규제연구 제20권 제2호 2011년 12월

환경규제가 우리나라 해외직접투자에 미치는 영향

이지연* · 한현옥**

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. 2000 2007 8

. (OECD)

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* 1 , , 30 (abu84@naver.com)
** , , 30 (hhan@pusan.ac.kr)
: 10/12, : 11/25

I. 서 론

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(environmentally sound and sustainable development) .

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(pollution heaven country)

(pollution heaven hypothesis) (industrial flight hypothesis)

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21 .

. (pollution heaven hypothesis)

(industrial flight hypothesis) ,

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,[1] 1980

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. 1990 2006 GDP

3.4 , 5 11 .

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1) ( ) . (:)

1991	1992	1993	1994	1995	1996	1997	1998
1,318,957	1,352,325	1,450,339	2,366,536	3,217,381	4,525,310	3,829,225	4,792,108
1999	2000	2001	2002	2003	2004	2005	2006
3,384,947	5,245,126	5,296,928	3,978,578	4,739,739	6,486,307	7,187,866	11,619,902

2) , GDP

(energy intensity) .

McCallum(1995)

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. Blonigen(2005)

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II. 선행연구

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2)

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$$\ln x_{ij} = a_1 \ln y_i + a_2 \ln y_j + a_3 \ln Distance_{ij} + \sum_{m=1}^{M} \beta_m \ln(z_{ij}^m) + \epsilon_{ij},$$

x_{ij} j i , y_i y_j i j GDP, $Distance_{ij}$

, z_{ij}^m(m = 1, ⋯, M) .

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Keller and Levinson(2002)

. OECD(1997)

( )

. Xing and

Kolstad(2002) , 1

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Bartik(1985) 1972 1978 500

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. McConnell and Schwab(1990) 1973 1982

, (State)

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. Wheeler and Mody(1992) 1980

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. Fabry and Zenghi(2000), Wheeler(2002), Eskeland and Harrison(2003)

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.[3]

(2002) .

3) Neumayer(2001), Eskeland et al.(2003), Bruunermeier et al.(2004), Ederington et al.(2004), Levinson et al.(2007) .

(2002)

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. (2002)

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· (2010)

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III. 모형과 데이터

1. 모형

(gravity model) ,

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.[4] Blonigen(2005)

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4) Bergstrand(1985), Lipsey(1999), Eaton & Tamura(1994), Sazanami & Wong(1997), Swedenborg(2001) .

(GDP) ,

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1 (1) 2 (2) .[5]

1 GDP , 2 GDP 1 GDP

. GDP 1 GDP 1 2

. 1 GDP ,

. 2

GDP 1 GDP , [6]

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. (robustness)

.

$$\ln(FDI_{ijt}) = \beta_0 + \beta_1 \ln(D_{ij}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(ER_{jt}) + \beta_4 \ln(Openness_{jt}) + \epsilon_{ijt} \quad (1)$$

$$\ln(FDI_{ijt}) = \beta_0 + \beta_1 \ln(D_{ij}) + \beta_2 \ln(POP_{jt}) + \beta_3 \ln(PCGDP_{jt}) + \beta_4 \ln(ER_{jt}) + \beta_5 \ln(Openness_{jt}) + \epsilon_{ijt} \quad (2)$$

FDI_{ijt} t i ( ) j ( )

5) (1) 1, (2) 2 .

6) 1 GDP .

, GDP_{jt} t GDP, POP_{jt} t ,
$PCGDP_{jt}$ t 1 GDP, D_{ij} , $Openness_{jt}$
t [7] . ER_{jt} (environmental
regulation variable) .

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(PACE, Pollution Abatement Cost & Expenditure) .

.[8] OECD
, OECD ,

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World Economic Forum( ) 142
(ESI: Environmental Sustainability Index)[9] . 2001 , 2002 , 2005

.

GDP

(energy intensity) .

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.[10]

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7) (+)/GDP
. Asiedu(2001), Gastanaga et al.(1998) .

8) (2007)
, .

9) (2005) .
.

10) (2009) GDP
, Costantini & Cresp(2008), (2009),
(2010) .

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1 β_2 (2) β_2 β_3 (+) , 1 2 β_1 (-) . GDP

,

1 β_4 2 β_5 (+) .

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, .

1 β_3 2 β_4 (+) .

2. 데이터

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OECD [11] 24 OECD [12] 30 54 .

2000 2007 8 .

OECD ,

OECD OECD .

OECD OECD

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11) , , ,

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SITC(Standard International Trade Classification)

Low and Yeats(1992) [13]

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.[14]

〈표 1〉 환경오염산업의 분류

SITC		SITC	
251	,	634	( )
322	, ,	635	
334		641	
515		642	
516		661	
523		67	
524		68	
562		69	
598			

: Low and Yeats(1992), pp.98-99.

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2000 2007

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, GDP, , 1 GDP, ,

WDI(World Development Indicators)

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13) Low and Yeats(1992)
1% .

14) (2009), (2005) .

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‘Great Circle Distance’ ,
‘Great Circle Distance’
, CEPII(Centred’Etudes prospectives et d’Informations internationales)
. .

〈표 2〉 변수 정의 및 자료출처

FDI			
GDP		GDP(US)	WDI
PCGDP		1 GDP(US)	WDI
POP			WDI
Distance		( )	CEPII
Openness		GDP , (%)	WDI
ER	EI_j	$(\frac{CO_{2j}}{GDP})$	WDI
	$\frac{EI_j}{EI_i}$	$(\frac{CO_2/GDP_{상대국(j)}}{CO_2/GDP_{한국(i)}})$	WDI

IV. 분석 결과

(1) (2) 8 (2000~2007)
pooled-OLS . .
(elasticity) .
54 , OECD OECD
.

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1. 전체 국가를 대상으로 한 추정 결과

(< 3>), 1 GDP
, 2 GDP (POP) 1 GDP(PCGDP) .
1 2 ,
(GDP) .
GDP 1% 1% .
(POP) 1% 2.3%
. (Distance) (-)
.
. 1 GDP (-)
.
(Openness) (-) 2
(+)
.
,
(EI_j) 1 2
(+) (-) .
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$\left(\frac{EI_j}{EI_i}\right)$, 1 2 (+) (-)
, 1 .

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〈표 3〉 환경규제가 한국의 해외직접투자에 미치는 영향의 추정결과

		ER=EI_j		ER=EI_j/EI_i	
		1	2	1	2
ln(Distance)	-	-3.72 (0.67)***	-2.22 (0.70)***	-3.39 (0.67)***	-2.17 (0.71)***
ln(GDP)	+	0.96 (0.25)***		1.07 (0.25)***	
ln(PCGDP)	+		-0.03 (0.29)		0.10 (0.29)
ln(POP)	+		2.32 (0.34)***		2.34 (0.35)***
ln(TRADE)	+	-0.01 (0.73)	2.71 (0.86)***	0.11 (0.72)	2.74 (0.87)***
ln(ER)	+	0.54 (0.51)	-0.74 (0.51)	1.19 (0.51)**	-0.32 (0.55)
		16.95 (13.94)	-14.42 (14.22)	14.06 (11.77)	-21.24 (13.36)
# OBS		432	432	432	432
R^2		0.12	0.18	0.14	0.18

: 1) ( )
2) *, **, *** 99%, 95%, 90%

2. OECD 국가와 비OECD 국가를 대상으로 한 추정 결과

OECD OECD ,

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(1) 투자 상대국이 OECD 국가인 경우

OECD

< 4> .

(EI_j) ,

1 GDP (+)

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. GDP

.

2 (POP)

(+) , .

OECD (POP)

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(DIST) 1 2

(-) , .

OECD

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2 1 GDP (+)

. OECD ,

, 1 (+)

. (Openness)

2 (+) .

OECD (+)

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$\left(\frac{EI_j}{EI_i}\right)$,

GDP, , , , 1 GDP

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(-) .

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(-) .

(-) .

〈표 4〉 OECD 국가를 대상으로 한 추정결과

	ER=EI_j		ER=EI_j/EI_i		ER=EI_j		ER=EI_j/EI_i	
	1	2	1	2	1	2	1	2
ln(Dist)	-4.84 (0.87)***	-2.88 (1.17)**	-4.71 (0.87)***	-2.61 (1.19)**	-4.94 (1.01)***	-4.24 (1.17)***	-4.61 (1.01)***	-4.18 (1.21)***
ln(GDP)	0.49 (0.33)		0.61 (0.34)*		1.55 (0,37)***		1.69 (0.36)***	
ln(PCGDP)		-0.41 (0.46)		-0.36 (0.47)		1.15 (0.49)**		1.47 (0.53)***
ln(POP)		1.60 (0.55)***		1.80 (0.57)***		1.97 (0.53)***		2.07 (0.53)***
ln(Openness)	-0.34 (0.93)	2.77 (1.55)*	-0.76 (0.88)	3.35 (1.57)**	-0.13 (1.00)	1.19 (1.53)	0.38 (0.99)	1.36 (1.55)
ln(ER)	-1.23 (0.59)**	-1.27 (0.58)**	-0.81 (0.63)	-0.96 (0.62)	-1.06 (0.65)	-1.03 (0.65)	-0.36 (0.72)	-0.35 (0.72)
	51.94 (18.0)***	8.97 (24.63)	38.45 (15.58)**	-8.33 (23.65)	23.16 (20.28)	5.95 (25.07)	6.54 (17.62)	-6.65 (22.90)
# OBS	176	176	176	176	176	176	176	176
R^2	0.18	0.20	0.17	0.19	0.28	0.29	0.28	0.29

: 1) ( )
2) *, **, *** 99%, 95%, 90%

OECD

. OECD .

(2) 투자 상대국이 비OECD 국가인 경우

OECD ,

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< 5> .

GDP OECD

(+) .

GDP 1% 2.7~4.7% .

(POP) (+) 1%

. (POP) 1%

2.18~3.91% .

(DIST) (-)

. OECD

.

1 GDP (+)

. OECD

(-)

OECD , 1 GDP

(+) . 1 GDP , OECD

OECD

. (Openness)

. (+) 1

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(EI_j) .

(+) .

1 , 2

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$\left(\frac{EI_j}{EI_i}\right)$

(+)

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OECD .

〈표 5〉 비OECD 국가를 대상으로 한 추정결과

	ER=*EIj*		ER=EI_j/EI_i		ER=EI_j		ER=EI_j/EI_i	
	1	2	1	2	1	2	1	2
ln(Dist)	-2.05 (1.51)	-1.82 (1.54)	-2.30 (1.46)	-1.88 (1.51)	-0.94 (1.64)	-0.97 (1.68)	-1.12 (1.61)	-0.89 (1.66)
ln(GDP)	4.65 (0.70)***		4.70 (0.65)***		2.70 (0.82)***		2.76 (0.76)***	
ln(PCGDP)		3.98 (1.52)***		5.06 (1.31)***		1.48 (1.51)		2.47 (1.34)*
ln(POP)		3.91 (0.69)***		3.54 (0.68)***		2.46 (0.76)***		2.18 (0.77)***
ln(Openness)	4.01 (1.97)*	3.08 (1.95)	3.79 (1.85)**	2.28 (1.93)	-0.46 (2.03)	-0.63 (2.06)	-0.57 (1.93)	-1.53 (2.09)
ln(ER)	5.09 (1.42)***	3.00 (1.98)	7.17 (1.43)***	6.05 (1.91)***	3.51 (1.43)**	1.53 (1.96)	4.97 (1.46)***	3.98 (1.95)**
	-145.90 (31.57)	-111.92 (32.8)***	-110.13 (25.6)***	-91.41 (24.8)***	-75.24 (35.70)**	-45.90 (34.87)	-51.26 (29.64)*	-36.69 (27.81)
# OBS	232	232	232	232	232	232	232	232
R^2	0.25	0.25	0.30	0.28	0.15	0.15	0.18	0.17

: 1) ( )
2) *, **, *** 99%, 95%, 90%

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Xing and Kolstad

(2002) .

(OECD)

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GDP .

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『 · 』 11 1 , 2002, pp.121-144.
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A Study on the Effect of Environmental Regulation on Direct Investment of Korea

Lee, Ji-yeon and Han, Hyun-Ok

According to the pollution heaven hypothesis, strict environmental regulation weakens the competitiveness of firms in the country, forcing the firms to move to other countries with loose environmental regulation. This study explores how environmental regulation in foreign countries affects direct investment of Korea to those countries empirically.

When all the countries are included in the analysis, we do not find strong evidence for supporting the pollution heaven hypothesis. However, only the non-OECD countries are considered, we find the pollution heaven hypothesis might hold in Korea.

Key words: Environmental Regulation, Pollution Heaven Hypothesis, Foreign Direct Investment