

규제연구 제20권 제2호 2011년 12월

# 환경규제가 우리나라 해외직접투자에 미치는 영향

이지연\* · 한현옥\*\*

. 2000 2007 8

( OECD )

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\*\* , ,  
: 10/12, : 11/25

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## I. 서론

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.  
(environmentally sound and sustainable  
development)

,  
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.

,  
(pollution heaven country)

(pollution heaven hypothesis)

(industrial flight hypothesis)



2) , GDP  
(energy intensity) .  
McCallum(1995)  
 ,  
 . Blonigen(2005)  
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II. 선행연구

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2)  
 .  
$$\ln x_{ij} = a_1 \ln y_i + a_2 \ln y_j + a_3 \ln Distance_{ij} + \sum_{m=1}^M \beta_m \ln(z_{ij}^m) + \epsilon_{ij},$$
  
  $x_{ij}$  j i ,  $y_i$   $y_j$  i j GDP,  $Distance_{ij}$   
 ,  $z_{ij}^m$  (m = 1, ..., M) .

Keller and Levinson(2002)

OECD(1997)

( )

. Xing and

Kolstad(2002) , 1

Bartik(1985) 1972 1978 500

. McConnell and Schwab(1990) 1973 1982

, (State)

. Wheeler and Mody(1992) 1980

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

.3)

(2002)

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

(2002)

· ,

· (2002)

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·

· (2010)

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### III. 모형과 데이터

#### 1. 모형

(gravity model) ,

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.<sup>4)</sup> 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)

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

$$+ \beta_4 \ln(Openness_{jt}) + \epsilon_{ijt}$$

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

$$+ \beta_4 \ln(ER_{jt}) + \beta_5 \ln(Openness_{jt}) + \epsilon_{ijt}$$

$$FDI_{ijt} \quad t \quad i \quad ( \quad ) \quad j \quad ( \quad )$$

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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)

(PACE, Pollution Abatement Cost & Expenditure)

.<sup>8)</sup> OECD  
, OECD ,

World Economic Forum( ) 142

(ESI: Environmental Sustainability Index)<sup>9)</sup> . 2001 , 2002 , 2005

GDP

(energy intensity)

.<sup>10)</sup>

7) ( + )/GDP

. Asiedu(2001), Gastanaga et al.(1998)

8) (2007)

9) (2005)

10) (2009)

GDP

, Costantini & Cresp(2008),

(2009),

(2010)



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SITC(Standard International Trade Classification)

Low and Yeats(1992) 13)

. ,

.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.

.

2000 2007

.

, GDP, , 1 GDP, ,

WDI(World Development Indicators)

13) Low and Yeats(1992)

14) 1% (2009), (2005)

‘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)

## 1. 전체 국가를 대상으로 한 추정 결과

( $\alpha_3$ ), 1 GDP  
 , 2 GDP (POP) 1 GDP(PCGDP)  
 1 2  
 (GDP)  
 GDP 1% 1% 2.3%  
 (POP) 1% (Distance) (-)  
 1 GDP (-)  
 (Openness) (-) 2  
 (+)  
 ( $EL_j$ ) 1 2  
 (+) (-)  
 ( $\frac{EL_j}{EL_i}$ ) , 1 2 (+) (-)  
 , 1

〈표 3〉 환경규제가 한국의 해외직접투자에 미치는 영향의 추정결과

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

: 1) ( )

2) \*, \*\*, \*\*\* 99%, 95%, 90%

## 2. OECD 국가와 비OECD 국가를 대상으로 한 추정 결과

OECD OECD ,

(1) 투자 상대국이 OECD 국가인 경우

OECD

< 4> .

$(EI_j)$  ,

1 GDP (+)

.

GDP

.

2 (POP)

(+)

OECD (POP)

.

(DIST) 1 2

(-)

OECD

.

2 1 GDP (+)

OECD ,

1 (+)

(Openness)

2 (+)

OECD (+)

.

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

GDP, , , , 1 GDP

(-)

(-)

(-)

〈표 4〉 OECD 국가를 대상으로 한 추정결과

|                | ER=EI <sub>j</sub> |                   | ER=EI <sub>j</sub> /EI <sub>i</sub> |                   | ER=EI <sub>j</sub> |                    | ER=EI <sub>j</sub> /EI <sub>i</sub> |                    |
|----------------|--------------------|-------------------|-------------------------------------|-------------------|--------------------|--------------------|-------------------------------------|--------------------|
|                | 1                  | 2                 | 1                                   | 2                 | 1                  | 2                  | 1                                   | 2                  |
| ln(Dist)       | -4.84<br>(0.87)*** | -2.88<br>(1.17)** | -4.71<br>(0.87)***                  | -2.61<br>(1.19)** | -4.94<br>(1.01)*** | -4.24<br>(1.17)*** | -4.61<br>(1.01)***                  | -4.18<br>(1.21)*** |
| ln(GDP)        | 0.49<br>(0.33)     |                   | 0.61<br>(0.34)*                     |                   | 1.55<br>(0.37)***  |                    | 1.69<br>(0.36)***                   |                    |
| ln(PCGDP)      |                    | -0.41<br>(0.46)   |                                     | -0.36<br>(0.47)   |                    | 1.15<br>(0.49)**   |                                     | 1.47<br>(0.53)***  |
| ln(POP)        |                    | 1.60<br>(0.55)*** |                                     | 1.80<br>(0.57)*** |                    | 1.97<br>(0.53)***  |                                     | 2.07<br>(0.53)***  |
| ln(Openness)   | -0.34<br>(0.93)    | 2.77<br>(1.55)*   | -0.76<br>(0.88)                     | 3.35<br>(1.57)**  | -0.13<br>(1.00)    | 1.19<br>(1.53)     | 0.38<br>(0.99)                      | 1.36<br>(1.55)     |
| ln(ER)         | -1.23<br>(0.59)**  | -1.27<br>(0.58)** | -0.81<br>(0.63)                     | -0.96<br>(0.62)   | -1.06<br>(0.65)    | -1.03<br>(0.65)    | -0.36<br>(0.72)                     | -0.35<br>(0.72)    |
|                | 51.94<br>(18.0)*** | 8.97<br>(24.63)   | 38.45<br>(15.58)**                  | -8.33<br>(23.65)  | 23.16<br>(20.28)   | 5.95<br>(25.07)    | 6.54<br>(17.62)                     | -6.65<br>(22.90)   |
| # OBS          | 176                | 176               | 176                                 | 176               | 176                | 176                | 176                                 | 176                |
| R <sup>2</sup> | 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 ,

< 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 , OECD

(+) . 1 GDP

OECD

(Openness)

(+) 1

$$(EI_j)$$

(+)

1

2

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

(+)

OECD

〈표 5〉 비OECD 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)     | -2.05<br>(1.51)    | -1.82<br>(1.54)      | -2.30<br>(1.46)      | -1.88<br>(1.51)     | -0.94<br>(1.64)     | -0.97<br>(1.68)   | -1.12<br>(1.61)    | -0.89<br>(1.66)   |
| ln(GDP)      | 4.65<br>(0.70)***  |                      | 4.70<br>(0.65)***    |                     | 2.70<br>(0.82)***   |                   | 2.76<br>(0.76)***  |                   |
| ln(PCGDP)    |                    | 3.98<br>(1.52)***    |                      | 5.06<br>(1.31)***   |                     | 1.48<br>(1.51)    |                    | 2.47<br>(1.34)*   |
| ln(POP)      |                    | 3.91<br>(0.69)***    |                      | 3.54<br>(0.68)***   |                     | 2.46<br>(0.76)*** |                    | 2.18<br>(0.77)*** |
| ln(Openness) | 4.01<br>(1.97)*    | 3.08<br>(1.95)       | 3.79<br>(1.85)**     | 2.28<br>(1.93)      | -0.46<br>(2.03)     | -0.63<br>(2.06)   | -0.57<br>(1.93)    | -1.53<br>(2.09)   |
| ln(ER)       | 5.09<br>(1.42)***  | 3.00<br>(1.98)       | 7.17<br>(1.43)***    | 6.05<br>(1.91)***   | 3.51<br>(1.43)**    | 1.53<br>(1.96)    | 4.97<br>(1.46)***  | 3.98<br>(1.95)**  |
|              | -145.90<br>(31.57) | -111.92<br>(32.8)*** | -110.13<br>(25.6)*** | -91.41<br>(24.8)*** | -75.24<br>(35.70)** | -45.90<br>(34.87) | -51.26<br>(29.64)* | -36.69<br>(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%

OECD ,  
(+) OECD  
(+) 1  
OECD

V. 결 론

1992  
(+)

OECD

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OECD

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OECD

OECD

OECD

, 1

Xing and Kolstad

(2002)

( OECD )

GDP

GDP

GDP

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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