

Innovation, Firm Dynamics, and Growth

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SEEK - October 8, 2015

Background

- Understanding the aggregate implications of growth & industrial policies requires a good understanding of micro players of the macroeconomic system.
- Going from micro-to-macro is crucial.
- Policies that seem good in partial equilibrium might have different general equilibrium impacts:
 - Aggregate price effect
 - Competition, Schumpeterian effect
 - Composition/Reallocation effect

Research Approach

- Start with empirical regularities in the micro data
- Construct a general equilibrium theory of firm dynamics and aggregate growth
- Estimate the structural parameters of the model using micro firm-level data
- Conduct counterfactual policy experiments
 - Incumbent R&D subsidy
 - Entry subsidy
 - Subsidy to incumbent fixed operation cost

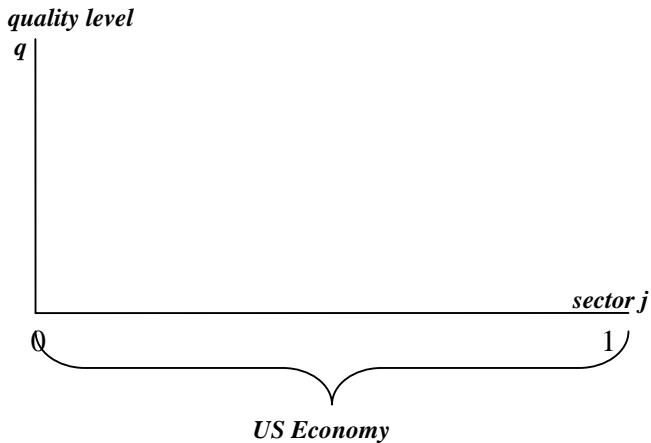
Today's Roadmap

- 1 Firms
- 2 Innovators
- 3 Innovations
- 4 Implications

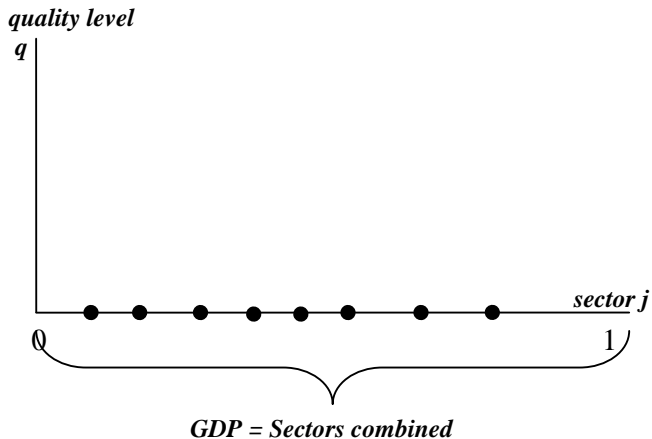
PART 1:

FIRMS

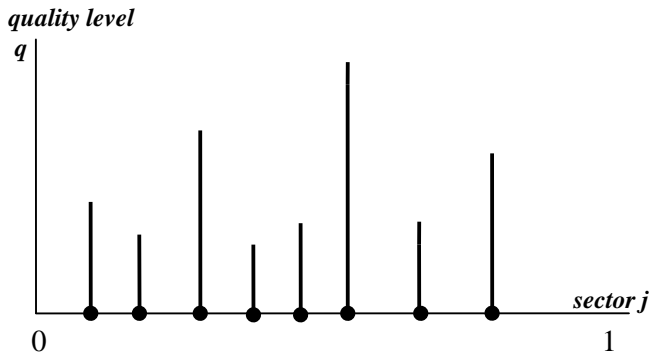
The Model Economy



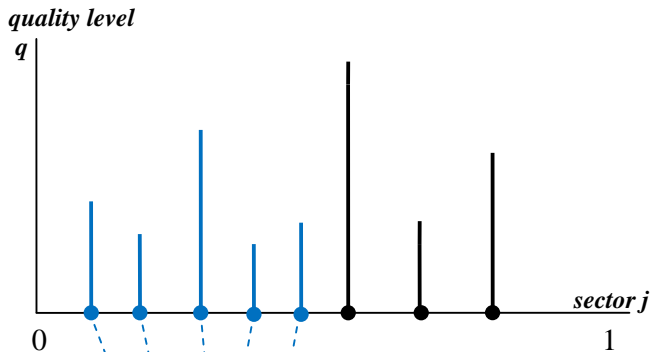
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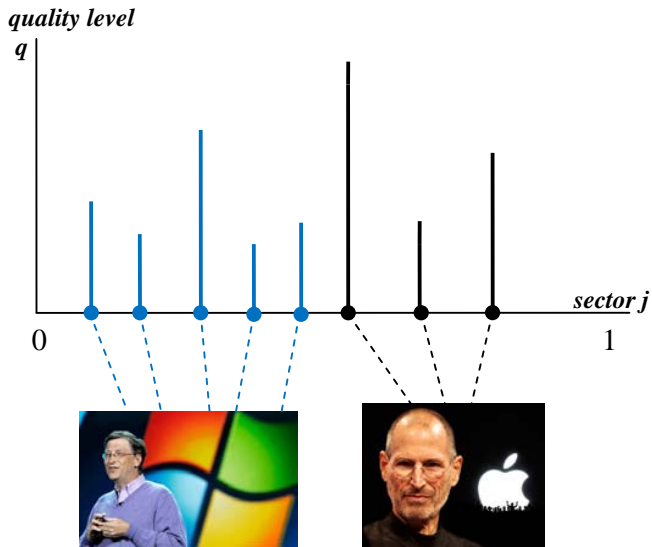
Sector-specific Productivities



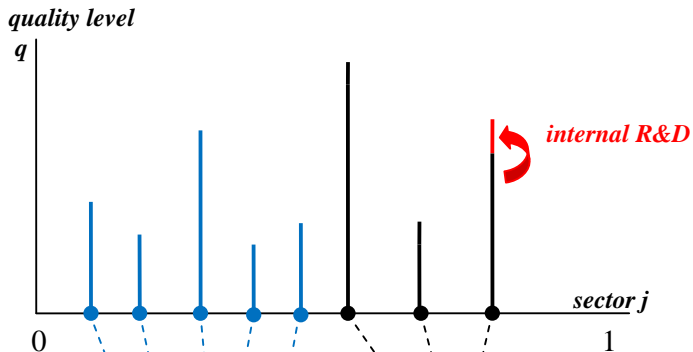
Example of a Firm



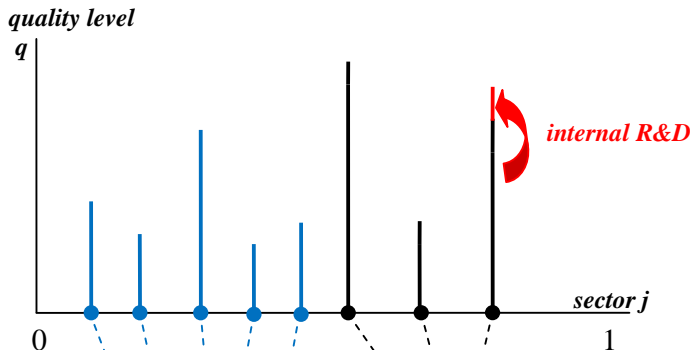
Example of another Firm



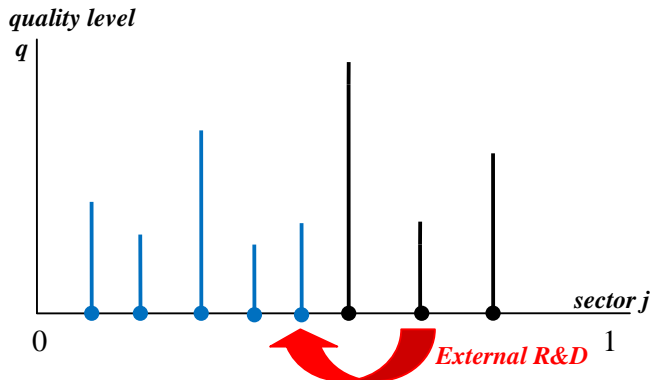
Productivity Growth: Internal R&D



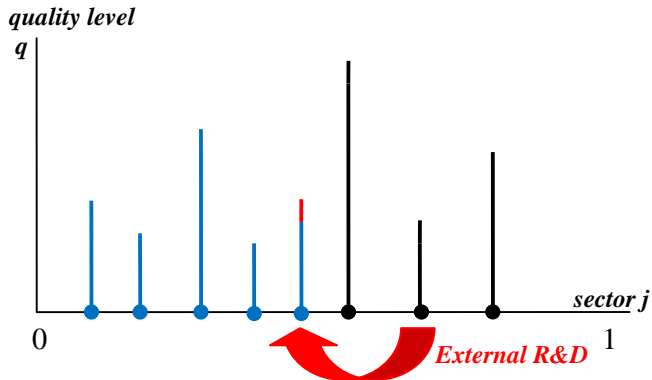
Productivity Growth: Internal R&D



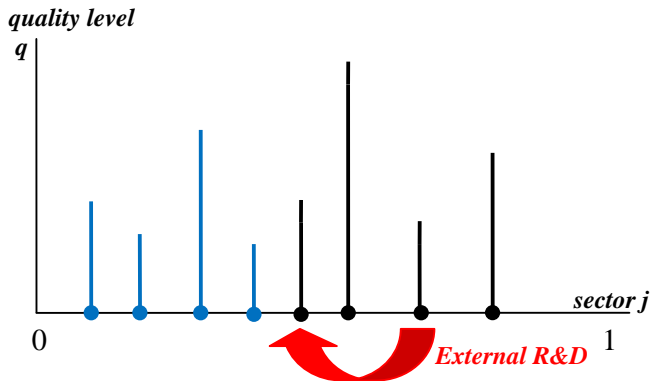
Productivity Growth: External R&D



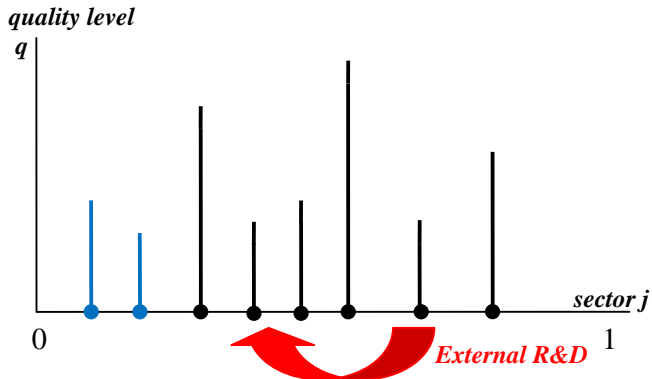
Productivity Growth: External R&D



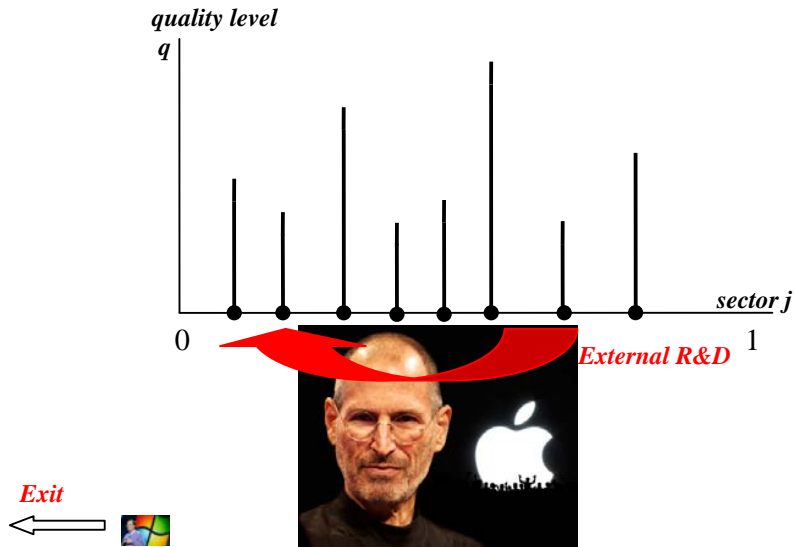
Reallocation is Taking Place...



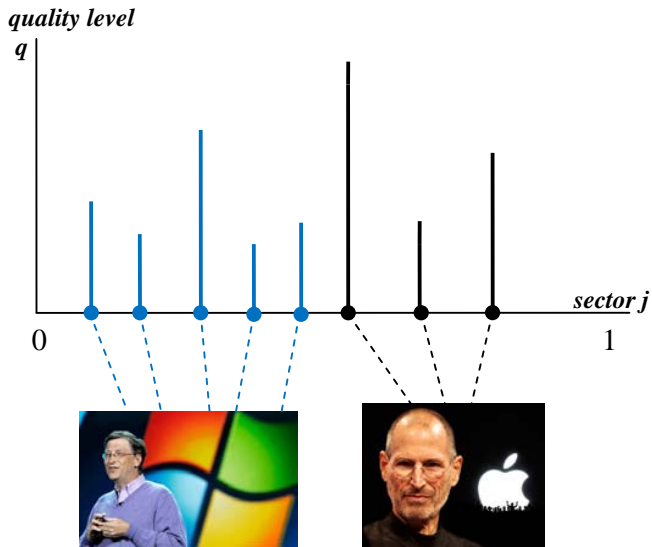
Competition Creates Selection



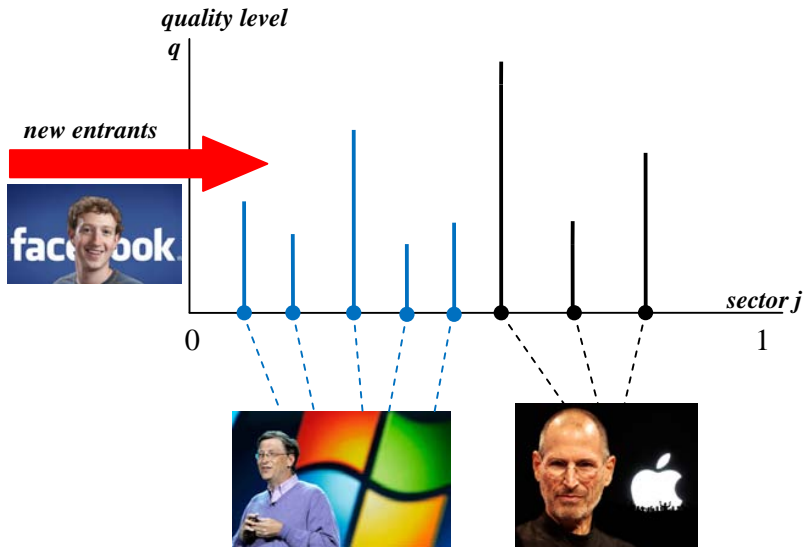
Eventually Some Firms Exit



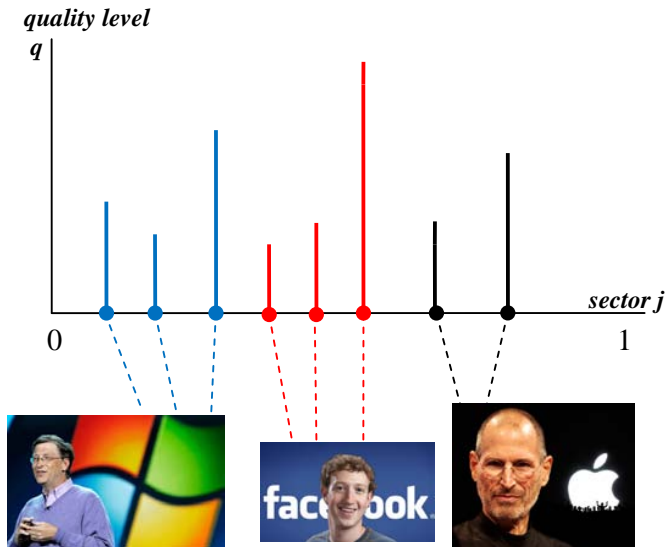
In the Meantime...



Some New Entrants Show Up



And New Entrants Replace Incumbents



General Equilibrium Effects of an Entry Subsidy

- Aggregate price effect
- Competition effect
- Composition/Reallocation effect

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R&D Input prices, wages/salaries, will increase.

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=



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Entrepreneurial talent is heterogeneous.

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Some are good entrepreneurs and some are bad:

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Some are good entrepreneurs and some are bad:



VS



Akcigit and Kerr (2010)

- We estimate this model using US firms.
- Data: Census of Manufacturing
- We find:
 - Small firms are more innovative relative to their size.
 - they do disproportionately more external innovations.
 - they generate larger spillovers per R&D dollars spent.

Acemoglu, Akcigit, Bloom, Kerr (2013)

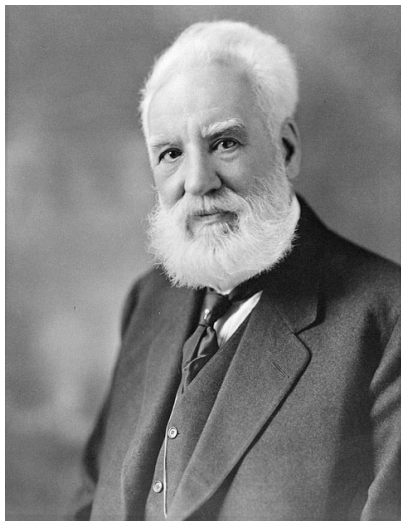
Findings:

- Subsidy to incumbent R&D is not boosting growth.
- Entry subsidy has a mild positive effect on growth.
- Taxing incumbent's operations increases growth by exploiting the **selection/reallocation margins**.

PART 2:

INNOVATORS

Alexander G. Bell



- Inventor of the telephone (1876).
- Created Bell Telephone Company (1877).
- By 1886: more than 150,000 people in U.S. own telephones.

James L. Kraft



- Invented a pasteurization technique for cheese.
- Created Kraft Foods.
- His company grew into a conglomerate: most popular food products and employing more than 100,000 people.

Ralph Baer



- Created TV game unit with paddle controls.
- Today, the video gaming industry is worth \$66 billion.

Introduction

- ... and the list goes on.

Introduction

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- In addition to being very prolific inventors, these innovators had something else in common:

Introduction

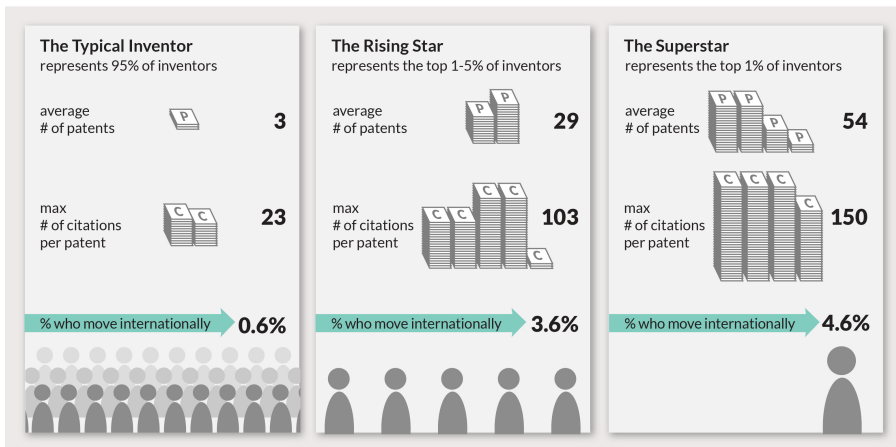
- ... and the list goes on.
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- They were all **immigrants**.

Introduction

- ... and the list goes on.
- In addition to being very prolific inventors, these innovators had something else in common:
- They were all **immigrants**.
- What determines the patterns of migration?

Akcigit, Baslandze, Stantcheva (2015)

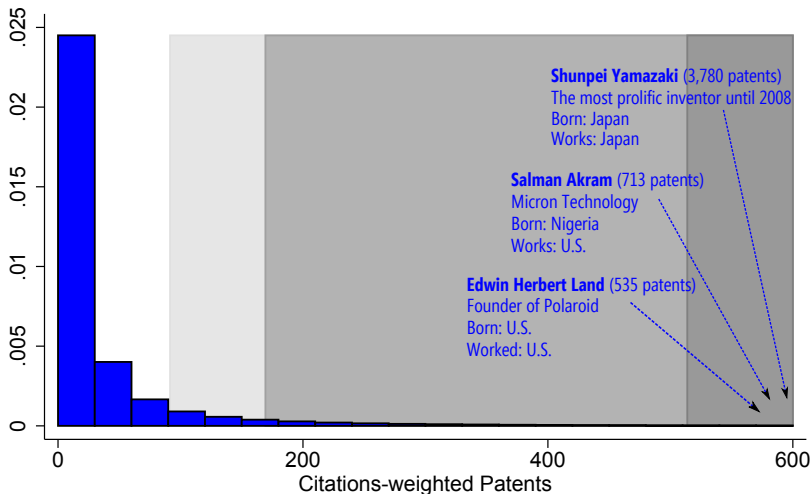
What Makes an Inventor a Superstar?



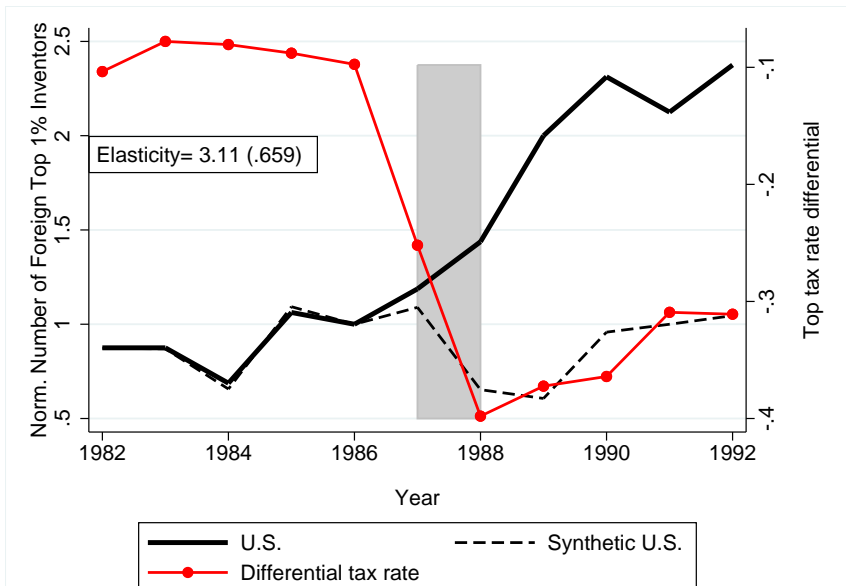
Source: Author's calculations and Akcigit, Baslandze, and Stantcheva. "Taxation and the International Mobility of Inventors." NBER Working Paper 21024, March 2015.

Washington Center
for Equitable Growth

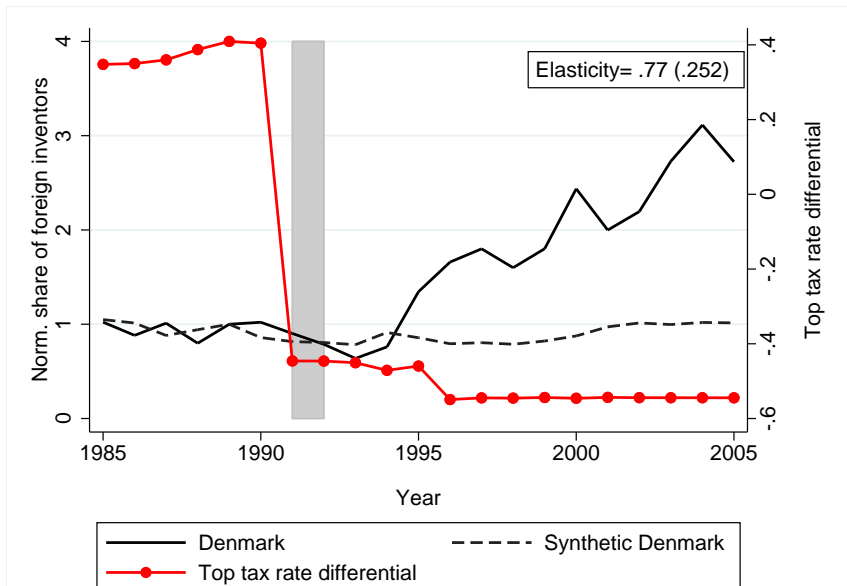
Akcigit, Baslandze, Stantcheva (2015)



Case Study: U.S. TRA 1986, Top 1% Inventors



Case Study: Denmark's 1992 Tax Reform

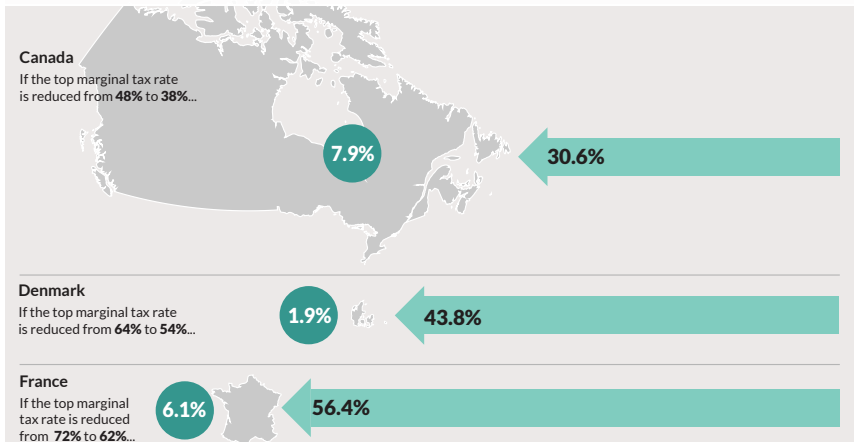


Superstar Responses in Different Countries

How do Superstar (Top 1%) Inventors Respond to Decreased Top Tax Rates?

This chart shows how many domestic superstar (top 1%) inventors and foreign superstar inventors would be added to a country if the top tax rate decreased by 10 percentage points from its level in that country in the year 2000.

● Percent increase in domestic superstar inventors ← Percent increase in foreign superstar inventors



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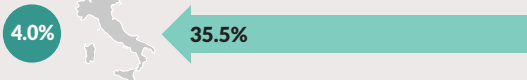
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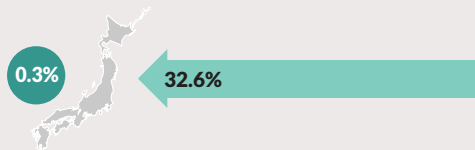
Italy

If the top marginal tax rate is reduced from 55% to 45%...



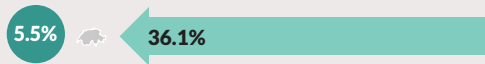
Japan

If the top marginal tax rate is reduced from 51% to 41%...



Switzerland

If the top marginal tax rate is reduced from 56% to 46%...



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United Kingdom

If the top marginal tax rate is reduced from 55% to 45%...

10.6%

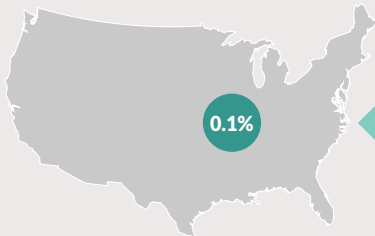


35.1%

United States

If the top marginal tax rate is reduced from 47% to 37%...

0.1%



23.7%

PART 3:

INNOVATIONS &
MARKET FOR IDEAS

Safety Pin



Walter Hunt (1796-1859)



USPTO Patent Number 6281

UNITED STATES PATENT OFFICE.

WALTER HUNT, OF NEW YORK, N. Y., ASSIGNOR TO WM. RICHARDSON AND JNO. RICHARDSON.

DRESS-PIN.

Specification of Letters Patent No. 6,281, dated April 10, 1849.

To all whom it may concern:

Be it known that I, WALTER HUNT, of the city, county, and State of New York, have invented a new and useful Improvement in the Make or Form of Dress-Pins, of which the following is a faithful and accurate description.

The distinguishing features of this invention consist in the construction of a pin made of one piece of wire or metal combining a spring, and clasp or catch, in which catch, the point of said pin is forced and by its own spring securely retained. They may be made of common pin wire, or of the precious metals.

See Figure 1 in the annexed drawings (which are drawn upon a full scale, and in which the same letters refer to similar parts,) which figure presents a side view of said pin, and in which is shown the three distinct mechanical features, viz: the pin A, the coiled spring B, and the catch D, which is made at the extreme end of the wire bar C, extended from B. Fig. 2 is a similar view of a pin with an elliptical coiled spring, the pin being detached from the catch D and thrown open by the spring B. Fig. 3 gives a top view of the same. Fig. 4 is a top view of the spring made in a flat spiral coil. Fig. 5 is a side view of the same.

Any ornamental design may be attached

to the bar C, (see Figs. 6, 7 and 8,) which combined with the advantages of the spring and catch, renders it equally ornamental, and at the same time more secure and durable than any other plan of a clasp pin, heretofore in use, there being no joint to break or pivot to wear or get loose as in other plans. Another great advantages unknown in other plans is found in the perfect convenience of inserting these into the dress, without danger of bending the pin, or wounding the fingers, which renders them equally adapted to either ornamental, common dress, or nursery uses. The same principle is applicable to hair-pins.

My claims in the above described invention, for which I desire to secure Letters Patent are confined to the construction of dress-pins, hair-pins, &c., made from one entire piece of wire or metal, (without a joint or hinge, or any additional metal except for ornament,) forming said pin and combining with it in one and the same piece of wire, a coiled or curved spring, and a clasp or catch, constructed substantially as above set forth and described.

WALTER HUNT.

Witnesses:

JOHN M. KNOX,
JNO. R. CHAPIN.

W. Hunt.

Pin.

Patented Apr. 10. 1849.

No. 6281.

Fig. 1.



Fig. 4.



Fig. 5.



Fig. 8.



Fig. 2.



Fig. 3.

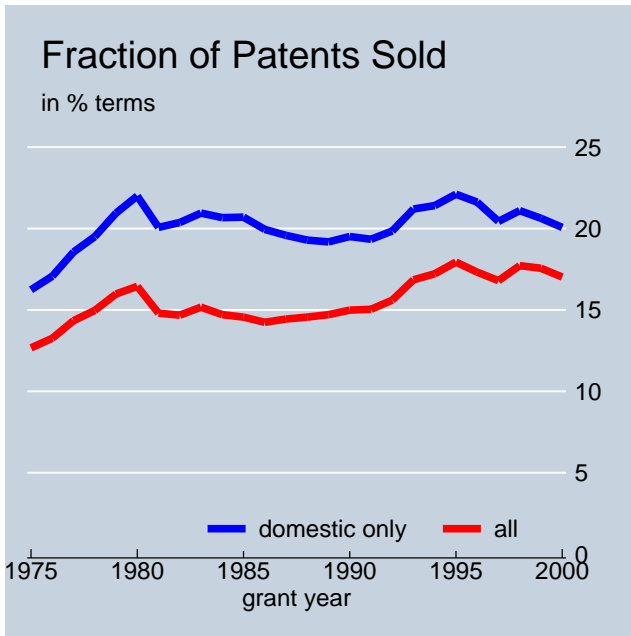


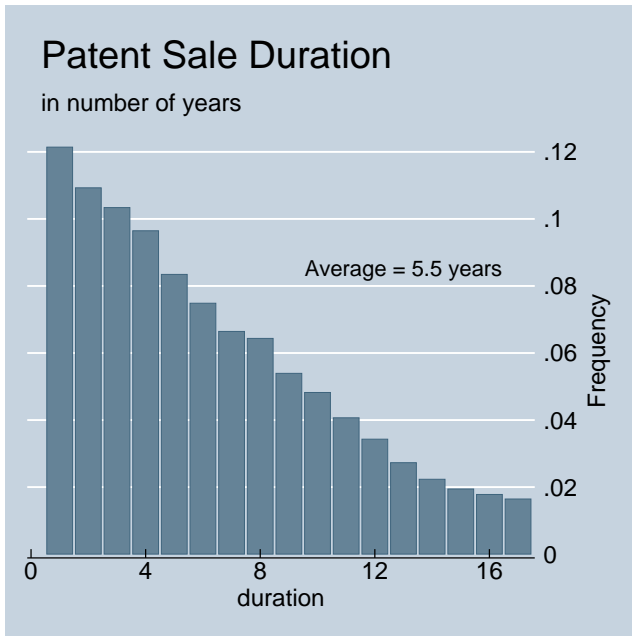
Fig. 6.



Fig. 7.









EDWARD VAN WINKLE
(1841-1923)

- Main problem:
Informational frictions.
- Trade facilitated by the emergence of **intermediaries.**
- They economize on the information costs
- They help to match sellers and buyers of patent rights.

Research Questions

- Are ideas born to their best users?
- How big is the misallocation of ideas?
- How much does the secondary market improve the allocation of ideas?

Empirical Facts We Document

- 1 Real sales and market value are **negatively correlated** with the distance between a firm and its patents.
- 2 Patents which are more **distant** are more likely to be **sold**.
- 3 After a patent resale, the **distance** between a patent and its owner **decreases**.

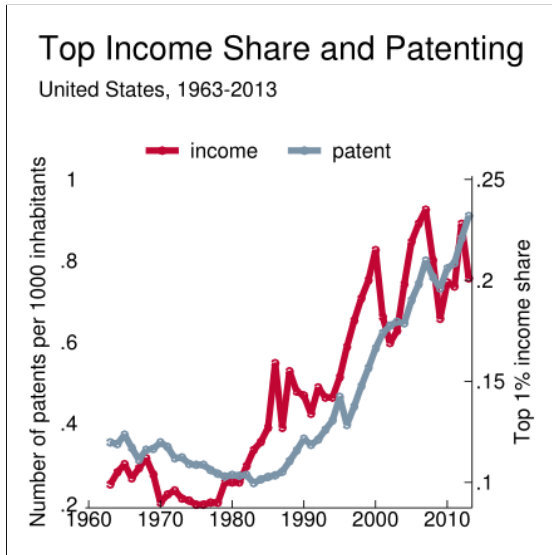
Akcigit, Celik, Greenwood (2014)

- We estimate the model using the micro firm and patent data.
- We find that reallocation of ideas increases productivity growth from
 $1.8\% \rightarrow 2\%$

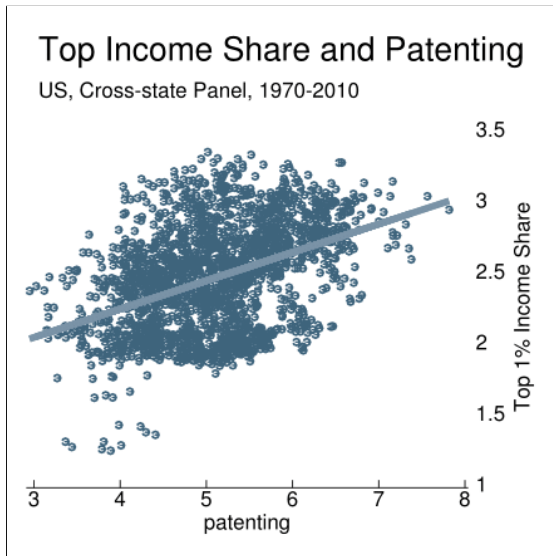
PART 4:

INNOVATION, INEQUALITY AND SOCIAL MOBILITY

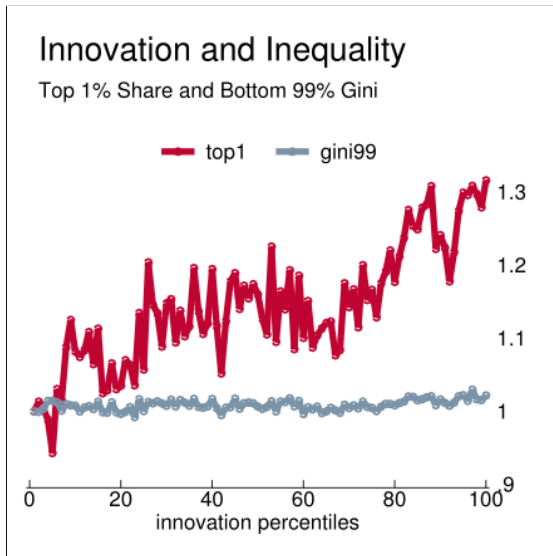
Innovation and Income Inequality



Innovation and Income Inequality



Innovation and Income Inequality



Innovation and Social Mobility



Aghion, Akcigit, Bergeaud, Blundell, Hemous (2015)

We find:

- Innovativeness increases top income inequality.
- We show that innovation does not increase broader measures of inequality which do not focus on top incomes.
- **Entrant innovation** is positively correlated with **social mobility**, but less so in states with more intense **incumbent lobbying** activities.

Conclusions

- General equilibrium is very important for policy.
- Inventors DO respond to policy.
- A well-functioning market for ideas/patents would help economic growth.
- Innovation is an important social elevator.
- The positive effect of entrant innovation is dampened by lobbying of the incumbents.

THANK YOU!