

The Firm Size Distribution

- Following the big oil price shocks of the 1970's, European labor markets experienced higher levels of unemployment than U.S. labor markets. Strict regulation of European markets (in the form of generous unemployment benefits, restrictions on firing, etc.) were thought to have led to Eurosclerosis (hardened high unemployment).
- An important question facing policymakers is "What is the quantitative impact of a job destruction tax on employment and welfare?"
- One of the first answers to the question was by Bentolila and Bertola (RESTUD, 1990). They used a partial equilibrium model of a monopolist which abstracted from entry/exit decisions and was calibrated to aggregate data. They found
 - Firing costs increase long-run employment
- Hopenhayn and Rogerson (1993, JPE, "Job Turnover and Policy Evaluation: A General Equilibrium Analysis") find
 - a tax on dismissals equal to 1 year's wages reduces long-run employment by 2.5%
 - a tax.... reduces utility by over 2% measured in terms of consumption
- The quantitative answer to this question potentially depends on whether all firms have identical job destruction and creation rates. This is the topic of Davis, S., J. Haltiwanger, S. Schuh. 1996. *Job Creation and Destruction*. Cambridge: MIT Press.
- DHS Question (p. 26): What role do plant births and deaths play in the creation and destruction of jobs? More generally, how are JC and JD distributed by plant level employment growth rates? Do JC and JD primarily involve mild expansions and contractions spread among a large number of plants or dramatic changes at a few plants?
- Key point: Shutdowns (exit) and startups (entry) are important for understanding employment data.
- Need an unbalanced panel in order to ask questions about entry and exit. **LRD** is constructed from pooling two sources:
 1. Census of Manufactures. From every manufacturing establishment with 1 or more employees, CM collects data on labor, material, and capital inputs; output, location, legal form of organization, etc.
 2. Annual Survey of Manufactures. Collects same basic stuff as CM, but in addition collects info on assets, capital expenditures, rental payments, supplemental labor costs, depreciation.

- Some definitions of variables (follow DHS):

1. Job Creation (JC). Employment gains summed over all plants that expand or start up between $t - 1$ and t .
2. Job Destruction (JD). Employment losses summed over all plants that contract or shut down between $t - 1$ and t .
3. Job Reallocation (JR). The sum of all plant level gains and losses that occur between $t - 1$ and t . (just =JC+|JD|). This is an upper bound calculation - JR is the max amount of worker reallocation induced by reshuffling employment opportunities across locations.
4. Minimum worker reallocation=max{JC,|JD|}. This is a lower bound on amount of worker reallocation required to accomodate job reallocation.

Summary of Data

1. Concentration.

- Figure 2.2 and 2.3 of DHS, p. 28-29. X-axis plant level growth rate measured as

$$g_t = \frac{EMP_t - EMP_{t-1}}{(1/2)(EMP_t + EMP_{t-1})}.$$

This way, growth rates are not ∞ for startups and not -1 for shutdowns (rather distribution is between -2 and $+2$). Also, this symmetry and boundedness property is potentially important for doing statistical work.

- Shut downs account for 23% of annual JD and startups account for 16% of annual JC. Thus, JC and JD involve dramatic events such as the startup of a new plant or the death of an old plant. Figure 2.2.
- 2/3 of all JC and JD occur at startups, shutdowns, and continuing plants that contract or expand by more than a quarter of its labor force. Figure 2.3: Startups+(25%-100%)+(>100%)=15.5+35.1+15.3=2/3, Shutdowns+(25%-100%)+(>100%)=22.9+25.6+18.4=2/3

2. Differences by size and age of firms

- Age - number of years since plant's construction or conversion
- Size - number of workers employed at a given point in time. Average size is mean over entire 63-88 period.
- Large, mature plants account for most newly created and newly destroyed jobs. Table 4.3. Size: Firms with ≥ 500 account for 69% of employment. Table 4.5. Age: Firms ≥ 10 years account for 78% of employment. Job destruction rates decline with age.

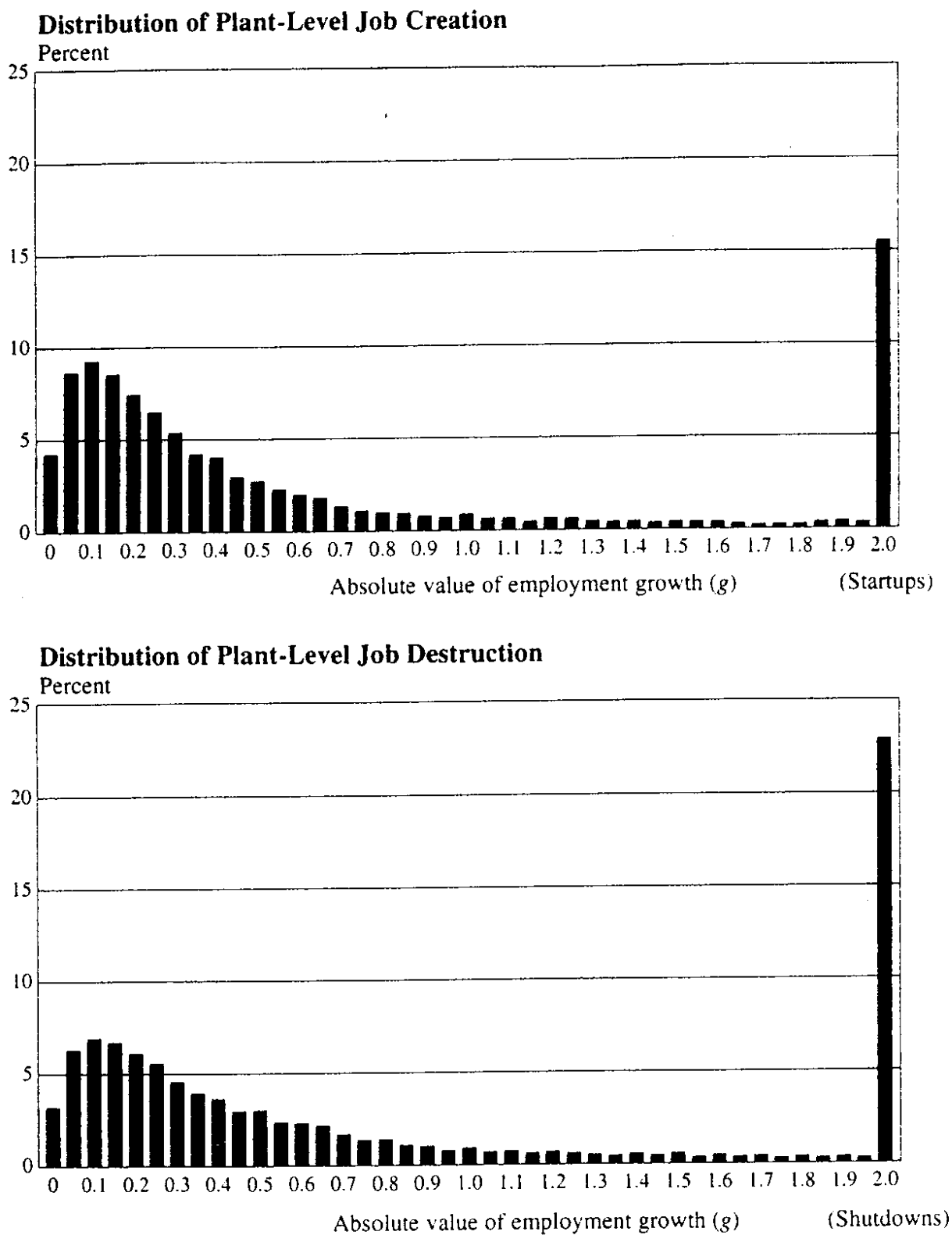
Models

Hopenhayn, H. 1992. “Entry, Exit, and Firm Dynamics in Long Run Equilibrium”, *Econometrica*, 60, p. 1127-50. (A Partial Equilibrium model of firm distribution).

Jovanovic, B. (1982) “Selection and the Evolution of Industry”, *Econometrica*, 50, p. 649-70.

- In Jovanovic, the firm draws a productivity from a distribution that is type dependent (i.e. high or low productivity types). It takes time (draws) for the firm to learn which type it is. High type firms stay in, low exit. Thus, age is the relevant state variable.
- In Hopenhayn, the firms draws persistent productivity shocks, which are the relevant state variable. Since labor is the only factor of production, this translates into an employment size measure.

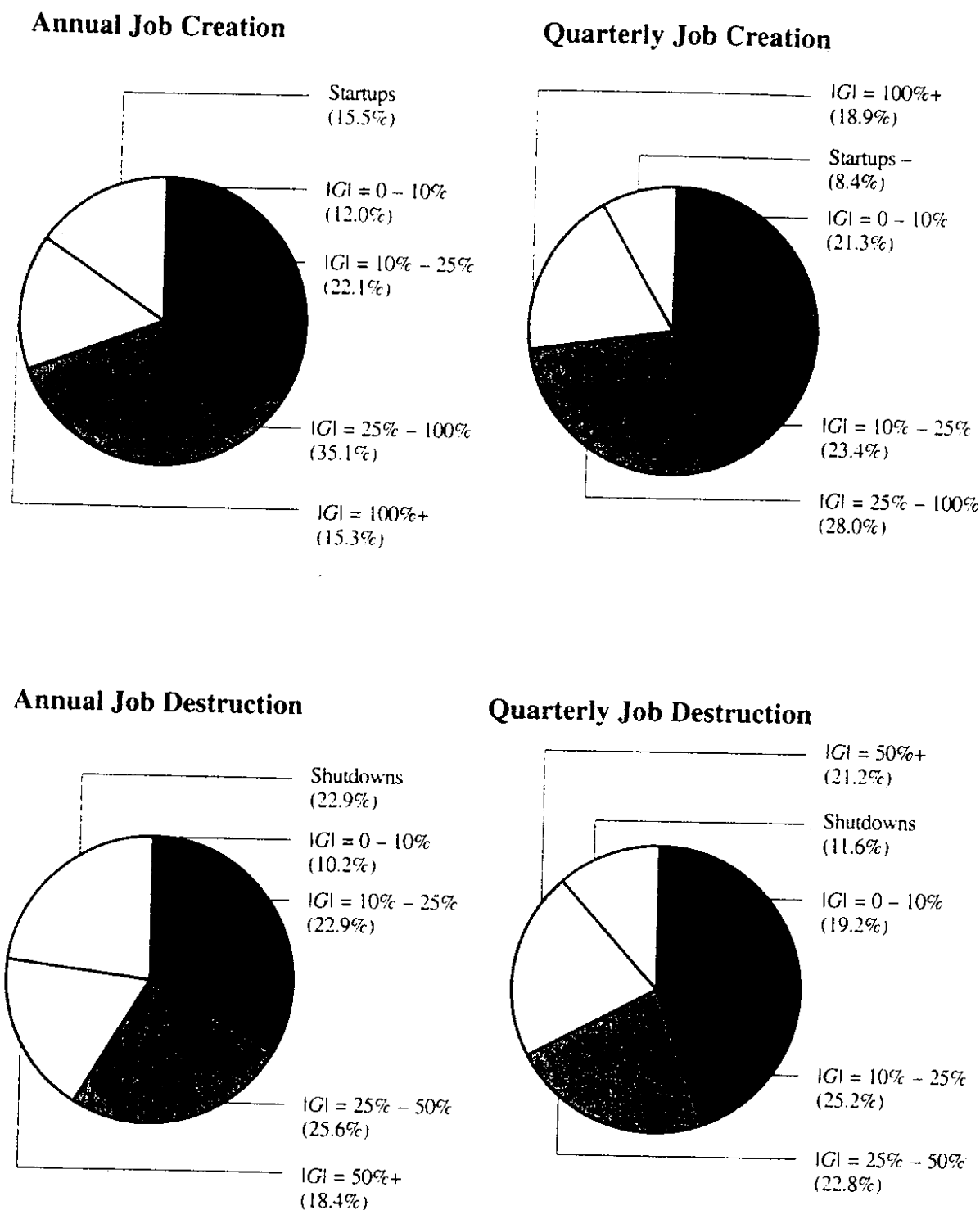
Figure 2.2
Distributions of Job Creation and Destruction:
Annual, 1973 to 1988



Note: The panels show the distributions of annual job creation and destruction by plant-level employment growth and contraction rates for the period 1973–1988.

The growth rates in this figure (g) are not the conventional measure but represent change in employment divided by the average of current and lagged employment.

Figure 2.3

Concentration of Job Creation and Destruction: 1973 to 1988

Note: The pie charts summarize the distributions of annual and quarterly job creation and destruction by plant-level employment growth and contraction rates for the period 1973-1988. The numbers in parentheses indicate shares of the total.

The growth rates in this figure (G) are the conventional measure.

Table 4.3

Shares of Gross Job Creation and Destruction by Employer Size Category: Annual Averages as Percentages of Employment, 1973 to 1988

	Job Creation	Job Destruction	Employment Share
Average Plant Size			
0 to 19 Employees.....	7.7	7.3	4.4
20 to 49	11.4	10.9	8.2
50 to 99	13.2	12.5	10.1
100 to 249	20.5	20.6	18.5
250 to 499	15.7	15.9	16.6
500 to 999	11.5	11.5	13.8
1,000 to 2,499	9.2	10.0	12.5
2,500 to 4,999	5.2	5.7	7.2
5,000 or More	5.7	5.6	8.8
Current Plant Size			
0 to 19 Employees.....	10.8	11.8	5.2
20 to 49	12.7	13.0	8.6
50 to 99	14.2	13.8	10.5
100 to 249	19.8	19.4	18.5
250 to 499	13.7	13.6	16.0
500 to 999	10.5	10.1	13.5
1,000 to 2,499	8.6	8.7	12.3
2,500 to 4,999	4.8	5.1	7.0
5,000 or More	5.0	4.6	8.4
Average Firm Size			
0 to 19 Employees.....	7.5	7.3	4.2
20 to 49	8.8	8.9	6.6
50 to 99	7.9	7.5	6.2
100 to 249	9.7	9.0	8.0
250 to 499	6.7	6.1	5.9
500 to 999	5.8	5.5	5.2
1,000 to 2,499	7.6	7.2	7.5
2,500 to 4,999	6.5	6.5	6.8
5,000 to 9,999	8.3	8.6	9.2
10,000 to 24,999	12.6	13.5	15.7
25,000 to 49,999	8.7	9.1	11.2
50,000 or More	10.1	10.9	13.5
Ownership Type			
Single-Unit.....	31.1	28.2	22.3
Multi-Unit.....	68.9	71.8	77.7

Table 4.5
Net and Gross Job Flows by Plant Age, 1973 to 1988

Mean Annual Rates							
	Job Creation	Job Destruc- tion	Job Reallo- cation	Net Growth	Excess Reallo- cation	Lower Bound	Employ- ment Share
<i>Crude Age Categories^a</i>							
Young (0-1 yrs.).....	45.8	12.5	58.4	33.3	25.1	45.8	3.1
Middle-Aged (2-10).....	12.3	13.3	25.6	-1.0	21.0	15.1	18.3
Mature (10+).....	6.9	9.4	16.3	-2.5	12.4	10.1	78.6
Standard Deviation	6.9	1.6	7.9	6.2	3.9	6.4	
<i>Detailed Age Categories^b</i>							
Births.....	200	0.0	200	200	0.0	200	0.6
1 Year Old.....	25.6	16.3	41.9	9.3	31.9	25.9	2.4
2 Years Old.....	15.2	13.8	29.0	1.4	24.6	16.7	1.5
3 Years Old.....	13.9	10.8	24.7	3.1	21.0	14.2	1.2
4-5 Years Old.....	14.7	12.1	26.9	2.6	23.5	15.1	2.6
6-10 Years Old.....	11.4	12.8	24.2	-1.5	20.7	13.9	11.3
11-14 Years Old.....	9.6	11.0	20.5	-1.4	16.6	12.2	10.7
15 Years or More.....	6.4	9.5	15.9	-3.2	11.8	10.0	69.7
Standard Deviation	15.2	1.7	14.9	15.7	4.8	14.8	

Percentages of Manufacturing

	Job Creation	Job Destruction	Employment
<i>Crude Age Categories^a</i>			
Young (0-1 yrs.).....	15.6	3.8	3.1
Middle-Aged (2-10 yrs.).....	24.8	24.0	18.3
Mature (10+ yrs.).....	59.6	72.2	78.6
<i>Detailed Age Categories^b</i>			
Births.....	12.7	0.0	0.6
1 Year Old.....	6.5	3.7	2.4
2 Years Old.....	2.5	2.1	1.5
3 Years Old.....	1.7	1.2	1.2
4-5 Years Old.....	4.2	3.1	2.6
6-10 Years Old.....	13.8	14.1	11.3
11-14 Years Old.....	11.0	11.4	10.7
15 or More Years.....	47.7	64.5	69.7

^aBased on data for 1973 through 1988. Age ranges are approximate; the precise cutoff between middle-aged and mature plants varies by year. See the Technical Appendix for details.