

Productivity Growth, Reallocation, and Innovation

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National Association of Business Economics, Economic Policy Conference
Longer-Run U.S. Productivity Outlook Session
March 21, 2022

Any opinions and conclusions expressed herein are those of the author and do not represent the views of the U.S. Census Bureau. All figures use publicly available data and/or previously published results (CBDRB-(FY20-(259, 357), FY21-(058, 113, 292, 305, 316), FY22-057)). Works cited and Census Bureau data products used are listed on slides at the end.

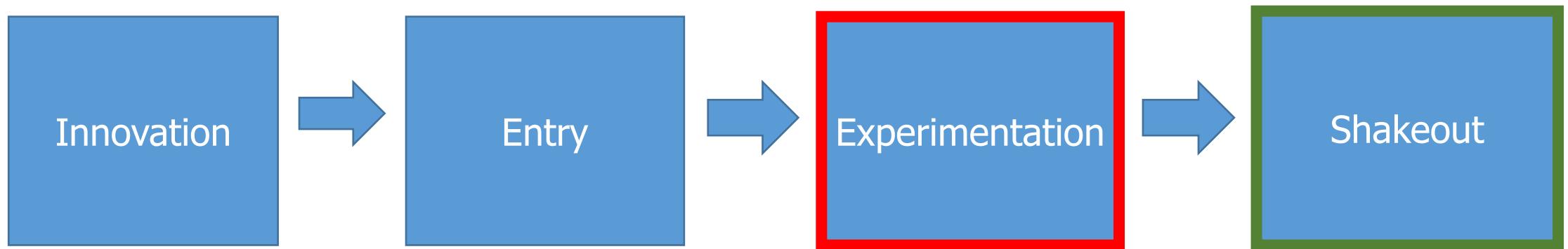
Productivity Growth and *Reallocation*

- An important determinant of *aggregate* productivity growth is the movement of resources from less productive to more productive firms. This reallocation takes place as new firms enter, high productivity firms grow, while low productivity firms contract and exit.
- Reallocation is an important mechanism because there are large, persistent differences in firm productivity levels even within narrowly defined industries (for example, cement has 2.4x).
- Moreover, the size of these differences varies by industry. Some have large differences (cement) while others have enormous differences (for example, computers has 5x).

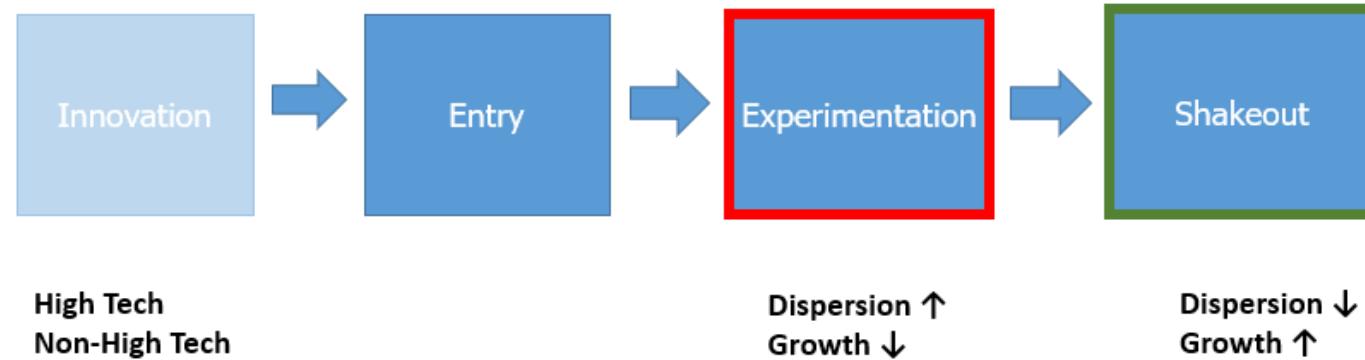
Productivity Growth, Reallocation, and *Innovation*

- This difference in productivity (which we call dispersion) can reflect many things. It could reflect frictions and distortions (such as barriers to entry) or it could reflect the presence of innovative activity.
- When there are frictions and distortions this can slow or distort the reallocation process and lead to slower productivity growth.
- When there is an innovation, the impact on productivity growth is complex because of the experimental nature of innovation. In empirical work, we find evidence that it leads to productivity growth with a lag.

Framework



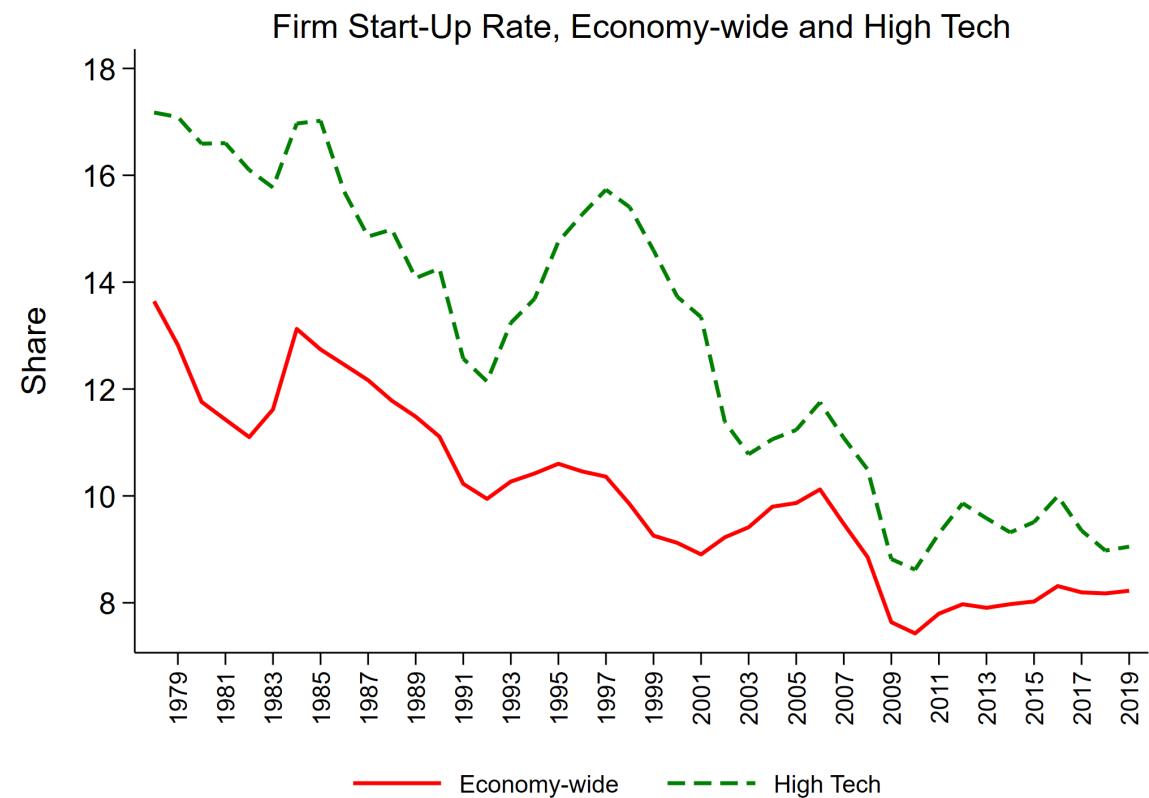
Regression Results: Productivity Dynamics



- Regressions of productivity dispersion (productivity growth) on entry with high-tech dummy over three (3-year) periods. Industry aggregates using micro-level data from the Longitudinal Business Database.
- Results show that following a period of entry:
 - Productivity dispersion rises then falls.
 - Productivity growth falls then rises.
 - Impact bigger for plants in High-Tech industries.
- Foster et al. (2021)

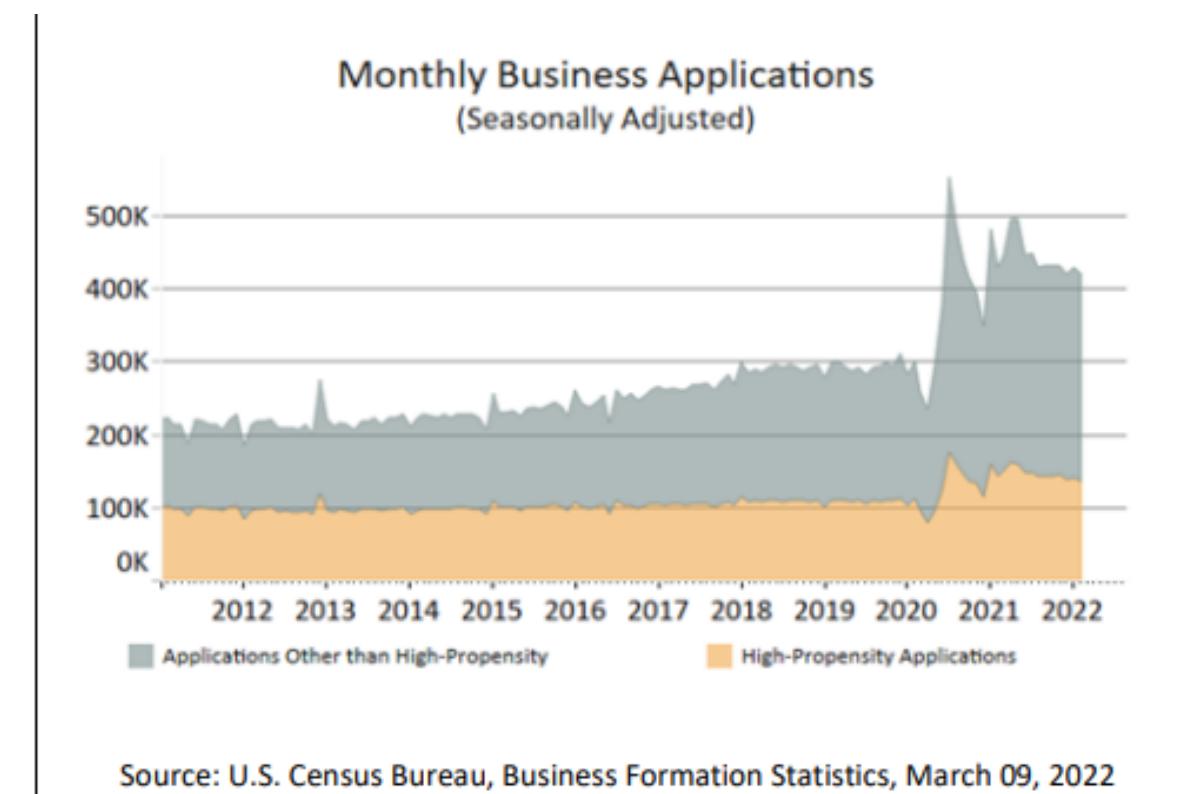
Reallocation (part 1)

- **Business Dynamic Statistics**
- 6M employer firms per year
- Decker et al. (2016) find declining dynamism in terms of firm entry and exit; worker flows; job creation and destruction.
- Holds to lesser extent for High-Tech part of economy.
- Negative impact on productivity growth through entry channel and less efficient reallocation.



Reallocation (part 2)

- **Business Formation Statistics**
- Applications for an Employer Identification Number
- Bayard et al. (2018) apply criteria to generate Business Application and High Propensity Business Applications (yellow).
- Pandemic: from 200K to 500K.



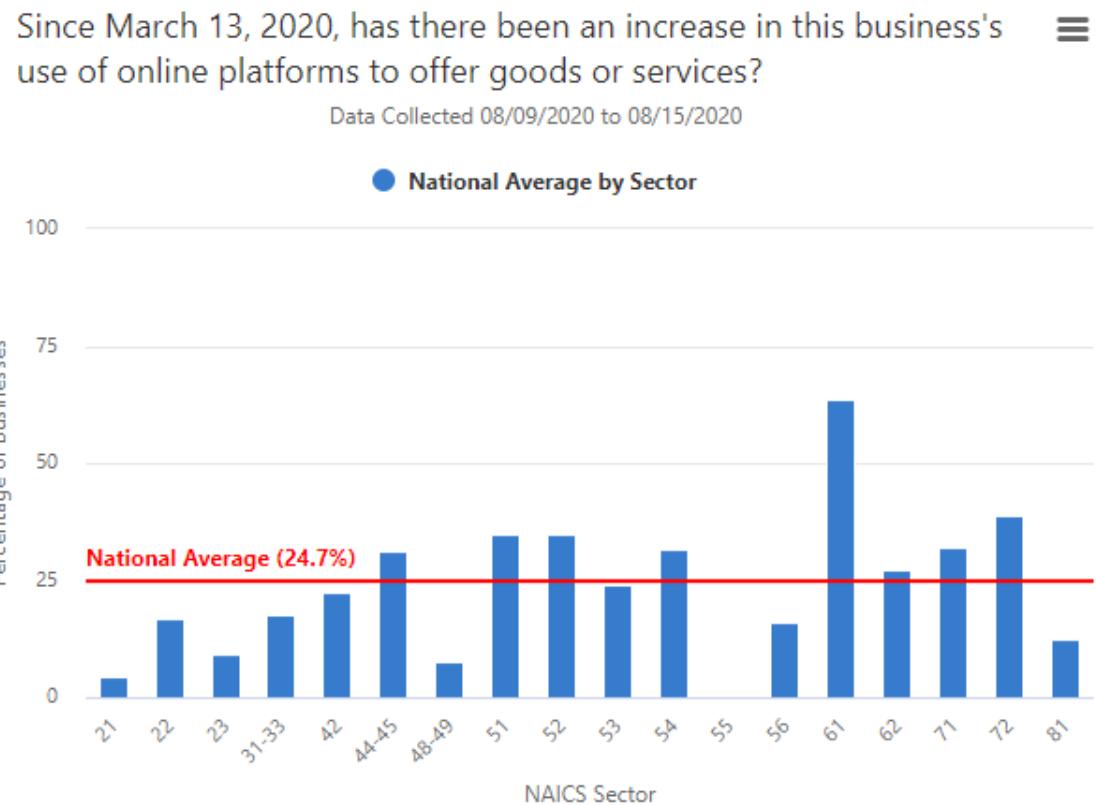
Innovation (part 1)

- **Annual Business Survey 2019**
- 300,000 firms, non-ag sectors
- Acemoglu et al. (2022) find:
 - Adoption is low for AI and robotics
 - Concentrated in larger (and controlling for size, younger) firms
 - Industry important determinant
 - Use of these technologies is associated with 15% increase in productivity -- ~1/3 of gap between frontier firms and others (not causal)

	AI Use	Robotics Use
Firms	3 %	2 %
Worker <i>Exposure</i>	13 %	16 %
Manufacture Worker <i>Exposure</i>	23 %	45 %

Innovation (part 2)

- **Small Business Pulse Survey**
- Weekly email to ~100,000 small businesses with 25% response rate. Started April 2020.
- Summer 2020: Increased online platform use: 25% for national average; 64% in educational services.
- A more detailed view will be possible via ABS 2023.



Summing Up

- **Productivity dynamics:** Framework inspired by Gort and Klepper helps us start to understand the connection between productivity growth, reallocation, and innovation.
- **Reallocation:** Pre-pandemic low entry rates suggest slower productivity growth to come; but pandemic surge in applications could suggest higher productivity growth to come. Not clear how many of these applications will result in employer businesses or moreover ones destined for growth.
- **Innovation:** Technology adoption concentrated by industry and in large or younger firms; but pandemic may have hastened adoption / intensity of use. Not clear how much adoption is above normal and permanent, future work will examine this.

Additional Slides

Background information

Other Ongoing / Future Work

- **Characteristics of AI adopters:** McEhleran et al. (2022) using 2018 ABS.
- **Automation and workers:** Acemoglu et al. (2022) using 2019 ABS.
- **Production technology:** Foster et al. (2021) using Annual Survey of Manufactures (ASM).
- **Labor adjusted for tasks/skills:** Cunningham et al. (2022) combining Occupational Employment and Wage Statistics and DiSP (and ASM).
- See also NBER/CRIW Conference on Technology, Productivity, and Economic Growth sessions from last week (March 17-18) available on YouTube for the next two weeks.

Data Products

- Annual Business Survey (joint with NCSES): [Annual Business Survey \(ABS\) Program \(census.gov\)](#)
- Business Dynamics Statistics: [Business Dynamics Statistics \(BDS\) \(census.gov\)](#)
- Business Formation Statistics: [Business Formation Statistics \(census.gov\)](#)
- Dispersion Statistics on Productivity (joint with BLS): [Dispersion Statistics on Productivity \(DiSP\) \(census.gov\)](#) and [Dispersion Statistics on Productivity \(DiSP\) \(bls.gov\)](#)
- Small Business Pulse Survey: [Small Business Pulse Survey \(census.gov\)](#)

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