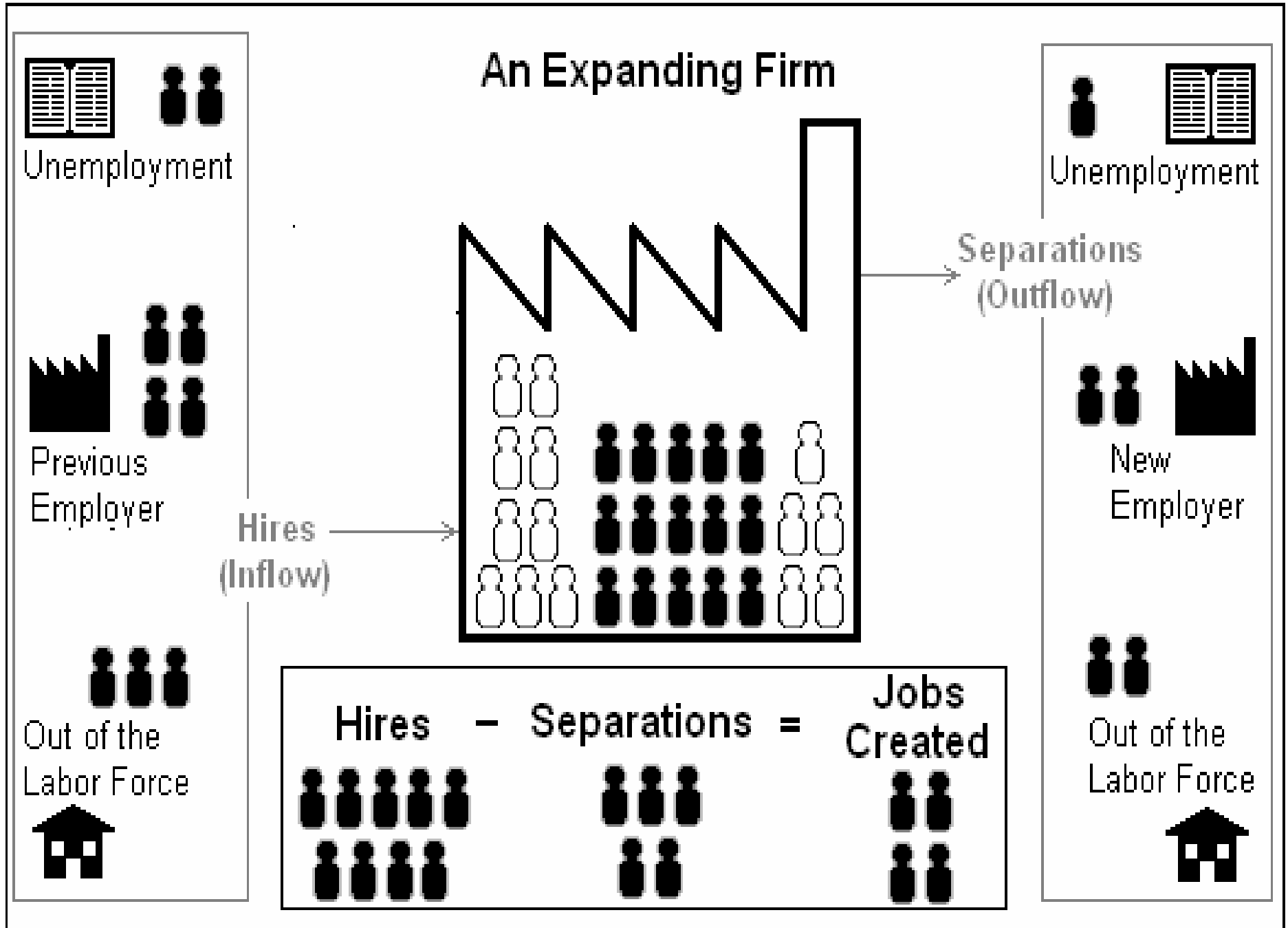
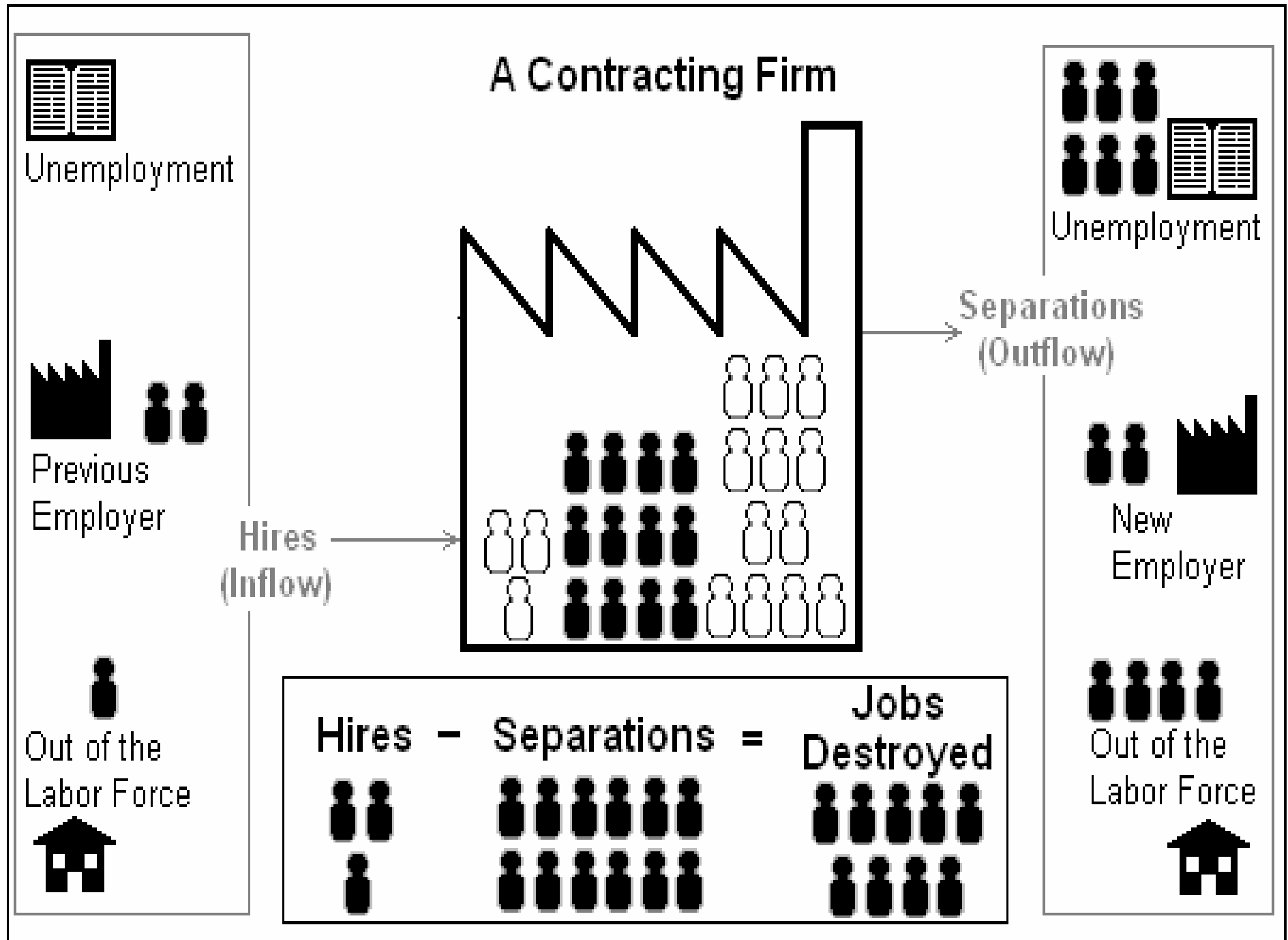


Basic Facts on Reallocation

Introduction

- Shocks:
 - Business Cycle Shocks “common” to all sectors although not common response.
 - Sectoral shocks: Industry and region
 - Idiosyncratic shocks
- Frictions:
 - Search/matching
 - Adjustment costs (capital/labor)
 - Technology adoption costs
 - Entry/exit
- Importance for macro:
 - Growth vs. Fluctuations (Emerging vs. Advanced)
 - Nonlinear micro + Heterogeneity
 - Non-representative agent approach





Job Creation and Destruction

- Job Creation: Employment gains from expanding and new businesses.
- Job Destruction: Employment losses from contracting and exiting businesses.
- Job Flows are SUBSET of worker flows!
- Measuring job flows requires longitudinal business data
 - Data infrastructure projects at Census (LBD, LEHD)
<http://lehd.dsd.census.gov/>,
<http://www.bls.gov/bdm/home.htm>,
<http://www.bsos.umd.edu/econ/haltiwanger/download.htm>, <http://www.ces.census.gov/ces.php/home>

$$g_{jkt} = (E_{jkt} - E_{jkt-1}) / X_{jkt}$$

$$ACC_{jkt} = a_{jkt} / X_{jkt}$$

$$X_{jkt} = .5(E_{jkt} + E_{jkt-1})$$

$$SEP_{jkt} = s_{jkt} / X_{jkt}$$

$$POS_{skt} = \sum_{g_{jkt} \geq 0, j \in s} (X_{jkt} / X_{skt}) g_{jkt}$$

$$EXCESSW_{jkt} = ACC_{jkt} + SEP_{jkt} - |g_{jkt}|$$

$$NEG_{skt} = \sum_{g_{jkt} < 0, j \in s} (X_{jkt} / X_{skt}) |g_{jkt}|$$

$$EXCACC_{jkt} = ACC_{jkt} - |\max(g_{jkt}, 0)|$$

$$NET_{skt} = POS_{skt} - NEG_{skt}$$

$$EXCSEP_{jkt} = SEP_{jkt} - |\min(g_{jkt}, 0)|$$

$$SUM_{skt} = POS_{skt} + NEG_{skt}$$

$$ACC_{skt} = \sum_{j \in s} (X_{jkt} / X_{skt}) ACC_{jkt}$$

$$SEP_{skt} = \sum_{j \in s} (X_{jkt} / X_{skt}) SEP_{jkt}$$

$$EXCESSJ_{skt} = SUM_{skt} - |NET_{skt}|$$

$$EXCESSW_{skt} = \sum_{j \in s} (X_{jkt} / X_{skt}) EXCESSW_{jkt}$$

j=firm/establishment, k=worker type, s=sector

Basic Facts

- Magnitude
 - Relationship to worker flows
- Productivity Dynamics?
- Concentration
- Persistence
- Idiosyncratic Shocks
- Cyclicalities
- By Plant Characteristics
- Along the way: U.S. vs. Europe vs. Emerging vs. Transition

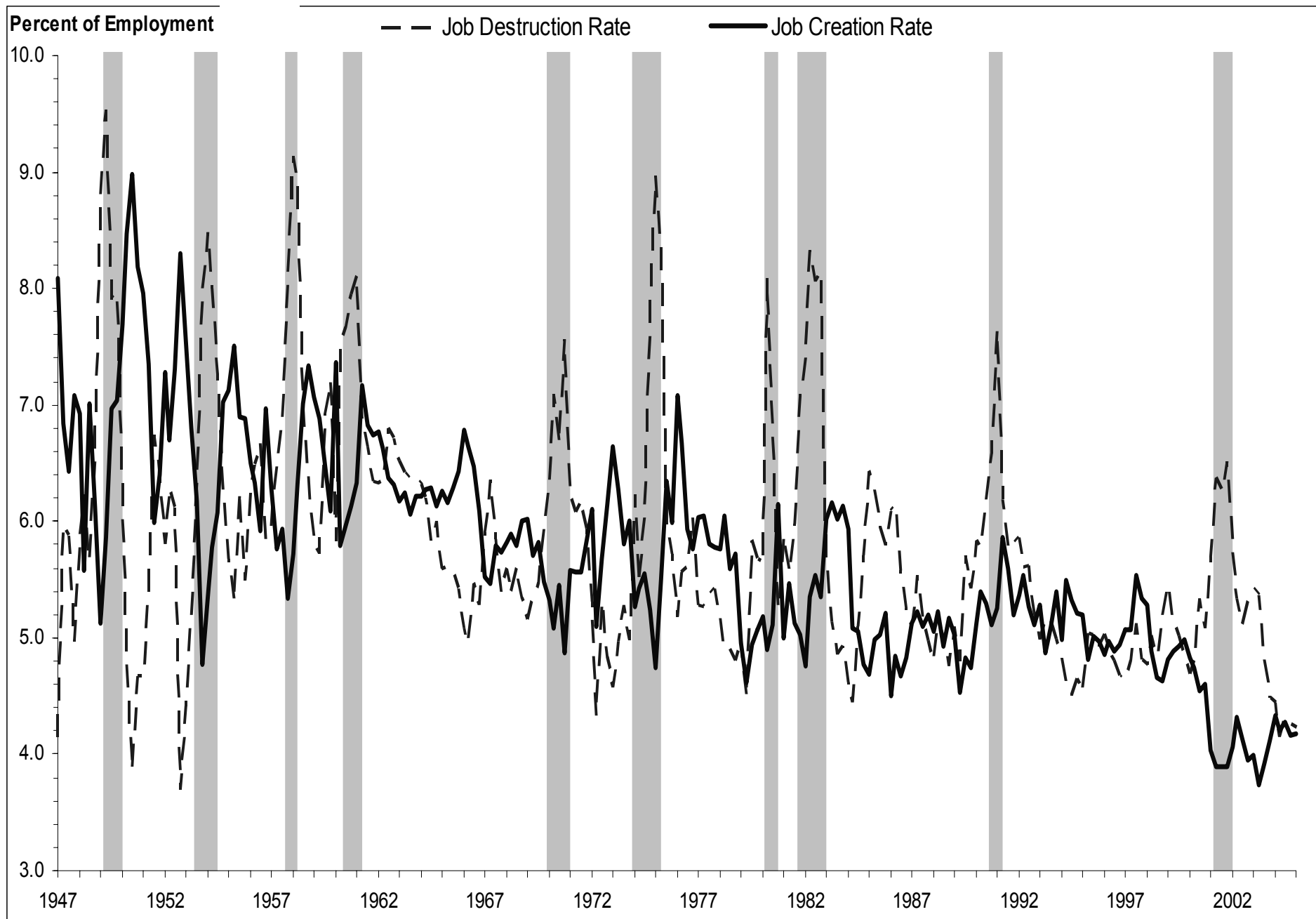
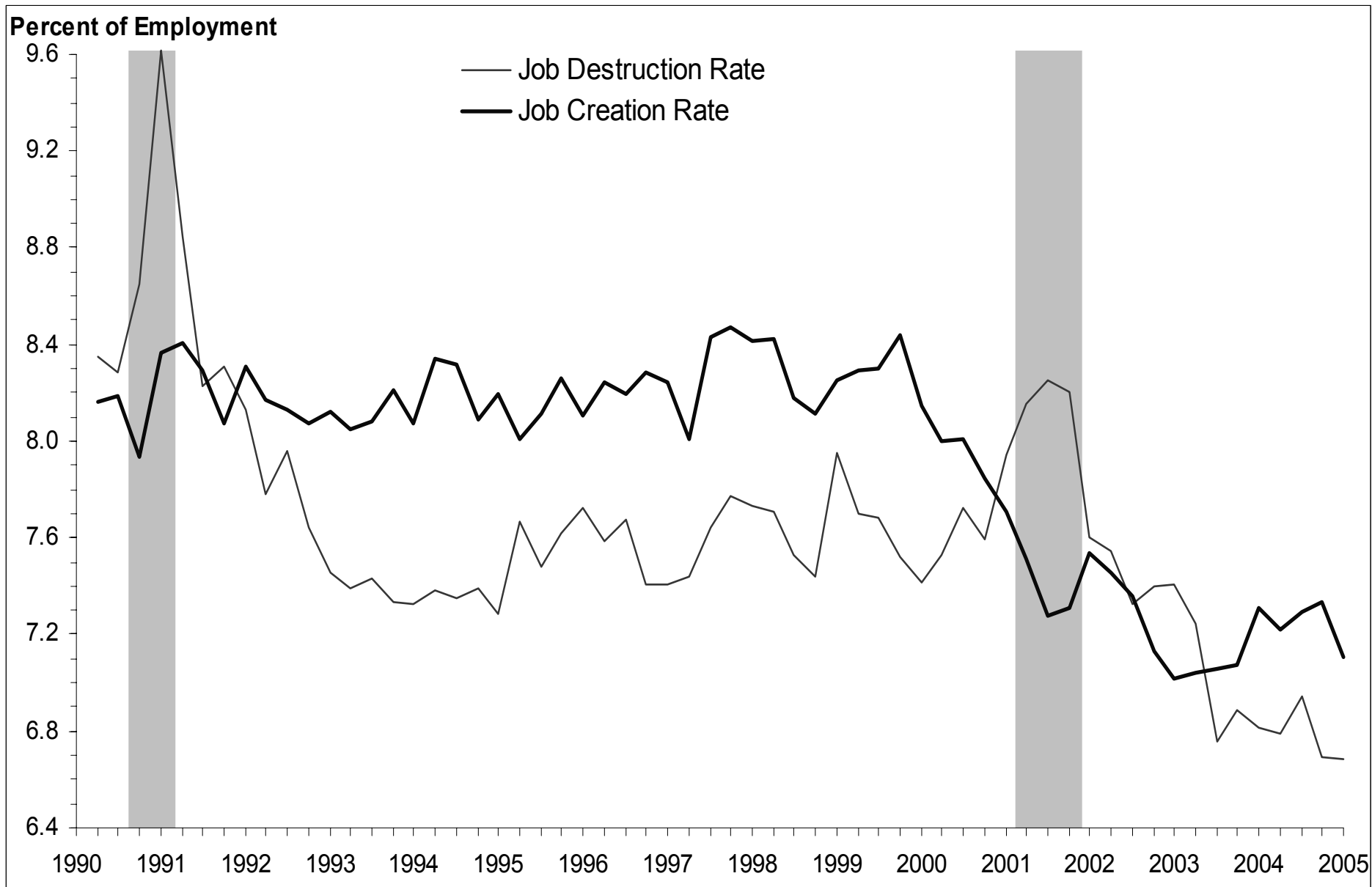


Figure 5. Quarterly Job Flows in Manufacturing, Seasonally Adjusted, 1947-2005



Quarterly Job Flows in the U.S. Private Sector, Seasonally Adjusted, 1990-2005

Magnitude

- Quarterly: Approximately 6%
- Annual: Approximately 11%
- Five-year: Approximately 35%
- Ten-year: Approximately 60%
- Varies SUBSTANTIALLY by industry and plant characteristic
- Important transitory and permanent components
- About 1/3 to 1/2 of Worker Flows

Sampling Frequency and Data Source	Job Creation	Job Destruction	Hires	Separations
Monthly				
JOLTS, continuous monthly units from microdata, Dec-00 to Jan-05	1.5	1.5	3.2	3.1
Quarterly				
JOLTS, continuous quarterly units from microdata, Dec-00 to Jan-05	3.4	3.1	9.5	9.2
BED, all private establishments, 1990:2-2005:1	7.9	7.6	---	---
LEHD, all transitions, ten selected states, 1993:2-2003:3	7.0	6.0	25.0	24.0
LEHD, "full-quarter" transitions, ten selected states, 1993:2-2003:3	7.6	5.2	13.1	10.7
Annual				
BED, from Pinkston and Spletzer (2004), private establishments, 1998-2002	14.6	13.7	---	---

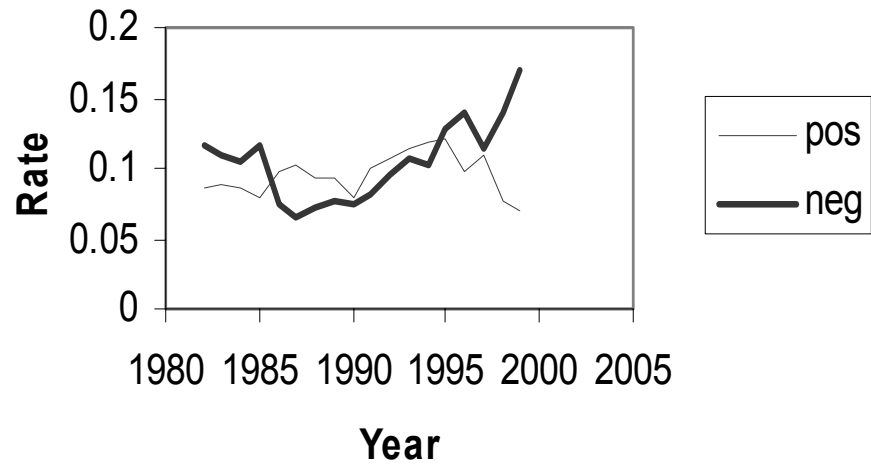
Table: Gross Reallocation of Outputs and Inputs in U.S. Manufacturing and Retail Trade

Measure	Creation (Expansion) Rate	Share of Creation (Expansion) Due to Entrants	Destruction (Contraction) Rate	Share of Destruction (Contraction) Due to Exits	Fraction of Excess Reallocation Within 4-digit Industry
Manufacturing, 1977-87					
Real Gross Output	49.4	0.44	34.4	0.61	0.80
Employment	39.4	0.58	45.8	0.62	0.75
Capital Equipment	46.1	0.42	37.1	0.51	0.71
Capital Structures	44.9	0.44	48.4	0.42	0.69
Retail Trade, 1987-97					
Employment	70.3	0.85	55.7	0.83	0.96
Real Output	72.6	0.81	46.6	0.80	0.98

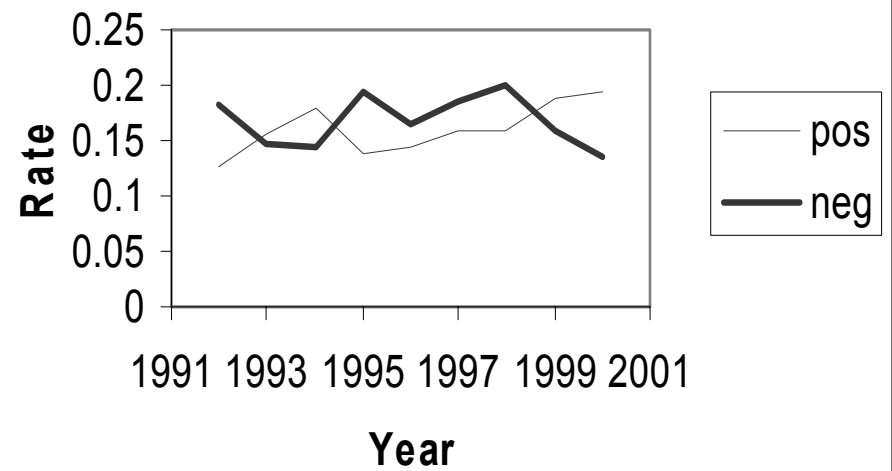
Source: Tabulations from the Census of Retail Trade **and Census of Manufacturers**

Country	Period	Coverage	Employer Unit	Job Crea- tion	Job Destruc- tion	Net Growth
Australia	1984-85	Manufacturing	Establishments	16.1	13.2	3.9
Canada	1974-92	Manufacturing	Establishments	10.9	11.1	-0.2
Canada	1983-91	All Employees	Firms	14.5	11.9	2.6
Chile	1976-86	Manufacturing	Establishments	13.0	13.9	-1.0
Colombia	1977-91	Manufacturing	Establishments	12.5	12.2	0.3
Denmark	1983-89	Private Sector	Establishments	16.0	13.8	2.2
Denmark	1981-91	Manufacturing	Establishments	12.0	11.5	0.5
Estonia	1992-94	All Employees	Firms	9.7	12.9	-2.2
Finland	1986-91	All Employees	Establishments	10.4	12.0	-1.6
France	1984-92	Private Sector	Establishments	13.9	13.2	0.6
France	1985-91	Manufacturing	Firms	10.2	11.0	-0.8
France ¹	1985-91	Nonmanufacturing	Firms	14.3	11.8	2.4
Germany	1983-90	All Employees	Establishments	9.0	7.5	1.5
Germany(Lower Saxony)	1979-93	Manufacturing	Establishments	4.5	5.2	-0.7
Italy ²	1984-93	Private Sector	Firms	11.9	11.1	0.8
Israel	1971-72	Manufacturing	Establishments	9.7	8.2	1.5
Morocco	1984-89	Manufacturing	Firms	18.6	12.1	6.5
Netherlands	1979-93	Manufacturing	Firms	7.3	8.3	-1.0
New Zealand	1987-92	Private Sector	Establishments	15.7	19.8	-4.1
Norway	1976-86	Manufacturing	Establishments	7.1	8.4	-1.2
Sweden	1985-92	All Employees	Establishments	14.5	14.6	-0.1
USA	1973-93	Manufacturing	Establishments	8.8	10.2	-1.3
USA ³	1979-83	Private Sector	Establishments	11.4	9.9	1.4
USA ^c	1979-83	Manufacturing	Establishments	10.2	11.5	-1.3
United Kingdom	1985-91	All Employees	Firms	8.7	6.6	2.1

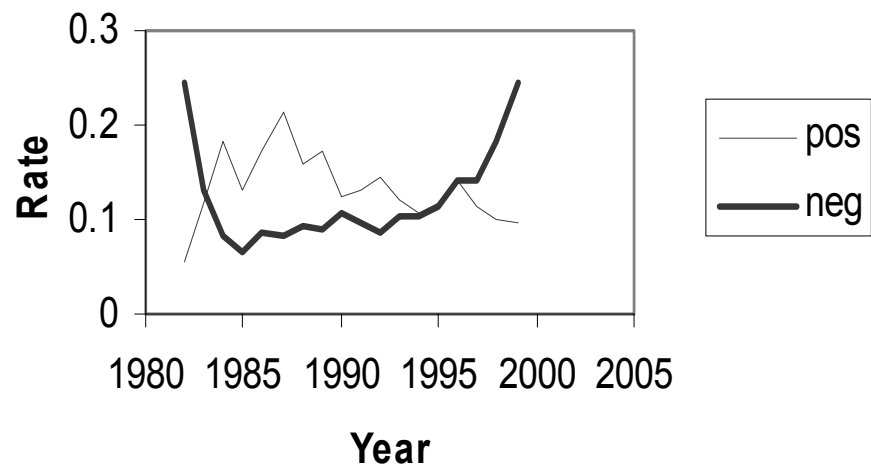
Colombia



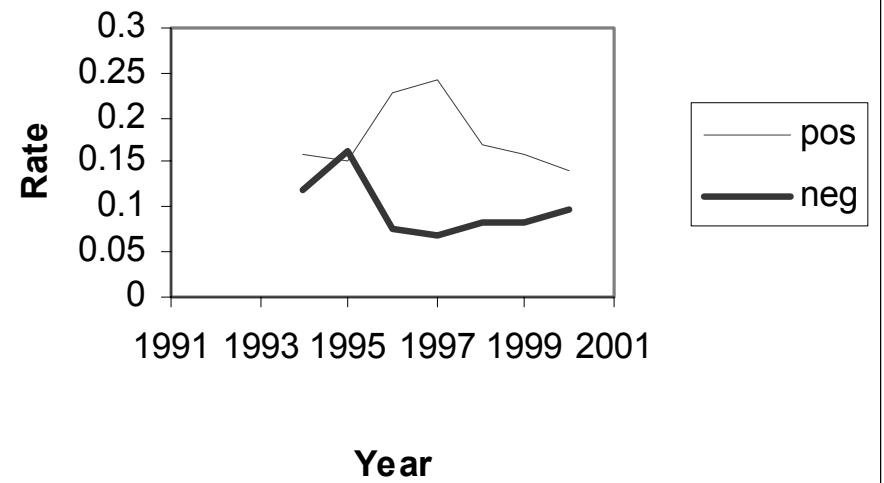
Brazil



Chile



Mexico



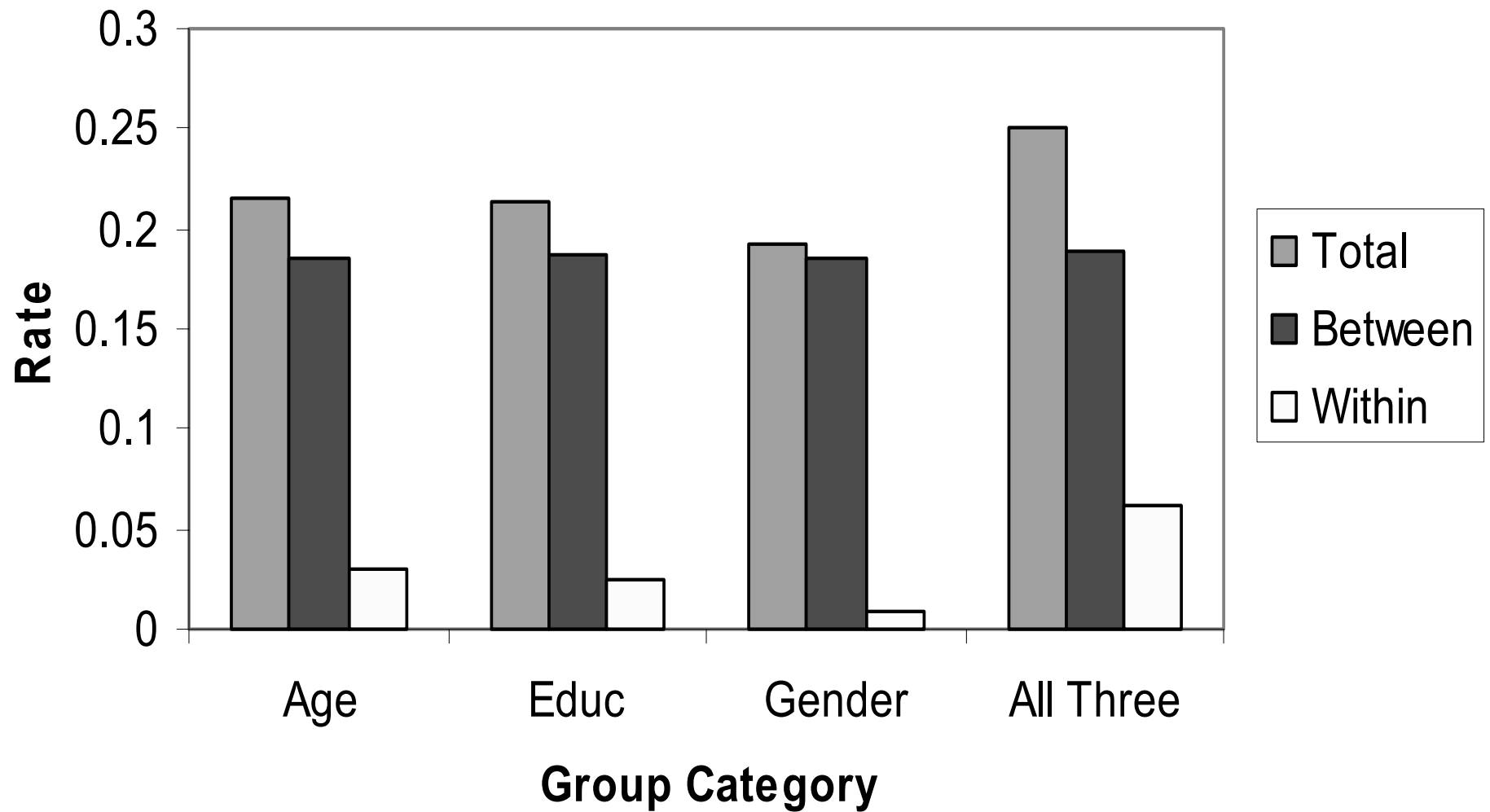
Average Quarterly Job and Worker Flow Rates in the BED, 1990:2 – 2005:1

	<i>Job Creation</i>	<i>Job Destruction</i>	<i>Net Growth</i>
Total Private	7.9	7.6	0.3
Construction	14.3	13.9	0.4
Manufacturing	4.9	5.3	-0.4
Retail Trade	8.1	7.9	0.2
Professional & Business Services	9.9	9.1	0.8
Leisure & Hospitality	10.7	10.2	0.5

	<i>Hires</i>	<i>Separations</i>	<i>Quits</i>	<i>Layoffs</i>	<i>Layoffs Per</i>	
					<i>Quit</i>	<i>Destroyed Job</i>
Total Nonfarm	3.2	3.1	1.7	1.1	0.7	0.8
Construction	5.3	5.5	2.1	3.2	1.5	1.1
Manufacturing	2.2	2.7	1.2	1.2	1.1	0.8
Retail Trade	4.3	4.2	2.6	1.3	0.5	0.7
Professional & Business Services	4.2	3.9	2.0	1.6	0.8	1.0
Leisure & Hospitality	6.1	5.9	3.9	1.8	0.5	0.7

Study	Coverage	Employer Unit	Between Reallocation Rate	Within Reallocation Rate
Hamermesh et al (1996), Table 2	Netherlands, All Sectors, 1988-90	Firms	6.2	0.8
Largarde et al (1994), Table 1	France, All Sectors, 1984-91	Establishments	7.9	6.7
Dunne et al (1997), Table 5	USA, Manufacturing 1972-88	Establishments	19.2	2.7

Slovenia. Total, Within Firm and Between Firm Job Reallocation (By Worker Type)



Country/State	Coverage	Sampling Frequency	Accession Rate	Job Creation Rate	Separation Rate	Job Destruction Rate
USA (Selected States)	Private Sector	Quarterly	22.3	7.1	21.4	6.4
USA (Selected States)	Manufacturing	Quarterly	24.7	5.8	24.6	6.2
USA -- Maryland	Private Sector ¹	Quarterly	18.4	9.0	18.7	9.3
USA -- Maryland	Manufacturing	Quarterly	12.9	7.5	14.2	8.8
Denmark	Manufacturing	Annual	28.5	12.0	28.0	11.5
Netherlands	Manufacturing ²	Annual	16.3	7.3	15.7	8.3
Norway	Manufacturing	Annual	21.0	11.0	23.0	13.0
Norway	Banking and Insurance	Annual	21.0	12.5	22.0	14.5

Productivity Decomposition

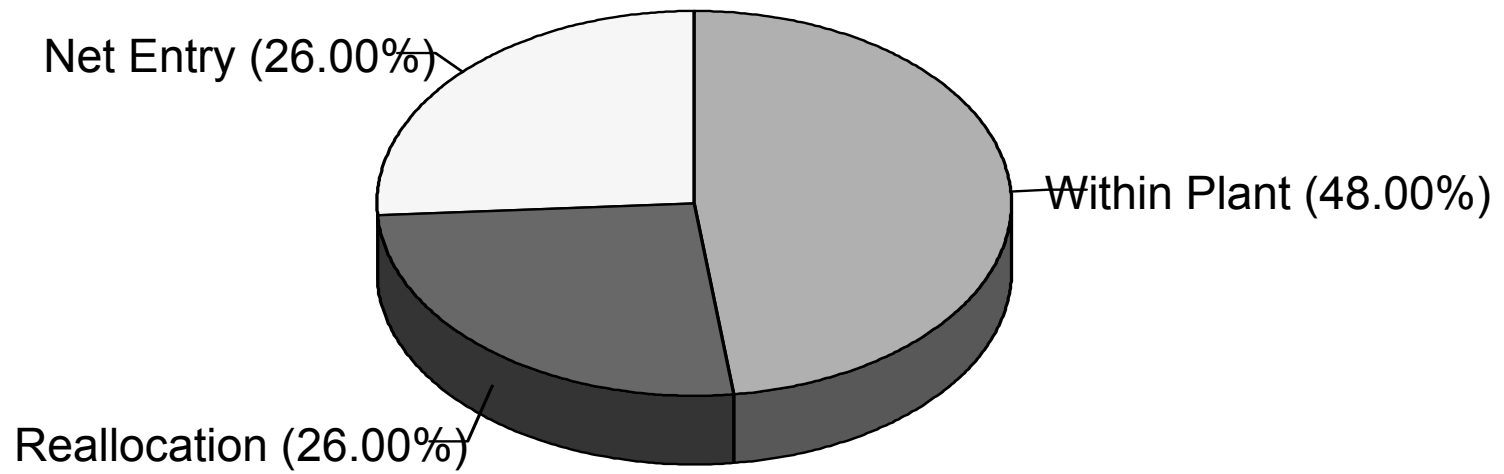
$$P_{it} = \sum_{e \in i} s_{et} P_{et}$$

Within, Between, Cross, Entry and Exit effects

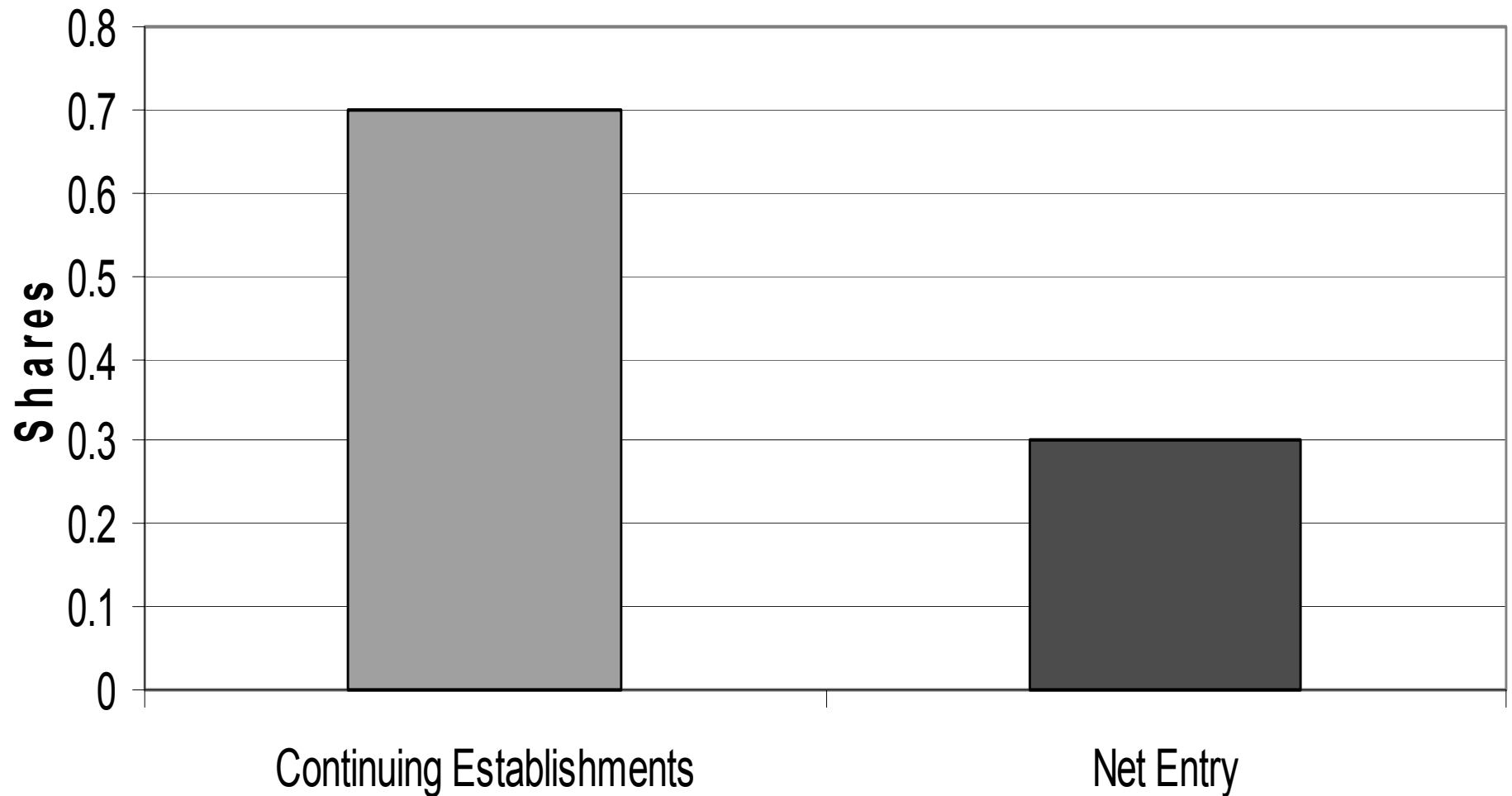
$$\Delta P_{it} = \sum_{\epsilon \in C} s_{\epsilon t-k} \Delta P_{\epsilon t} + \sum_{\epsilon \in C} \Delta s_{\epsilon t} (P_{\epsilon t-k} - P_{it-k}) + \sum_{\epsilon \in C} \Delta P_{\epsilon t} \Delta s_{\epsilon t} + \sum_{\epsilon \in N} s_{\epsilon t} (P_{\epsilon t} - P_{it-k}) - \sum_{\epsilon \in X} s_{\epsilon t-k} (P_{\epsilon t-k} - P_{it-k})$$

- Key Issues:
1. Longitudinal links
 2. Horizon
 3. Measurement

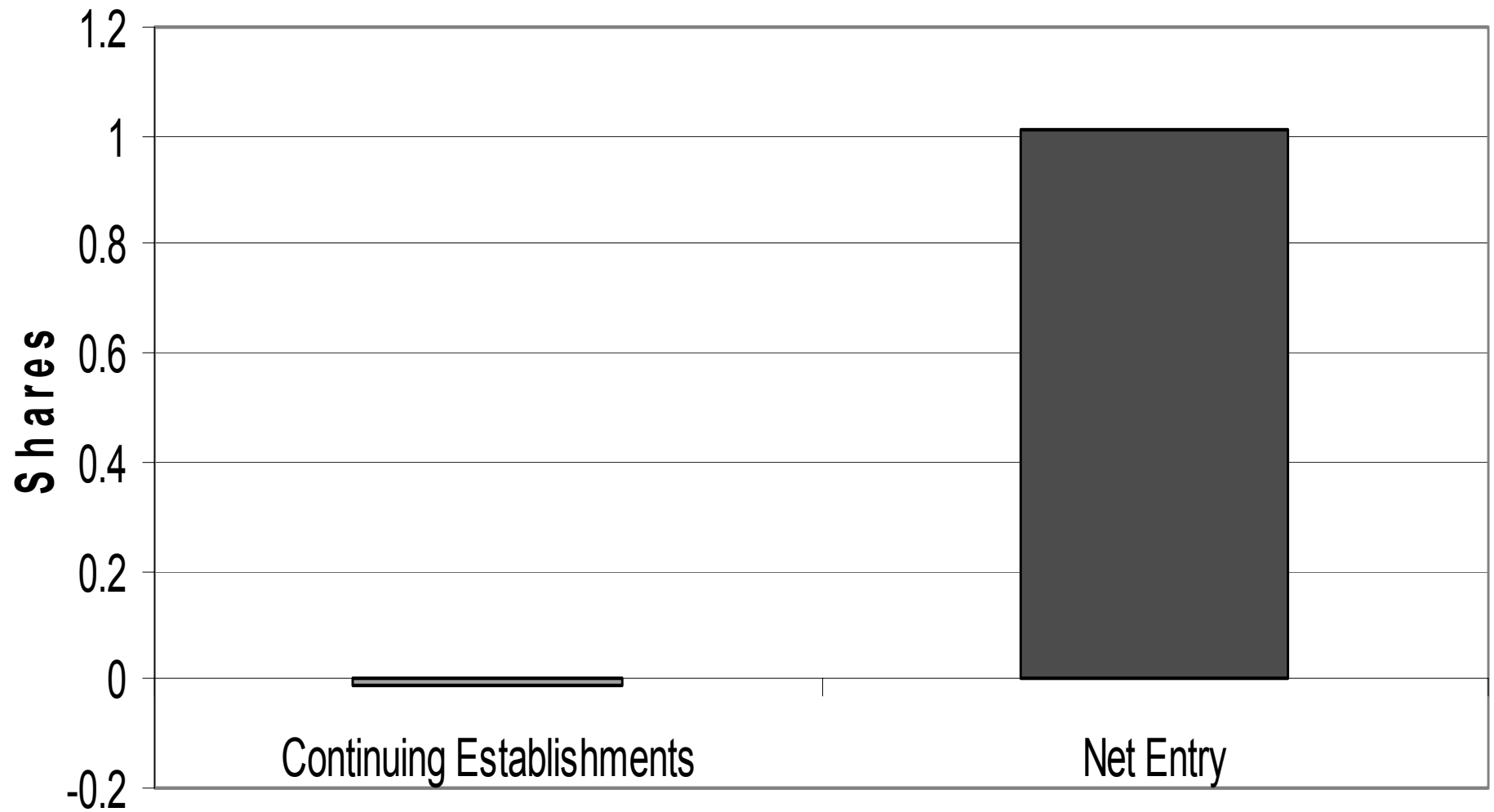
Decomposition of TFP in U.S. Mfg 1977-1987



Contribution of Continuing Establishments vs. Net Entry to U.S. Manufacturing Labor Productivity Growth, 1977-87



Contribution of Continuing Establishments vs. Net Entry to U.S. Retail Trade Labor Productivity Growth, 1987-97

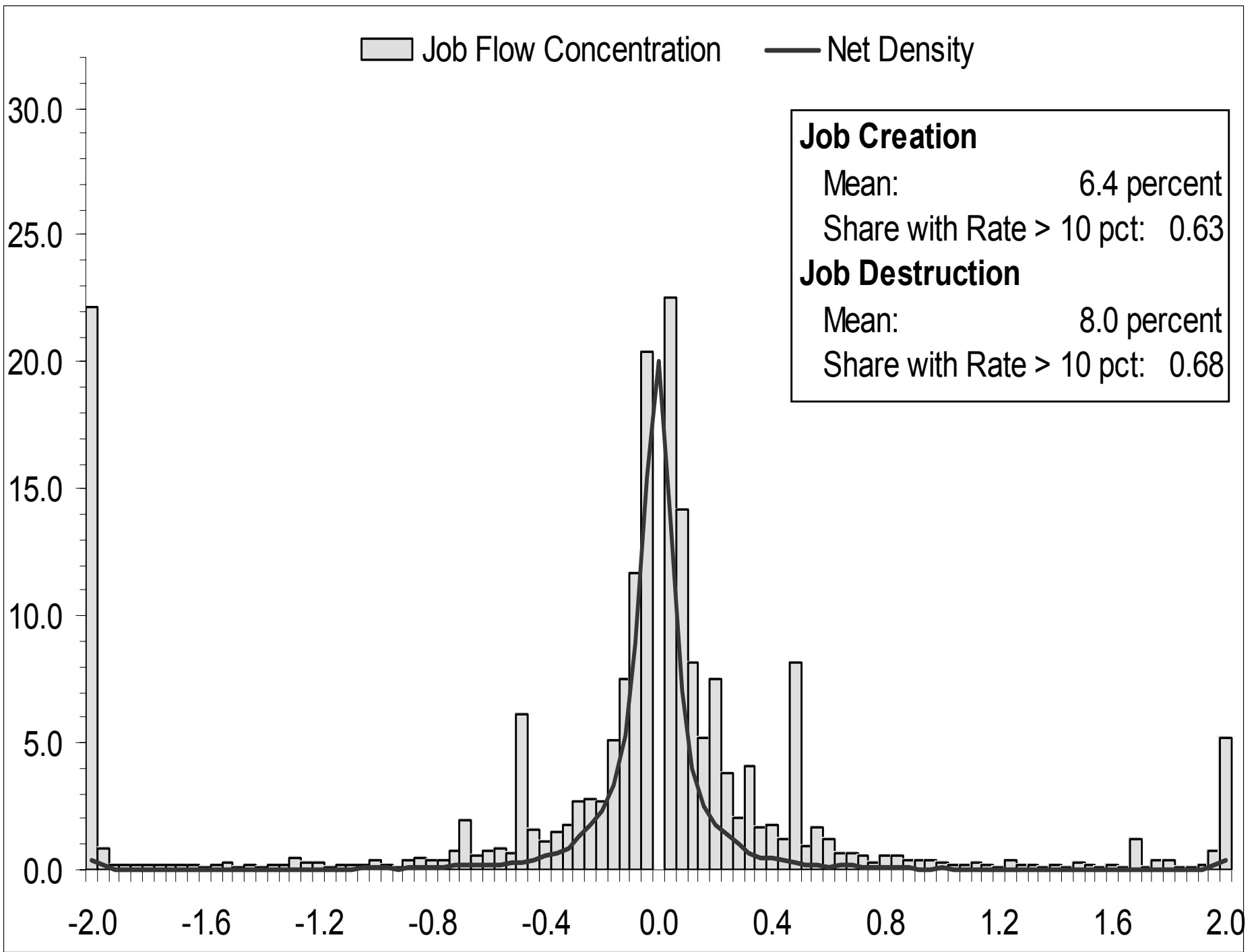


Comments on Decomposition in Literature

- Some question about how to interpret aggregate index defined in this manner
 - Typical check (e.g., BHC and FHK) to see how this index performs relative to standard aggregate measures
 - Common result – magnitudes very similar and correlations high
 - Not clear what correct aggregate index is
 - Standard aggregate indexes not well-justified on theoretical grounds (e.g., Fisher – conditions under which aggregate production function exists are very stringent)
 - Standard decomposition summarizes activity weighted micro distribution taking into account unbalanced panel

Concentration

- For Manufacturing, more than 2/3 of creation/destruction accounted for by large (greater than 25% changers). Births account for 20% of annual creation, Deaths account for 25% of annual destruction.
- For non-mfg, entry/exit play an even larger role.
- Contribution of entry/exit larger over longer horizons.
- Importance:
 - Job flows can't be fully accommodated by attrition/worker flows
 - Adjustment costs?



Country	Percent of Job Creation or Destruction Accounted for by Plants with Growth Rates in the Indicated Interval					
	[-2,-1)	[-1,-.2)	[-0.2,0)	(0,0.2]	(0.2,1]	(1,2]
United States	32.9	44.0	23.1	30.7	45.1	24.2
Canada	77.7		22.3	24.8		75.2
Denmark	45.9	33.7	20.4	23.4	37.4	39.1
Israel	84.7		15.3	21.8		78.2

Persistence

- Measured as the fraction of the change that persists for 1 year.
- Roughly 50 percent of quarterly job flows persistent
- Roughly 70-80 percent of annual job flows persistent

Country	USA		Denmark		Netherlands		Norway	
	1973-88		1980-91		1979-93		1977-86	
Horizon	One Year	Two Years	One Year	Two Years	One Year	Two Years	One Year	Two Years
Job Creation	70.2	54.4	71.0	58.0	77.9	58.8	72.7	65.1
Job Destruction	82.3	73.6	71.0	58.0	92.5	87.3	84.2	79.8

Between vs. Within Sector Shifts

- Decomposition of Excess Reallocation into Between/Within Components.
- 4-digit industry accounts for 13% of Mfg.; less for other sectors.
- 2-digit, state accounts for 14% of Mfg;
- 2-digit, region, size, age, ownership (14,400 sectors in Mfg) accounts for only 39% of Mfg.
- Idiosyncratic Shocks Dominate!

Decomposition of excess job reallocation

$$EXCESSJ(k)_{st} = (SUM_{st} - |NET_{st}|) + \left(\sum_{j \in S} (X_{jt} / X_{st}) \right) \left(\sum_k (X_{jkt} / X_{jt}) |g_{jkt}| \right) - |g_{jt}|$$

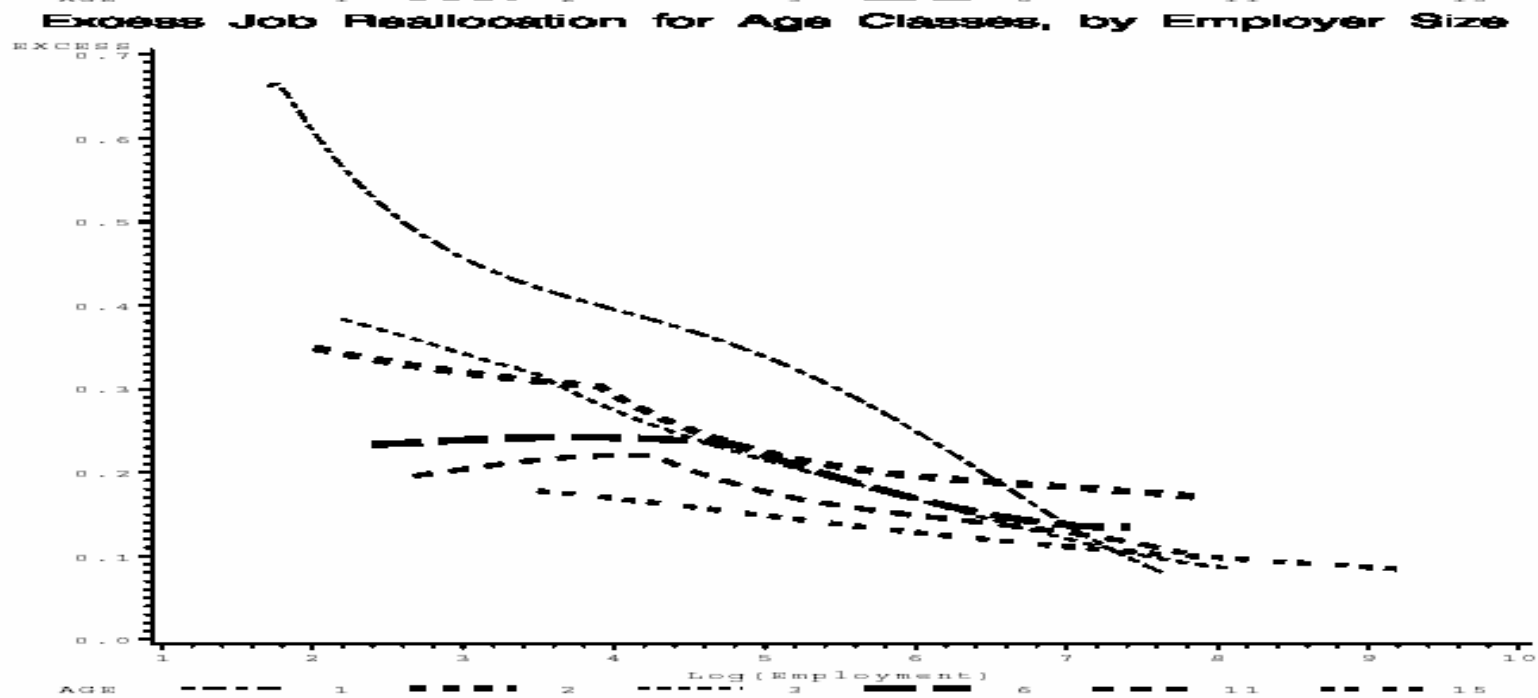
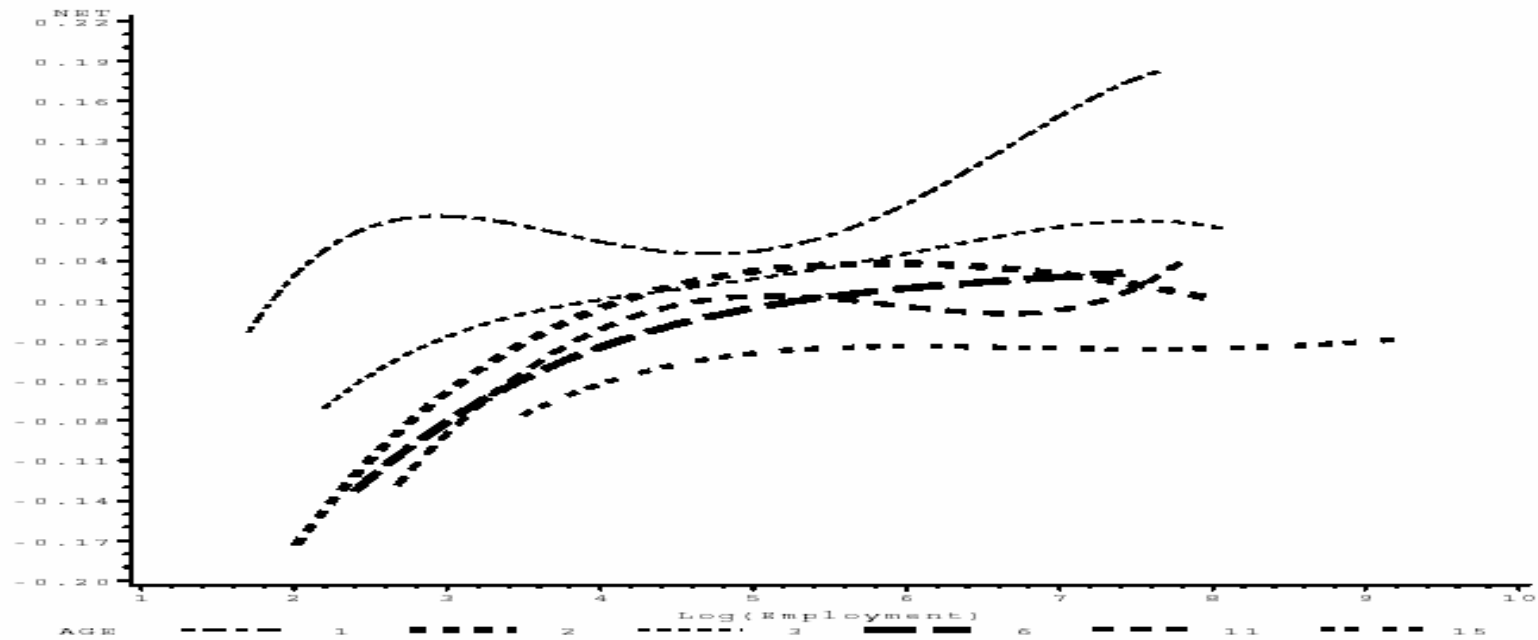
Country	Period	Unit of Analysis	Number of Sectors	Average Number of Workers per Sector (in thousands)	Fraction Resulting from Shifts Between Sectors
USA	1972-88	plant	448/456	39.1 ¹	0.13
USA	1972-88	plant	980	17.9	0.14
Denmark	1983-89	plant	8	196.1	0.00
Finland	1986-91	plant	27	48.9	0.06
Germany	1983-90	plant	24	1171.2	0.03
Italy	1986-91	firm	28	321.5	0.02
Netherlands	1979-93	firm	18	10.0	0.20
Sweden	1985-91	plant	28	112.4	0.03
Norway	1976-86	plant	142	2.4	0.06
France 1	1984-88	plant	15	883.3	0.06
France 2	1985-91	firm	600	36.6	0.17
France 3	1984-91	plant	100		0.12
New Zealand	1987-92	plant	28	27.5	0.01
Chile	1979-86	plant	69	3.7	12.2
Colombia	1977-91	plant	73	6.31	13.2
Morocco	1984-89	plant	61	4.0	16.9

Sectoral Differences in Flows

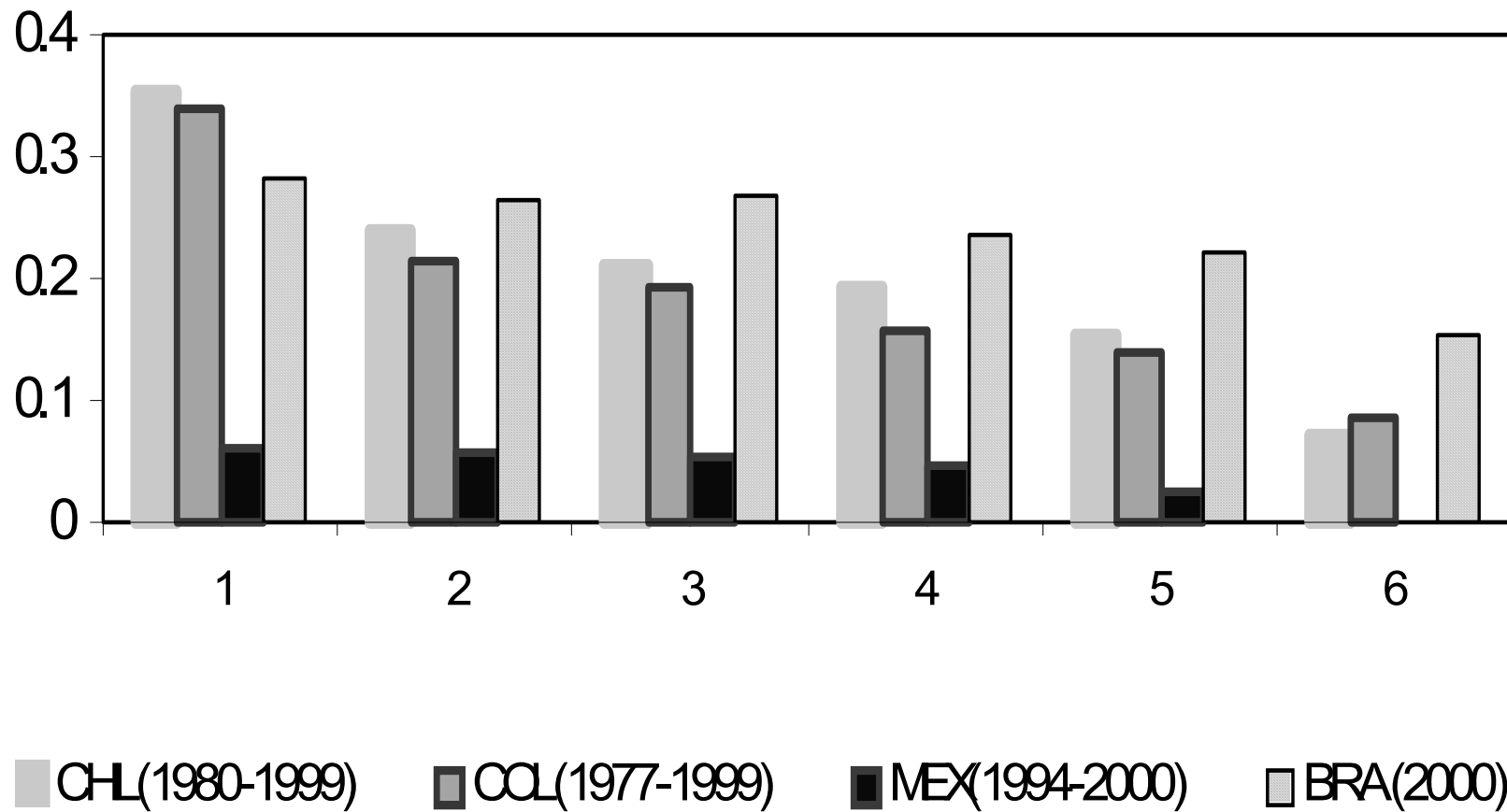
- Non-manufacturing greater than manufacturing.
- Small, young, single unit, low wage businesses more likely to create and destroy jobs.
- These factors are highly interrelated!

	Country	USA	Canada	Netherlands	Norway
Industry	Period	1974-92	1974-92	1979-93	1976-86
Food		17.9	19.5	18.4	15.3
Tobacco		12.7	12.3		
Textiles		16.9	21.3	19.1	18.3
Apparel		25.2	27.8	23.4	
Lumber		25.8	26.2	20.8	15.7
Furniture		20.7	27.7		
Paper		12.5	11.1	14.6	12.6
Printing		17.1	22.0	16.3	
Chemicals		14.0	18.7	12.1	12.7
Petroleum		14.2	15.6	10.1	13.2
Rubber		20.3	21.5	12.1	
Leather		22.4	24.2	17.5	
Stone, Clay, Glass		20.4	23.0	15.6	
Primary Metals		16.0	13.3	5.2	6.3
Fabricated Metals		20.0	27.7	18.8	18.7
Nonelectric Machinery		20.5	27.8	16.4	
Electric Machinery		19.5	24.6	11.3	
Transportation		18.4	20.6	14.6	
Instruments		10.5		19.7	
Miscellaneous		14.4	28.1	28.5	18.3
Total Manufacturing		19.0	21.9	15.6	15.5

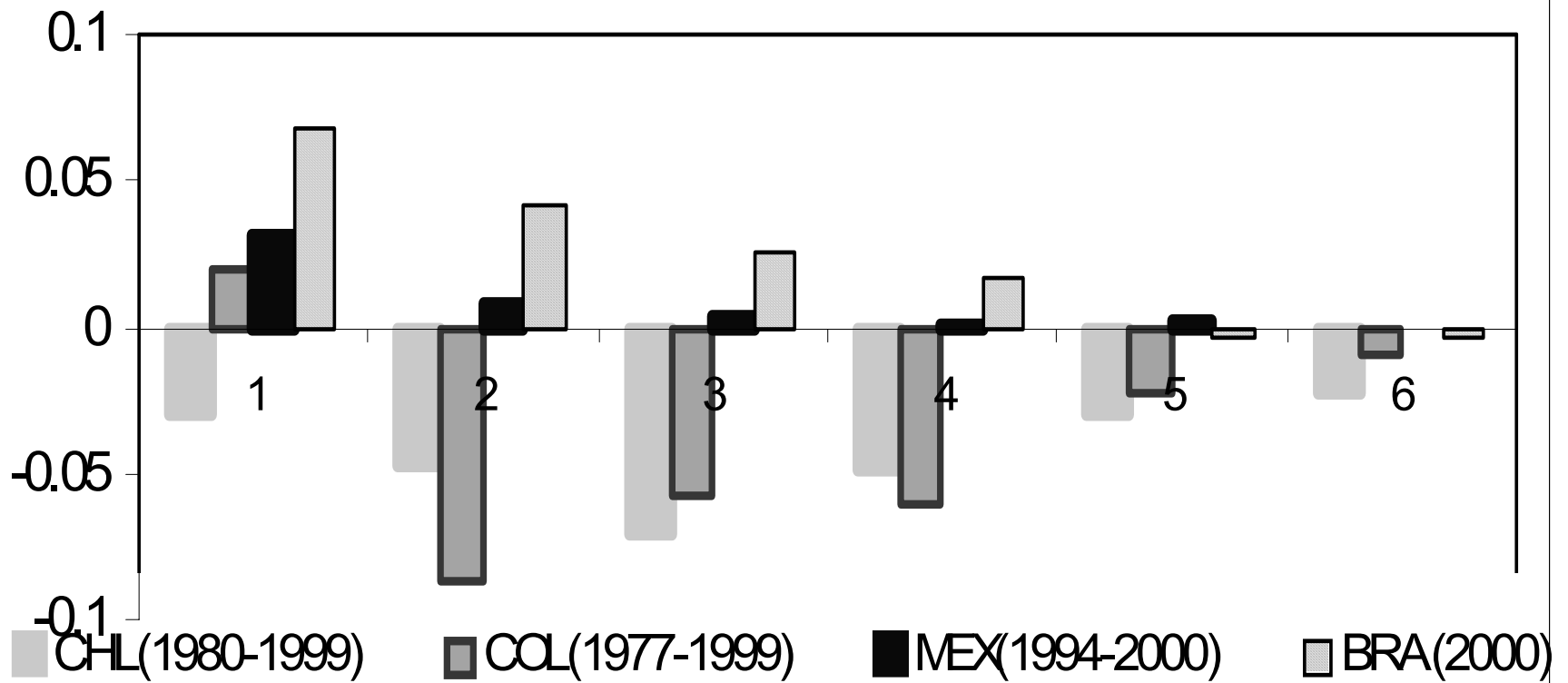
Figure 3.2
Net Growth Rate for Age Classes, by Employer Size



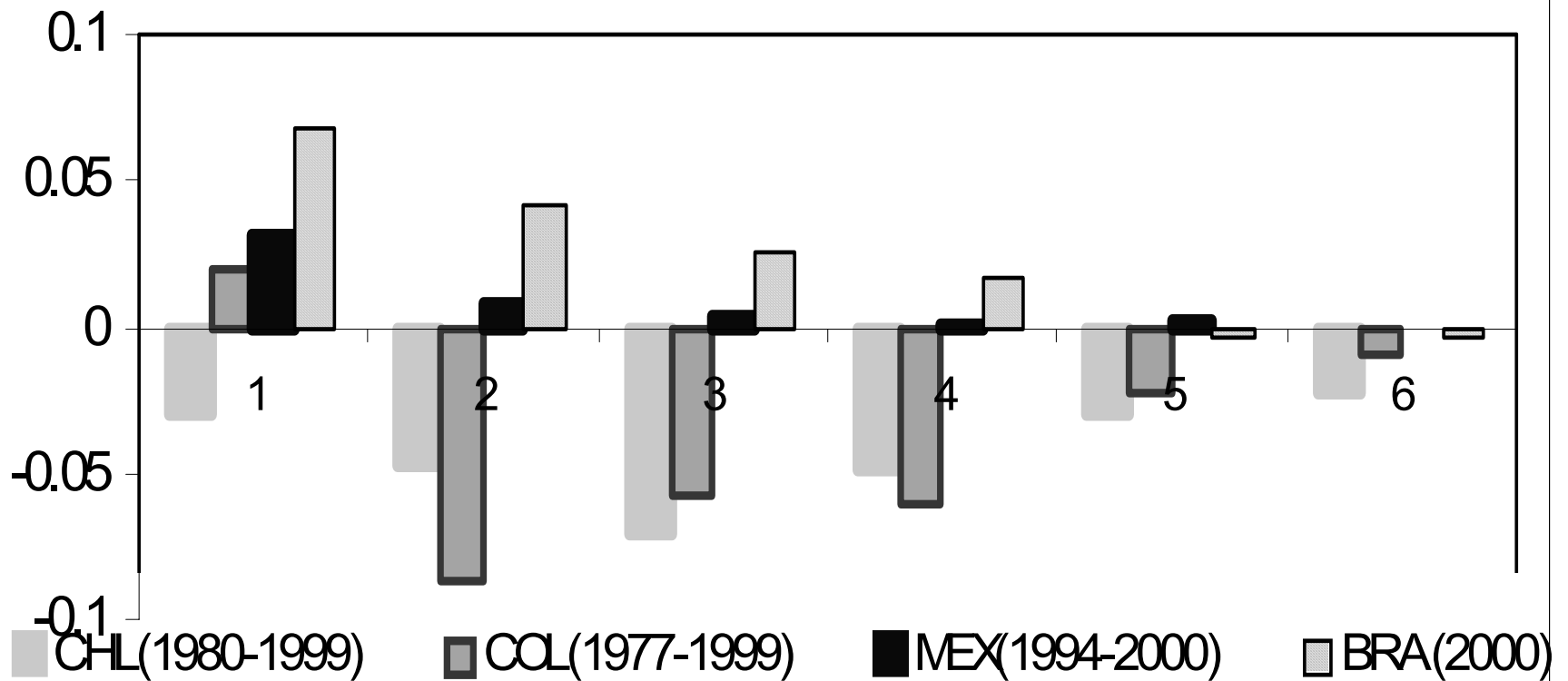
Excess Job Reallocation Rates By Business Age



NET Employment Growth by Business Age

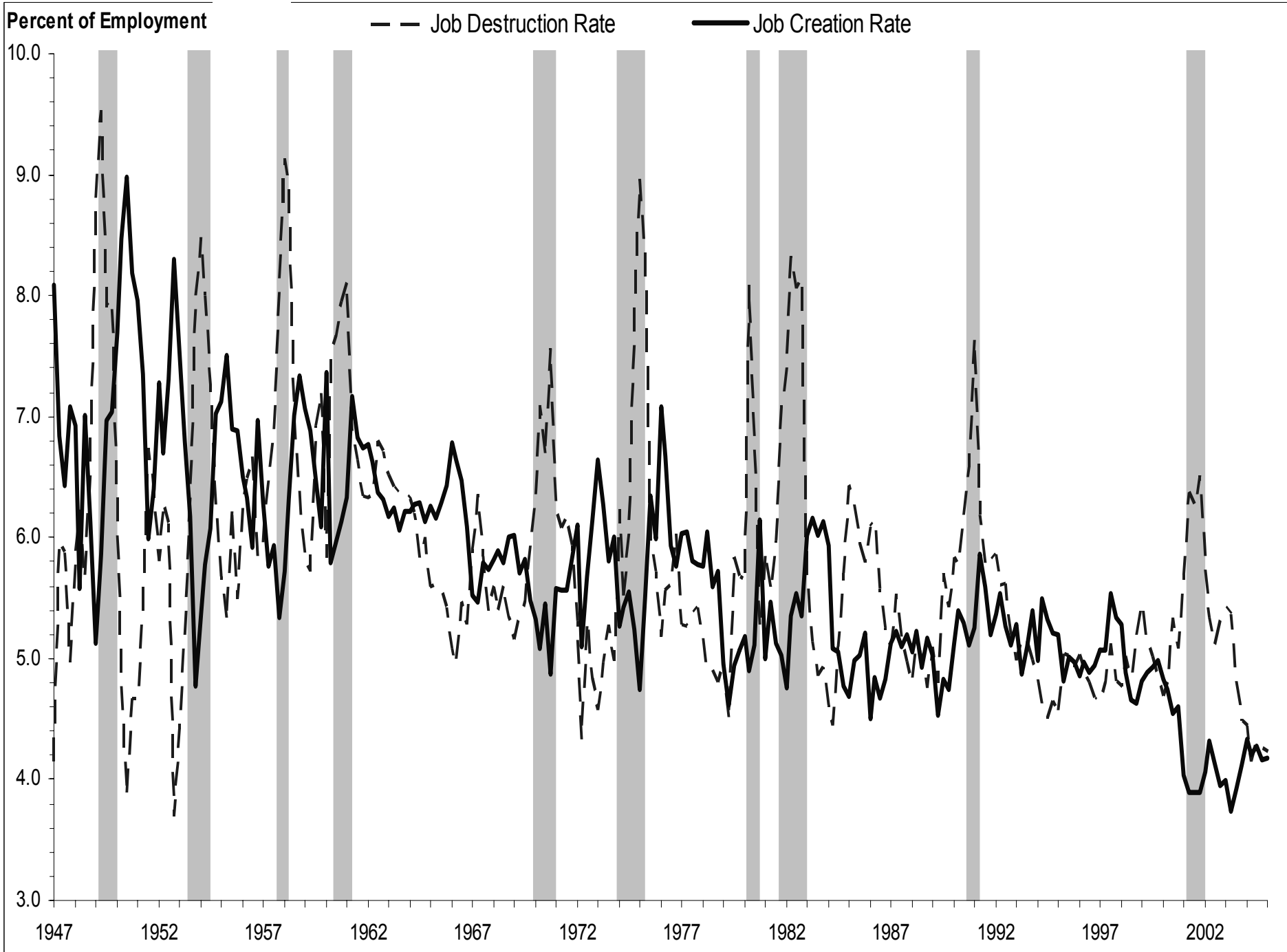


NET Employment Growth by Business Age



Cyclicality

- Recessions are times of reorganization especially in manufacturing and especially for large, mature businesses in manufacturing.
- Spikes in permanent job destruction are key characteristic of recessions in manufacturing
 - Open question about most recent recession



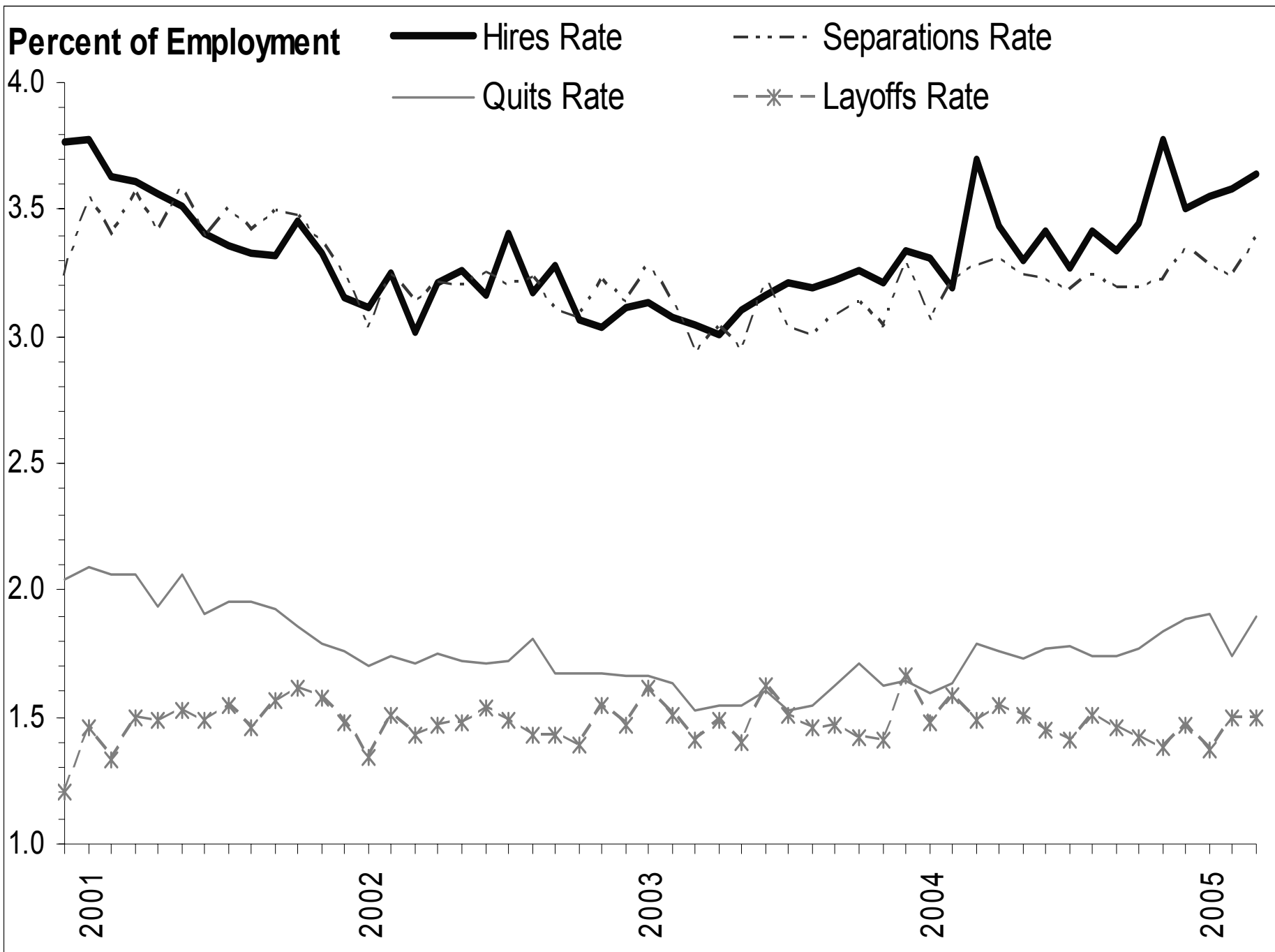
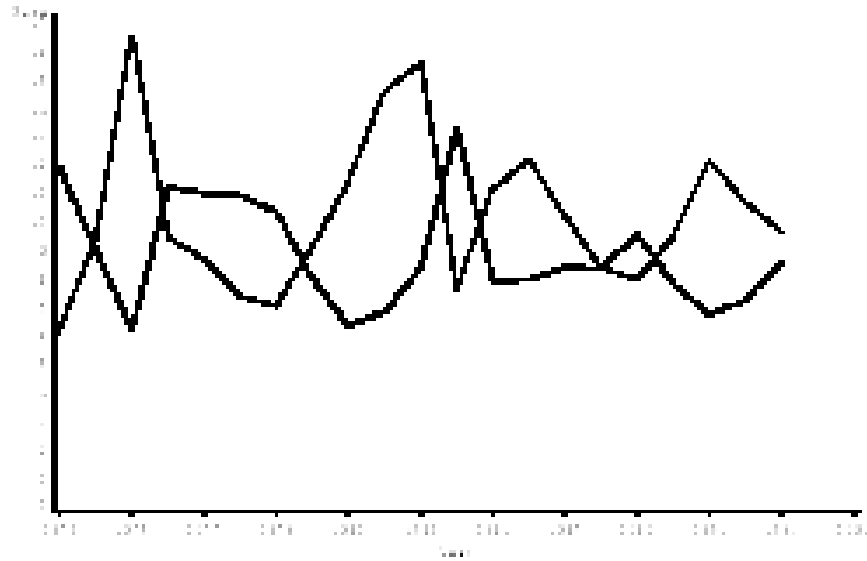
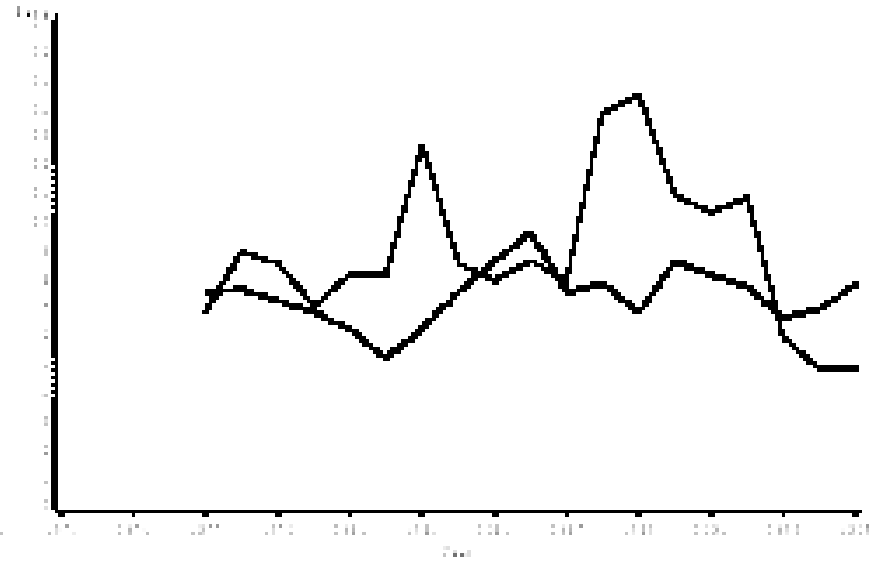


Figure 4.1: Job Creation and Job Destruction Across Districts
LA: Manufacturing



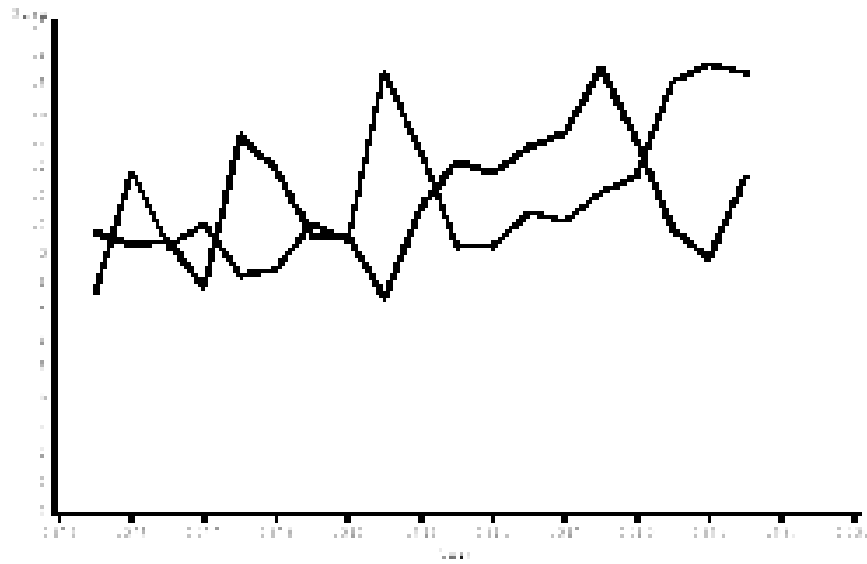
Source: Bureau of Economic Analysis, Bureau of Labor Statistics, and Bureau of Economic Analysis, *Survey of Current Business*.

Energy: Manufacturing



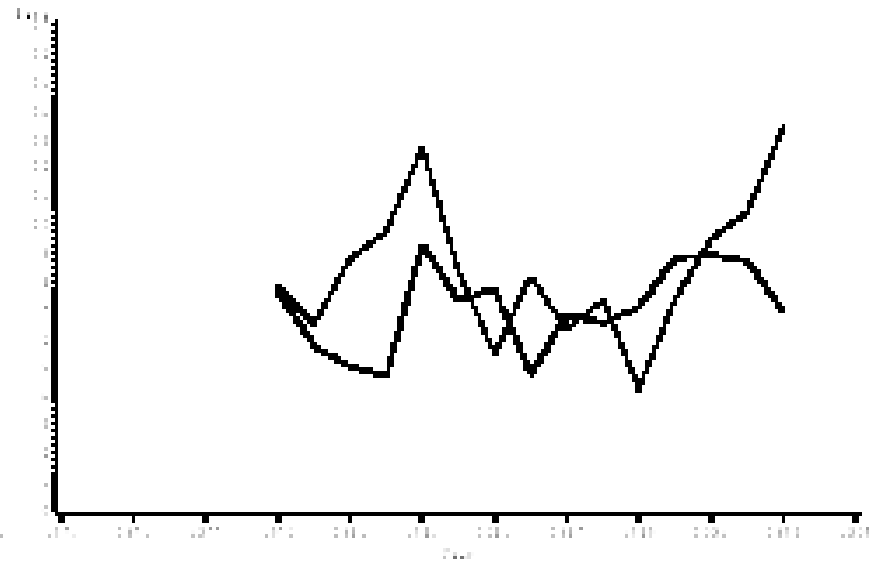
Source: Bureau of Economic Analysis.

Consumer: Manufacturing



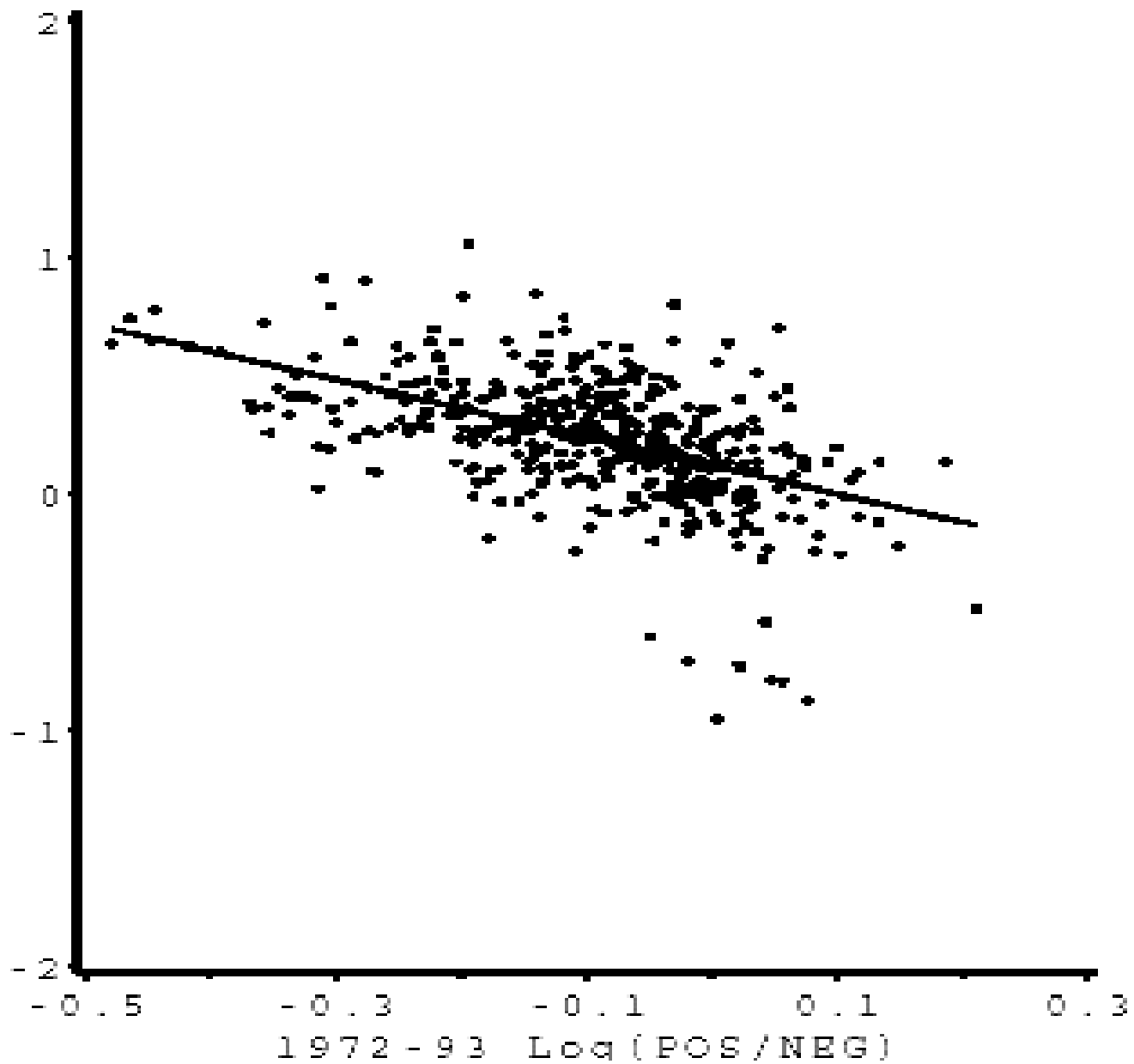
Source: Bureau of Economic Analysis.

Other: Manufacturing

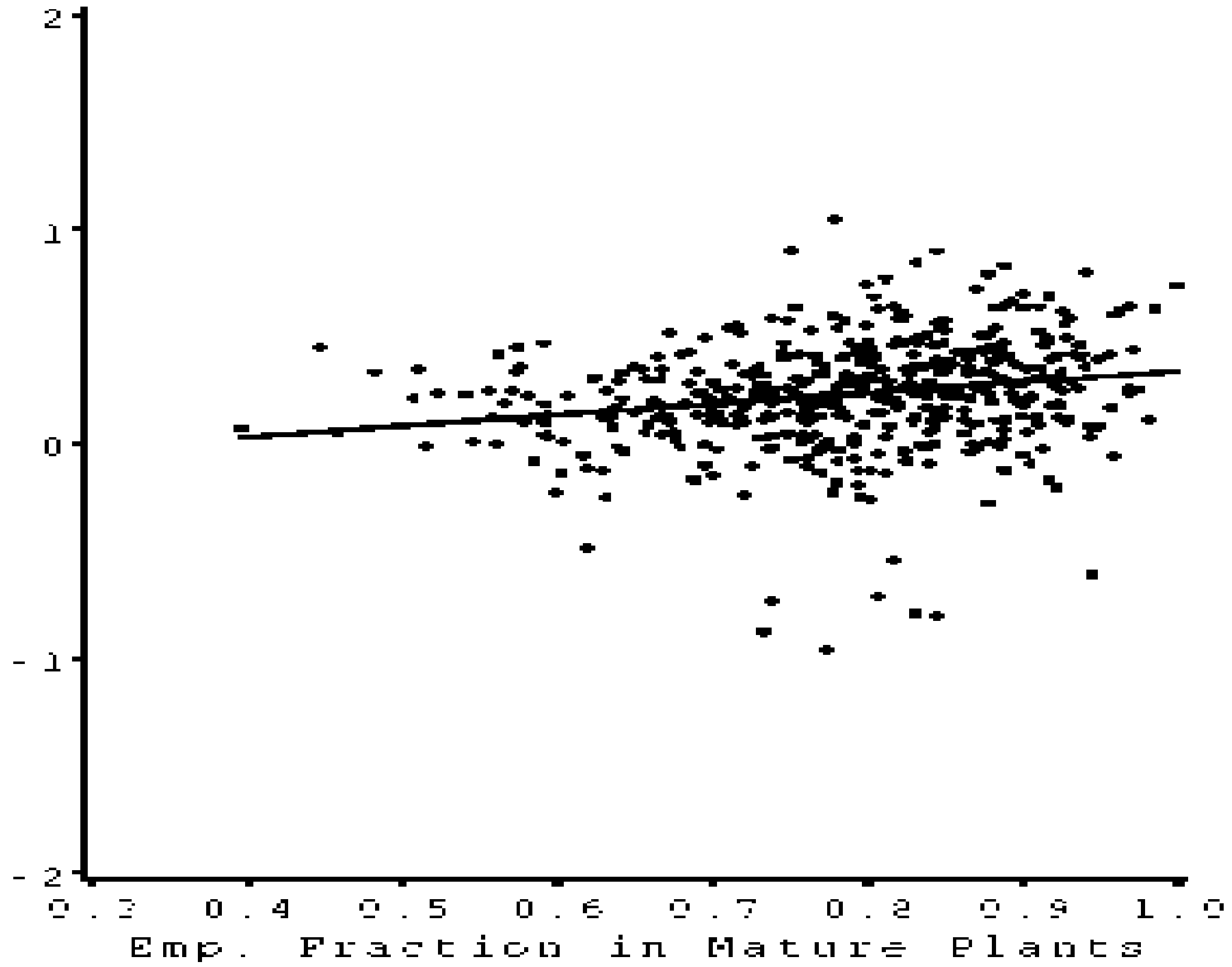


Source: Bureau of Economic Analysis.

Trend Growth

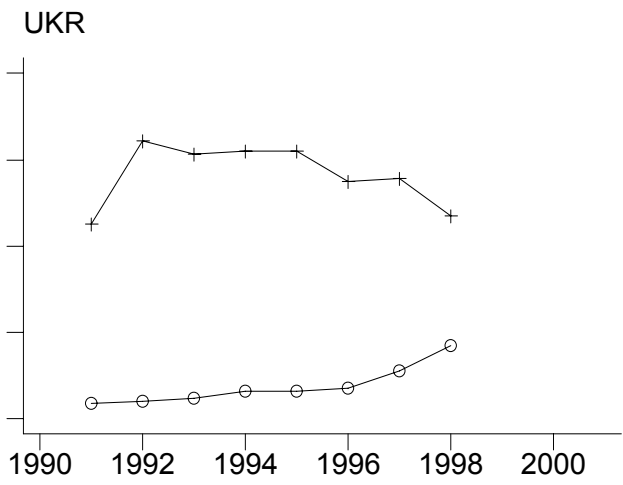
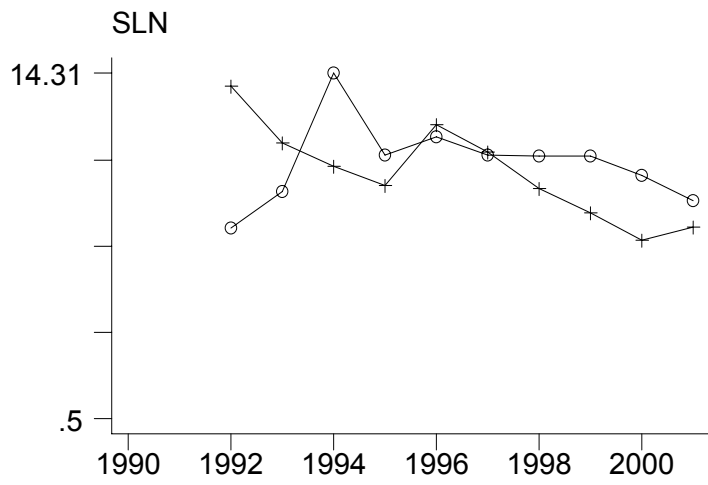
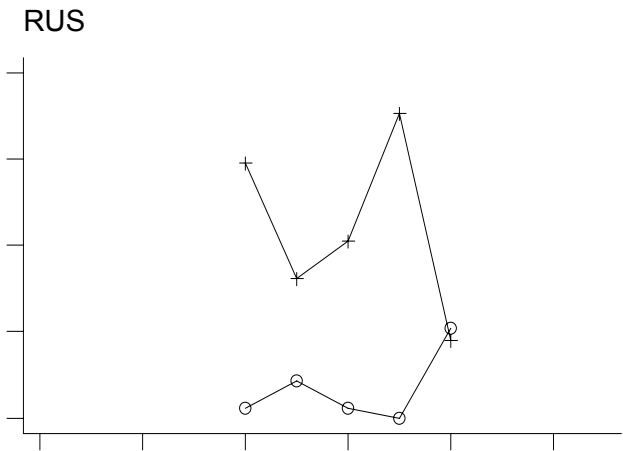
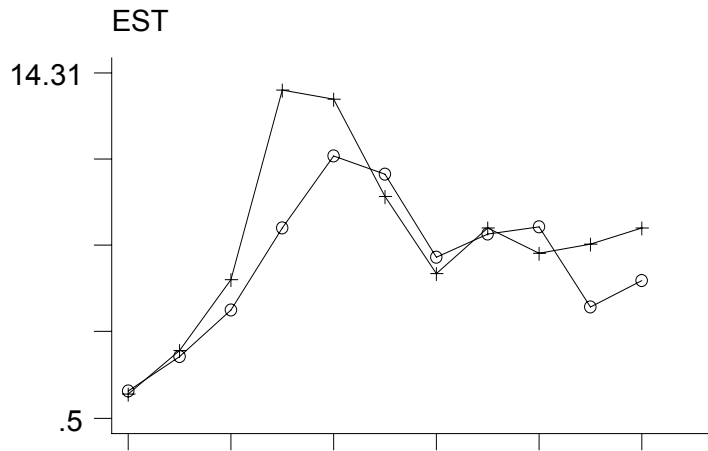


Plant Age



○ JobCreat

+ JobDest



year
Job Flows in Selected Transition Economies

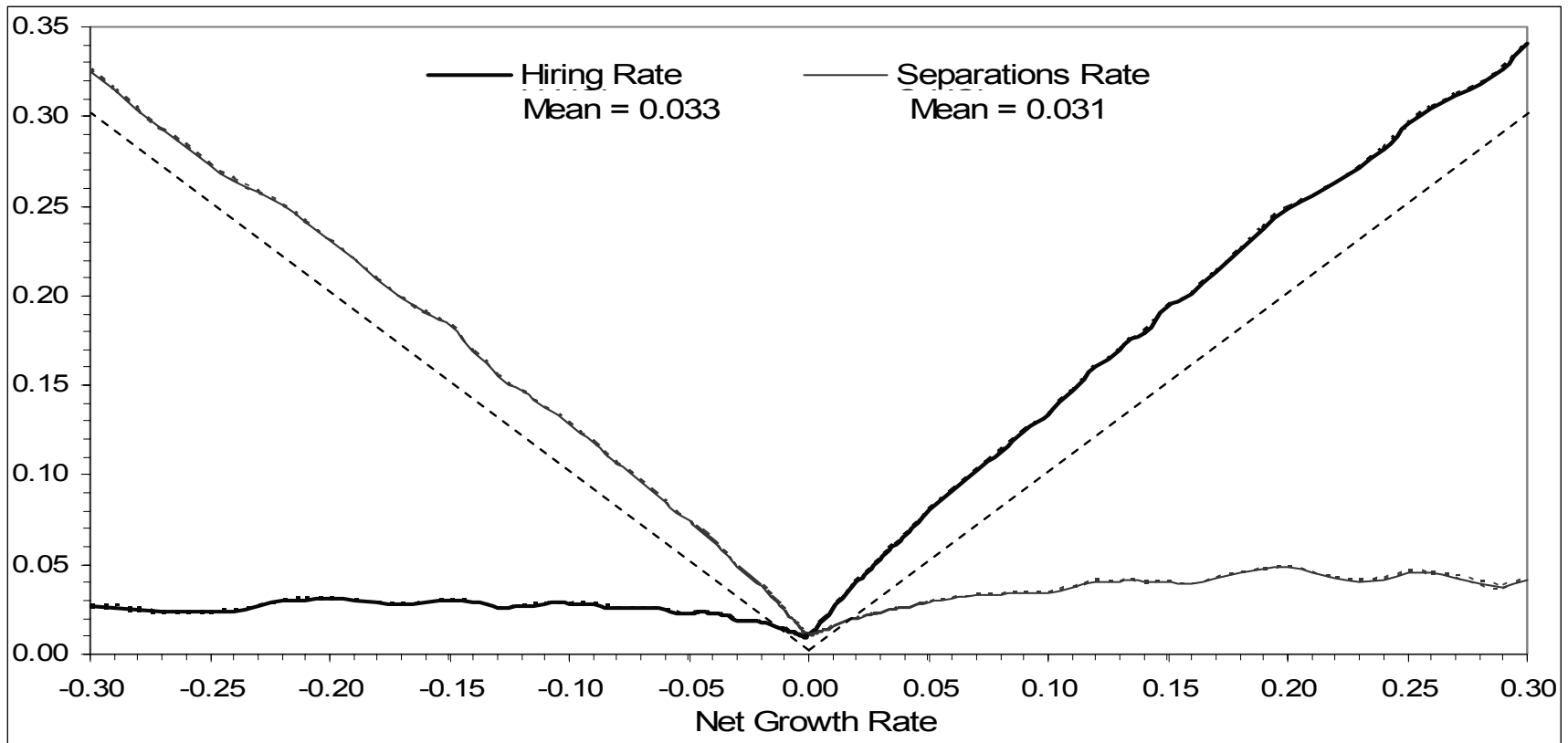
Cyclical Link Between Job and Worker Flows

Micro Nonlinearity +
Heterogeneity = Complex
Aggregation

Overview

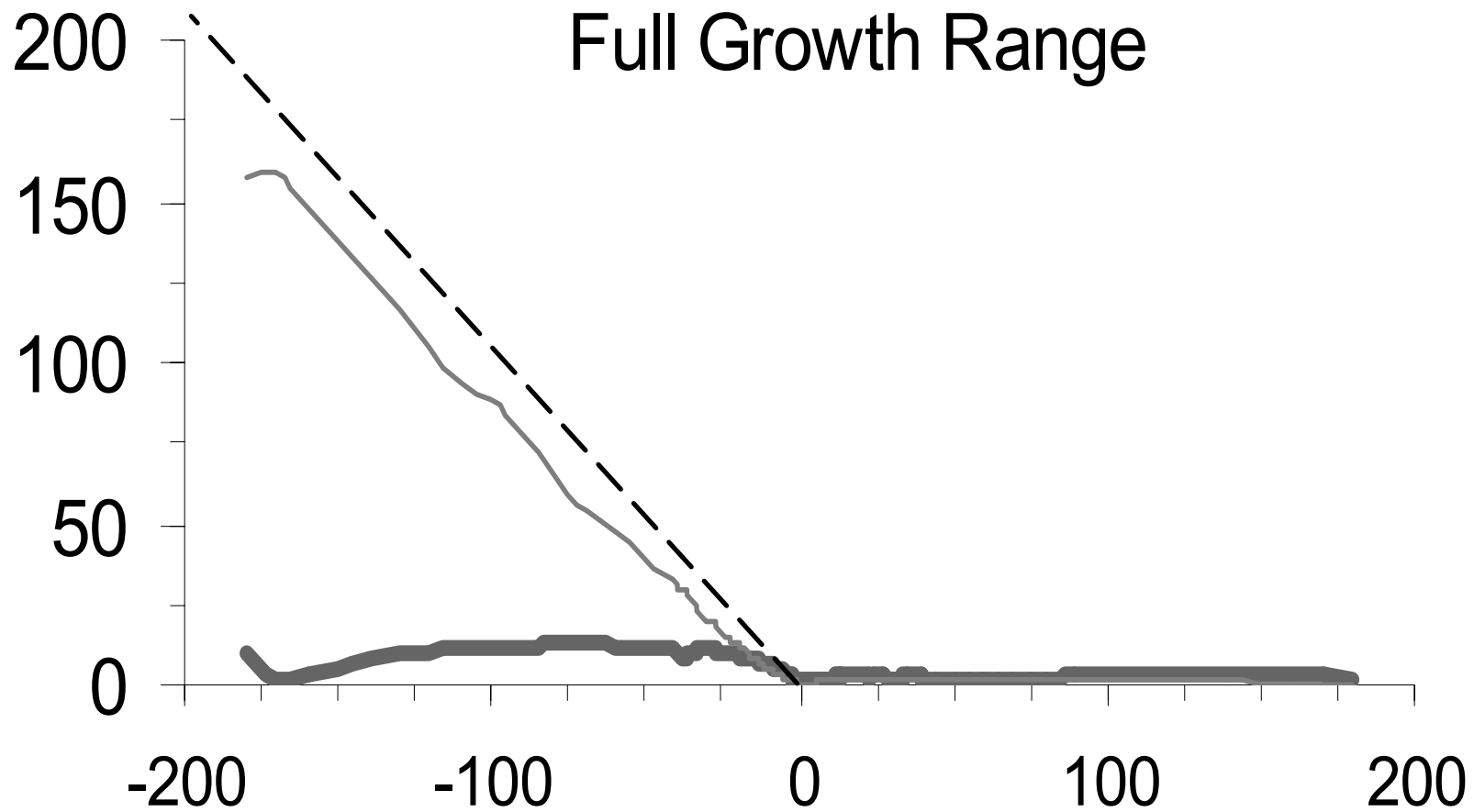
- Caution about drawing inferences for representative worker/firm based upon aggregate/industry evidence
- Aggregate behavior may reflect micro nonlinearities + heterogeneity
 - More than just compositional aggregation problems

Worker & Job Flow Relations – Hires and Separations vs Net Growth

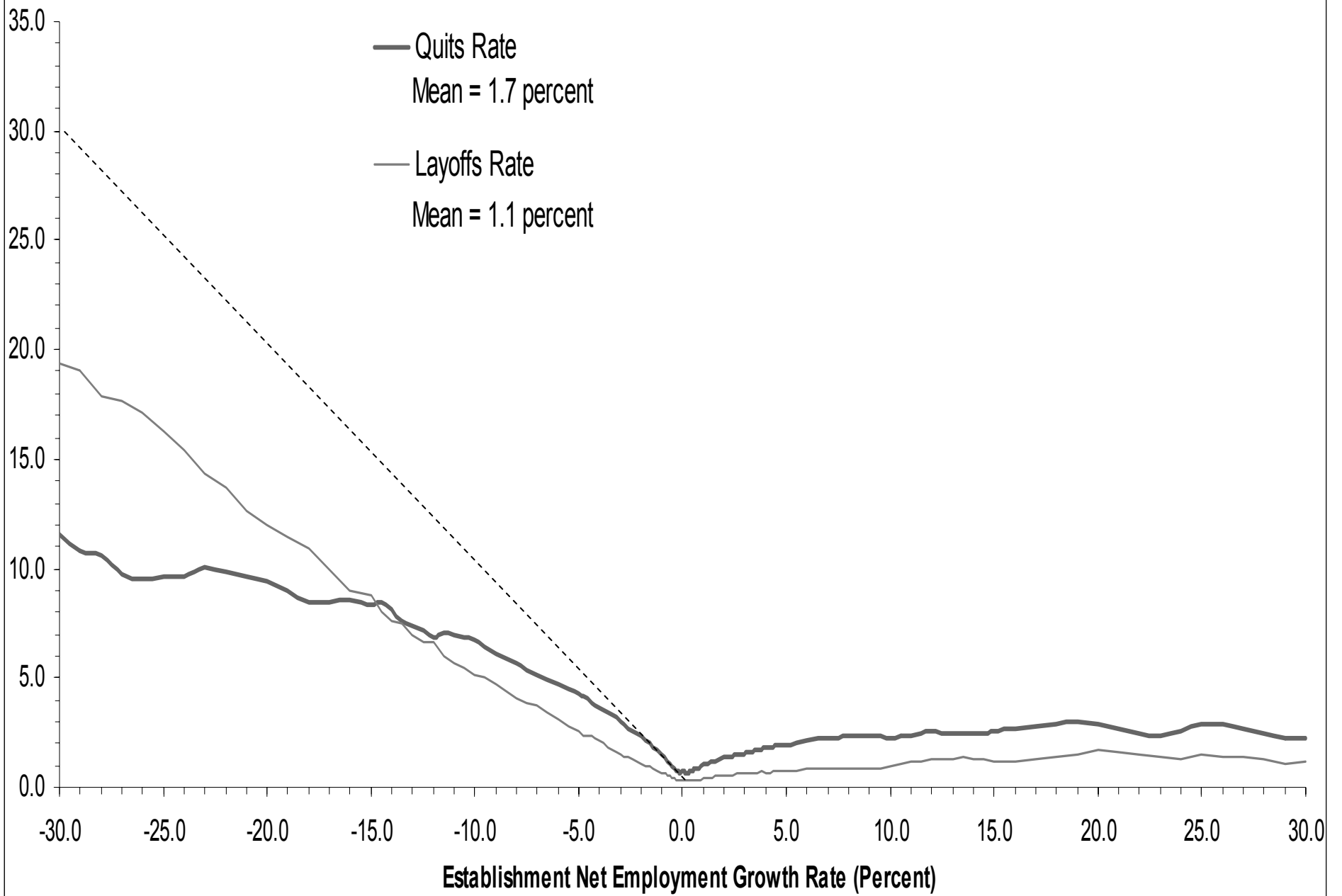


- Strong nonlinear relations of H and S to net growth
 - H rates rise sharply to right of 0, S rates rise sharply to left of 0
 - Considerable hires at contracting, separations at expanding estabs

Worker & Job Flow Relations – Quits and Layoffs vs Net Growth



Percent of Employment



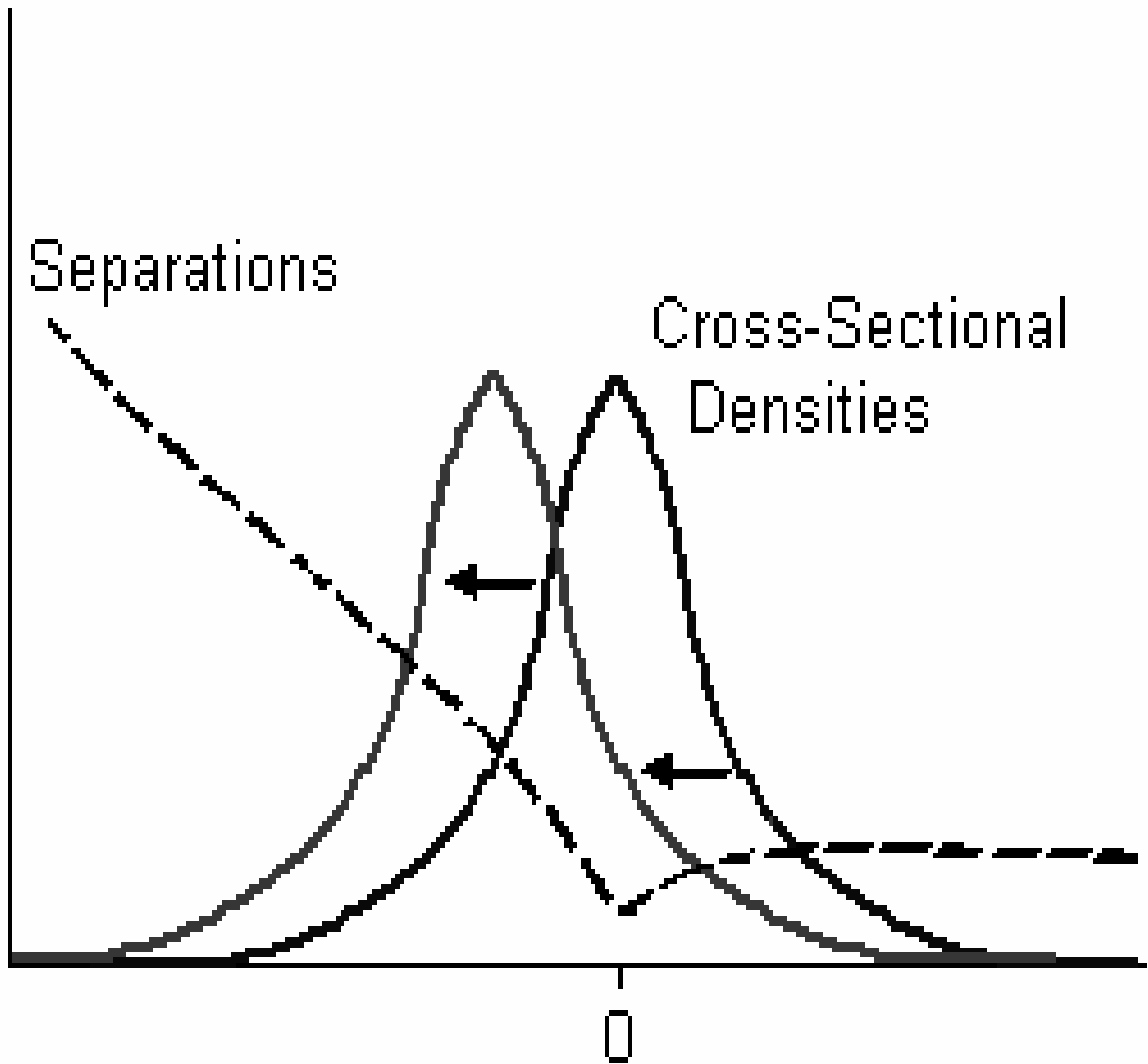
Nonlinear aggregation

$$H = \int h(n) f(n) dn$$

$$S = \int s(n) f(n) dn$$

Cross sectional distribution shape and location matters
Concentration matters!

**Separations (Pct. of Employment)
and Cross-Sectional Density**



Establishment Net Growth Rate

Taking stock

- Idiosyncratic shocks dominate
 - Technology
 - Taste
 - Cost
- Time varying intensity of reallocation shocks vs. changes in incentives?
- Efficiency?
 - Is it at least productivity enhancing?
 - Measurement issues for productivity
 - What market structure/institutions promote efficient reallocation?
 - Cautions:
 - Second Best and Creative Destruction

Taking stock Cont...

- Large scale job (and worker flows) driven by idiosyncratic shocks
- Varies by sector, cyclically, time period, country
- From here – two areas of focus:
 - Cyclical:
 - Theory
 - More structured empirical analysis
 - Productivity and reallocation:
 - Theory
 - More structured empirical analysis