Estimating Labor Market Rigidities with Heterogeneous Firms

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Outline

1. Motivation
2. Reduced-Form
3. Model
4. Transitory/Permanent
5. Estimation

Motivation

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- Importance of idiosyncratic shocks
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- *Benefits to Reallocation are Large*
  equalizing marginal productivity of labor and capital across plants would boost aggregate total factor productivity by around $30 - 40\%$ *in the U.S. manufacturing sector and even more in China and India (Hsieh and Klenow (2009, QJE))*

Motivation

Important Impediments to the Reallocation of Labor:

1. Adjusment Costs to Labor
   - institutional, e.g. employment protection legislation
   - technological, e.g. reduced efficiency during adjustment
2. Wages Flexibility
   - reduces the incentives to adjust the workforce

Employment and Wages Flexibility

Why modelling both ?

- Intensity of labor reallocation is remarkably similar in France and in the US

Surprising ? NO
(intuition from Bertola and Rogerson (1997))

- Employment Protection Reduces Labor Reallocation
- Wage Rigidities Increase Labor Reallocation

Permanent and Transitory Shocks

Firms face both Permanent and Transitory Shocks to Business Conditions

- How are Employment and Wages Reacting to these Shocks?
- firm dynamics literature typically assumed an $AR(1)$ process

This Paper

My Contributions:

- Reduced-Form Analysis:
  1. transitory shocks to output have a strong effect on wages
  2. permanent shocks have a small effect on wages
- Simple structural model of the firm that can explain these dynamics
  1. decreasing return to labor / imperfect competition
  2. labor adjustment costs
  3. surplus sharing between the firm and its workers
- Estimation by Indirect Inference

This Paper

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- Worker Bargaining Power is 45%
- Adjustment Costs alone cannot explain the high dispersion of labor productivity
- Differences in Technology and Market Power across firms can

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Data

Panel of French Firms

- accounting data for the manufacturing sector
- 7 Years of Observations: 1994 - 2000
- over 2500 firms of more than 100 employees

Important Variables

- Value-Added
- Employment
- Labor Costs

Joint dynamics of Output and Wages

$$\begin{aligned} \Delta y_{it} &= \zeta^y_{it} + \Delta\nu^y_{it} + \Delta r^y_{it} \\ \Delta w_{it} &= \tau\zeta^y_{it} + \phi\Delta\nu^y_{it} + \Delta r^w_{it} + \zeta^w_{it} \end{aligned}$$

- ζ: permanent shock
- ν: transitory shock
- r: measurement error
- τ: transmission of permanent sales shock to wages
- ϕ: transmission of transitory sales shock to wages

Estimation Results

Estimate

	τ	ϕ (lower bound)
Pooled	0.0076	0.5708
	(0.0101)	(0.0713)
EWMD	0.0073	
	(0.0106)	

Variance Decomposition

	$\tau^2\sigma^2_{\zeta y}$	$\phi^2\sigma^2_{\nu y} + \sigma^2_{rw}$	$\sigma^2_{\zeta w}$
	0.15%	86.38%	13.47%

Table: Estimation using Minimum Distance with Identity Matrix

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Model
Static Profit

$$\pi = \left(e^{\epsilon^T} A\right)^{1-\alpha} (n_t + d_t)^{\alpha} - w(A, \epsilon^T, n + d)(n_t + d_t) - c|d_t|$$

- A: exogenous profitability follows a random walk
- ϵ^T: transitory shock
- n_t: Employment
- d_t: job creation and destruction
- α: decreasing returns and/or market power
- w: wage
- c: constant cost of creating and destroying jobs

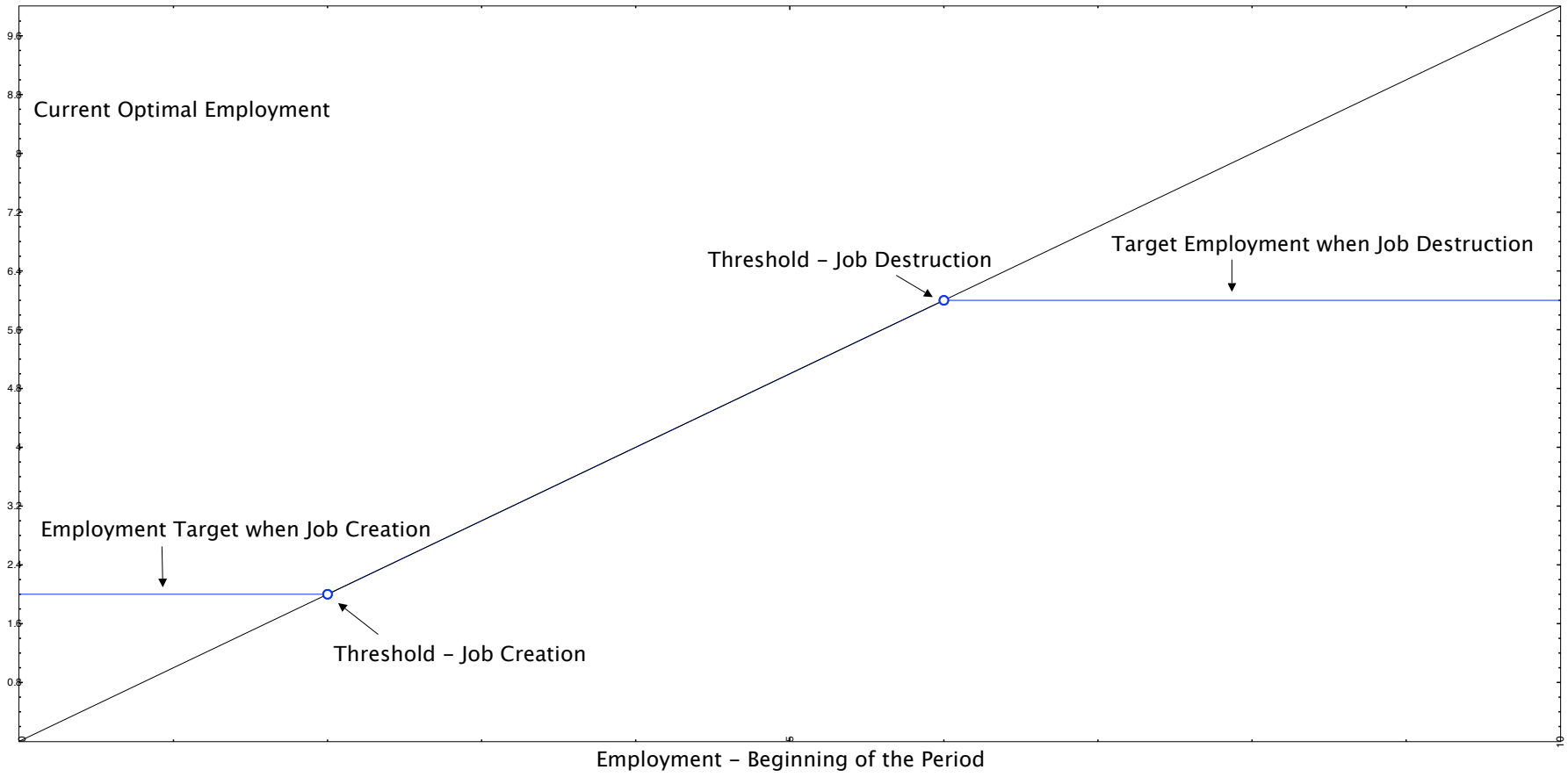

Figure: Optimal Decision rule conditional on Shocks

Model
Wage Determination

Nash bargaining with multiple workers (Stole and Zwiebel (1996))

- Costless renegotiation every period - no long term contract
- sequence of bilateral negotiations between the firm and its employees where each is regarded as the marginal worker
- Worker outside option is unemployment benefits
- Firm outside option is producing with one worker less

Surplus Sharing rule:

$$(1-\gamma)\left[w(A,\epsilon^T,n)-b\right]=\gamma\pi_n(A,n)$$

Wages Solution

The wage function writes:

$$w(A, \epsilon^T, n) = (1-\gamma)\, b + \frac{\gamma\alpha}{1-\gamma(1-\alpha)} \left(e^{\epsilon^T} A\right)^{1-\alpha} n^{\alpha-1}$$

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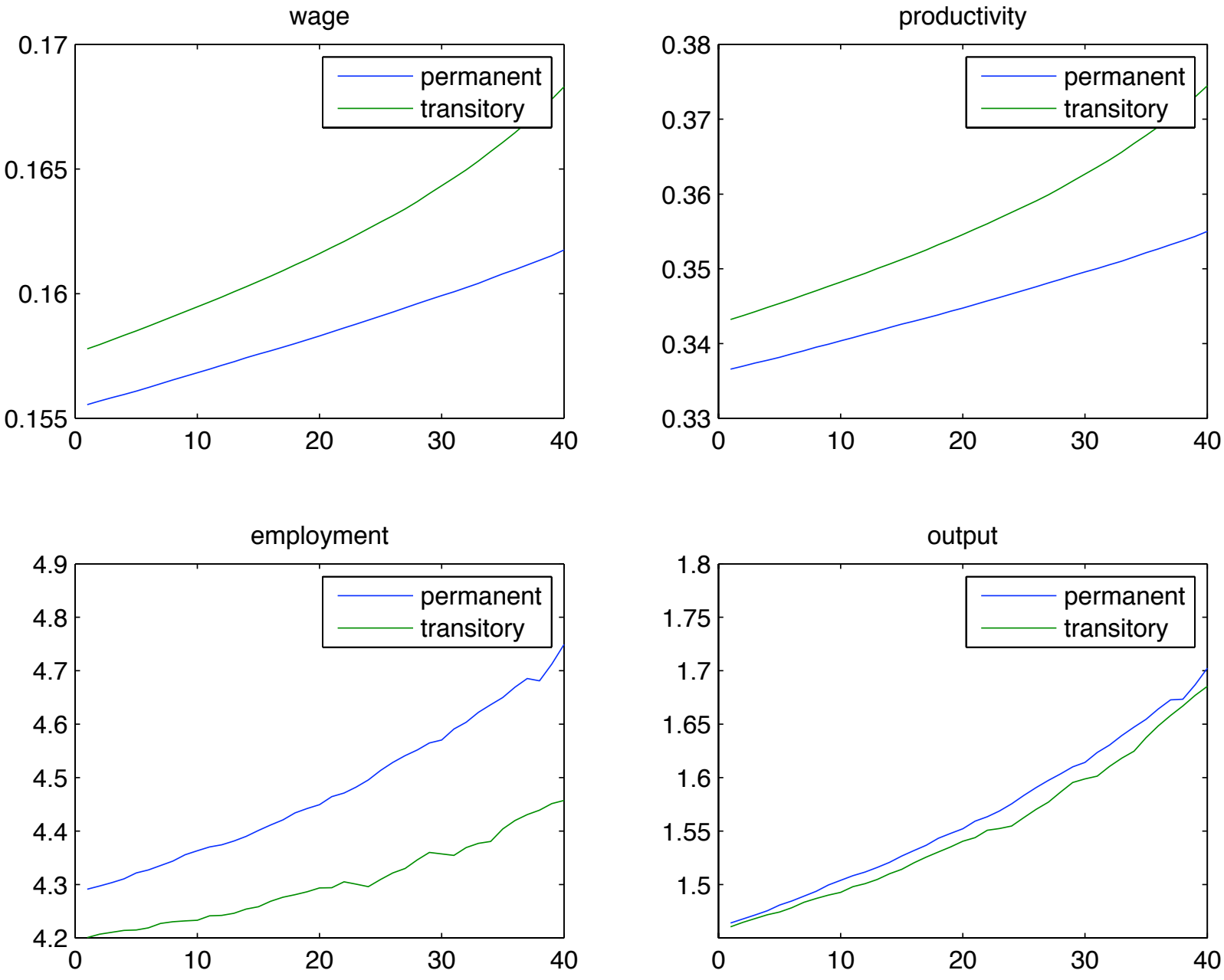

Figure: Response to Shocks - Baseline Calibration

Intuition:

- A transitory shock only changes today's profits while a permanent shock changes both today's profits and expected future profits.
- Because of adjustment costs, the firm then decides to not create or destroy much jobs folllowing a transitory shock labor productivity remains high and so wages increase
- Permanent shocks lead to more employment changes. Since there are decreasing returns to labor, the variations of labor productivity and thus the variations of wages are smaller

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Parameters	Homogeneous Model	3-Types Model
α	0.1964 (0.0020)	
b	0.0420 (0.0034)	
α_1		0.1682 (0.0187)
α_2		0.2303 (0.0106)
α_3		0.2660 (0.0142)
b_1		0.0449 (0.0036)
b_2		0.0377 (0.0034)
b_3		0.0337 (0.0037)

Table: Structural Parameters Estimates

- α is estimated lower than typical values in production function estimation
- α is not the labor share
  implied labor share: 0.51

If $c = 0$, labor share is:

$$\frac{\alpha}{1 - \gamma(1 - \alpha)}$$

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- value of unemployment: 500 - 713 euros per months
  minimum wage is about 900 euros over the period 1994-2000

Parameters	Homogeneous Model	3-Types Model
c	0.0094 (0.0031)	0.0087 (0.0010)
	($\simeq$1 month of wages)	
γ	0.4469 (0.0346)	0.4509 (0.0122)
σ_{ϵ^P}	0.1759 (0.0025)	0.1727 (0.0029)
σ_{ϵ^T}	0.0805 (0.0026)	0.0867 (0.0031)
σ_{MRN}	0.0183 (0.0081)	0.0268 (0.0016)
σ_{MRO}	0.0531 (0.0022)	0.0561 (0.0028)
σ_{MRW}	0.0446 (0.0025)	0.0452 (0.0017)

Table: Structural Parameters Estimates (std. dev)

Interpretation

Motivation for Exiting Employment	Rate
End of a Short-Term Contract	57.2%
Voluntary Quit	17.3%
Layoff for Non-Economic Motives	5.5%
Layoff for Economic Motives	0.9%
End Essay-Period	3.63%
Retirement	2.7%
Other	12.7%

Table: Source: DARES - September 2008

Firm Heterogeneity

$$\log p_{it} = \mu + \varphi_t + \eta_i + \nu_{it}$$

	Data	Homogeneous	3-Types
Log-Productivity			
Between Firm Variance	0.1291	< 0.0001	0.1104
Within-Firm Variance	0.0372	0.0301	0.0305

Conclusion

- Permanent Shocks to Output are the most important one, very small impact on wages, affect employment
- Transitory Shocks to Output transmit to Wage, impact less employment
- A Model of both Employment and Wages Dynamics that can account for these dynamics
- Adjustment are relatively modest (about one month of wages)
- Productivity dispersion can be explained by technology differences and not adjustment costs

THANK YOU !