

Hollowing out Investment

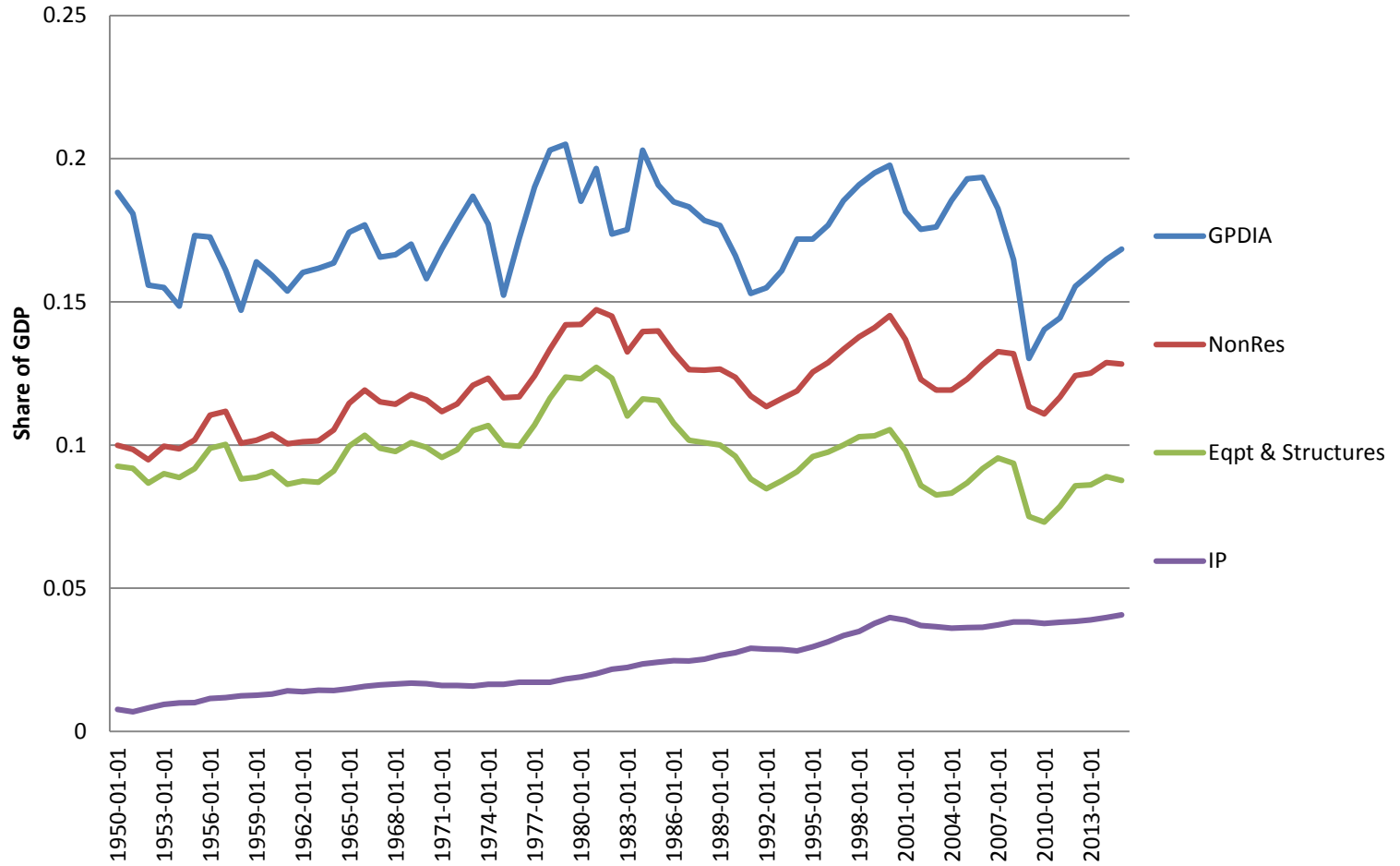
Lewis Alexander
Janice Eberly

IMF Jacques Polak Research Conference
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Introduction

- Low investment emphasized post Great Recession
 - By Hall (2014, '16) as contributing toward slow growth
 - Using firm-level data, investment is lower than “expected” from 2000 on
 - There was industrial reallocation during this time period, as well as a shift in employment toward nontradeables/services
 - What does the cross-section of investment say?
- ⇒ Shift toward nontradeable sectors
- ⇒ and intangible investment

US Fixed Investment 1950-2015



Compustat firms 1975 – 2015; 50,984 observations in full sample

Table 1: Summary Statistics

Variables	N	Mean	STD	Min	p25	p50	p75	Max
A (Asset)	50,984	5,484	20,073	1.691	152.7	629.1	2,792	538,550
I	50,984	352.3	1,612	0	5.909	28.98	142.8	48,955
INTAN	50,984	968.2	5,598	0	0	21.64	249.6	204,805
K	50,984	3,785	16,430	0.0884	64.93	307.2	1,544	456,525
Market Value	50,984	3,811	14,912	0.00906	95.45	441.9	1,925	571,846
CF(CashFlow)	50,984	573.2	2,179	0	12.24	57.33	264.4	58,087
Q	50,984	2.783	3.037	2.40e-06	0.768	1.569	3.597	15.00
I/K	50,984	0.133	0.129	0	0.0638	0.102	0.165	11.60
I/A	50,984	0.0640	0.0677	0	0.0238	0.0437	0.0792	1.749
CF/A	50,984	0.105	0.0707	0	0.0626	0.0962	0.135	4.850
INTAN/A	50,984	0.124	0.166	0	0	0.0487	0.187	0.913

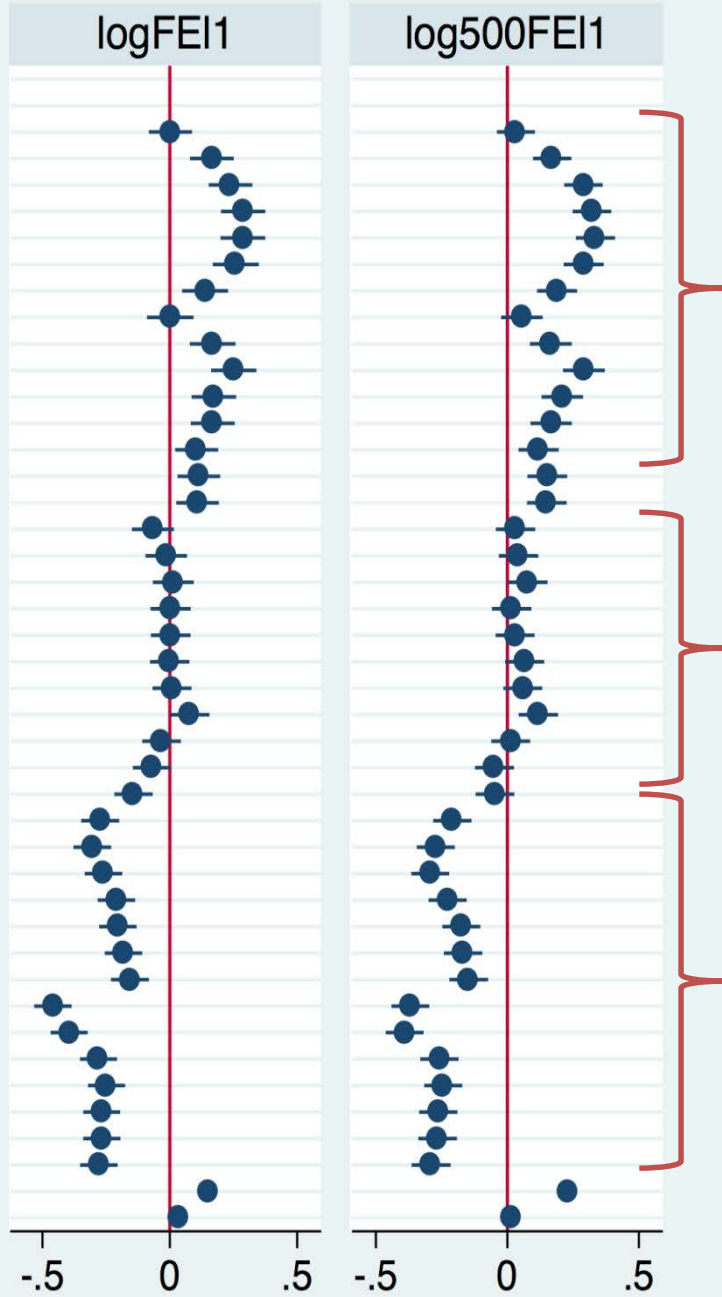
1. Compustat firms with annual data for the period 1975-2015.
2. Investment is adjusted using the implicit price deflator for nonresidential investment, and the other variables are adjusted using the GDP deflator. Both series are obtained from the St. Louis Federal Reserve FRED database.
3. Units: millions of real 2009 dollars.
4. A: Assets; I: Investment; INTAN: Intangible stock; K: Capital Stock

Table 2: Benchmark Regressions

VARIABLES	Full Sample	Top 500	Full Sample	Top 500
	I/A	I/A	log(I/A)	log(I/A)
CF/A	0.0960*** (0.00415)	0.117*** (0.00625)		
Q	0.000904*** (0.000104)	0.000697*** (0.000157)		
log(CF/A)			0.153*** (0.00535)	0.232*** (0.00841)
log(Q)			0.0369*** (0.00512)	0.0141* (0.00766)
Constant	0.0466*** (0.00205)	0.0431*** (0.00193)	-2.747*** (0.0359)	-2.555*** (0.0339)
Observations	33,699	14,323	33,699	14,323
R-squared	0.065	0.099	0.101	0.176
Number of gvkey	3,732	1,512	3,732	1,512
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

The table reports panel data regressions of the investment-asset ratio I/A on Q , CF/A and $\log(I/A)$ on $\log(Q)$, $\log(CF/A)$ respectively. Columns (1) and (2) report results for the full sample. Columns (3) and (4), report results for the largest 500 firms by Market value each year. Standard errors are in parentheses. *** indicates the coefficient is different from zero at 1% level, ** at the 5% level, and * at the 10% level.

Data	Year	ISCa	log
1970	1970	1	1
1971	1971	1	1
1972	1972	1	1
1973	1973	1	1
1974	1974	1	1
1975	1975	1	1
1976	1976	1	1
1977	1977	1	1
1978	1978	1	1
1979	1979	1	1
1980	1980	1	1
1981	1981	1	1
1982	1982	1	1
1983	1983	1	1
1984	1984	1	1
1985	1985	1	1
1986	1986	1	1
1987	1987	1	1
1988	1988	1	1
1989	1989	1	1
1990	1990	1	1
1991	1991	1	1
1992	1992	1	1
1993	1993	1	1
1994	1994	1	1
1995	1995	1	1
1996	1996	1	1
1997	1997	1	1
1998	1998	1	1
1999	1999	1	1
2000	2000	1	1
2001	2001	1	1
2002	2002	1	1
2003	2003	1	1
2004	2004	1	1
2005	2005	1	1
2006	2006	1	1
2007	2007	1	1
2008	2008	1	1
2009	2009	1	1
2010	2010	1	1
2011	2011	1	1
2012	2012	1	1
2013	2013	1	1
2014	2014	1	1
2015	2015	1	1
2016	2016	1	1
2017	2017	1	1
2018	2018	1	1
2019	2019	1	1
2020	2020	1	1



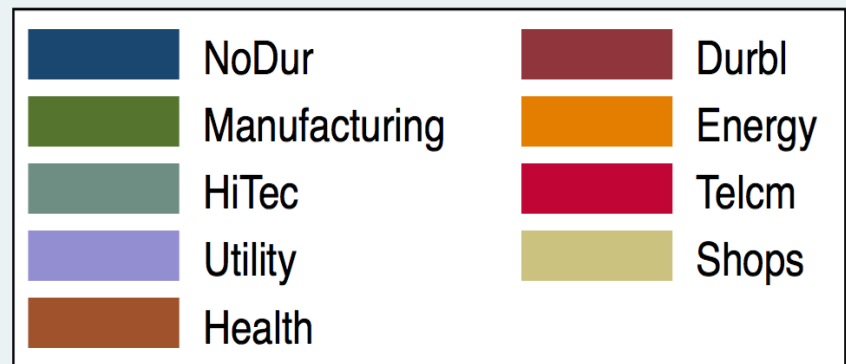
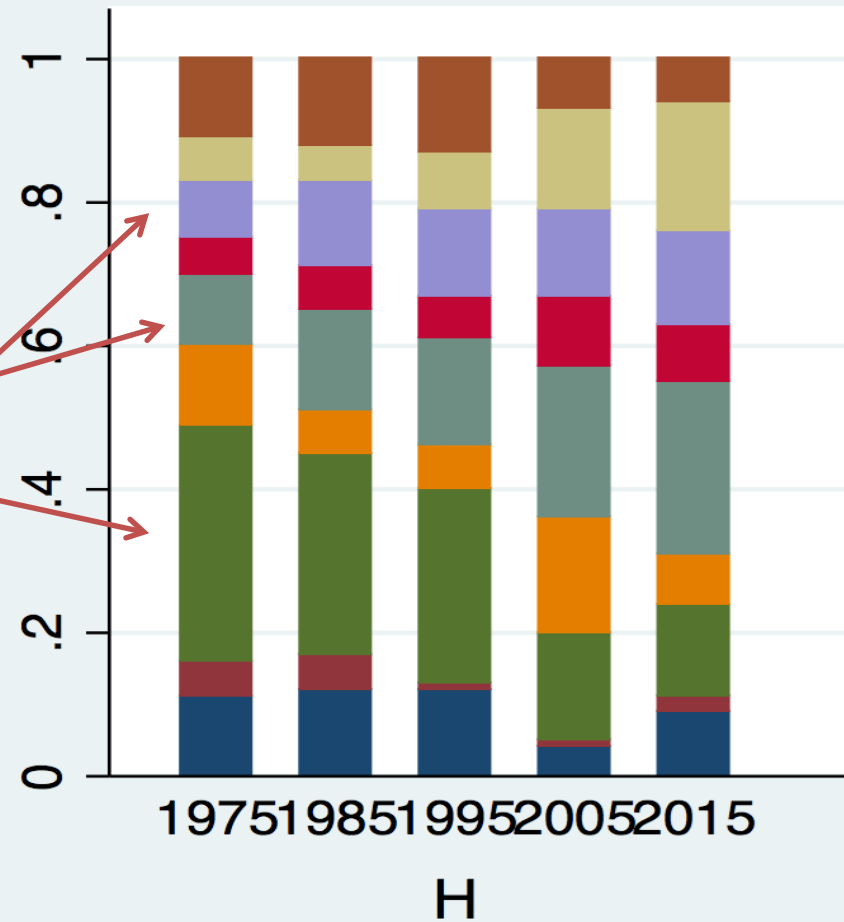
1970s – 80s: positive time effects

1990s: zero time effects

2000s-10s: negative time effects

These time effects correspond to changes in industry composition:

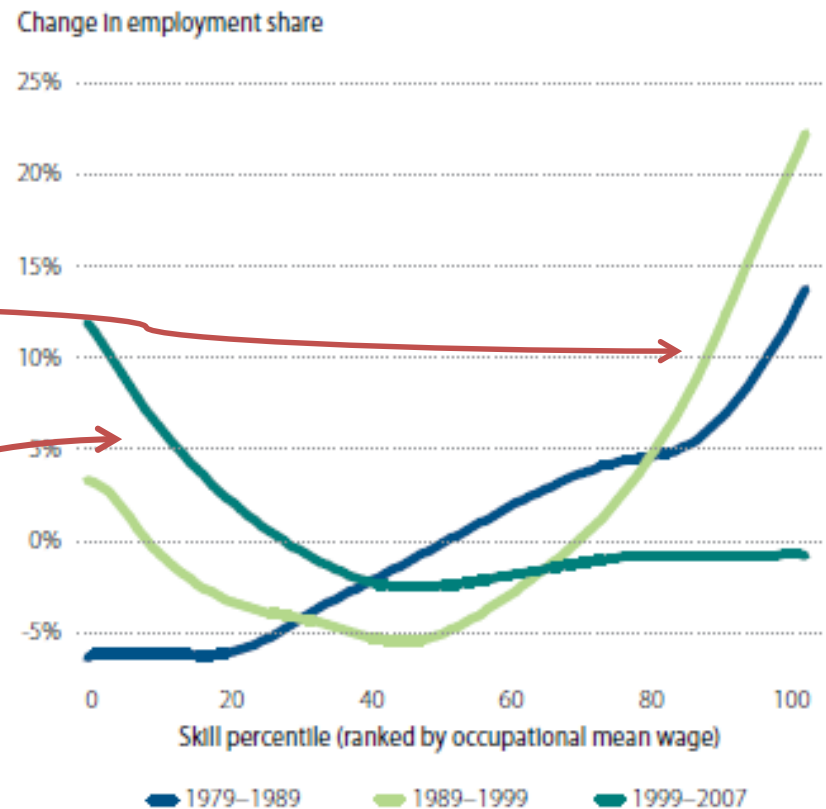
- Shrinking of manufacturing
- Rise of Hi Tech
- And to some extent Shops, Telecomm, and Energy



This shift in industrial composition also coincided with a shift in employment composition: From skill-biased technical change toward rising employment in lower-skill services

FIGURE 1

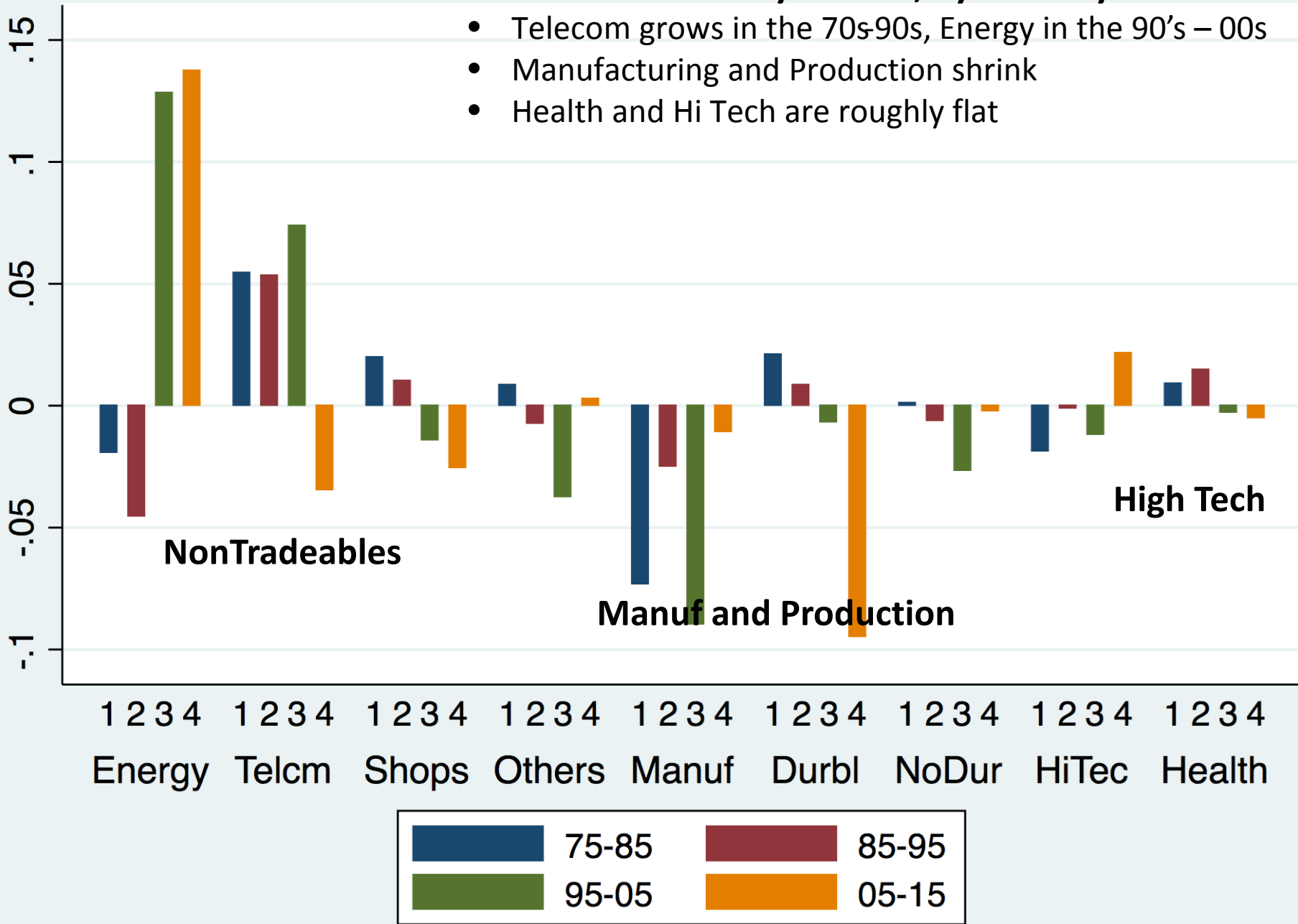
Smoothed changes in employment by occupational skill percentile, 1979–2007

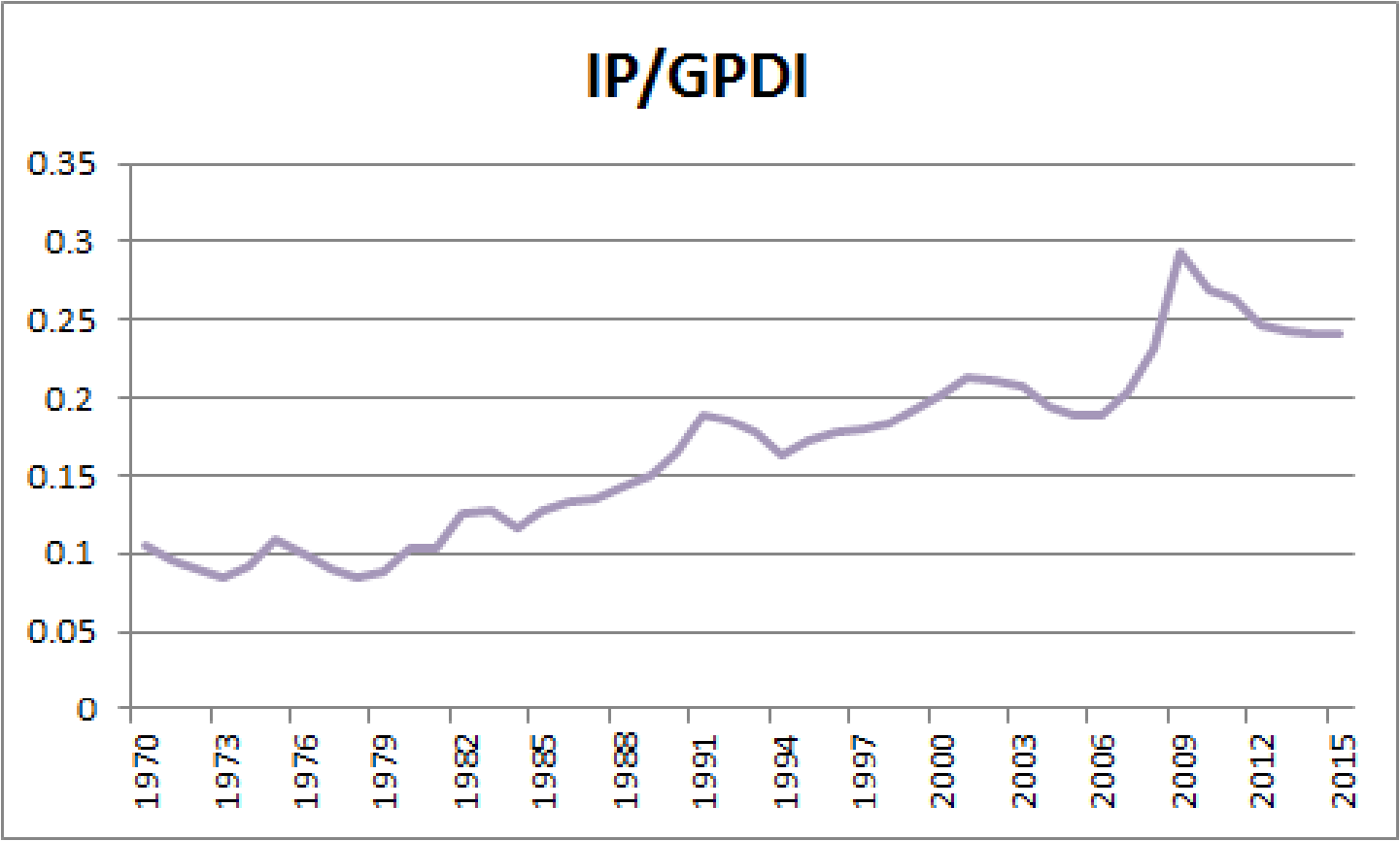


Source: Data are Census IPUMS 5 percent samples for years 1980, 1990, and 2000, and U.S. Census American Community Survey 2008. All occupation and earnings measures in these samples refer to prior year's employment. The figure plots log changes in employment shares by 1980 occupational skill percentile rank using a locally weighted smoothing regression (bandwidth 0.8 with 100 observations), where skill percentiles are measured as the employment-weighted percentile rank of an occupation's mean log wage in the Census IPUMS 1980 5 percent extract. Mean education in each occupation is calculated using workers' hours of annual labor supply times the Census sampling weight. Consistent occupation codes for Census years 1980, 1990, and 2000, and 2008 are from Autor and Dorn (2009a).

Investment share by decade, by industry

- Telecom grows in the 70s-90s, Energy in the 90's – 00s
- Manufacturing and Production shrink
- Health and Hi Tech are roughly flat





Intellectual Property investment grew in the aggregate over this time period.

Avg Intan/A across Industry

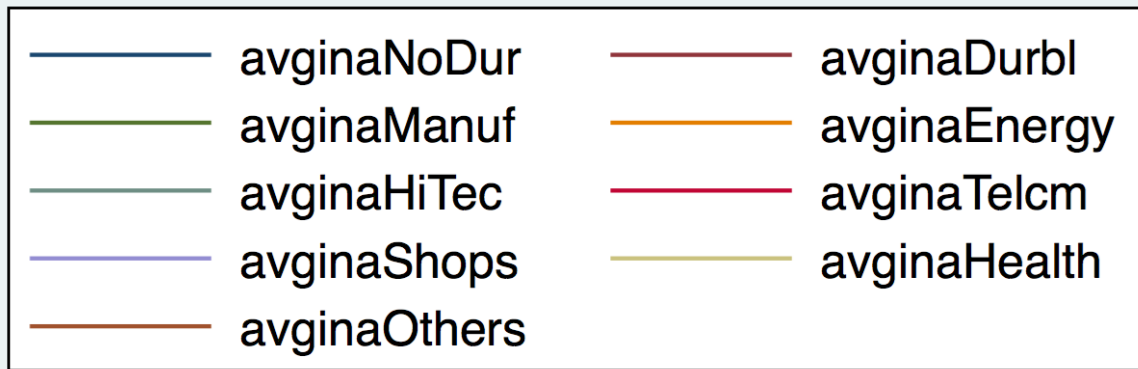
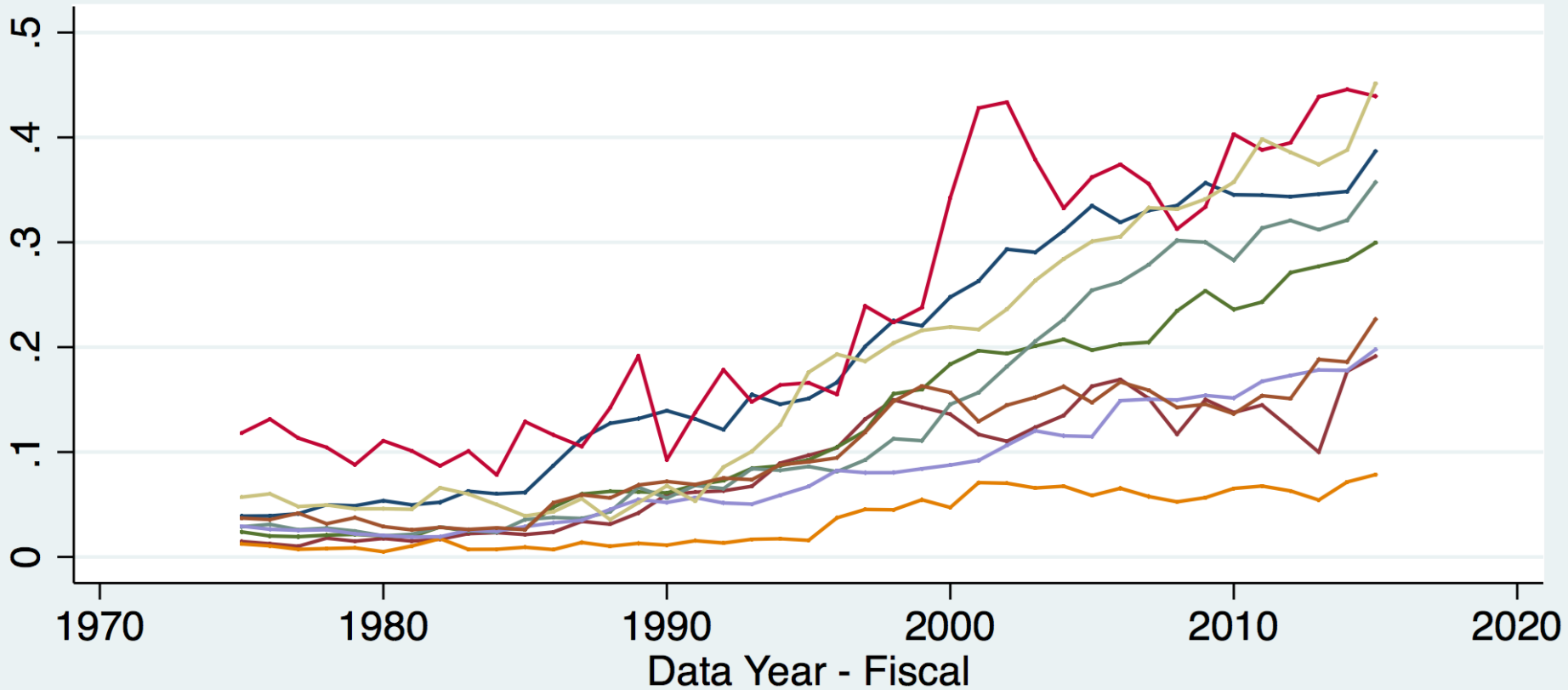
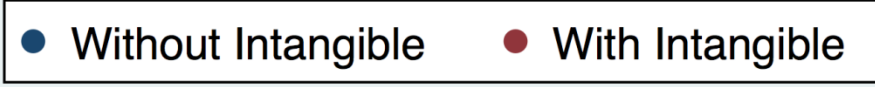
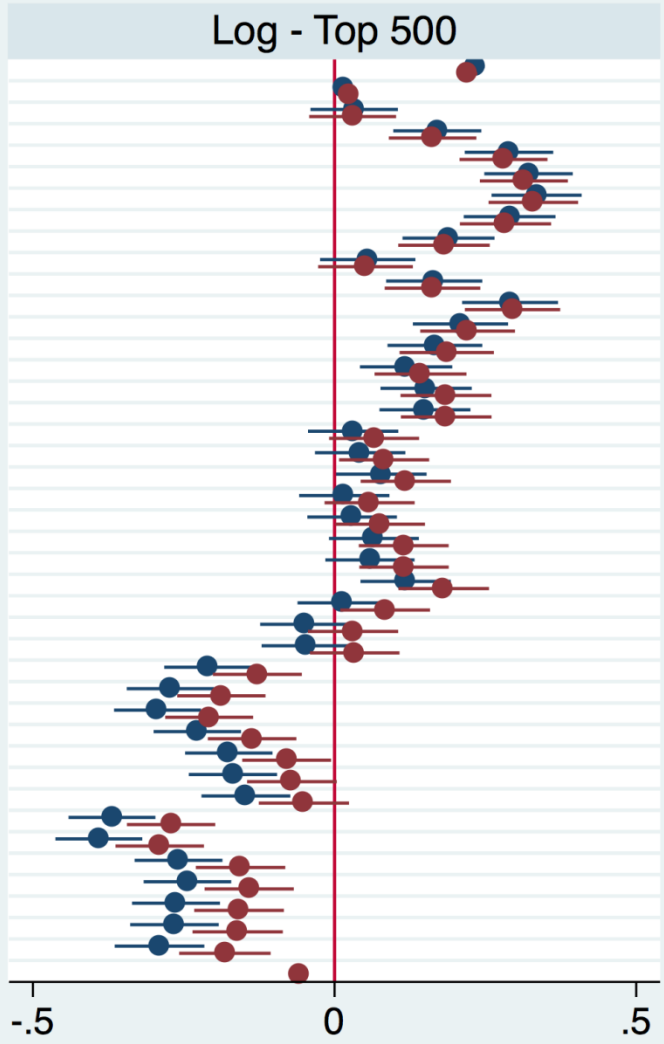
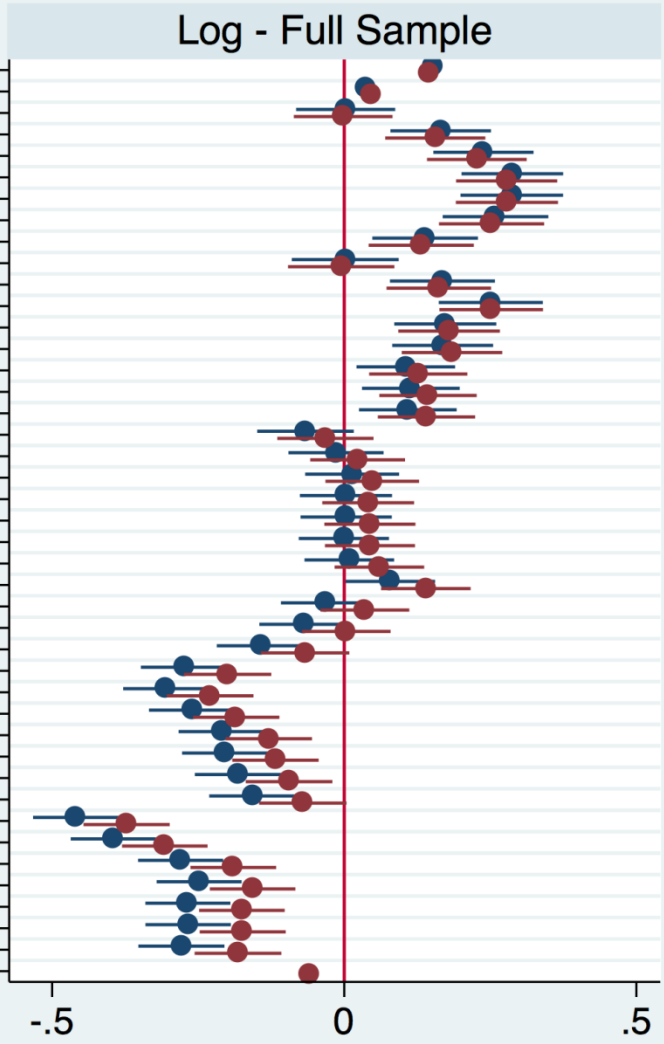
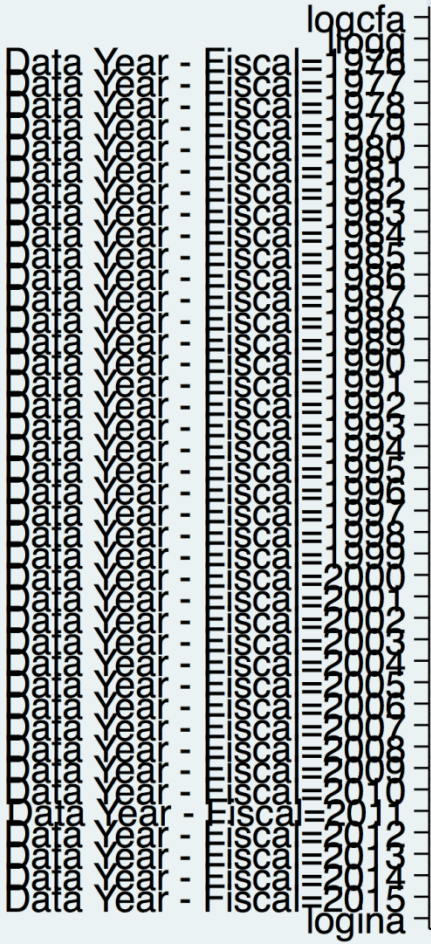
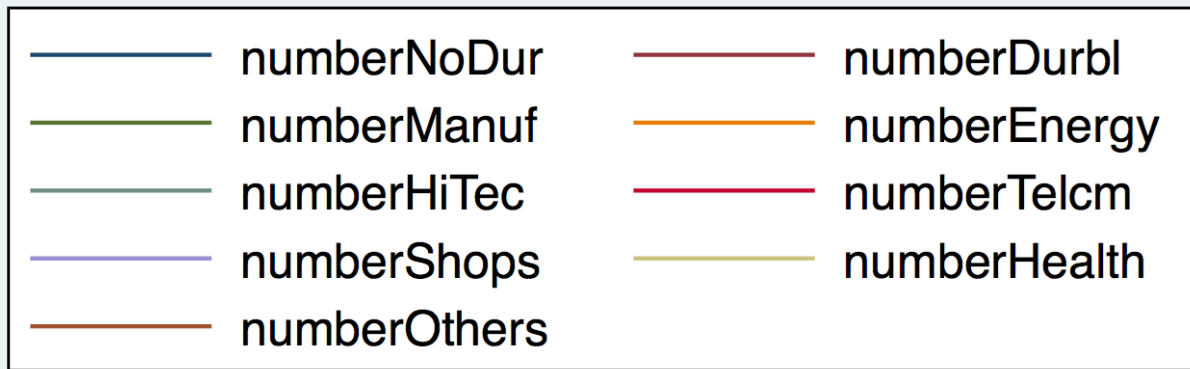
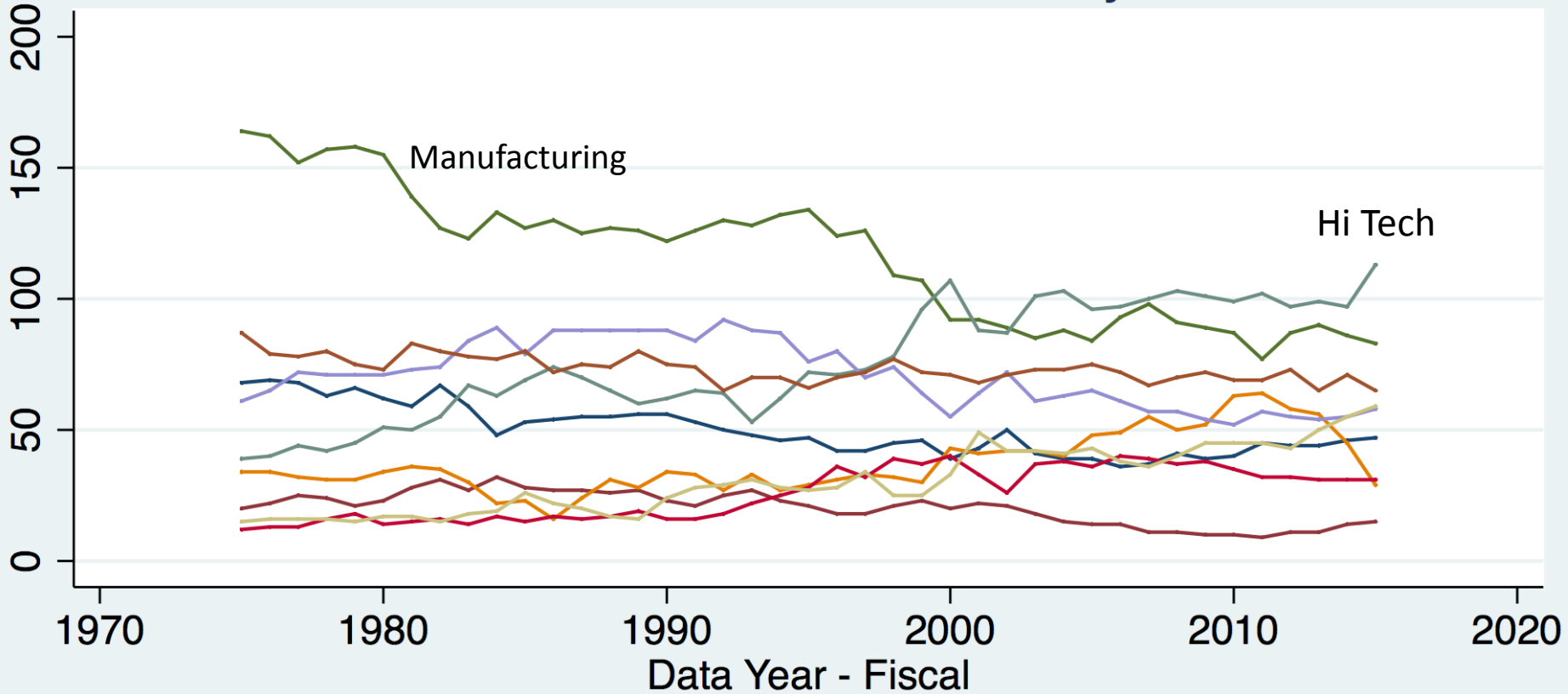


Table 3: The effect of intangibles and entry on investment.

VARIABLES	Full Sample log(I/A)	Full Sample log(I/A)	Top 500 log(I/A)	Top 500 log(I/A)	Top 500 log(I/A)
log(CF/A)	0.153*** (0.00535)	0.145*** (0.00535)	0.232*** (0.00841)	0.220*** (0.00842)	0.232*** (0.00841)
log(Q)	0.0369*** (0.00512)	0.0468*** (0.00513)	0.0141* (0.00766)	0.0233*** (0.00765)	0.0144* (0.00766)
log(In/A)		-0.0604*** (0.00369)		-0.0588*** (0.00475)	
NewGround*Log(In/A)					-0.0295 (0.0341)
NewProduction*Log(In/A)					0.0123 (0.0345)
NewTech*Log(In/A)					-0.107** (0.0423)
Constant	-2.747*** (0.0359)	-2.990*** (0.0387)	-2.555*** (0.0339)	-2.797*** (0.0390)	-2.562*** (0.0342)
Observations	33,699	33,699	14,323	14,323	14,323
R-squared	0.101	0.109	0.176	0.186	0.177
Number of gvkey	3,732	3,732	1,512	1,512	1,512
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Number of Firms Industry



New Firms by SIC Codes, 2000-2015

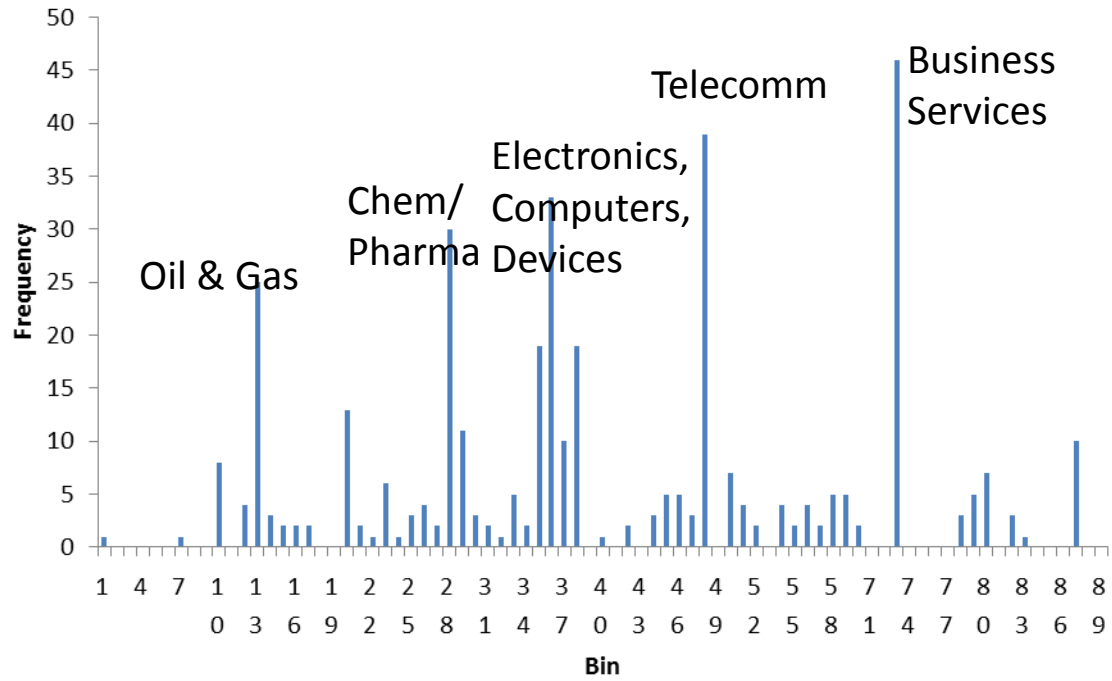


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Conclusions

- “Low investment” emerges in the 2000s
- Investment shifts toward *spatially grounded* sectors, like Energy extraction and Telecomm
 - Shifts away from manufacturing and production
 - Doesn’t shift into High Tech
- Investment in intangibles is “crowded in”
 - Intangible investment partially “explains” the time effects
 - Especially in high tech

Avg I/K across Industry

