

*

Heckman Selection
 . 50

가 가 가

1990 40 가

I.

(active aging) (the young old) 가

1/3 가 가 55 60 70

가 가 2001 55 64 55%, 60%

가 75% 55 64 25%, 32%가

*

, 65
2001).

55%, 53%가

(,

가

1998

8%가

(. 1998). 2002

41.5%

가

7.8%

4.0%

, 36.9%

가

가

가

?

가

가

가

가

가

가

가

가

가

가

가?

가

가

가

가?

20

100

, 5

[

1]

. 1980

. 30

40

50

1985

50

1990

. 1990

30

40

2000

50

20

1.7

30

50

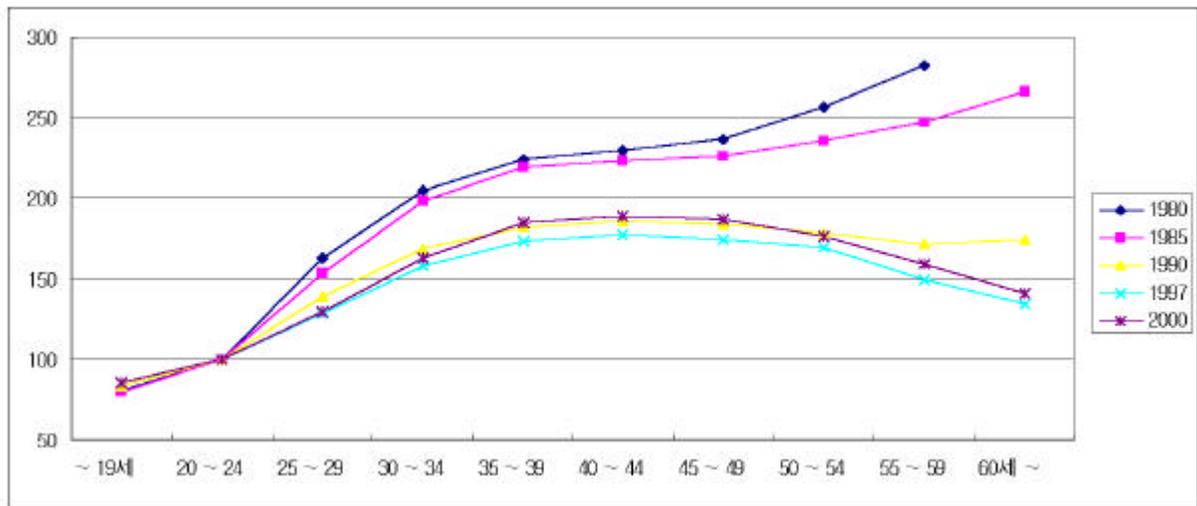
[

2]

30-34

(100) 2) 1990 1990
 , 50 1980
 . 55 90 가 ,
 60 55 1997
 가 1990 가
 가

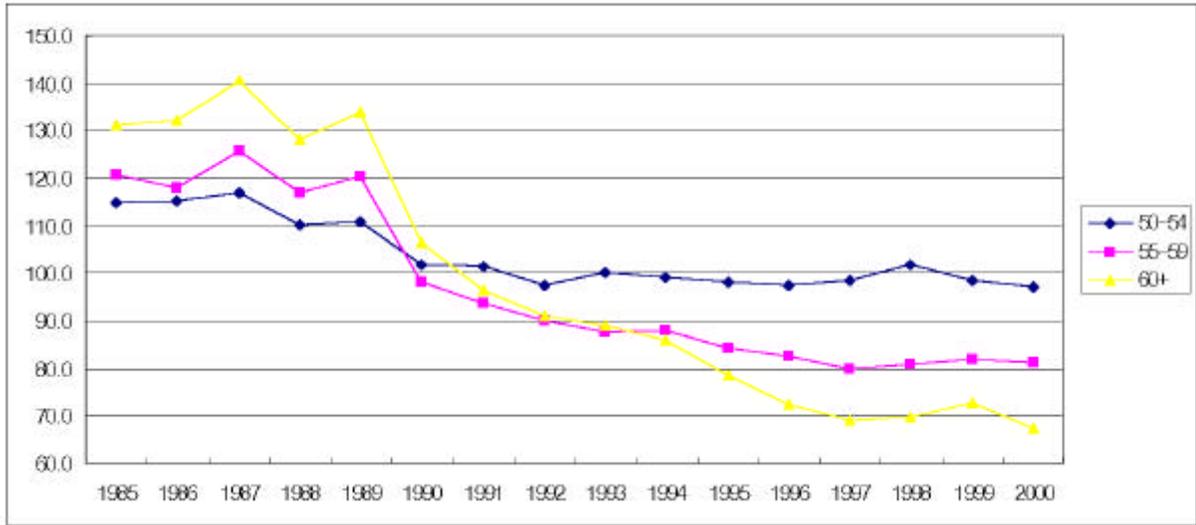
[1] (, 20 24 =100)



: (Labor SIS)

[2] (, 35 39 =100)

2) ()
 20



: (Labor SIS)

가?

가?

가?

40

가

가?

가

가

가?

가?

가

가

가?

가

가?

가,

가?

II.

가

1.

가?

가

가 가

가

가

가? ,

(proxy variable)

(Human Capital Theory)

(seniority)

가

가

(Heterogeneity)

가

(Altonji & Shakatko 1987, Abranham

& Farber, 1987).

가

가 ,

(return)

가 가 . 가

(firm-specific human capital) 가

(Topel 1991).

(on-the-job-training)

가가

가가

가 (Brown 1989).

(Lazear 1981).

, 가

()

가

(, ,

1998; 2002).

1998; 2002). 가 (,

2.

- 가 (utility) 가(L) (X) (w)
(market wage) (reservation wage)

Quinn, Burthause, and Myers(1990)

가 , 가
가 가 가

3. 가

60 , 1990 50
() 가
(return) , 50 가
가 ,

가 1.

가 . 가
가 , 가
(randomly)

Heckman Selection Model

가 2. , 가
가 3. ()

(, 2002; , 1997), 가 - 50
(1).
(, 1998;
2002), 1990

가 , 가 () ,
가 (bridge job)

?
가 , 가

가 4.

가 가

가 5.

III.

1.

Income Panel Survey) 1 4 (1998 2001) (Korean Labor and
가 가 (5,000가 가)
1 1 , , ,
(longitudinal survey) .
4 45
2001 4 15
가 (Life Course) (履歷),
(Schooling History), (Work History) (Labor Market Transitions)
< 1>

< 1>

		15- 29	30- 49	50- 79	
		1,380 (46.8)	2,236 (50.5)	1,433 (46.5)	5,049 (48.3)
		1,571 (53.2)	2,191 (49.5)	1,647 (53.5)	5,409 (51.7)
	.	13 (.4)	375 (8.5)	1,630 (52.9)	2,018 (19.3)
	.	1,435 (48.6)	2,857 (64.5)	1,181 (38.3)	5,473 (52.3)
		1,503 (50.9)	1,195 (27.0)	269 (8.7)	2,967 (28.4)
		2,435 (82.5)	370 (8.4)	13 (.4)	2,818 (26.9)
	.	507 (17.2)	3,870 (87.4)	2,364 (76.8)	6,741 (64.5)
	.	9 (.3)	187 (4.2)	703 (22.8)	899 (8.6)
가	가 .	235 (8.0)	2,113 (47.7)	1,764 (57.3)	4,112 (39.3)
	가 .	2,716 (92.0)	2,314 (52.3)	1,316 (42.7)	6,346 (60.7)
	가	4.14	4.04	3.55	3.92
		2.12	2.47	3.23	2.61
		198.54	216.54	165.26	195.40
	(%)	706 (23.9)	931 (21.0)	969 (31.5)	2,606 (24.9)
	(%)	153 (5.2)	212 (4.8)	213 (7.0)	578 (5.6)
		2,951 (28.2)	4,427 (42.3)	3,080 (29.5)	10,458 (100.0)

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()

		15- 29	30- 49	50- 79	
		1,125 (38.1)	3,168 (71.6)	1,404 (45.6)	5,697 (54.5)
**		9 (.8)	116 (3.7)	344 (24.7)	469 (8.3)
		256 (23.1)	798 (25.4)	176 (12.6)	1,230 (21.8)
		47 (4.2)	278 (8.8)	135 (9.7)	460 (8.2)
		63 (5.7)	246 (7.8)	82 (5.9)	391 (6.9)
		284 (25.7)	882 (28.1)	322 (23.1)	1,488 (26.4)
		172 (15.5)	295 (9.4)	128 (9.2)	595 (10.5)
		276 (24.9)	529 (16.8)	205 (14.7)	1,010 (17.9)
		1,107 (19.6)	3,144 (55.7)	1,392 (24.7)	5,643 (100.0)
**		330 (29.7)	638 (20.4)	144 (10.4)	1,112 (19.8)
		298 (26.8)	304 (9.7)	41 (2.9)	643 (11.4)
		220 (19.8)	770 (24.6)	305 (21.9)	1,295 (23.0)
		7 (.6)	104 (3.3)	343 (24.7)	454 (8.1)
		257 (23.1)	1,312 (41.9)	557 (40.1)	2,126 (37.8)
		1,112 (19.8)	3,128 (55.6)	1,390 (24.7)	5,630 (100.0)
		860 (77.7)	1,634 (52.7)	389 (28.6)	2,883 (51.8)
	/	180 (16.3)	404 (13.0)	245 (18.0)	829 (14.9)
		67 (6.1)	1,060 (34.2)	724 (53.3)	1,851 (33.3)
		1,107 (19.9)	3,098 (55.7)	1,358 (24.4)	5,563 (100.0)
		93.74	136.19	107.22	119.30

: **

2.

가 . 4 OLS
Heckman Selection Model

OLS

가

가

(

),

가

가

Heckman(1979)

가

(sample selection bias)가 , 가
가

(self-selection) : 가 가
(parameters)

(1a) $Y_{1i} = X_{1i}\beta_1 + U_{1i}$,

(1b) $Y_{2i} = X_{2i}\beta_2 + U_{2i} \quad (i = 1, \dots, I)$

where $E(U_{ji}) = 0$, $E(U_{ji}U_{j'i'}) = \sigma_{jj'}$, $i = i'$,
 $= 0$, $i \neq i'$.

가 .
가 . (1a) Y
? ' 가 가? .

$E(Y_{1i} | X_{1i}) = X_{1i}\beta_1 \quad (i = 1, \dots, I)$.

가 .

$E(Y_{1i} | X_{1i}, \text{sample selection rule}) = X_{1i}\beta_1 + E(U_{1i} | \text{sample selection rule})$,

U 0 가 ,
, 가
. Y₂ 가 0 Y₁ Y₁

$E(U_{1i} | X_{1i}, \text{sample selection rule}) = E(U_{1i} | X_{1i}, Y_{2i} \geq 0)$

$$= E(U_{1i} | X_{1i}, Y_{2i} \geq -X_{2i}\beta_2).$$

U_1, U_2 가 , Y_1

$$E(U_{1i} | X_{1i}, Y_{2i} \geq 0) = X_{1i}\beta_1 + E(U_{1i} | U_{2i} \geq -X_{2i}\beta_2).$$

Heckman

Heckman Selection Model

가

5
logit model)

(binomial logit model)

(multinomial

() ,

() 4

$$\text{logit}_{ij} = \log [\pi_{ij} / \pi_{i4}]$$

i , j

가

(=2)

가

(=4)

가

$$\text{logit}_{i2} = \log [\pi_{i2} / \pi_{i4}]$$

가

$$\text{logit}_{ik} = \alpha_{ik} + x_i\beta_k$$

α_{ik}

(parameter)

β_k

(regression parameter)

가

가

IV.

1.

< 2>

가

40

30 가

< 2>

(: ,)

20	108.9	(418)	87.1	(543)	96.6	(961)
30	158.2	(771)	92.9	(325)	138.8	(1,096)
40	162.4	(570)	87.3	(365)	133.1	(935)
50	136.3	(321)	73.2	(141)	117.0	(462)
60	104.6	(93)	48.0	(60)	82.4	(153)
70	72.8	(8)	40.0	(7)	57.5	(15)
	144.0	(2,181)	85.2	(1,441)	120.6	(3,622)

, (ln(wage))

. [3] 가

(ln())

OLS

()

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, Heckman Selection

OLS

가

가

가

가

가

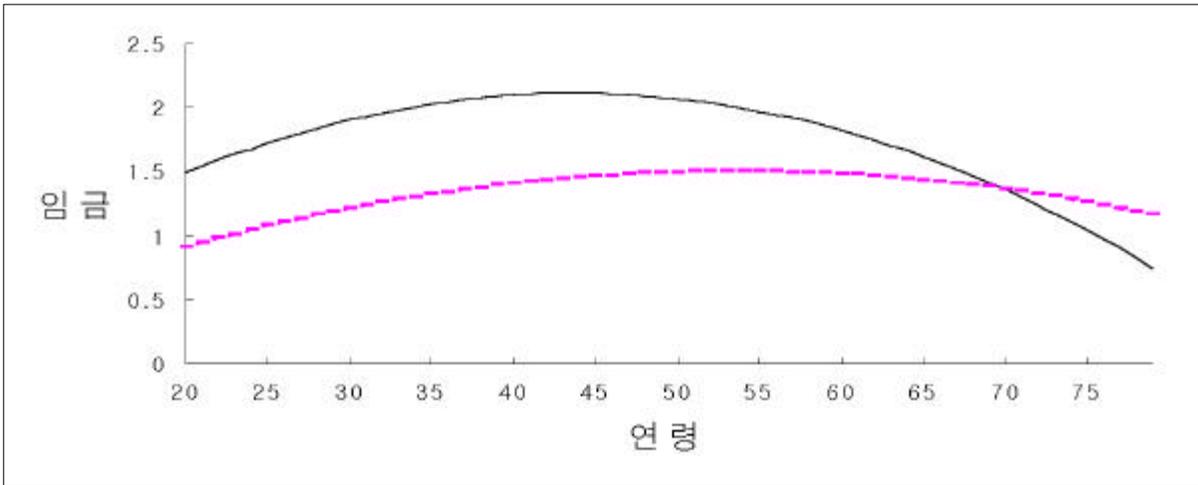
50

가

가 [가 1] [가 2]

가

[3] ln()



2.

50

가

가 < 3> , 50

가 (linear relationship)

- , 50

, 45

가

-0.28

가

가

, 50

(coef. -0.02 -0.03). 50

< 3>

, 50

가

, 45

50

가

< 3> 50

: OLS/Heckman selection model

	OLS			Heckman selection model +		
	5.94	(0.30)	***	5.66	(0.39)	***
	-0.03	(0.00)	***	-0.02	(0.01)	*
()	-0.02	(0.06)		-0.01	(0.06)	
	0.19	(0.07)	*	0.19	(0.08)	*
()	0.39	(0.18)	*	0.18	(0.28)	
	0.22	(0.06)	**	0.40	(0.10)	***
	-0.28	(0.20)		-0.92	(0.20)	***
	0.11	(0.07)		0.27	(0.11)	*
()	-0.21	(0.47)		-0.41	(0.10)	***
	0.07	(0.08)		-0.01	(0.08)	
	-0.08	(0.09)		-0.12	(0.07)	*
/	-0.28	(0.11)	*	-0.36	(0.10)	***
/	-0.19	(0.08)	*	-0.24	(0.07)	***
	0.03	(0.08)		-0.06	(0.08)	
()	0.64	(0.08)	***	0.66	(0.08)	***
	0.32	(0.09)	**	0.34	(0.11)	**
	0.28	(0.14)	*	0.35	(0.11)	**
	0.37	(0.51)		0.48	(0.16)	**
	0.27	(0.06)	***	0.25	(0.07)	***
n	421			rho	-0.56	(0.15)
R Square	0.556			sigma	0.51	(0.04)
				lambda	-0.28	(0.09)

: + Wald test of indep. eqns. (rho = 0) : chi2(1)= 8.46 Prob> chi2= 0.0036

p < .1 * p < .01 ** p < .001 ***

: (KLIPS) 4

V.

OLS

Heckman Selection Model

가? . 5 가

가 , , 45 (

4-1, 4-2). 45 가 () 50 50

가 . 45 가

가 가

가 45 가 50 가

가 50 가

가 가

가 , < 4> 50

가 , < 5> , 가 3)

45 (linear relationship) 가 I , 45 가

50 가 45

가 , 45 50 2 가 II

3)

< 4-1 >

. ()

가	0.49 (0.12) ***		0.02 (0.02)	
가 ²	-0.03 (0.01) *			
)		-0.76 (0.28) **		-0.69 (0.24) **
		-0.75 (0.28) **		-0.69 (0.25) **
45	-0.64 (0.19) **	-0.41 (0.18) *		
45 ²	0.06 (0.03) *	0.05 (0.03) *		
()			-0.48 (0.53)	-0.46 (0.53)
			0.12 (0.21)	0.10 (0.21)
			-0.48 (0.28) *	-0.50 (0.28) *
			-1.24 (0.26) ***	-1.25 (0.26) ***
			0.44 (0.37)	0.45 (0.38)
			-0.71 (0.24) **	-0.66 (0.24) **
()			0.71 (0.25) **	0.74 (0.25) **
			0.38 (0.28)	0.40 (0.29)
			0.99 (0.26) ***	1.05 (0.26) ***
			1.95 (0.23) ***	1.95 (0.24) ***

< 4-2>

()

가	-0.08 (0.19)		0.05 (0.04)	
가 ²	0.02 (0.03)		0.00 (0.00)	
)		-0.97 (0.49) *		-0.94 (0.28) **
		-1.02 (0.55) *		-0.71 (0.29) *
45	3.41 (9.46)	3.51 (9.53)	0.63 (0.15) ***	0.61 (0.15) ***
45	0.55 (0.25) *	0.60 (0.24) *		
45 ²	-0.04 (0.02)	-0.04 (0.02) *		
()			-0.89 (0.39) *	-0.92 (0.40) *
			-1.01 (0.60) *	-0.89 (0.60)
			-2.04 (1.23) *	-1.85 (1.24)
			-1.06 (0.28) ***	-1.06 (0.28) ***
			-0.91 (0.65)	-0.81 (0.64)
			-0.27 (0.39)	-0.30 (0.39)
()			1.39 (0.59) *	1.47 (0.59) *
			0.56 (0.82)	0.78 (0.83)
			1.30 (0.25) ***	1.33 (0.25) ***
			1.91 (0.19) ***	1.90 (0.19) **

: , , , 가 , 가 , 45

: ()

* p<.1 ** p<.01 *** p<.001

: , 「 4 」 , 2001

< 5 >

		logit(/)	logit(/)	logit(/)
45		-0.14 (0.08) *	-0.07 (0.11)	0.07 (0.06)
45		-0.08 (0.27)	-0.77 (0.24) **	-0.47 (0.20) *
45	²	-0.03 (0.05)	0.07 (0.03) *	0.07 (0.03) *
	()			
		1.78 (0.80) *	0.82 (0.75)	-1.07 (0.60) *
		0.08 (0.29)	1.40 (0.28) ***	-0.95 (0.31) **
		0.55 (0.33) *	-0.77 (0.65)	-1.52 (0.44) **
		-0.08 (0.34)	-0.79 (0.54)	-2.12 (0.32) ***
		1.33 (0.43) **	0.46 (0.70)	-0.26 (0.48)
		0.49 (0.29) *	0.02 (0.46)	-2.56 (0.39) ***
	()			
		0.46 (0.29)	-2.16 (1.06) *	1.24 (0.30) ***
		0.17 (0.34)	0.47 (0.45)	0.24 (0.42)
		-0.34 (0.36)	-0.29 (0.54)	2.12 (0.31) ***
		-0.09 (0.48)	1.00 (0.40) *	2.29 (0.25) ***

: , , 가 , 가 , .

: ()

* p<.1 ** p<.01 *** p<.001

: , 「 4 」, 2001

VI.

, 1980 가
 , 1990 가 , 1990 1998
 . 1990 (1, 2).

40

가

가

Heckman

Selection

50

가

(,2002)

1990

1997

가

. 1990

가

가

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1990

가

가

가

1990

40

가

가

가

가

(2001), 『
(2000), 『
(2002), 『
(1999), 『
4 1999 12 ,
(2001), 『2001
(1998) 『
(2001), 『 1-4
(2002), 『
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