

Evaluating Labor Market Reforms: A General Equilibrium Approach

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Fact 1

Table 1
Distribution of the share of temporary employment in total employment

	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>EU-15*</i>	9.0	10.2	10.4	10.9	10.6	11.0	11.5	11.8	12.2	12.8	13.2	13.4
<i>Belgium</i>	6.9	5.3	5.1	4.9	5.1	5.1	5.3	5.9	6.3	7.8	10.3	9.0
<i>Denmark</i>	12.3	10.8	11.9	11.0	10.7	12.0	12.1	11.2	11.1	10.1	10.2	10.2
<i>Germany*</i>	10.0	10.5	10.1	10.5	10.3	10.3	10.4	11.1	11.7	12.3	13.1	12.7
<i>Greece</i>	21.1	16.5	14.7	10.2	10.4	10.3	10.2	11.0	10.9	13.0	13.0 ⁽²⁾	13.1
<i>Spain</i>	15.6	29.8	32.2	33.5	32.2	33.7	35.0	33.6	33.6	32.9	32.7	32.1
<i>France</i>	4.7	10.5	10.2	10.5	10.9	11.0	12.3	12.6	13.1	13.9	14.0	15.0
<i>Ireland</i>	7.3	8.5	8.3	8.7	9.4	9.5	10.2	9.2	9.4	9.4 ⁽¹⁾	9.4 ⁽¹⁾	4.6
<i>Italy</i>	4.8	5.2	5.4	7.5	6.0	7.3	7.2	7.5	8.2	8.6	9.8	10.1
<i>Luxembourg</i>	4.7	3.4	3.3	2.9	3.0	2.9	..	2.6	2.1	2.9	3.4	3.4
<i>Netherlands</i>	7.5	7.6	7.7	9.7	10.0	10.9	10.9	12.0	11.4	12.7	12.0	14.0
<i>Austria</i>	..	..	..	..	..	..	6.0	8.0	7.8	7.8	7.5	7.9
<i>Portugal</i>	14.4	18.3	16.4	11.0	9.8	9.4	10.0	10.6	12.2	17.3	18.6	20.4
<i>Finland</i>	10.5	11.5	12.0	13.1	12.7	12.9	16.5	17.3	17.1	17.7	18.2	17.7
<i>Sweden</i>	11.9	10.0	9.8	10.5	11.5	11.5	12.5	11.8	12.1	12.9	13.9	14.7
<i>UK</i>	7.0	5.2	5.3	5.5	5.9	6.5	7.0	7.1	7.4	7.1	6.8	6.7

Source: European Commission. Employment in Europe (1985-1996) and Labour Force Survey (1997-2000).

*Since 1991, data on Germany and EU-15 include the new German Länder

(1) Ireland reports the 1997 value for 1998 and 1999.

(2) Greece reports the 1998 value for 1999.

Fact 2

Table 2		
Within-group regression of the share of temporary employment over the unemployment rate		
	EU-15	EU-12
Coefficient	0.182	-0.008
p-value	0.08	0.96
F test	61.2	67.7
p-value	0.00	0.00

Model Economy

- Workers
 - a continuum of risk averse workers of measure one
 - a constant death probability σ every period
 - unemployed workers search for either permanent or temporary jobs
 - search is costly
 - job finding rate depends on search effort and market tightness: $e^{\xi}\theta^{1-\xi}$
 - incomplete asset market: only trade risk-free bond
 - the assets of the dead worker are taxed away by the government, and new born worker is unemployed with zero assets

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- Labor contracts
 - permanent contract
 - a severance payment (sp_t) in case of dismissal
 - fixed-term contract
 - last only one period
 - may be promoted to a permanent one by the firm

Model Economy

- Firms
 - production function $y_t = \exp(s_t)k_t^\alpha N_t^\gamma$
 - efficiency units of labor $N_t = n_t^1 + \lambda(n_t^0 + m_t)$
 - productivity shock s_t follows a first-order Markov process
 - hiring and firing costs
 - for permanent worker: hiring cost $\theta_n^H > 0$, firing cost $\theta_n^F = sp_t$
 - for temporary worker: hiring cost $\theta_m^H > 0$, no firing cost

Firms' Problem

$$W(s_t, n_{t-1}, m_{t-1}; P) = \max_{m_t, n_t, k_t} \left\{ \pi(s_t, n_t, m_{t-1}) + \frac{1}{1+r} E_s(W(s_{t+1}, n_t, m_t; P)) \right\}$$

- profit function

$$\begin{aligned} \pi(s_t, n_t, m_{t-1}) = & \exp(s_t) k_t^\alpha N_t^\gamma - (r_t + \delta) k_t - w_{nt} n_t - w_{mt} m_t - \theta_m^H m_t \\ & - \theta_n^H \text{netd}_t - \theta_n^F \max\{-(n_t - (1 - \sigma)n_{t-1}), 0\} \end{aligned}$$

- netd_t is the net demand of **permanent** workers

$$\begin{aligned} \text{netd}_t &= n_t - (1 - \sigma)n_{t-1} - (1 - \sigma)m_{t-1} \\ &= n_t - (1 - \sigma)(n_{t-1} + m_{t-1}) \end{aligned}$$

Workers' problem

- a **permanent** worker *before* hiring/firing decisions

$$\begin{aligned} V^n(a_t, s_t, n_{t-1}, m_{t-1}) &= (1 - \omega)p_1(s_t, n_{t-1}, m_{t-1})\hat{V}^n(a_t, s_t, n_t, m_t) \\ &\quad + (1 - \omega)(1 - p_1(s_t, n_{t-1}, m_{t-1}))V^u(a_t + sp_t) \\ &\quad \omega V^u(a_t) \end{aligned}$$

- a permanent worker who stays employed

$$\begin{aligned} \hat{V}^n(a_t, s_t, n_t, m_t) &= \max_{c_t, a_{t+1}} \{u(c_t) + (1 - \sigma)\beta E(V^n(a_{t+1}, s_{t+1}, n_t, m_t))\} \\ \text{s.t.} \quad &a_{t+1} + c_t \leq (1 + r_t)a_t + w_{nt} + \Pi_t \\ &a_{t+1} \geq -A \quad \forall t \end{aligned}$$

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- a **temporary** worker *before* hiring/firing decisions

$$\begin{aligned} V^m(a_t, s_t, n_{t-1}, m_{t-1}) &= (1 - \omega)p_2(s_t, n_{t-1}, m_{t-1})\hat{V}^n(a_t, s_t, n_t, m_t) \\ &\quad + (\omega + (1 - \omega)(1 - p_2(s_t, n_{t-1}, m_{t-1})))V^u(a_t) \end{aligned}$$

Workers' Problem (continuing)

- an **unemployed** worker (before search)

$$V^u(a_t) = \max\{V^{sn}(a_t), V^{sm}(a_t)\}$$

- V^{sn} is the value of searching for **permanent** jobs

$$V^{sn}(a_t) = \max_{e_t} \{-\varphi e_t + e_t^\xi \theta_{nt}^{1-\xi} E(\hat{V}^n(a_t, s_t, n_t, m_t)) \\ + (1 - e_t^\xi \theta_{nt}^{1-\xi}) \hat{V}^u(a_t)\}$$

- V^{sm} is the value of searching for **temporary** jobs

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- an **unemployed** worker **after** search

$$\hat{V}^u(a_t) = \max_{c_t, a_{t+1}} \{u(c_t) + (1 - \sigma)\beta V^u(a_{t+1})\}$$

Stationary Competitive Equilibrium

A *recursive stationary competitive equilibrium* consists of a set of value functions $V^n, V^m, V^u, \hat{V}^n, \hat{V}^m, \hat{V}^u, W$, associated decision rules $c(\cdot), a(\cdot), e(\cdot)$ for workers, $y(\cdot), k(\cdot), m(\cdot), n(\cdot)$ for firms, factor prices w^n, w^m, r and laws of motions for distribution of agents in the economy, such that these functions satisfy

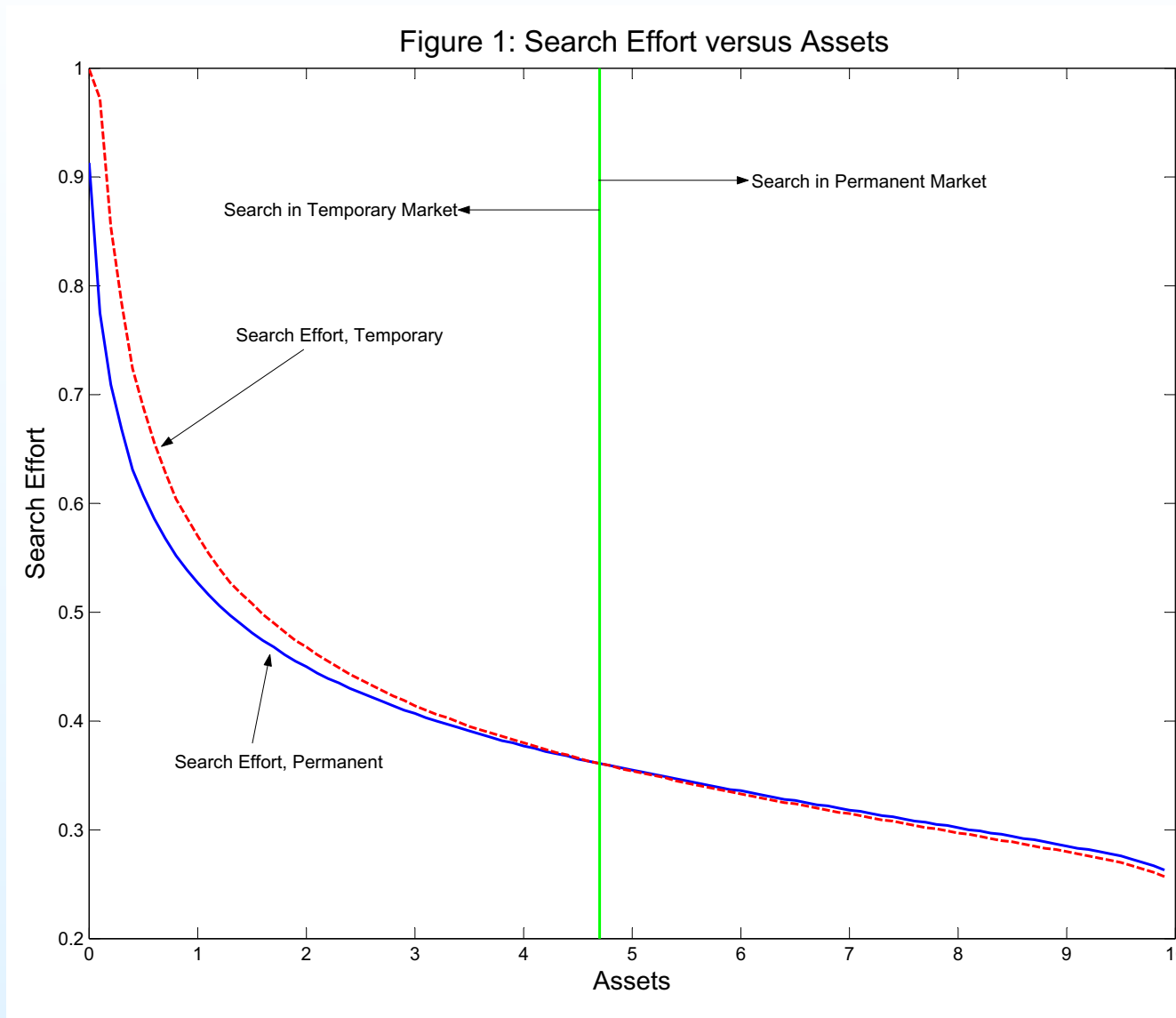
- workers' problem
- firms' problem
- the consistency of individual and aggregate decisions
- markets clear
- the aggregate resource constraints

Parameterization

Table 3: Benchmark Economy Parameterization

<i>Technology parameters</i>		
Relative productivity of new workers	λ	0.795
Technological coefficient of labor	α	0.6282
Technological coefficient of capital	γ	0.2718
Depreciation	δ	0.12
Productivity shocks' persistence	ρ	0.691
Productivity shocks' S.D.	ν	0.196
Elasticity of probability of finding job	ξ	0.4
Voluntary quits	ω	0.0232
Death probability	σ	0.022
<i>Preference Parameters</i>		
Discount factor	β	0.9795
Effort cost	φ	0.91
<i>Policy Parameters</i>		
Firing costs	$\phi^F = \theta_n^F / w_n$	0.511
Hiring costs (permanents)	$\phi^P = \theta_n^H / w_n$	0.098
Hiring costs (fixed-term)	$\phi^H = \theta_m^H / w_m$	0.159

Workers' Dynamics



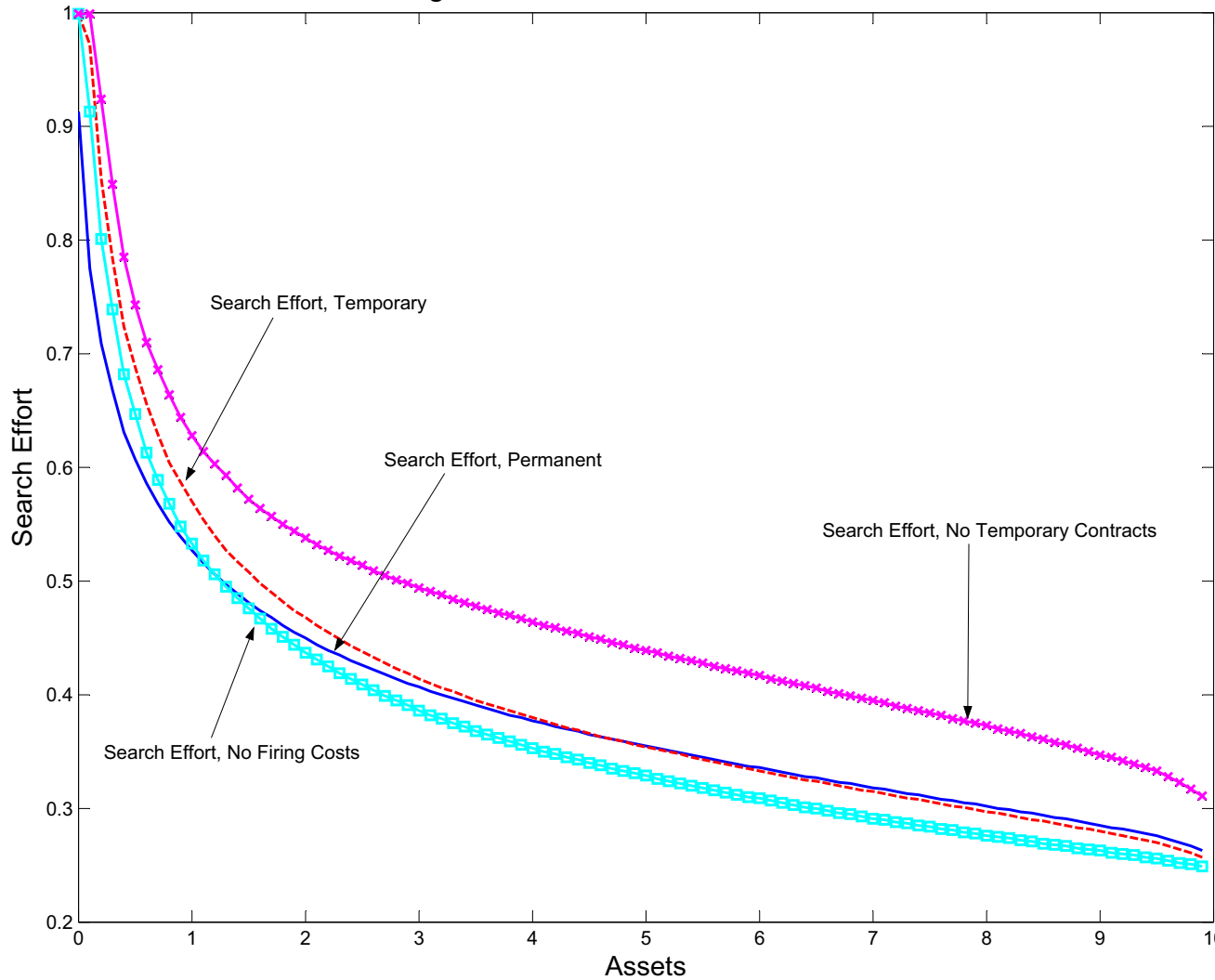
Labor Market Outcomes

Table 6: Labor Market

	<i>Benchmark Economy</i>	<i>No Temporary Contracts</i>	<i>No Firing Costs</i>
Employment Rate	80.51%	88.90%	78.22%
Unemployment Rate	19.49%	11.10%	21.78%
Permanents	67.75%	100%	100%
Temporaries	32.25%	0%	0%
Job Creation/Destruction Rate	31.53%	19.33%	35.56%
New jobs that are permanent	0.79%	100%	100%

Search Intensity

Figure 2: Search Effort versus Assets



Aggregate Quantities

Table 4: Aggregate Quantities

	<i>Benchmark Economy</i>	<i>No Temporary Contracts</i>	<i>No Firing Costs</i>
Output	100	105.49	99.91
Capital/Output Ratio	100	95.81	101.59
Aggregate Firing/Hiring Costs	100	101.10	34.92
Average Labor Productivity	100	95.59	102.71
Profits	100	106.33	116.19

Prices

Table 5: Prices

	<i>Benchmark Economy</i>	<i>No Temporary Contracts</i>	<i>No Firing Costs</i>
Interest Rate	4%	4.70%	3.75%
Wage permanents	100	92.48	103.43
Wage temporaries	88.94	NA	NA