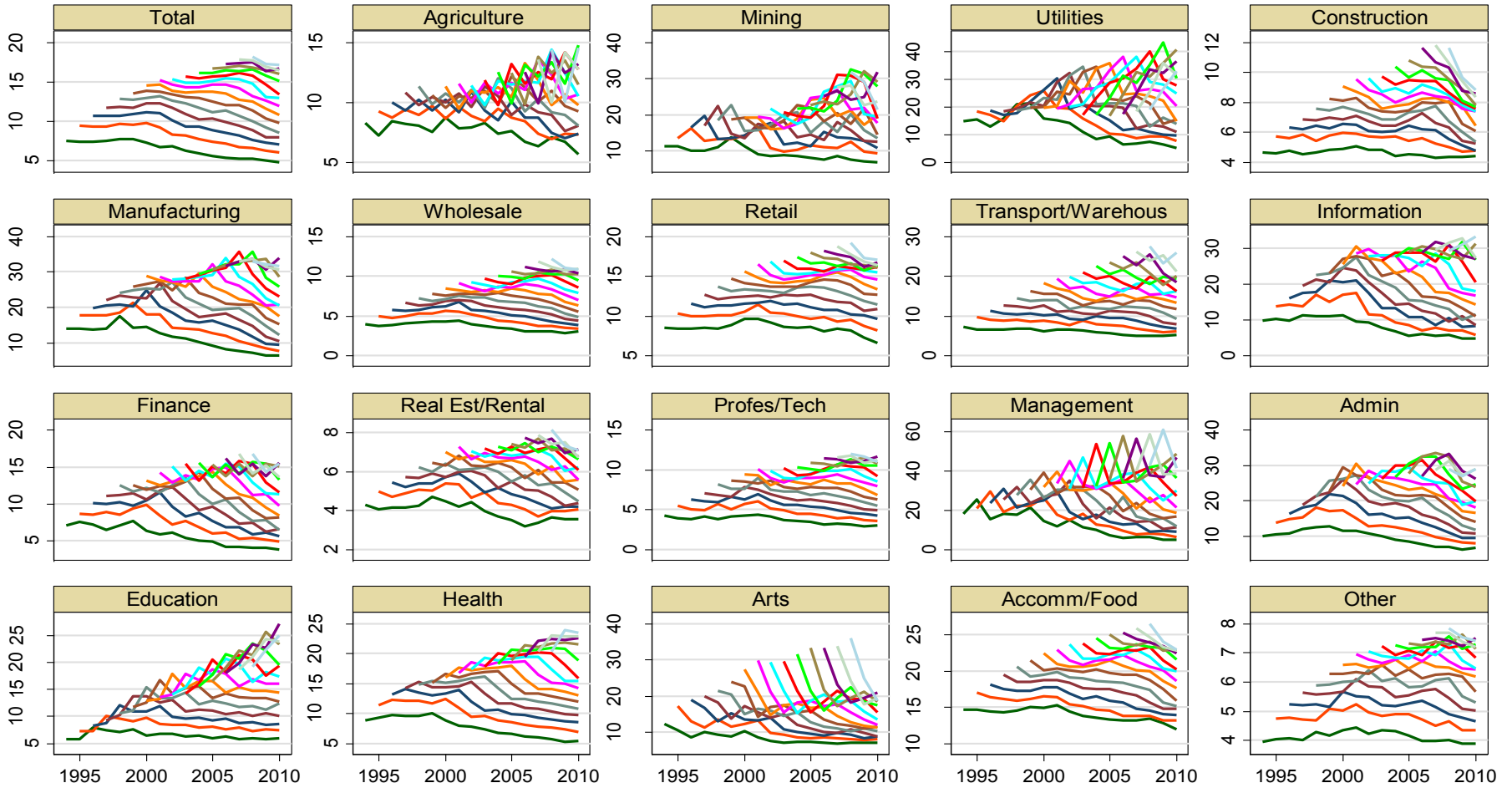


Discussion

- Speculative causes
 - Our hypothesis: Information technology replacing labor is a key driver of these trends
 - Smaller establishment births consistent with the hypothesis that births enter the economy with new modes of production
- Future work: finding empirical evidence
 - Correlation between changes in information K/L ratios of each industry and changes in the average size of establishments
 - Trend in occupational composition of young establishments from Occupational Employment Statistics (OES)



Time Series Profile of Average Estab Size by Estab Age in Each Industry





Age Profile of Average Estab Size by Birth Cohort in Each Industry

