

# Macroeconomics from the Ground up: Lecture 3

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## Today's key word is “reallocation”

- ▶ In a dynamic economy, new products get introduced and old product becomes obsolete over time. New technologies are found, and old technologies are taken over. Young people join the labor force, and old people retire. Old machines break, and are replaced by new machines. These dynamic process necessitates continuous **reallocation of productive resources**.
- ▶ Recent researches show that this reallocation process is an importance source of productivity gain.

# Reallocation of what?

- ▶ Reallocation occurs in many levels. Perhaps most important are:
  - ▶ Reallocation of firms/establishments—entry and exit of firms/establishments.
  - ▶ Reallocation of labor—hiring and firing of workers.
  - ▶ Reallocation of other productive resources, such as machines and structures.
  - ▶ I will talk about the first two.

# Background

- ▶ Consider the Neoclassical production function:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha},$$

where  $Y_t$  is GDP,  $K_t$  is capital stock, and  $L_t$  is labor.  $A_t$  is the total factor productivity (TFP).

- ▶ Various empirical studies have attributed a large fraction of economic growth in advanced countries to the growth in  $A_t$ .
- ▶ Also the international income differences.
- ▶ Theoretically, in many growth models (Solow model, Ramsey model, and some endogenous growth model), the growth in  $A_t$  is the engine of growth.
- ▶ Thus, it is important to develop “the theory of TFP.”

## An empirical illustration

- ▶ A version of Baily, Hulten, and Campbell (1992) decomposition of industry productivity change  $\Delta P_{it}$ :

$$\begin{aligned}\Delta P_{it} = & \sum_{e \in C} s_{et-1} \Delta p_{et} + \sum_{e \in C} (p_{et-1} - P_{it-1}) \Delta s_{et} + \sum_{e \in C} \Delta p_{et} \Delta s_{et} \\ & + \sum_{e \in N} s_{et} (p_{et} - P_{it-1}) - \sum_{e \in X} s_{et-1} (p_{et-1} - P_{it-1})\end{aligned}$$

where  $C$  is continuing establishments,  $N$  is entering establishments, and  $X$  is exiting establishments. The first is the “within” term, the second is the “between” term, the third is the “cross” term, and then net entry terms.

- ▶ Foster, Haltiwanger, and Krizan’s (2001) measurement of U.S. manufacturing plants productivity (1977-87): within 48%, between  $-8\%$ , cross 0.34, and net entry 26%.
- ▶ The reallocation accounts for more than half of productivity growth.
- ▶ Many new studies for productivity decomposition methods: e.g. Petrin and Levinsohn (2012), Osotimehin (2012), etc.

## A bit more about expansion/contraction of firms

- ▶ How much are expanding firms expanding? **Job creation:**

$$JC = \frac{\sum_{n_t > n_{t-1}} (n_t - n_{t-1})}{\sum n_{t-1}}$$

- ▶ How much are contracting firms contracting? **Job destruction:**

$$JD = \frac{\sum_{n_t < n_{t-1}} (n_{t-1} - n_t)}{\sum n_{t-1}}$$

- ▶ The above are called “(gross) job flows.” Note that the gross job flows are much larger than the net change in employment in the aggregate economy.
- ▶ Gross flows are quite large. In U.S. manufacturing (Davis, Haltiwanger, and Schuh 1996) 1973-1988, average annual  $JC$  is 9.1% and  $JD$  is 10.3%.

## Relationship to yesterday

- ▶ Yesterday we talked about the worker flows. What is the relationship between job flows and worker flows?
- ▶ There are simple accounting relationships—job flows are the sum of job creation and separation:

$$JF \equiv JC + JD = (H - RH) + (S - RH)$$

where  $H$  is hire,  $S$  is separation, and  $RH$  is replacement hiring.

$$WF \equiv H + S = EN + EU + NE + UE + 2JJ,$$

where  $JJ$  is job-to-job transition. So,

$$JF + 2RH = WF.$$

Usually worker flow is two to three times larger than the job flow—the replacement hiring is large. This  $2RH$  term is often called the “churning flow.”

## Some datasets: Census

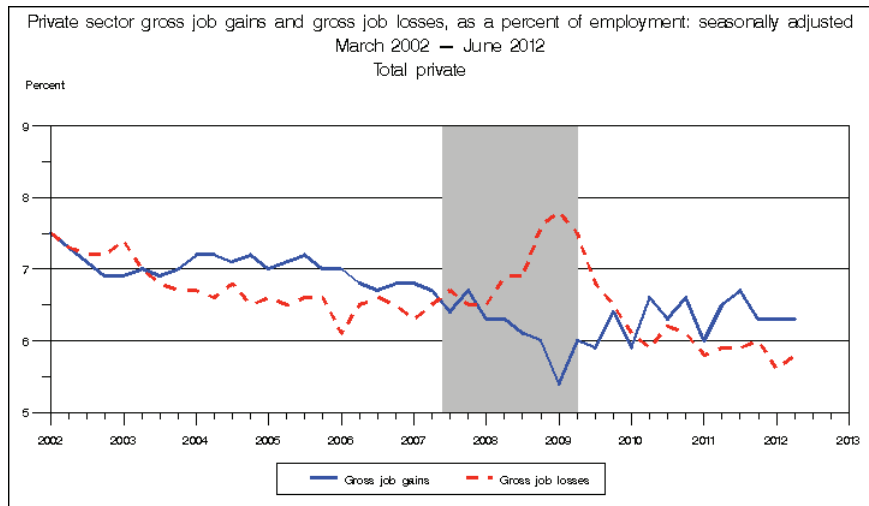
- ▶ Longitudinal Research Database (LRD): the dataset of U.S. manufacturing plants by the U.S. Census Bureau.
  - ▶ Census of Manufactures (CM): The universe of plants. Every 5 years.
  - ▶ Annual Survey of Manufactures: Subset of CM (rotated). Every year.
  - ▶ Some quarterly data is also available.
- ▶ Longitudinal Business Database (LBD): The descendant of LRD. Annual data and covers all sectors.
- ▶ Business Dynamics Statistics (BDS) is made from LBD and it is public data. It includes the numbers of firms and establishments, firm age distribution, employment distribution, entry/exit, job creation and job destruction.
- ▶ Longitudinal Employer-Household Dynamics (LEHD): Quarterly employer-household matched data.
- ▶ Statistics of U.S. Businesses (SUSB): Annual numbers of firms, establishment, employment, and annual payroll.



## Some datasets: Bureau of Labor Statistics

- ▶ Business Employment Dynamics (BED, BDM): Quarterly establishment-level data of employment. Covers 98% of all employment.
- ▶ Job Openings and Labor Turnover Survey (JOLTS): Monthly data from a sample of approximately 16,000 U.S. business establishments. Asks job openings (vacancies), hires, separations, quits, layoffs.
- ▶ Canadian datasets: T2LEAP, etc.

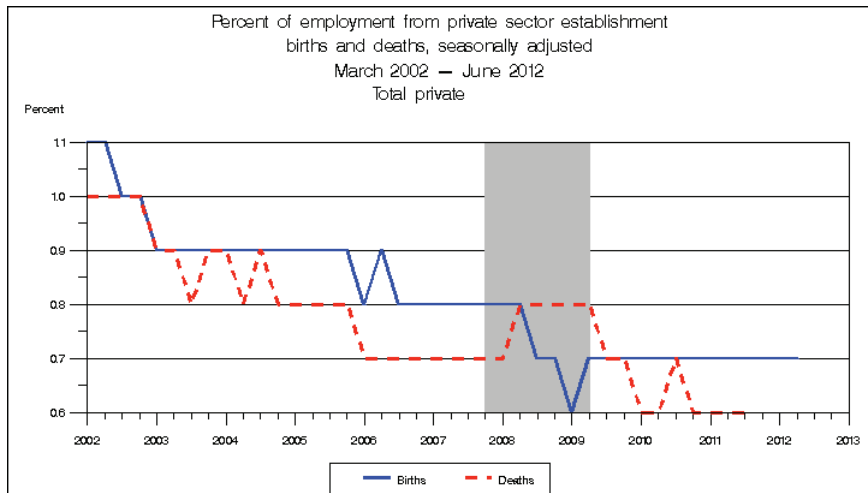
# Some graphs from BED



Source: U.S. Bureau of Labor Statistics

Note: Shaded area represents NBER defined recession period.

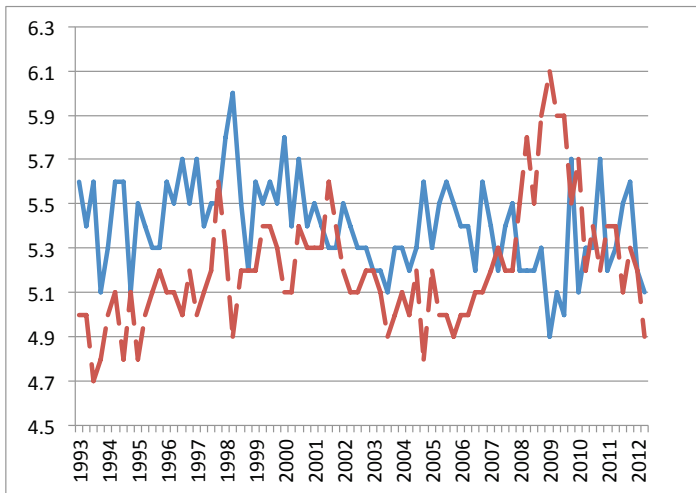
# Some graphs from BED



Source: U.S. Bureau of Labor Statistics

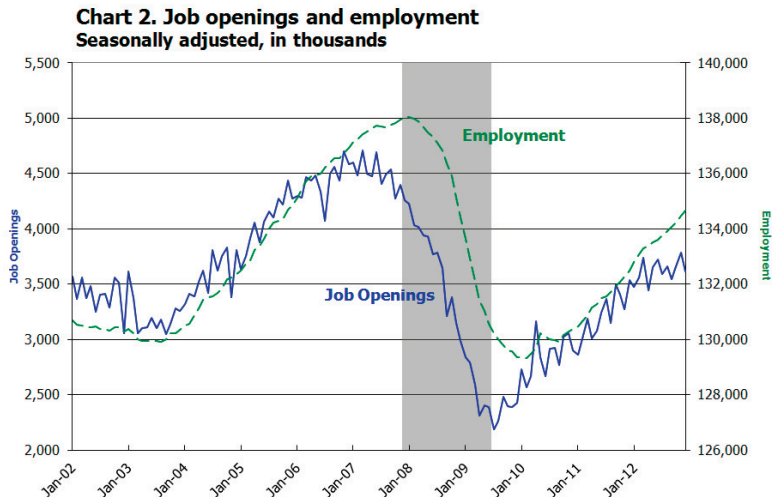
Note: Shaded area represents NBER defined recession period.

## Some graphs from BED



- ▶ Solid line is establishment opening rate and dashed line is establishment closing rate.

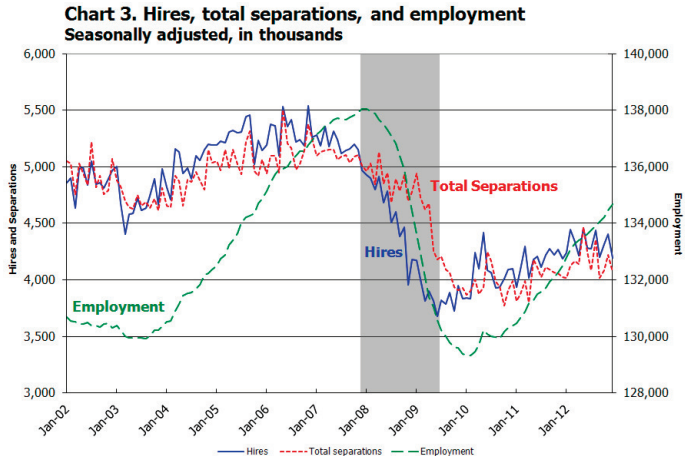
# Some graphs from JOLTS



Source: Bureau of Labor Statistics, Current Employment Statistics and Job Openings and Labor Turnover Survey, February 12, 2013.

Note: Shaded area represents recession as determined by the National Bureau of Economic Research (NBER).

# Some graphs from JOLTS



Source: Bureau of Labor Statistics, Current Employment Statistics and Job Openings and Labor Turnover Survey, February 12, 2013.

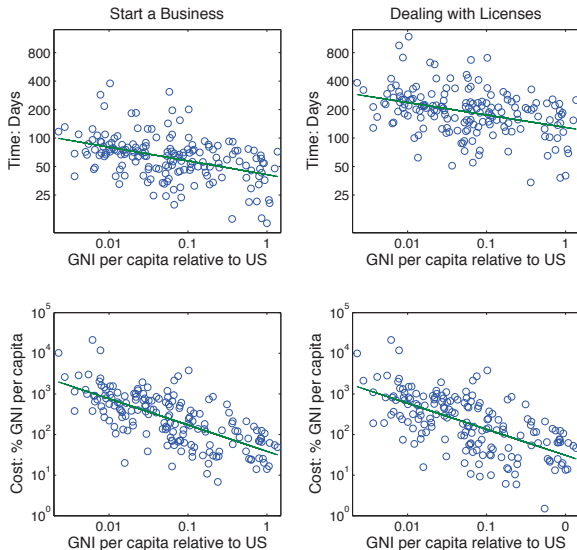
Note: Shaded area represents recession as determined by the National Bureau of Economic Research (NBER).

- ▶ Both hires and separations fall during recession.

## Barriers to reallocation

- ▶ Reallocation is important for productivity growth.
- ▶ But there are many countries that intentionally impose barriers to reallocation.
- ▶ Data: “Doing Business” dataset:  
<http://www.doingbusiness.org>
  - ▶ Measures various aspects of the ease of doing business.
  - ▶ Some are directly linked to the issue of reallocation, such as the procedures required to start a business, hiring and firing costs etc.
  - ▶ Example: in the U.S. it takes 6 days to register a firm. In Brazil, 119 days. In Suriname, 694 days.

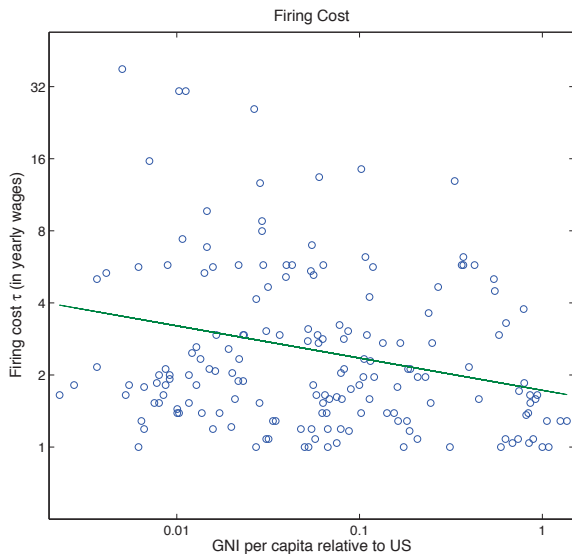
# Barriers to reallocation



Source: Moscoso Boedo and Mukoyama (2012)



# Barriers to reallocation



Source: Moscoso Boedo and Mukoyama (2012)

## What are the consequences of these barriers?

- ▶ It seems that a high-barrier country corresponds to a poor country. One natural interpretation is that the barriers reduce productivity.
- ▶ Moscoso Boedo and Mukoyama (2012) build a Hopenhayn (1992)-style industry dynamics model with entry and exit, and evaluate the effect of entry costs and firing costs on aggregate productivity. Moving these costs from the U.S. level to the average level of low-income countries reduces the TFP by 27%–34%.

## Why do they impose these barriers?

- ▶ A large part of these costs are imposed by the government (many procedures to register a firm, for example).
- ▶ They seem like “bad policies,” reducing the aggregate productivity and income.
- ▶ Then why do they impose these barriers?
- ▶ One reason: there is a subset of the economy who can gain from these policies.
  - ▶ Current incumbents gain from high entry costs.
  - ▶ Currently employed workers may gain from high firing costs.
- ▶ Mukoyama and Popov (2012) build a political economy model where industry incumbents and potential entrants lobby for the level of entry barriers. There can be multiple steady states due to **politics-economics feedback**: large political power of incumbents → high entry barriers → large political power of incumbents.

## Main takeaways

- ▶ Reallocations of productive resources have important impact on productivity.
- ▶ There are many new datasets that can be used for analyzing reallocations.
- ▶ Many countries impose policies that can become barriers to reallocation. One promising research area is to consider the interactions between politics and economics in analyzing this type of policymaking.

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