†

2004 4

††

---

† 2003

JIP Database

21 COE

††

k.fukao@srv.cc.hit-u.ac.jp 21 COE

Hi-Stat

1992

2 90

3

TFP

3

90 2

Hayashi and Prescott (2002)

2003 2002

2003 2003 2003 [1]

TFP TFP

2003 2003

[1] 2001 2002 Hayashi and Prescott (2002) Jorgenson and Motohashi (2003) 2003

1997 2003 2003

TFP [2] 2003

96

2001 Fukao Nishimura, Sui, and Tomiyama (2003) [3]

2003 2003

TFP

2 TFP

Japan Industrial Productivity Database

JIP [4] [5]

TFP

---

[2] Burnside, Eichenbaum, and Rebelo (1995) Basu (1996)

[3] 2003 1994 98

TFP 1996 98

2 TFP

1996 98

[4] JIP 1970-98 84 TFP

[5]

TFP

TFP

TFP

3

JIP TFP 4

3

5 4

6

JIP [6]90

Hayashi and Prescott (2002)

2.1.

t

K_t L_t T_t

$$Y_t = F(K_t, L_t, T_t) \quad (2.1)$$

[6] JIP 2003 6

Y_t

(2.1)

$$\frac{\partial \ln F}{\partial \ln K} = \frac{\partial F}{\partial K}\frac{K}{Y} = \frac{w_K}{p}\frac{K}{Y} = s_K$$
$$\frac{\partial \ln F}{\partial \ln L} = \frac{\partial F}{\partial L}\frac{L}{Y} = \frac{w_L}{p}\frac{L}{Y} = s_L$$

$\bar{s}_{Kt} = (s_{Kt} + s_{Kt-1})/2$ 2

$\bar{s}_{Ljt} = (s_{Lt} + s_{Lt-1})/2$ 2

$$d\ln A_t = d\ln Y_t - (\bar{s}_{Kt}\, d\ln K_t + \bar{s}_{Lt}\, d\ln L_t) \qquad (2.2)$$

$d\ln Y_t = \ln Y_t - \ln Y_{t-1}$ $d\ln K_t = \ln K_t - \ln K_{t-1}$ $d\ln L_t = \ln L_t - \ln L_{t-1}$

2.

$$dlnA_t = \frac{\partial \ln F}{\partial \ln T} d\ln T$$

TFP

JIP

L

MH

N 2.2

[7]

$$dlnY_t - dlnN_t = \bar{s}_{Kt}(dlnK_t - dlnN_t) + \bar{s}_{Lt}(dlnMH_t - dlnN_t) + \bar{s}_{Lt}(dlnL_t - dlnMH_t) + dlnA_t \quad (2.3)$$

GDP

TFP

JIP 2.1.a

Hayashi and Prescott (2002) 1973-83 83-91 91-98 3

1973 1983 1991

JIP

2003 2.1.b

2.1.a 2.1.b JIP

91-98 0.96 2.88 0.33

2.1

2.1.a 1983-91 91-98 GDP

3.94 1.25 2.69

[8]

0.79

TFP 0.43%

---

[7] 15 64 1970-78

1979-1997; 1998;

[8] JIP

GDP

GDP JIP

2003 1

0.51

0.72

0.25

1 90 GDP

90

0.79 0.25 1.04

TFP 0.43 TFP

0.33 0.43 TFP 1.5

0.65 [9]

91 98

2.1.b.

0.72 0.51

[9] Hayashi and Prescott (2002) $Y=AL^{\alpha}K^{1-\alpha}$

$(1/\alpha)\,(dA/A) - (dL/L)$

d (dA/A) 0.43 (dK/K) 0.65

1.23

2.2. TFP

90 GDP TFP

TFP [10]

JIP

2003

90

D.I.

1990

D.I.

[11]

2.2

[12] 90

91 0.84 2.1 0.96

[10]

[11] JIP 91 98 0.963 0.958

0,878 0.783 10

[12]

2003 5

83-91

1.58 2.1 1.47

TFP 83-91 91-98

0.43 0.54 0.11 2.2

0.20 0.43 0.23 [13]

2.3 TFP

Hayashi and Prescott (2002)

1960-2000

2.3 [14] Hayashi and Prescott 1991

TFP 2.1 2.2

91

TFP 2.4

0.2 2.2 TFP

Hayashi and Prescott (2003) 2.1.b

TFP

GNP

GNP

[13] $w_k K/PY$

91 TFP

[14] 2.3

GNP

91

TFP

Jorgenson and Motohashi (2003) [15]

TFP 1975-90 0.96 90-95 0.61 95-2000

1.04

IT

IT IT IT

IT [16] IT

IT GDP

[17] IT

IT

[18]

IT

---

[15] Jorgenson, Ho, and Stiroh (2002, 2003)

[16] Jorgenson and Motohashi (2003)

TFP

90

90

93SNA

[17]

[18] Colecchia and Schreyer (2002)

IT TFP

IT

IT

TFP

1990 TFP

JIP

TFP

3.1

3.1 TFP

2001 2002

3.1

2.2 TFP

gross

output [19]

3.1

3.1 91

TFP

---

[19]

TFP

TFP Domar (1961)

1

TFP

TFP

TFP

1990

2001 2002 1998 1999 2001

80 90 TFP 90 TFP

TPF

TFP

2001

TFP 3.1

3.1 90 TFP

0.1 [20]

TFP

[21] Gross Output TFP

Baily (1986)

---

[20] 91

TFP 91

[21] TFP

TFP TFP

[22]

TFP

TFP

2.1 TFP

TFP

McGucjin (1993)

Baily (1986) JIP

90

90

TFP

[23] 98

[22] 0.5

10 11 10 5 6

TFP 10

TFP 20 TFP

$Q=A(t)F(L, K, M)$ $A(t)$ M

Q-M$=B(t)G(L, K)$

Baily (1986)

[23]

0.422 JIP

0.450 91-98

JIP 2 JIP

2 TFP

TFP 0.1

[24]

3.3 3 TFP

JIP 3 19

TFP TFP TFP

Domar (1961) 84

[25] 2 3.1 3.2 [26] 3.1

---

[24] JIP

[25] 2.1 2.1

90 TFP

TFP

3.2 TFP

3.1 3.2

TFP

4 5

TFP

1990 98

(1999)

92

NTT 85

94 96

97

96 93 97

95

90

97

2.1 TFP

3.2 TFP

3.2 2.2 3.1

[26] 3-2 TFP TFP

95

(95)

92

TFP

TFP

2003 1999 3

1970-98 5

3 TFP JIP

3 3 2

90

TFP

M&A 1990

M&A

2003

TFP

TFP

TFP

1994-2001 [27]

1 2003

96 4

10

30

3

4 98

2001

4.1 TFP

Caves, Christensen, and Diewert (1982) Good, Nadiri, and Sickles (1997)

Caves (multilateral productivity index)

[27] 50

3,000 100

Caves

representative firm

Good, Nadiri, and Sickles (1997)

Caves Good

TFP

Aw, Chen,

and Roberts (1997) Hahn (2000) (2002)

t > 0 f TFP t

= 0 TFP

$$\ln TFP_{ft} = (\ln Y_{ft} - \overline{\ln Y_t}) + \sum_{s=1}^{t}(\overline{\ln Y_s} - \overline{\ln Y_{s-1}})$$
$$-[\sum_{i=1}^{n}\frac{1}{2}(S_{ift} + \overline{S_{it}})(\ln X_{ift} - \overline{\ln X_{it}}) + \sum_{s=1}^{t}\sum_{i=1}^{n}\frac{1}{2}(\overline{S_{is}} + \overline{S_{is-1}})(\overline{\ln X_{is}} - \overline{\ln X_{is-1}})] \quad (4.1)$$

Y t X_{ift} f i S_{ift} f

i (4.)

TFP

TFP

1994 2001

TFP 3 TFP

A

JIP 2 3

4.2 TFP

t TFP TFP

$$\ln TFP_t = \sum_i^n \theta_{it} \ln TFP_{it} \qquad (4.2)$$

TFP_{it} TFP θ_{it} i

TFP

TFP

[28] (4.2)

TFP Forster, Haltiwanger, and Krizan (1998)

Forster $t - \tau$ t TFP

[28] Forster, Haltiwanger, and Krizan (1998) Bartelsman and Domes (2000)

[29]

1. (within effect):

$$\sum_{i \in s} \theta_{it-\tau} \Delta \ln TFP_{it}$$

2. (between effect):

$$\sum_{i \in s} \Delta \theta_{it} (\ln TFP_{it-\tau} - \overline{\ln TFP_{t-\tau}})$$

3. (covariance effect) :

$$\sum_{i \in s} \Delta \theta_{it} \Delta \ln TFP_{it}$$

4. (entry effect)

t

$$\sum_{i \in N} \theta_{it} (\ln TFP_{it} - \overline{\ln TFP_{t-\tau}})$$

5. (exit effect)

$$\sum_{i \in X} \theta_{it-\tau} (\overline{\ln TFP_{t-\tau}} - \ln TFP_{it-\tau})$$

---

[29] 1994 98 TFP

(2003) , Hulten, and Campbell (1992)

cohort Olley and Pakes (1996) cross section Griliches and Regev

(1995) Aw, Chen, and Roberts (2001)

Aw

measurement error

Forster, Haltiwanger, and Krizan (1998)

[30]

TFP

1994 2001

4.1 1994 2001 3 TFP

4.2

4.3

[31]

[30]

[31] 93 10 97 5 99 1
2000 10 2002 1

4.1 4.2 4.3

3 1994-2001 TFP

TFP 1994-2001

TFP 2.1 6 1.2

1994

2001 TFP 0.33

Baily, Hulten, and Campbell (1992) Foster, Haltiwanger, and Krizan (1998)

1994 2001 0.61

1994 2001 2.1

20.1 11.0 10.3

TFP 1994-96

1999 2000 TFP 1996-98 2000 2001

TFP

2003 96

98

94-96

94 2001

TFP

[32]

TFP

labor hoarding

2

TFP 90

[32] 5 5.1

TFP

[33] 1994-2001

TFP

3

$$VC = \sum_{i=1}^{N} w_i X_i \qquad (5.1)$$

VC w_i Xi (5.1)

$$\frac{dVC}{dt} = \sum_{i=1}^{N} \frac{dw_i}{dt} X_i + \sum_{i=1}^{N} w_i \frac{dX_i}{dt} \qquad (5.2)$$

(5.2) [34]

$$\hat{VC} - \sum_{i=1}^{N} \frac{w_i X_i}{VC} \hat{w_i} = \sum_{i=1}^{N} \frac{w_i X_i}{VC} \hat{X_i} \qquad 5.3$$

$$VC = VC(w_1 ... w_n, Y, K, t) \qquad 5.4$$

[33] 12

[34]

Y K

$$\frac{dVC}{dt}=\sum_{i=1}^{N}\frac{\partial VC}{\partial w_i}\frac{dw_i}{dt}+\frac{\partial VC}{\partial Y}\frac{dY}{dt}+\frac{\partial VC}{\partial K}\frac{dK}{dt}+\frac{\partial VC}{\partial t} \quad 5.5$$

5.5 Shephard's lemma $\partial VC/\partial w_i = X_i$

$$\frac{dVC}{dt}\frac{1}{VC}=\sum_{i=1}^{N}\frac{w_iX_i}{VC}\frac{1}{w_i}\frac{dw_i}{w_i}+\frac{\partial VC}{\partial Y}\frac{Y}{VC}\frac{1}{Y}\frac{dY}{dt}+\frac{\partial VC}{\partial K}\frac{K}{VC}\frac{1}{K}\frac{dK}{dt}+\frac{\partial VC}{\partial t}\frac{1}{VC} \quad 5.6$$

ε_{VCY} ε_{VCK}

$\partial VC/\partial t$ *$(1/VC)$ ε_{VCT}

$$\hat{VC}=\sum_{i=1}^{N}\frac{w_iX_i}{VC}\hat{w}_i+\varepsilon_{VCY}\hat{Y}+\varepsilon_{VCK}\hat{K}+\varepsilon_{VCT} \quad 5.7$$

5.3

$$\sum_{i=1}^{N}\frac{w_iX_i}{VC}\hat{X}_i=\varepsilon_{VCY}\hat{Y}+\varepsilon_{VCK}\hat{K}+\varepsilon_{VCT} \quad 5.8$$

$$\hat{P}=\sum_{i=1}^{N}\frac{w_iX_i}{C}\hat{X}_i+\frac{w_kK}{C}\hat{K} \quad 5.9$$

C w_k VC w_k K 5.9

5.8

$$\hat{P}=\frac{VC}{C}\sum_{i=1}^{N}\frac{w_iX_i}{VC}\hat{X}_i+\frac{w_kK}{C}\hat{K}=\frac{VC}{C}(\varepsilon_{VCY}\hat{Y}+\varepsilon_{VCK}\hat{K}+\varepsilon_{VCT})+(1-\frac{VC}{C})\hat{K} \quad 5.10$$

TFP

TFP 5.10 TFP

$$\hat{TFP}=\hat{Y}-\hat{P}=-\frac{VC}{C}\varepsilon_{VCT}+(1-\frac{VC}{C}\varepsilon_{VCY})\hat{Y}-\{1+\frac{VC}{C}(\varepsilon_{VCK}-1)\}\hat{K} \quad 5.11$$

$$C(w_1 \ldots w_n, w_k, Y, t) = \min_K \{VC(w_1 \ldots w_n, Y, K, t) + w_k K\} \quad (5.12)$$

semi-elasticity

$\partial C/\partial t$ *$(1/C)$

K $\partial C/\partial t$

*$(1/C)$ 5.11 $VC\ \varepsilon_{VCT}/C$ [35]

1 $\partial C/\partial Y$

*(Y/C) (5.12)

5.11 ($VC\ \varepsilon_{VCY}/C$)*(dY/Y)

$\partial VC/\partial K$ w_k

$w_k K$ 5.11 (

$(VC\ /C)$*$(\ \varepsilon_{VCY}\ \ 1))$* (dK/K)

[36]

TFP

3

TFP

TFP

---

[35] $VC\ \varepsilon_{VCT}/C$

$VC\ \varepsilon_{VCT}/C$ $VC\ \varepsilon_{VCT}/C$

[36] Morrison(1993)

5.1

5.1 TFP

$$\ln VC = a_0 + \alpha_l \ln p_l + a_m \ln p_m + a_Y \ln Y + a_K \ln K + a_t t + (1/2)[a_{ll}(\ln p_l)^2 + a_{mm}(\ln p_m)^2 + a_{YY}(\ln Y)^2 + a_{KK}(\ln K)^2 + a_{tt}t^2] + a_{lm} \ln p_l \ln p_m + a_{lY} \ln p_l \ln Y + a_{mY} \ln p_m \ln Y + a_{lt} \ln p_l t + a_{mt} \ln p_m t + a_{lk} \ln p_l \ln K + a_{mk} \ln p_m \ln K + a_{YK} \ln Y \ln K + a_{Yt} \ln Yt + a_{Kt} \ln Kt$$

5.13

VC Y K

$$a_l + a_m = 1,\ a_{ll} + a_{lm} = a_{lm} + a_{mm} = 0,\ a_{lY} + a_{mY} = 0,\ a_{lk} + a_{mk} = 0$$

5.13

$$\ln(VC/p_m) = a_0 + a_l \ln(p_l/p_m) + a_Y \ln Y + a_K \ln K + a_t t + (1/2)[a_{ll}\{\ln(p_l/p_m)\}^2 + a_{YY}(\ln Y)^2 + a_{kk}(\ln K)^2 + a_{tt}t^2] + a_{lY} \ln(p_l/p_m) \ln Y + a_{lK} \ln(p_l/p_m) \ln K + a_{lt} \ln(p_l/p_m)t + a_{YK} \ln Y \ln K + a_{Yt} \ln Yt + a_{Kt} \ln Kt$$

5.14

$$S_l = \frac{\partial \ln VC}{\partial \ln p_l} = a_l + a_{ll} \ln(p_l/p_m) + a_{lY} \ln Y + a_{lK} \ln K + a_{lt} t \qquad 5.15$$

(5.14) (5.15) 2 3

[37]

Seemingly unrelated regression (SUR)

30 [38]

2 1

$$\varepsilon_{VCY} = \frac{\partial \ln VC}{\partial \ln Y} = a_Y + a_{YY} \ln Y + a_{lY} \ln(p_l / p_m) + a_{YK} \ln K + a_{Yt} t$$

$$\varepsilon_{VCK} = \frac{\partial \ln VC}{\partial \ln K} = a_K + a_{KK} \ln K + a_{lk} (\ln p_l / p_m) + a_{YK} \ln Y + a_{Kt} t$$

$$\varepsilon_{VCT} = \frac{\partial \ln VC}{\partial t} = a_t + a_{tt} t + a_{lt} (\ln p_l / \ln p_m) + a_{Yt} \ln Y + a_{Kt} \ln K$$

(5.11)

TFP

(5.11) ((*VC* /*C*)*(ε_{VCY} 1))

1

[37]

[38] 3 58

3 30

Morrison (1993) 1

1

5.1

[39]

1997 2000

4.1

5.1 5.2 5.3 5.4

(5.11) $VC\ \varepsilon_{VCY}/C$ 1

$C/\ (\varepsilon_{VCY}VC)$ 1

5.2

5.3. (5.11) $VC\ \varepsilon_{VCT}/C$

5.3

[39]

5.2 TFP

TFP

$$TFPG_{jt} = \sum_i (\frac{\theta_{it} + \theta_{it-1}}{2})(\ln Y_{it} - \ln Y_{it-1}) - \sum_i (\frac{\omega_{it} + \omega_{it-1}}{2})(\ln P_{it} - \ln P_{it-1}) \quad (5.16)$$

TFPG *j* TFP θ_i *j* *i* ω_i *j*

i (5.11)

TFP

$$TFPG_{jt} = -\sum \bar{\omega}_{it} \frac{1}{2}(\varepsilon_{iCT} + \varepsilon_{iCT-1}) + \sum \bar{\omega}_{it}(1 - \frac{1}{2}(\varepsilon_{iCY} + \varepsilon_{iCY-1}))(\ln Y_{it} - \ln Y_{it-1}) +$$
$$\sum (\bar{\theta}_{it} - \bar{\omega}_{it})(\ln Y_{it} - \ln Y_{it-1}) - \sum \bar{\omega}_{it} \frac{1}{2}(\varepsilon_{iCK} + \varepsilon_{iCK-1})(\ln K_{it} - \ln K_{it-1})$$

(5.17)

2 (5.17)

TFP

(5.17) TFP 5.1

5.1 1994-2001 2

TFP 2

4 5.1

[40]

5.1

5.1 1994-2001 TFP 0.2

0.8

[40] switch-in switch-out 5.1

0.5

TFP

1980

90

TFP

1994-2001 TFP 5

10.4 5.9 3.4 2.4

1.7 5 2.1 1.0

1.00 0.4 0.3 5

2 TFP 30

0.48 1

5.1 7.5 5.8

4.0 2.7 2.7

1994 2001

TFP 3

4

5 3 3

4

5

3

[41]

JIP 1994-2001

1990

90

TFP

TFP

94-2001 TFP TFP

TFP TFP

TFP

TFP

TFP

94-2001

[41] 4 TFP 5 TFP

0.81 1

A

1994 2001

851 0.76

A.1 TFP

3 3

95

Aw, Chen, and Roberts (1997)

1995 1996

(2001)

1990

$$K_{ft} = BV_{ft} * (INK_{jt} / IBV_{jt})$$

BV t f ( ) INK_{jt} f

j I V_{jt} f j

( )

1990

1976 ( ) 1995

(perpetual inventory method) 1970

$$INK_{jt} = INK_{jt-1}(1-\delta_{jt}) + I_{jt}$$

I 1990

δ

(2000) 0.0792

JIP

( ) 30

( )

0

\+ ( )

TFP

[42]

JIP

A.2

TFP

3

TFP

[42] (2001)

(10)

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1995 -

6 .76 91

1997 Static and Dynamic Unit

TFP 16 4

2002

1999

52 2 pp.166-186 2001 4

2001 pp.113-124 226-228

2002 4 pp.183 213

2003

10

(2003) IT

2003 1990

#03-J-002

1998 1997

1999 90

(2002)

2003 10

2003

10

(2001)

RIETI (*Research Institute of Economy, Trade and Industry*) *Discussion Paper Series* 01-J-002

2003 1970-98

170

2003

10

(2000) - -

Working Paper 00-5

2003 10

10

2003

ESRI Discussion Paper Series No.68

2003

10

表2.1.a 成長会計：1973年－98年

（年率、%）

	実質GDP成長率	生産年齢人口の成長率	実質GDP／生産年齢人口の成長率	全要素生産性の成長率	実質資本サービス／生産年齢人口増加の寄与	労働投入／生産年齢人口増加の寄与		
						合計	うち人・時間／生産年齢人口増加の寄与	うち労働の質上昇の寄与
	a=c+b	b	c	d=c−e−f	e	f=g+h	g	h
1973−83	3.56%	0.88%	2.68%	−0.27%	1.83%	1.12%	0.46%	0.65%
1983−91	3.94%	0.84%	3.09%	0.54%	1.47%	1.08%	0.62%	0.46%
1991−98	1.25%	0.06%	1.19%	0.11%	0.96%	0.12%	−0.10%	0.21%

生産年齢人口は15－64歳の男女人口

表2.1.b 生産要素投入量の成長率

	実質資本ストック／生産年齢人口の成長率	人・時間／生産年齢人口の成長率	労働の質の成長率
1973−83	6.35%	0.65%	0.92%
1983−91	4.31%	0.95%	0.70%
1991−98	2.88%	−0.14%	0.32%

表2.2. 稼働率変化を考慮した場合の成長会計：1973年－98年　　（年率、%）

	実質GDP／生産年齢人口の成長率	全要素生産性（稼働率変化を考慮）の成長率	実質資本サービス*稼働率／生産年齢人口増加の寄与	労働投入／生産年齢人口増加の寄与
	a	b=a−c−d	c	d
1973−83	2.68%	−0.30%	1.87%	1.12%
1983−91	3.09%	0.43%	1.58%	1.08%
1991−98	1.19%	0.23%	0.84%	0.12%

表2.3. Hayashi and Prescottによる成長会計：1960年-2000年　（年率、%）

	実質GNP／生産年齢人口の成長率	全要素生産性（稼働率変化を考慮せず）の成長率	実質資本ストック／生産年齢人口増加の寄与	人・時間／生産年齢人口増加の寄与
	a	b=a-c-d	c	d
1960-73	7.2%	4.1%	4.1%	-1.0%
1973-83	2.2%	0.5%	2.1%	-0.4%
1983-91	3.6%	2.4%	1.4%	-0.3%
1991-2000	0.5%	0.2%	1.1%	-0.8%

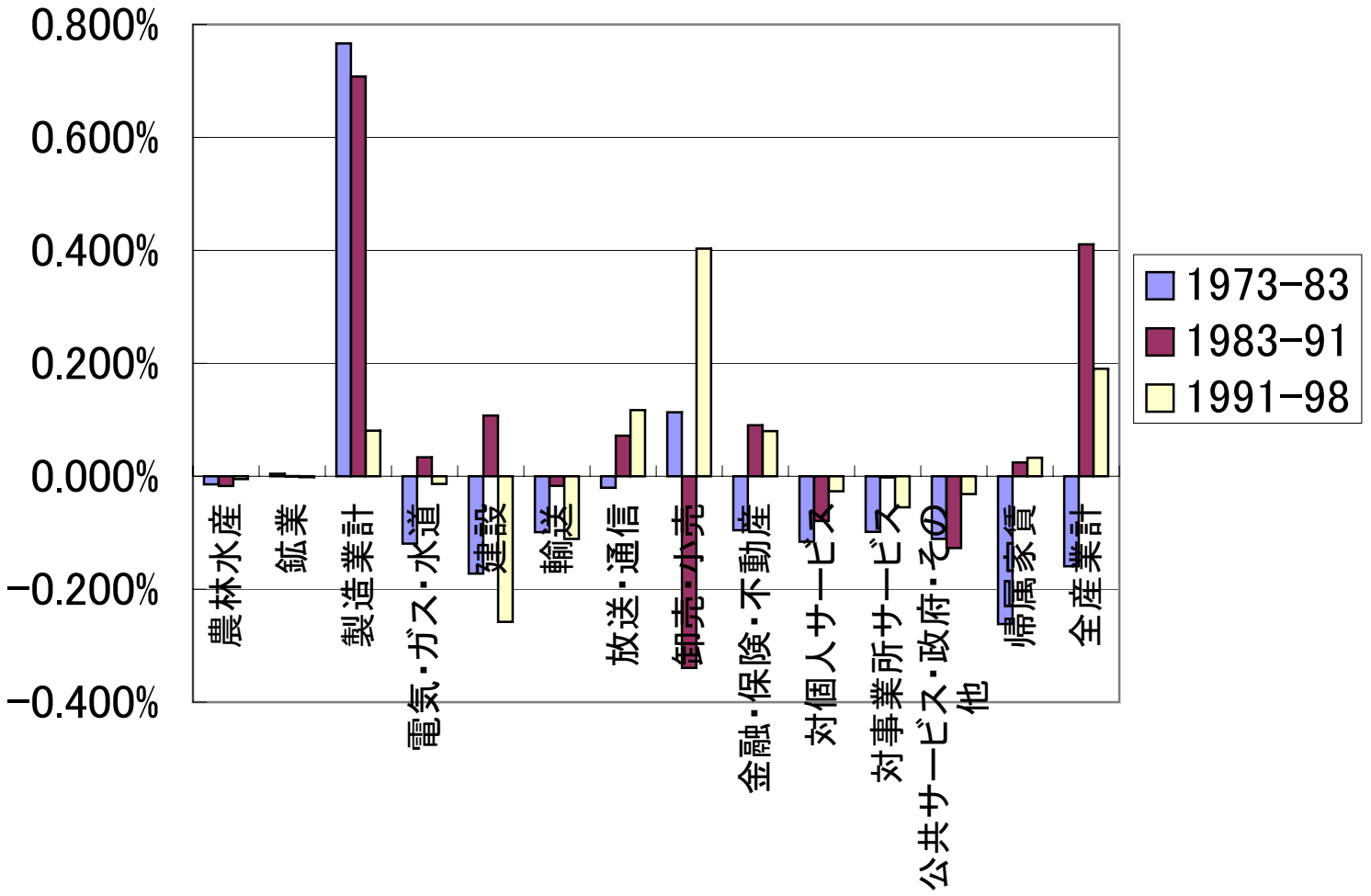
生産年齢人口は20－69歳の男女人口

表3.1. 非サービス業とサービス業における全要素生産性成長率：1973-98年

（年率、%）

		稼働率変化を考慮		稼働率変化を考慮せず	
		非サービス	サービス	非サービス	サービス
労働の質変化を考慮	73-83	0.66%	-0.77%	0.57%	-0.72%
	83-91	0.67%	-0.07%	0.74%	0.05%
	91-98	0.21%	0.13%	0.03%	0.19%
労働の質変化を考慮せず	73-83	0.85%	-0.40%	0.76%	-0.35%
	83-91	0.78%	0.24%	0.84%	0.37%
	91-98	0.32%	0.23%	0.15%	0.29%

図3.1　マクロ経済のTFP上昇への各産業の寄与：業種別・時期別
年率％



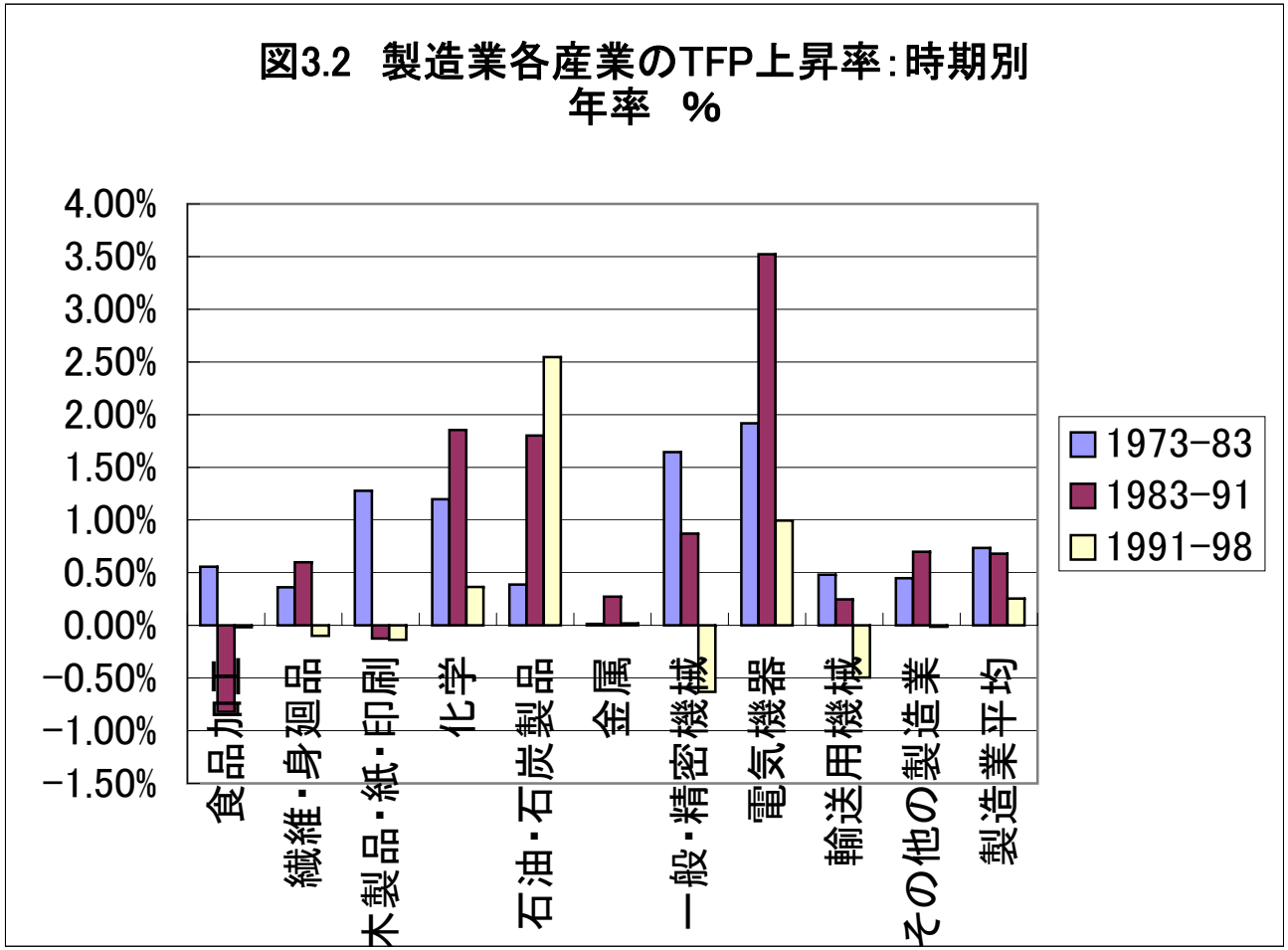


図3.2 製造業各産業のTFP上昇率:時期別
年率 %
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
−0.50%
−1.00%
−1.50%
食品加工
繊維・身廻品
木製品・紙・印刷
化学
石油・石炭製品
金属
一般・精密機械
電気機器
輸送用機械
その他の製造業
製造業平均
1973-83
1983-91
1991-98

表3.2. 中西・乾(2003)が算出した各産業の「規制緩和指標」: 時期別

	1970	1980	1990	1998
	0.811	0.811	0.785	0.765
	0.340	0.345	0.341	0.426
	0.667	0.667	0.750	0.750
	0.315	0.329	0.343	0.453
	0.503	0.495	0.735	0.795
	0.251	0.331	0.397	0.540
	0.301	0.341	0.500	0.635
	0.560	0.571	0.588	0.599

4.1. TFP (1994 2001) 7

								switch-in	switch-out		
		a	b	c	D=a+b+c	e	f	g	h	I=e+f+g+h	J=D+I
1		0.003	-0.001	0.001	0.003	0.006	-0.005	0.001	0.000	0.002	0.005
2		-0.008	-0.002	0.007	-0.002	0.007	-0.027	0.001	0.000	-0.019	-0.020
3		0.000	-0.002	0.001	0.000	0.004	-0.017	0.001	-0.015	-0.027	-0.028
4		0.007	0.000	0.001	0.008	0.000	-0.002	0.000	0.000	-0.001	0.007
5		0.008	-0.001	0.003	0.011	0.010	0.000	0.000	0.000	0.010	0.020
6		0.007	0.001	0.002	0.010	0.001	-0.001	0.002	0.000	0.000	0.011
7		0.004	-0.001	0.001	0.004	0.003	-0.004	0.001	0.000	0.000	0.005
8		0.073	0.005	0.022	0.100	0.010	0.000	0.001	0.000	0.010	0.110
9		0.016	0.001	0.000	0.017	0.007	0.001	0.002	0.001	0.012	0.028
10		0.027	0.015	0.014	0.056	0.000	-0.010	0.000	0.000	-0.010	0.046
11		-0.003	-0.002	0.003	-0.001	0.004	-0.002	0.005	-0.001	0.006	0.005
12		-0.024	0.002	0.000	-0.022	0.000	0.000	0.001	-0.001	0.000	-0.022
13		0.013	-0.003	0.003	0.013	0.002	-0.004	0.003	0.008	0.009	0.022
14		0.003	-0.005	0.000	-0.002	0.000	0.001	0.001	-0.001	0.000	-0.002
15		0.008	-0.001	0.002	0.009	-0.006	-0.005	0.001	-0.001	-0.011	-0.002
16		-0.009	-0.006	0.006	-0.009	0.003	-0.003	0.003	-0.003	0.000	-0.009
17		0.037	-0.002	0.015	0.050	0.009	0.000	0.012	-0.007	0.015	0.065
18		0.022	-0.003	-0.002	0.017	0.003	-0.004	0.003	-0.001	0.000	0.018
19		0.040	-0.001	0.009	0.048	0.013	0.000	0.045	-0.002	0.055	0.103
20		-0.005	-0.002	0.002	-0.005	0.003	-0.003	0.002	-0.002	-0.001	-0.006
21		-0.015	-0.005	0.002	-0.018	0.005	-0.003	0.001	-0.003	0.000	-0.018
22		0.015	-0.002	-0.002	0.010	0.007	0.001	0.005	-0.002	0.010	0.020
23		0.071	-0.001	0.010	0.081	0.008	0.003	0.108	0.002	0.120	0.201
24		0.026	0.003	0.005	0.033	0.008	-0.002	0.004	-0.012	-0.002	0.031
25		0.044	-0.001	0.010	0.053	0.017	-0.008	0.007	-0.002	0.014	0.067
26		0.014	0.000	0.004	0.017	0.033	-0.012	0.011	-0.007	0.025	0.042
27		0.018	0.000	0.005	0.023	0.001	-0.001	0.000	0.000	0.000	0.022
28		0.040	0.000	0.002	0.041	0.005	0.002	0.003	0.000	0.011	0.052
29		0.017	-0.002	0.011	0.026	0.011	0.003	0.003	-0.001	0.016	0.041
30		-0.005	0.004	-0.001	-0.002	0.046	-0.005	0.009	-0.004	0.046	0.045
		0.012	-0.001	0.004	0.015	0.006	-0.004	0.005	-0.001	0.006	0.021
		0.56	-0.04	0.20	0.71	0.28	-0.17	0.25	-0.07	0.29	1.00

4.2

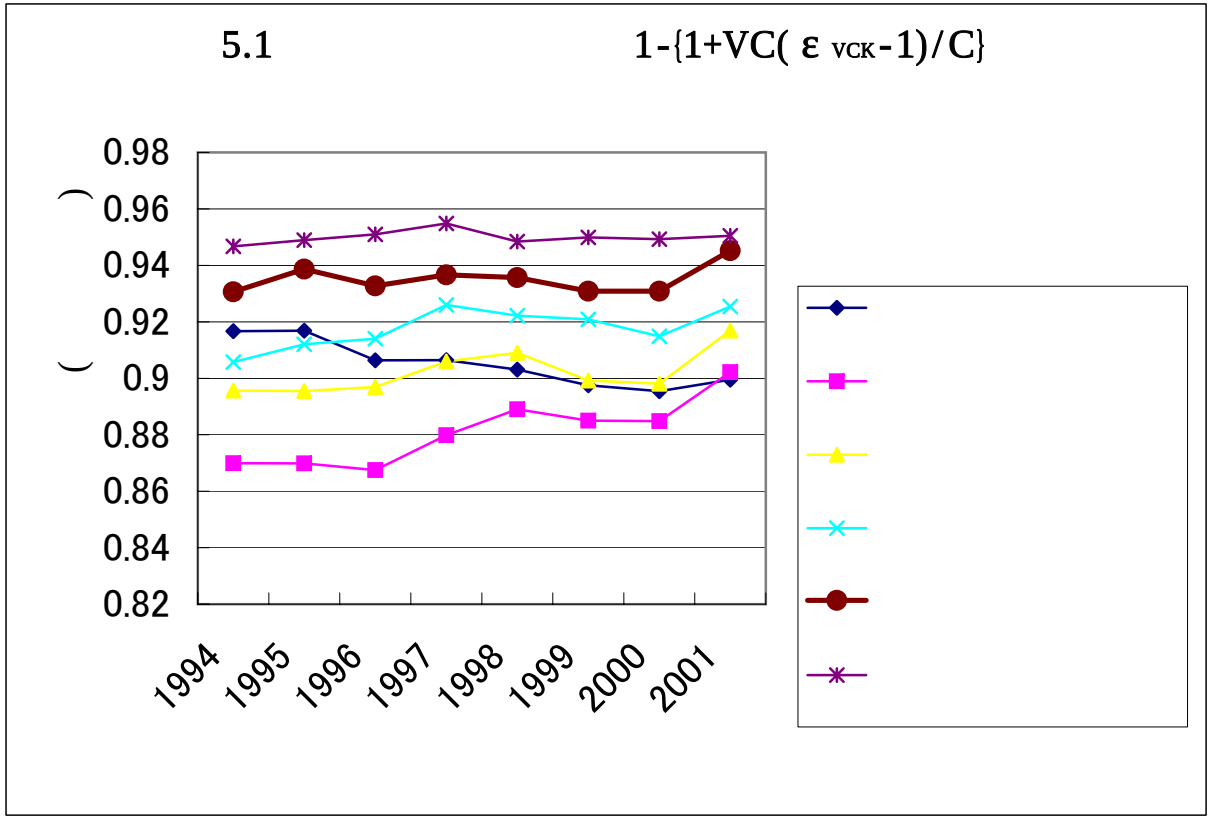
		TFP (%)		)	)		)	)
Hahn(2000)	1990-95	23.0	13.11 (0.57)	−0.69 (-0.03)			10.58 (0.46)		
Baily, Hulten and Campbell(1992)	1977-82	2.4	-1.10 (-0.46)	2.54 (1.06)			0.96 (0.40)		
Foster, Haltiwanger, and Krizan(1998)	1977-87	10.2	4.92 (0.48)	2.66 (0.26)	−0.82 (-0.08)	3.48 (0.34)	2.66 (0.26)		
van Dijk(2003)	1978-92		(0.57)	(0.12)	(-0.09)	(0.20)	(0.31)	(0.26)	(0.05)
(2004)	1994-2001	2.1	1.20 (0.56)	0.33 (0.15)	−0.09 (-0.04)	0.42 (0.20)	0.61 (0.29)	1.13 (0.53)	−0.52 (-0.24)

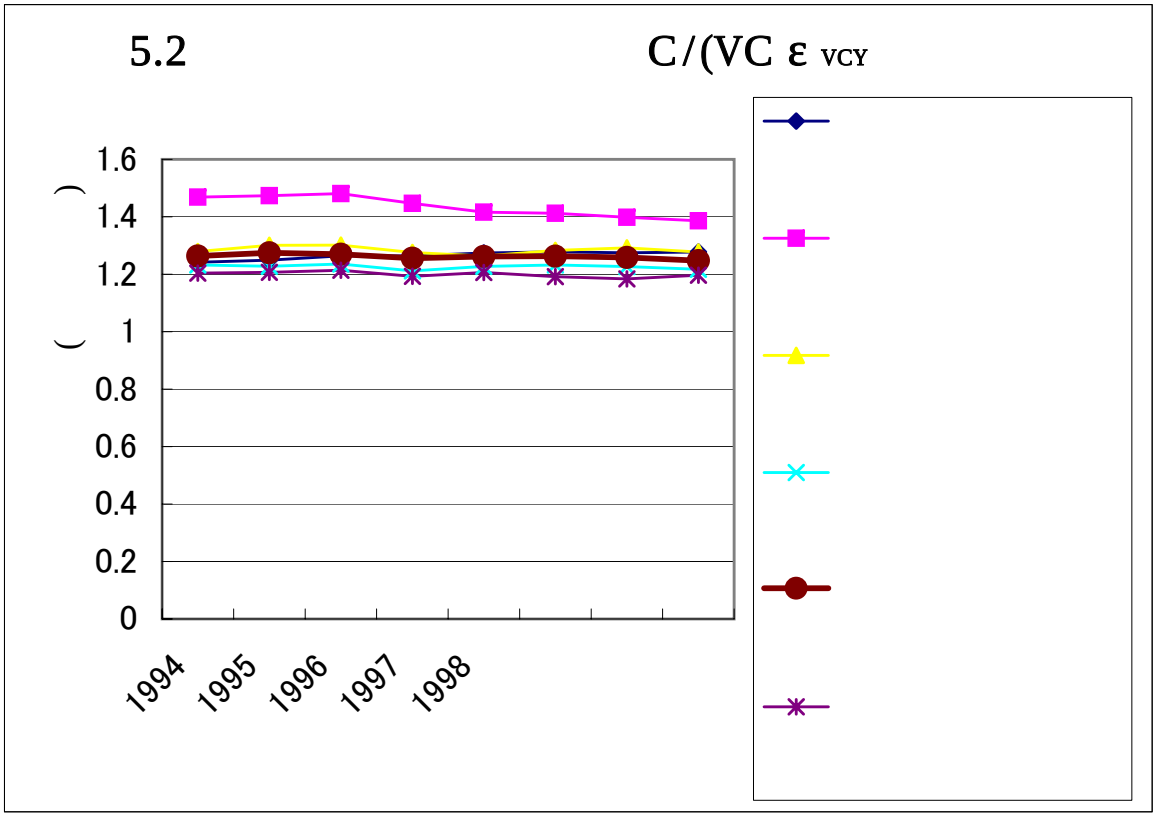
) 1. switch-in switch-out
2. van Dijk
3.
4. (2003)

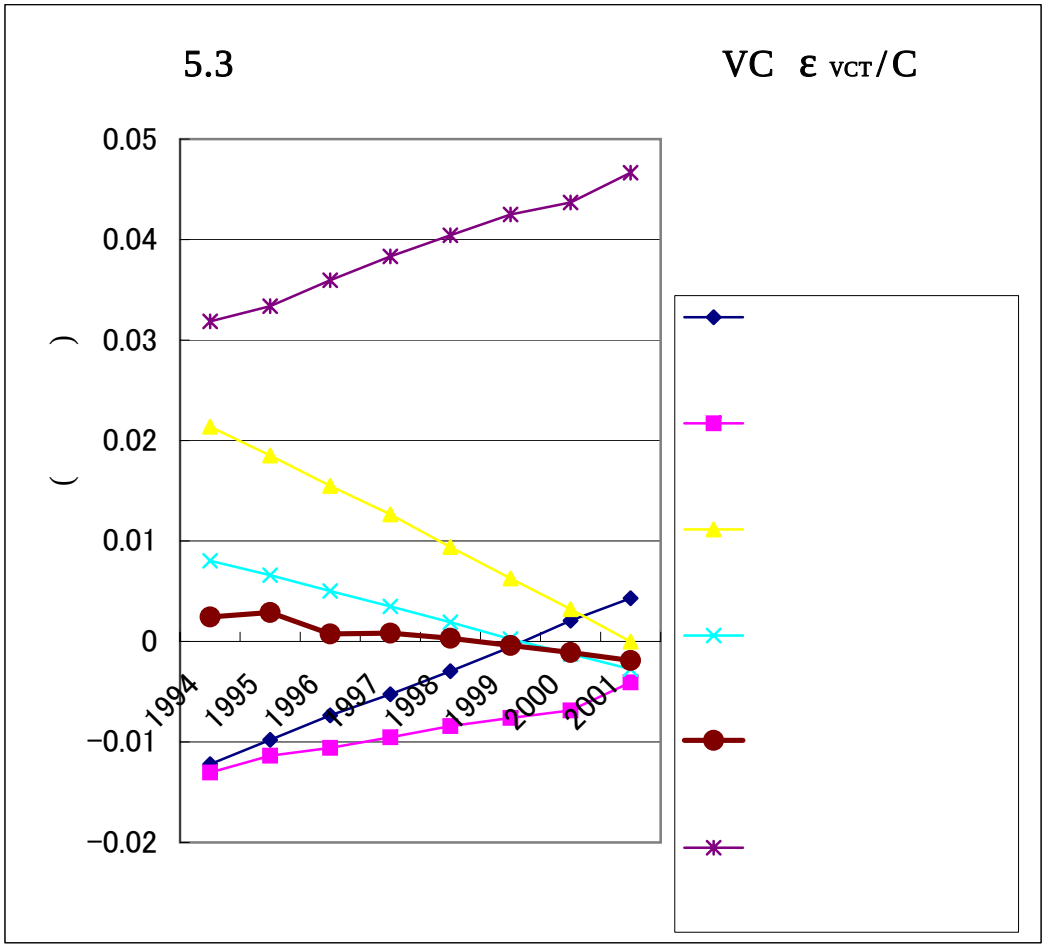
4.3.

	TFP			)	)		)	)
1994-1995	0.029	0.024	0.000	-0.002	0.002	0.005	0.012	-0.006
1995-1996	0.011	0.008	0.001	0.000	0.002	0.002	0.009	-0.007
1996-1997	-0.002	-0.002	0.003	0.001	0.002	-0.003	0.005	-0.008
1997-1998	-0.007	-0.008	0.001	0.000	0.002	0.000	0.005	-0.004
1998-1999	0.011	0.010	0.000	-0.002	0.002	0.001	0.006	-0.004
1999-2000	0.017	0.013	0.003	0.001	0.002	0.001	0.006	-0.005
2000-2001	-0.005	-0.008	0.003	-0.001	0.004	-0.001	0.006	-0.007

) 1. switch-in switch-out


5.1
1-{1+VC(ε vck-1)/C}
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
1994
1995
1996
1997
1998
1999
2000
2001


5.2
C/(VC ε VCY
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1994
1995
1996
1997
1998


5.3
VC εVCT/C
0.05
0.04
0.03
0.02
0.01
0
−0.01
−0.02
1994
1995
1996
1997
1998
1999
2000
2001

5.1. TFP ( ) 1994-2001

	-0.007	-0.003	-0.004	-0.001	0.000
	-0.023	-0.003	-0.021	-0.001	0.001
	-0.036	-0.014	-0.022	0.000	0.001
	-0.007	-0.002	0.000	-0.005	0.000
	-0.010	-0.012	0.003	-0.001	0.000
	-0.012	0.002	-0.013	-0.002	0.001
	-0.016	-0.014	-0.002	0.000	0.001
	0.034	0.010	0.027	-0.003	0.001
	-0.005	0.002	-0.007	-0.002	0.001
	0.010	0.010	0.002	-0.002	0.001
	-0.016	-0.009	-0.006	-0.001	0.001
	-0.019	-0.009	-0.006	-0.004	0.001
	-0.017	-0.011	-0.005	-0.001	0.000
	-0.022	-0.001	-0.021	0.000	0.000
	-0.018	-0.005	-0.008	-0.005	-0.001
	-0.040	-0.014	-0.025	-0.001	0.001
	0.017	0.001	0.016	0.000	0.000
	-0.015	-0.008	-0.009	0.001	0.001
	0.024	-0.006	0.030	0.000	0.001
	-0.018	-0.010	-0.008	0.000	0.000
	-0.019	-0.007	-0.012	0.001	0.000
	0.010	-0.010	0.019	0.000	0.001
	0.104	0.021	0.058	-0.001	0.000
	0.059	-0.016	0.075	-0.001	0.001
	0.012	-0.027	0.040	-0.002	0.001
	0.001	-0.012	0.015	-0.003	0.000
	0.005	-0.004	0.011	-0.002	0.000
	0.013	0.003	0.009	0.000	0.001
	0.006	-0.003	0.008	-0.001	0.001
	0.006	0.004	0.027	-0.002	0.003
	0.002	-0.005	0.008	-0.001	0.001