

Measuring Innovation: Building a Data Infrastructure

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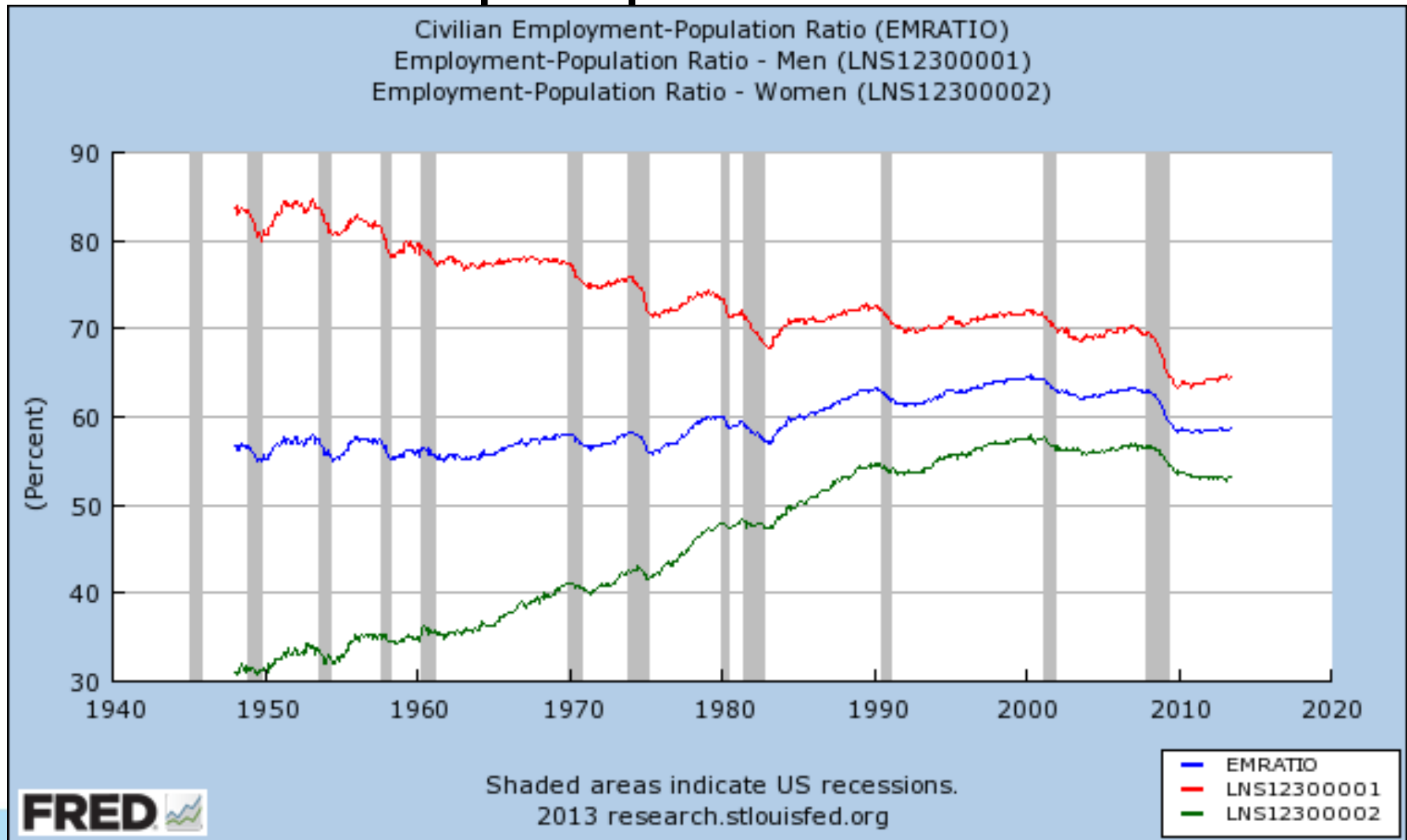
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Importance of “Measuring Innovation”

- Driver of Improved Living Standards
 - Especially in Europe and North America
- Debate about whether
 - Rate of Innovation too fast
 - Rate of Innovation too slow
- Impact of Innovation on labor markets
 - Winner and losers

Summary of angst from both perspectives



FRED

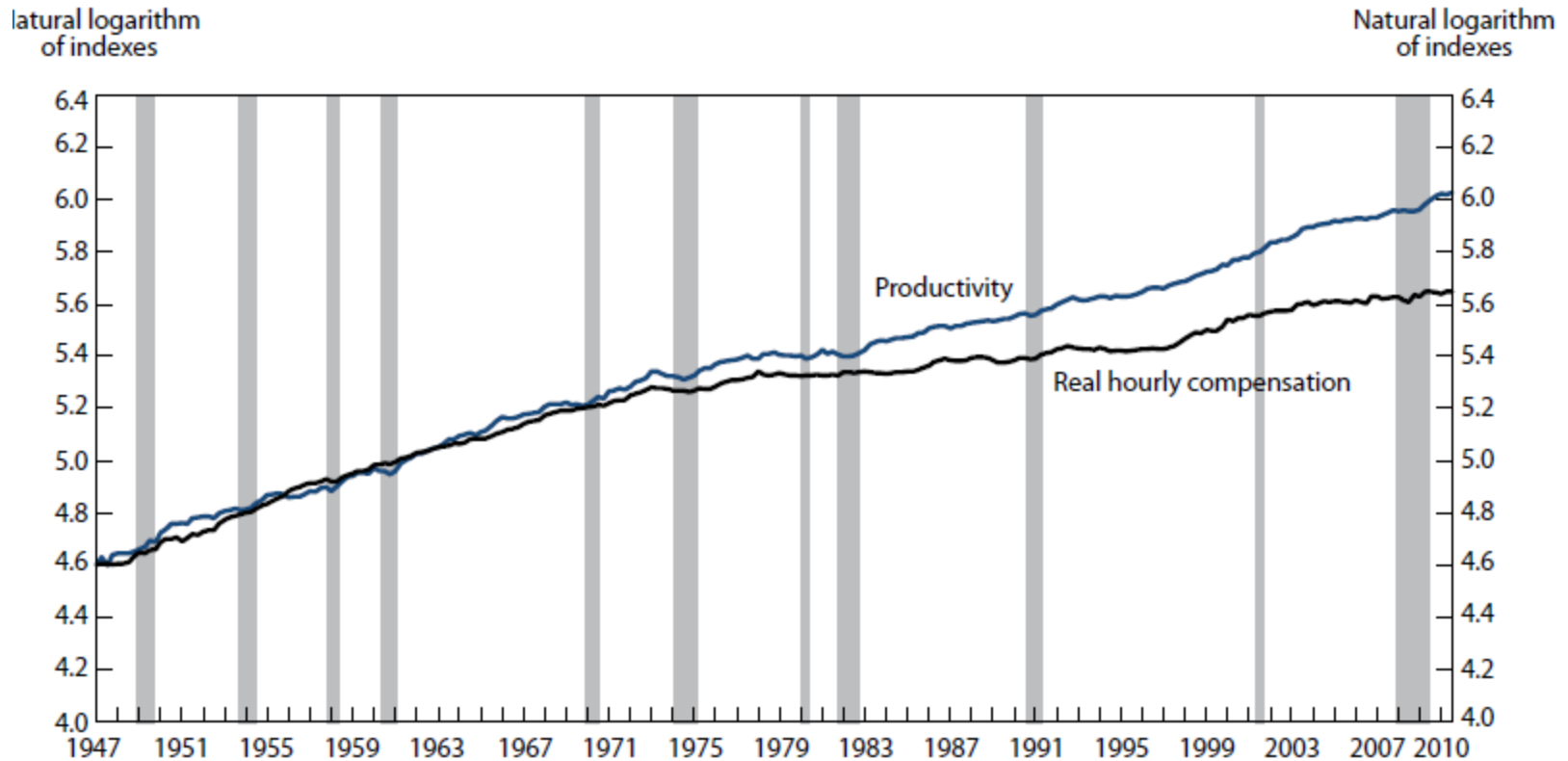
United States
Census
Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU

More angst...

1. Productivity and real hourly compensation, nonfarm business sector, first quarter 1947–third quarter 2010

Source: Fleck, Glaser and Sprague (2011) MLR



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

Schumpeterian creative destruction and Economic Dynamism

- Productivity improves as resources are reallocated from less valued to more valued uses.
- Innovation introduces shocks that induce reallocation – aka **entrepreneurship**
- Frictions can slow reallocation

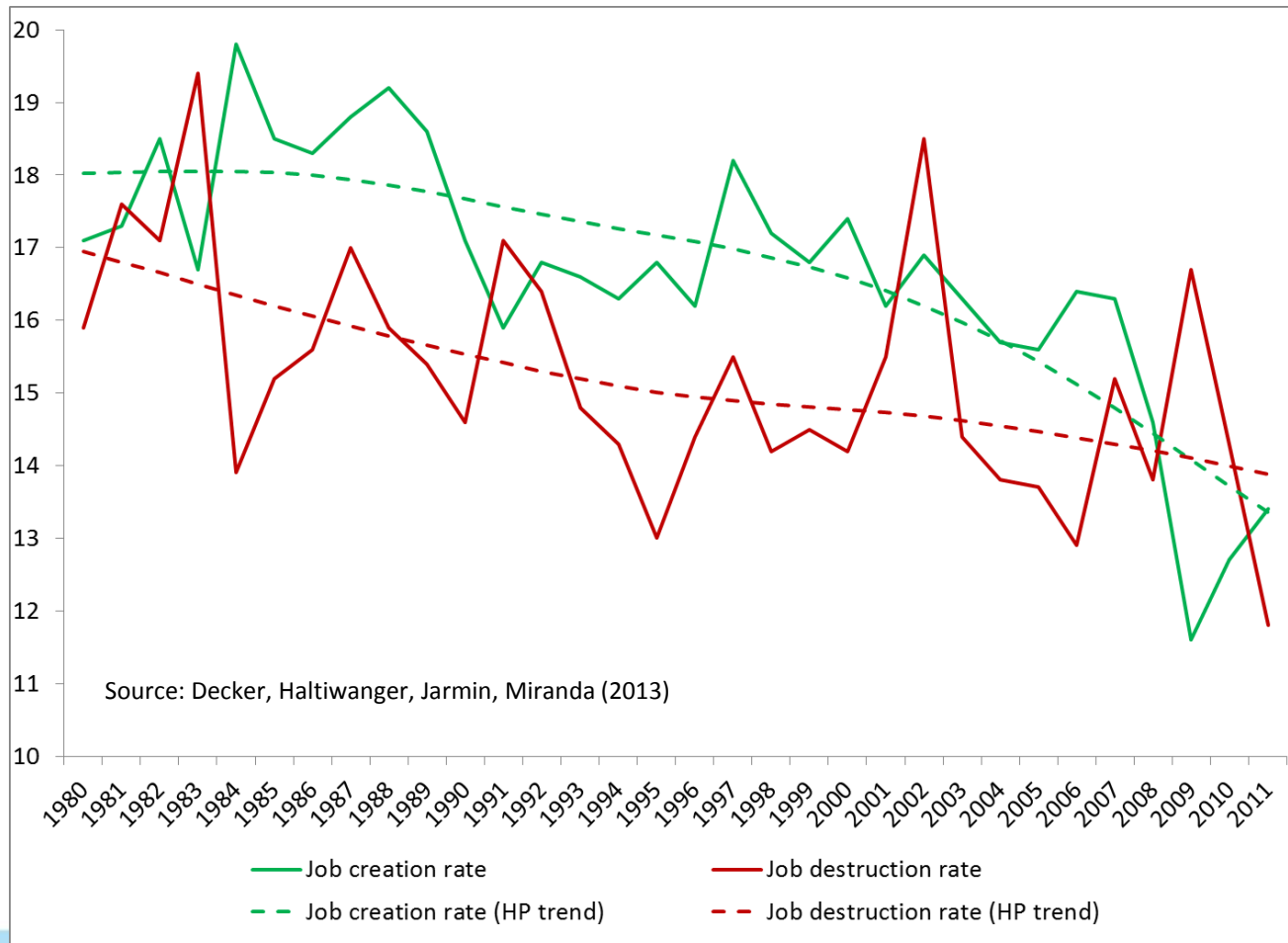
We're better at measuring reallocation than we are at measuring innovation

- Ability to measure business and labor market dynamics has improved dramatically in last decade.
- Business Dynamics:
 - Census: Longitudinal Business Database (LBD) / Business Dynamics Statistics (BDS) / SynLBD @ Cornell Virtual RDC
 - BLS: Quarterly Census of Employment and Wages (QCEW) / Business Employment Dynamics (BED)
- Labor Market Dynamics:
 - Census: Longitudinal Employer Household Dynamics (LEHD) program (QWI and OnTheMap)
 - BLS: Job Openings and Labor Turnover Survey (JOLTS)

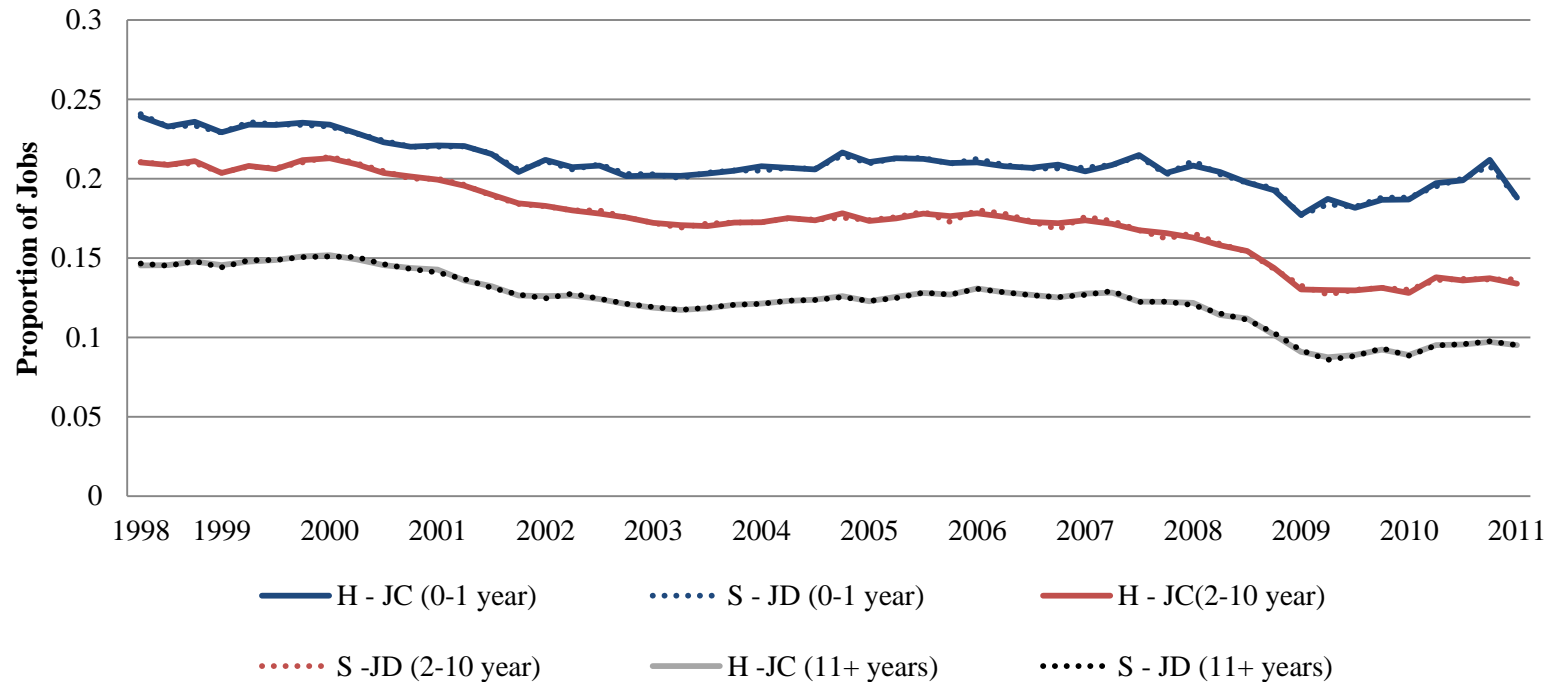
What have we learned about Business Dynamics and the Process of Reallocation in the U.S.?

- Regardless of the rate of innovation, reallocation is required for the economy to benefit.
- Obviously, innovation not the only driver of reallocation (e.g., M&A, Private Equity etc)
- Evidence along a number of fronts points to a secular decline in the pace of reallocation in the U.S. economy over the last several decades

Declining rates of Job Creation and Destruction



Declining Worker Churning Rates (Hires - JC & Separations – JD)

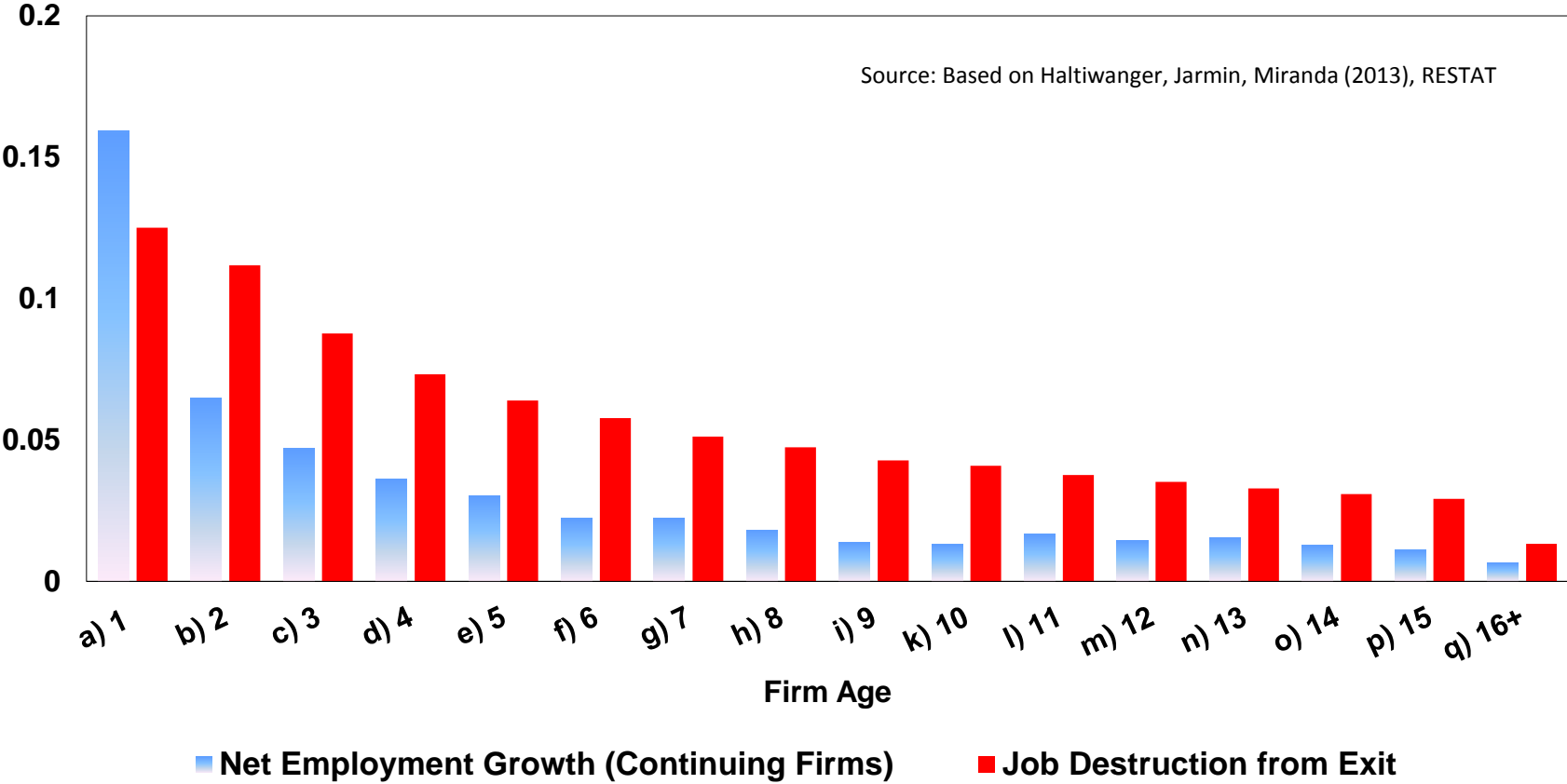


Source: Haltiwanger, Hyatt, McEntarfer, Sousa (2013). Based on seasonally adjusted QWI tabulations for 28 states. Worker churning is measured in two ways: Hires - Jobs Creation (H-JC), and Separations - Job Destruction (S-JD). Note that these two measurements should yield identical worker churning, with some variation created by noise infusion used to protect the confidentiality of the data and by seasonal adjustment factors.

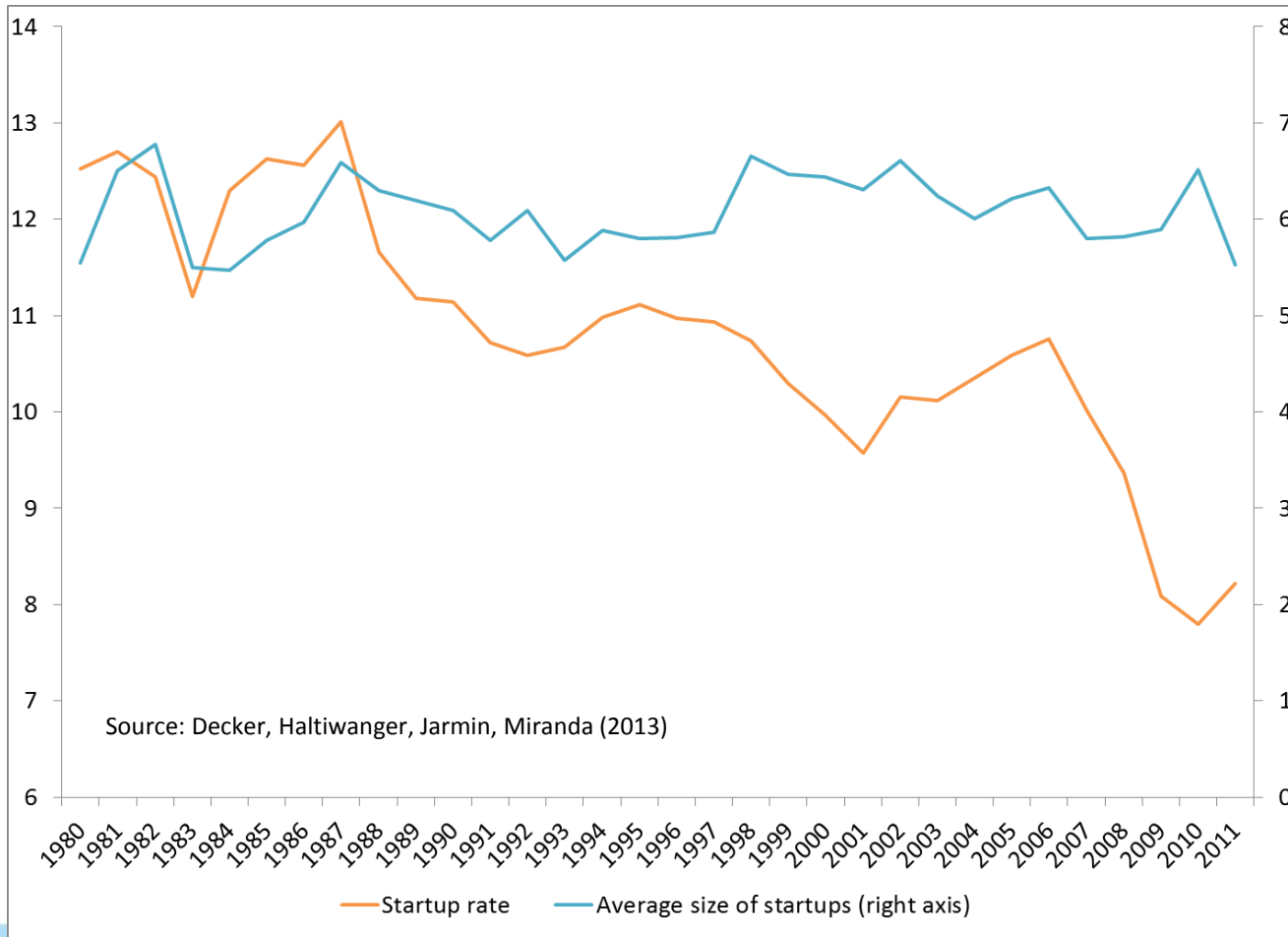
Importance of Young Entrepreneurial Businesses in Driving Reallocation

Up or Out Dynamics of Young U.S. Firms

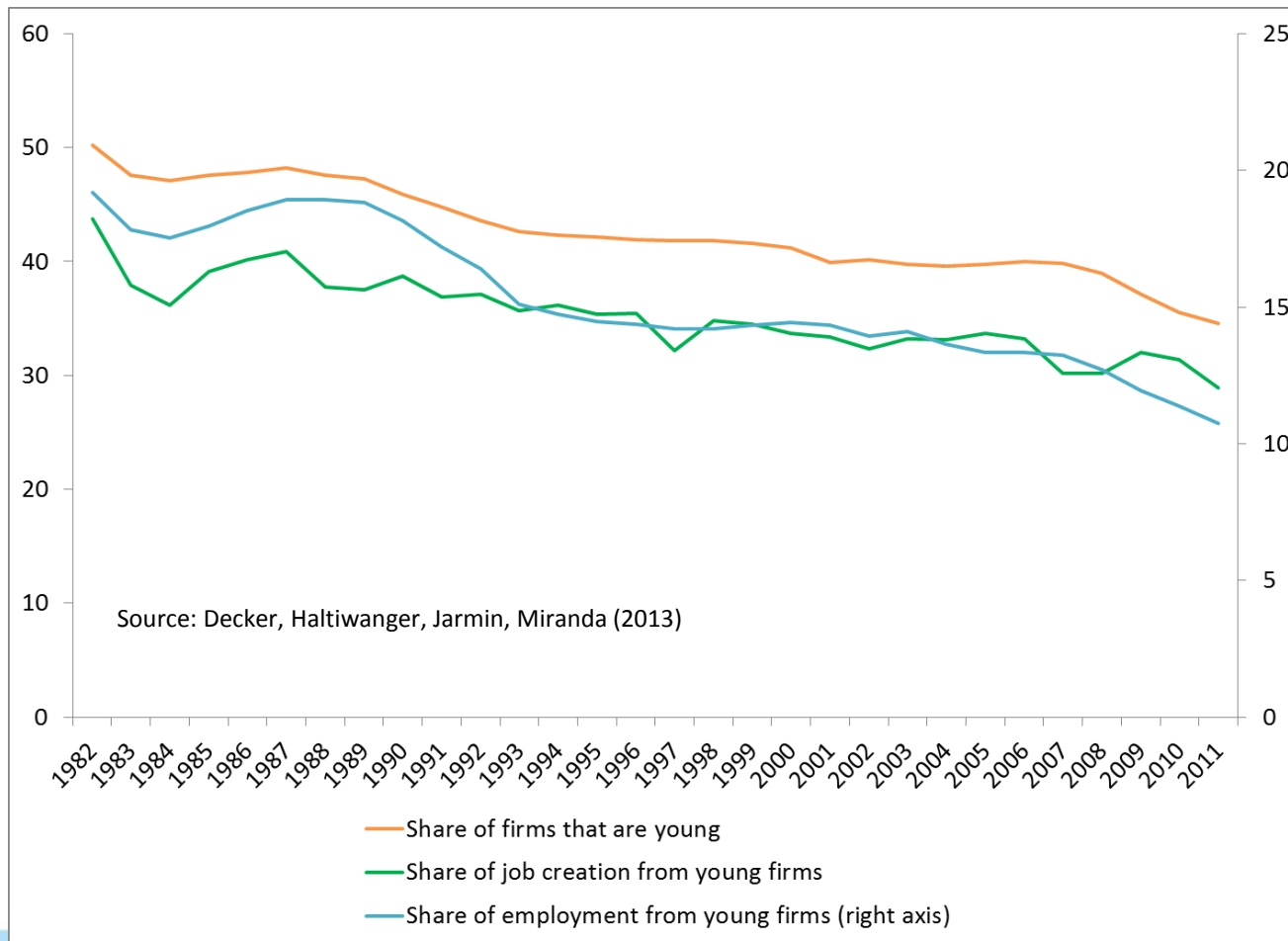
Source: Based on Haltiwanger, Jarmin, Miranda (2013), RESTAT



Declining (employer) Business Start-Up Rate

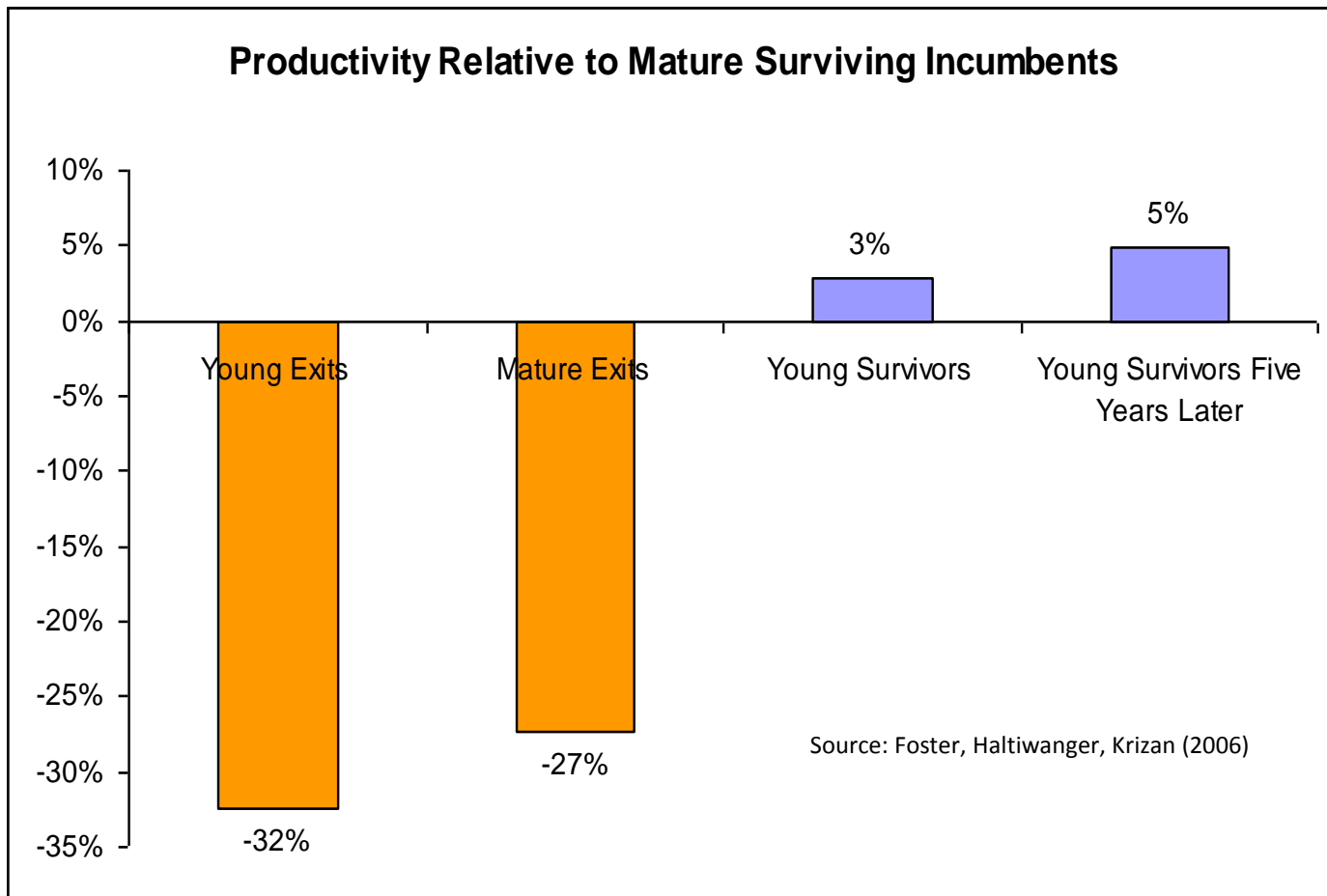


Declining Share of Activity Accounted for by Young Business



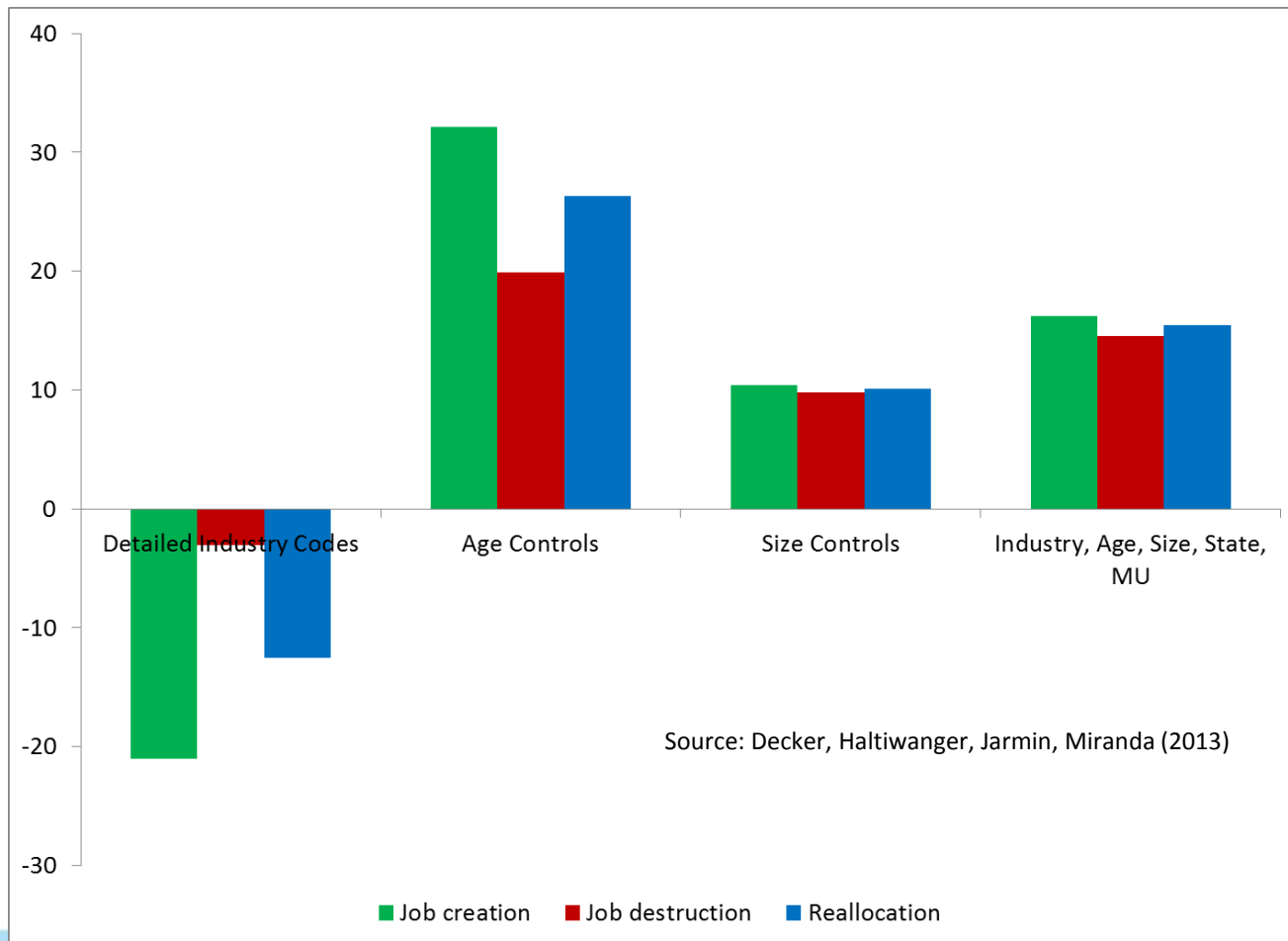
So What?

Process of Entry/Exit Critical for Productivity Growth



Can We Explain Declining Dynamics?

Changing industrial, age and size composition of firms



Other possible explanations

- Demographics?
 - Hyatt, Spletzer (2013) suggest not
- Frictions?
 - U.S. dynamism has declined since period of de-regulation in the 70s-80s
 - Cyclical frictions may be important though
 - Fort, Haltiwanger, Jarmin, Miranda (2013) show young entrepreneurial firms hit especially hard in Great Recession in regions experiencing larger drops in home prices.
- Changes in rate or quality of Innovation?

Enhancing data on Business and Labor Market Dynamics to Better Understand the Impact of Innovation

- Why is this a sensible thing to do?
 - This is where a lot of the impacts (e.g., productivity, employment, wages) we're interested in are manifested.
 - **Universe coverage** of firms and workers means we can find “rare” impacts that surveys would miss.
 - **Universe coverage** makes linkage to other data sources more productive (e.g., have population controls)
 - Data are based on administrative records and are “inexpensive” both in terms of resources and public burden.

Enhanced Business and Labor Market Dynamics Data Systems Provide Valuable Platform for Program Evaluation

- Characteristics just cited are the same that are valuable for tracing impacts of programs intended to spur innovation...

Possible Policy Remedies to Spur Innovation

- Douglas Elmendorf, Director of CBO:
 - “Increase or Redirect Federal Funding for Research and Development
 - Increase or Redirect Federal Support for Education
 - Change Tax Treatment of Private Investment
 - Increase Immigration of Highly Skilled Workers
 - Pursue Patent Reform
 - Reconsider Regulatory Goals”

What has been done to date to build this data infrastructure?

- The development of these data systems was not trivial
- They are only now being thought of as primary assets of the federal statistical system
- Some work done, especially at Census, to enhance these data with information from other assets:
 - Variety of demographic and business characteristics added to the LEHD infrastructure

Ongoing Enhancements

- Link to Patent Data
 - Academic researchers have linked Census microdata to patent data for research purposes.
 - Very useful for policy analysis (e.g., Acemoglu, Akcigit, Bloom and Kerr (2013))
- Census and USPTO undertaking project to more systematically link LBD and patent data to produce regular enhanced BDS statistics
- Link to transactions level trade data LFTTD
- Both projects supported by Census developmental seed investments

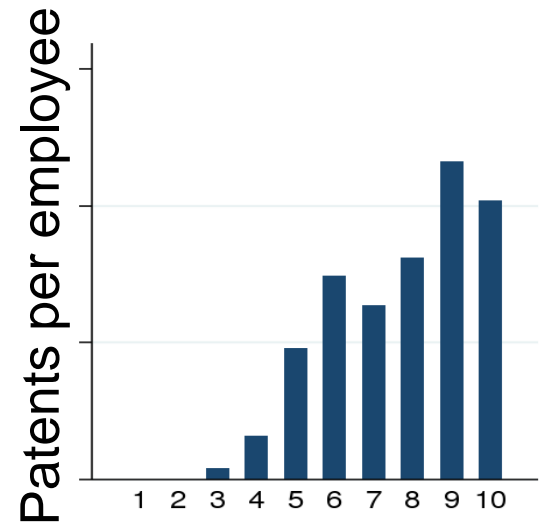
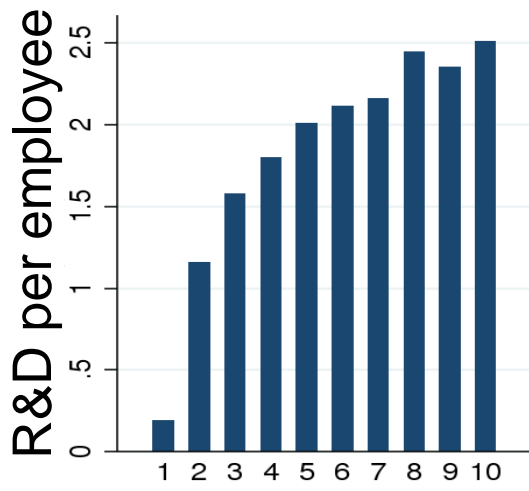
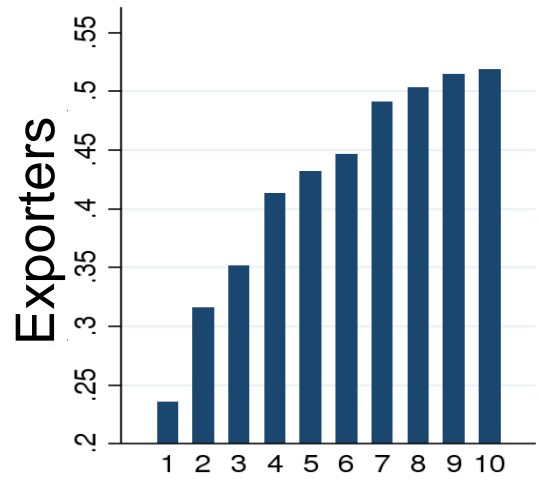
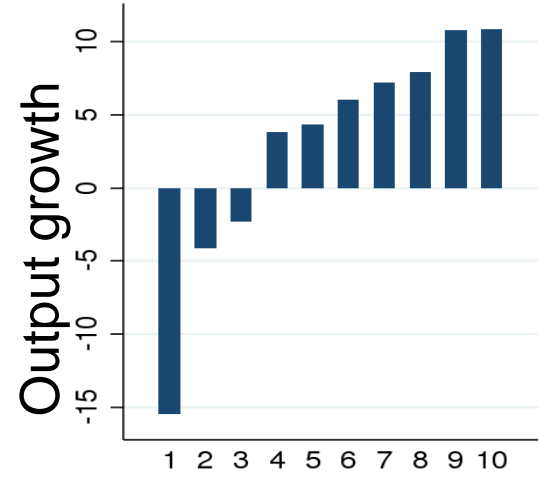
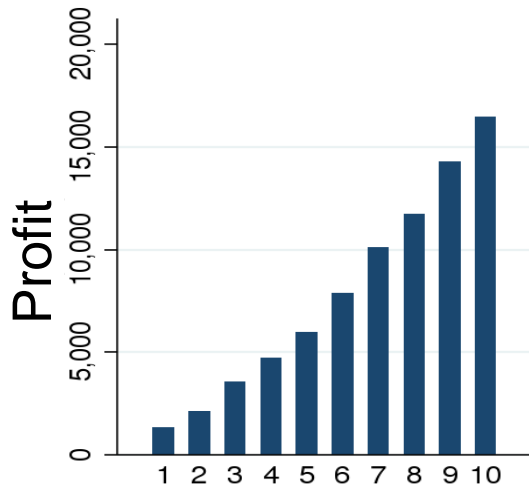
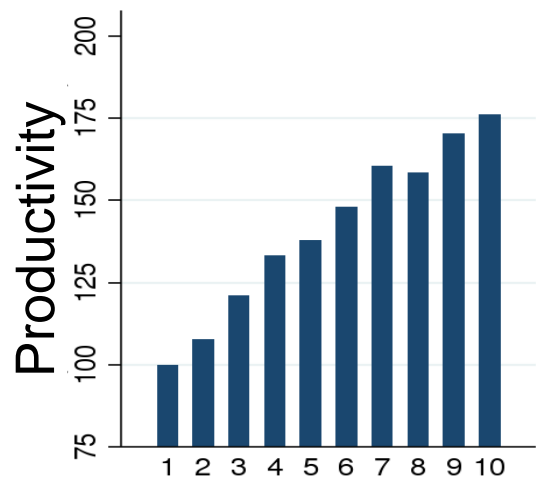
Ongoing Enhancements (cont.)

- National Job-to-Job Flows
 - Building national data system from state level infrastructure in LEHD
- Link Self-Employed to LEHD infrastructure

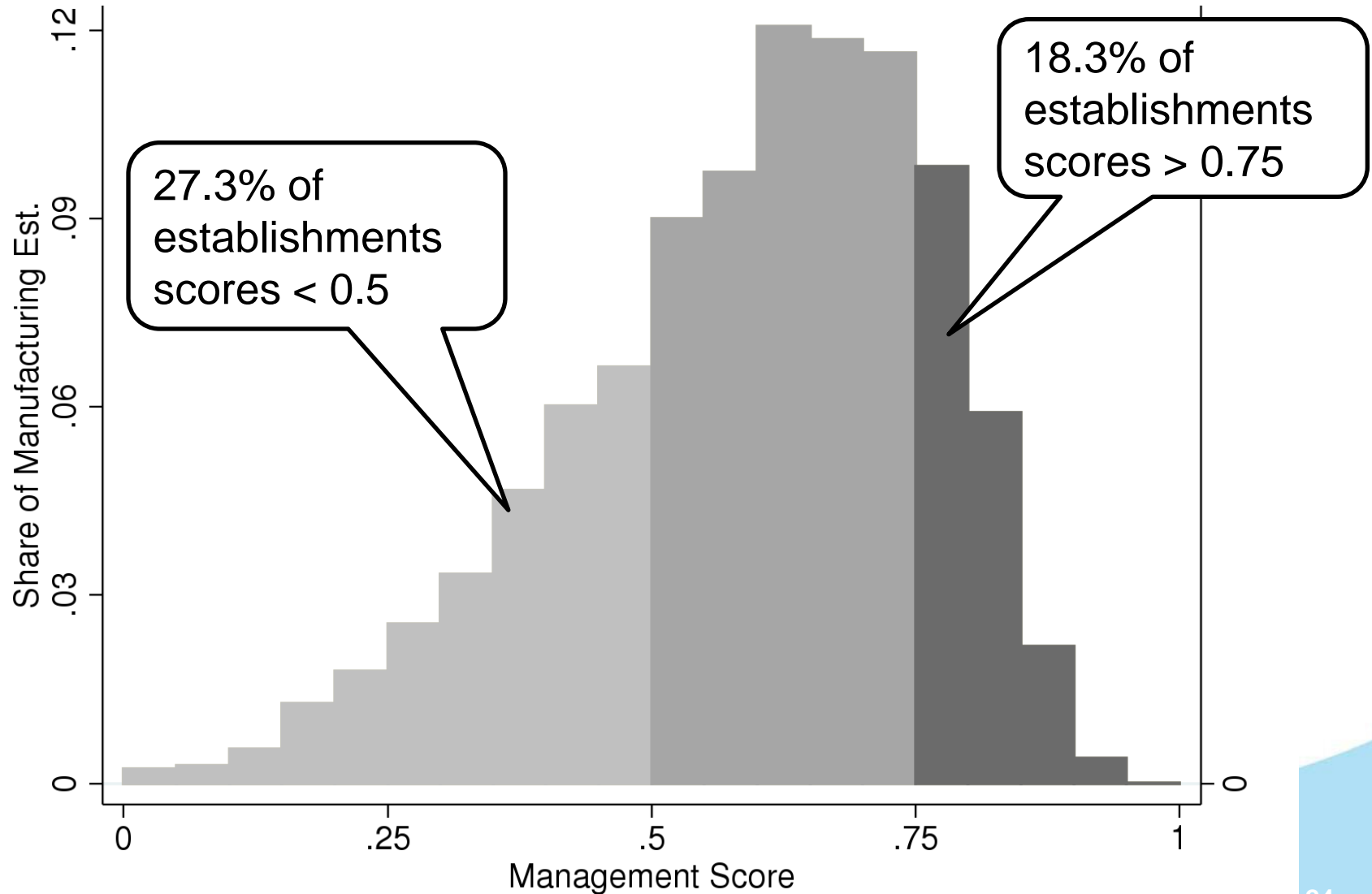
Adding new types of data

- Bringing in additional “Big Data” sources
 - Commercial data (currently only being used for Census 2010 and 2020 research)
 - Other transactional data (e.g., credit card, social networking, metadata from online transactions)
- New survey data
 - Management and Organizational Practices Survey (working paper by Bloom et. al)

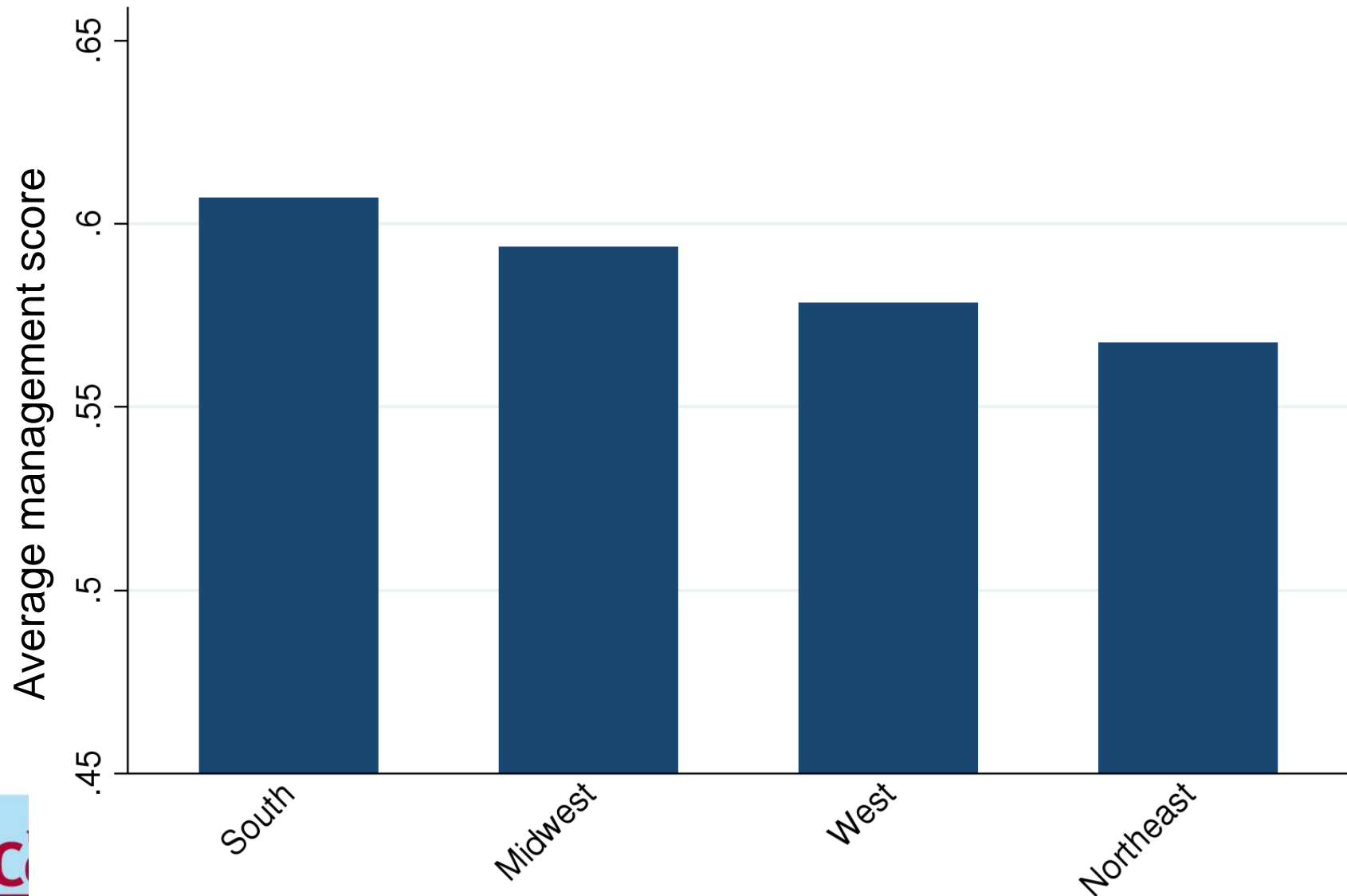
“Structured Management” practices are associated with significantly better performance



There is a very wide spread of the adoption of structured management in the US

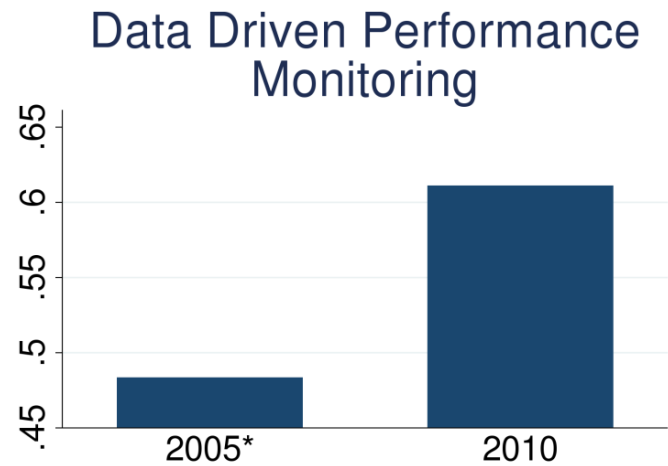
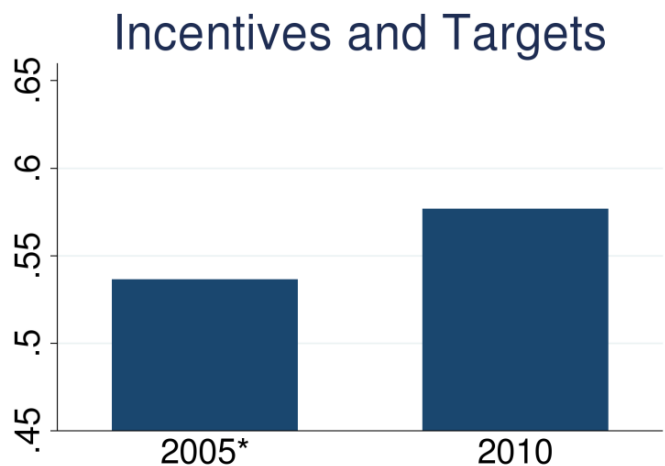
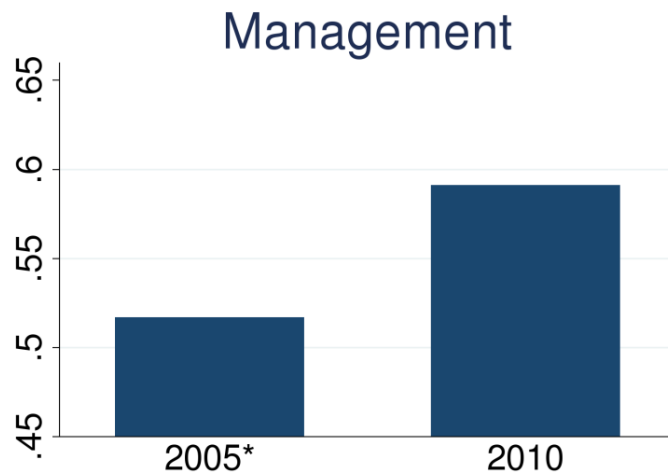


The adoption of structured management practices varies across regions of the US



Structured Management scores for data use have improved the most

Presumably this reflect the growing use of IT in modern firms



Model for future work

- Administrative data augmented with surveys
 - New measures from data like LEHD could allow us to stratify surveys based on new characteristics (e.g., degrees of worker turnover, occupational mix or similar)
- Surveys like the MOPS really allow us to peer into the “Black Box”
- Successful model developed with MOPS can be replicated, but resources always an issue.

Issues with expanding the data infrastructure

- Importance of good link keys for mashing up data from different sources
- Computational issues
- Legal and policy issues
- Data access
- Too much information in one place?