

4-1-2018

# How Does Foreign Direct Investment (FDI) Affect Environmental Pollution

Ming Wie Khoo  
*Pittsburg State University*

Michael Davidsson  
*Pittsburg State University*

Follow this and additional works at: [https://digitalcommons.pittstate.edu/papers\\_2018](https://digitalcommons.pittstate.edu/papers_2018)

 Part of the [Environmental Health Commons](#), and the [International Business Commons](#)

---

## Recommended Citation

Khoo, Ming Wie and Davidsson, Michael, "How Does Foreign Direct Investment (FDI) Affect Environmental Pollution" (2018).  
*Paper Presentations*. 13.  
[https://digitalcommons.pittstate.edu/papers\\_2018/13](https://digitalcommons.pittstate.edu/papers_2018/13)

This Article is brought to you for free and open access by the Research Colloquium 2018 at Pittsburg State University Digital Commons. It has been accepted for inclusion in Paper Presentations by an authorized administrator of Pittsburg State University Digital Commons. For more information, please contact [dlwhite@pittstate.edu](mailto:dlwhite@pittstate.edu).



# RESEARCH COLLOQUIUM 2018

PITTSBURG STATE  
UNIVERSITY

Ming Wie Khoo

# INTRODUCTION

How does foreign direct investment (FDI) affect environmental pollution?



# PURPOSE AND CONTRIBUTION OF THE STUDY

- ▶ To study the effect of FDI toward Environmental Pollution
- ▶ Dependent Variable (DV):
  1. Net foreign direct investment (FDI).
- ▶ Independent Variable (IV):
  1. Carbon dioxide (CO<sub>2</sub>) emissions from liquid fuel consumption.
  2. CO<sub>2</sub> emissions from burning of fossil fuel and manufacture of cement.
  3. Rate of primary completion(% of relevant age group).

# THE EMPIRICAL MODEL

## Using the Ordinary Least Square (OLS) Method: Panel Regression

[Net foreign direct investment (FDI).  
1960 – 2017 ] =

[Carbon dioxide (CO<sub>2</sub>) emissions from liquid fuel  
consumption.]

+

[Carbon dioxide (CO<sub>2</sub>) emissions from burning of fossil fuel  
and manufacture of cement]

+

[Rate of primary completion(% of relevant age group).]

# DATA



- United Nations Conference on Trade and Development (UNCTAD).



- Klynveld Peat Marwick Goerdeler (KPMG) International.



- World Bank.



- Bloomberg New Energy Finance.

# LITERATURE REVIEW



## ► Natalia Zugravu Soilita, 2005

1. **Pollution Haven Hypothesis:** Weak environmental regulations in a host [developing] country attracts foreign firms to avoid high environmental cost compliance of guest [developed] country of origin.
2. **Endowments Factor Hypothesis:** Contradicts previous hypothesis → Pollution intensive firms are also capital intensive, benefits from lack environmental regulation would offset relative higher price in host country → Deter or reduce investments → Smaller effect on pollution in host country than theoretical predictions by Pollution Haven Hypothesis.
3. **Chain-Effect Hypothesis:** FDI → Technology improvement → Upgrade/ Improve host country environmental standards → Improve existing guest country environmental standards → Universal environmental standard (eg. ISO 14001).



Equation: UNTITLED Workfile: UNTITLED::Untitled\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: FDI  
 Method: Least Squares  
 Date: 03/21/18 Time: 02:45  
 Sample (adjusted): 1977 2508  
 Included observations: 367 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCIRATE	-428561.4	1264704.	-0.338863	0.7349
CO2LIQKT	102.7786	26.91594	3.818504	0.0002
CO2KKT	-43.68080	11.76232	-3.713620	0.0002
C	-86222444	88098083	-0.978710	0.3284

R-squared	0.048408	Mean dependent var	-1.38E+08
Adjusted R-squared	0.040543	S.D. dependent var	3.32E+08
S.E. of regression	3.25E+08	Akaike info criterion	42.04584
Sum squared resid	3.83E+19	Schwarz criterion	42.08841
Log likelihood	-7711.412	Hannan-Quinn criter.	42.06276
F-statistic	6.155297	Durbin-Watson stat	2.033951
Prob(F-statistic)	0.000432		

# Findings Econometric Study

1. **Coefficient:** Indicate changes of absolute value in independent variables for every one-unit change of FDI

2. **Probability:** P-Value  $\leq$   $\alpha$ -Value (0.05). IV are significant

3. **Durbin-Watson Stat :** There is no correlation which is good.

**Running White Test:** Test variance of error in regression model is constant that is homoscedasticity.

➤ Greater R-Squared & Adjusted R-Squared value indicate greater variability usually in percentage.

- **Durbin Watson Stat (D):** Detect the presence of autocorrelation of the regression
- Value lies between 0 and 4 ( $0 < D < 4$ ).
  - $D < 2$  : There is positive correlation.
  - $D = 2$  : No correlation.
  - $D > 2$  : Successive error term are negatively correlated.



# FINDINGS

## Econometrics Study

	FDI	PCIRATE	CO2LIQKT	CO2KT
FDI	1.000000	-0.093827	-0.006136	-0.090367
PCIRATE	-0.093827	1.000000	0.576864	0.668662
CO2LIQKT	-0.006136	0.576864	1.000000	0.922349
CO2KT	-0.090367	0.668662	0.922349	1.000000

### Correlation Test between Variables:

1. Values indicate the correlations between variables in percentage
2. Positive (+ve) sign indicate both variables are related in the same direction
3. Negative(-ve) sign indicate both variables are related in the opposite direction.

# FINDINGS

## Conclusions

Equation: UNTITLED Workfile: UNTITLED::Untitled\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: FDI  
 Method: Least Squares  
 Date: 03/21/18 Time: 02:45  
 Sample (adjusted): 1977 2508  
 Included observations: 367 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCIRATE	-428561.4	1287704.	-0.338863	0.7349
CO2LIQKT	102.7786	26.91594	3.818504	0.0002
CO2KT	-43.68080	11.76232	-3.713620	0.0002
C	-8692444	8809993	-0.978710	0.3284

R-squared	0.048408	Mean dependent var	1.38E+08
Adjusted R-squared	0.040543	SD. dependent var	3.32E+08
S.E. of regression	3.25E+08	Akaike info criterion	42.04584
Sum squared resid	3.83E+19	Schwarz criterion	42.08841
Log likelihood	-7711.412	Hannan-Quinn criter.	42.06276
F-statistic	6.155297	Durbin-Watson stat	2.033951
Prob(F-statistic)	0.000432		



Carbon Dioxide Emissions from Liquid Fuel Consumption (CO<sub>2</sub>LIQKT)



Carbon Dioxide Emissions from Burning of Fossil Fuels and the Manufacture of Cement (CO<sub>2</sub>KT)

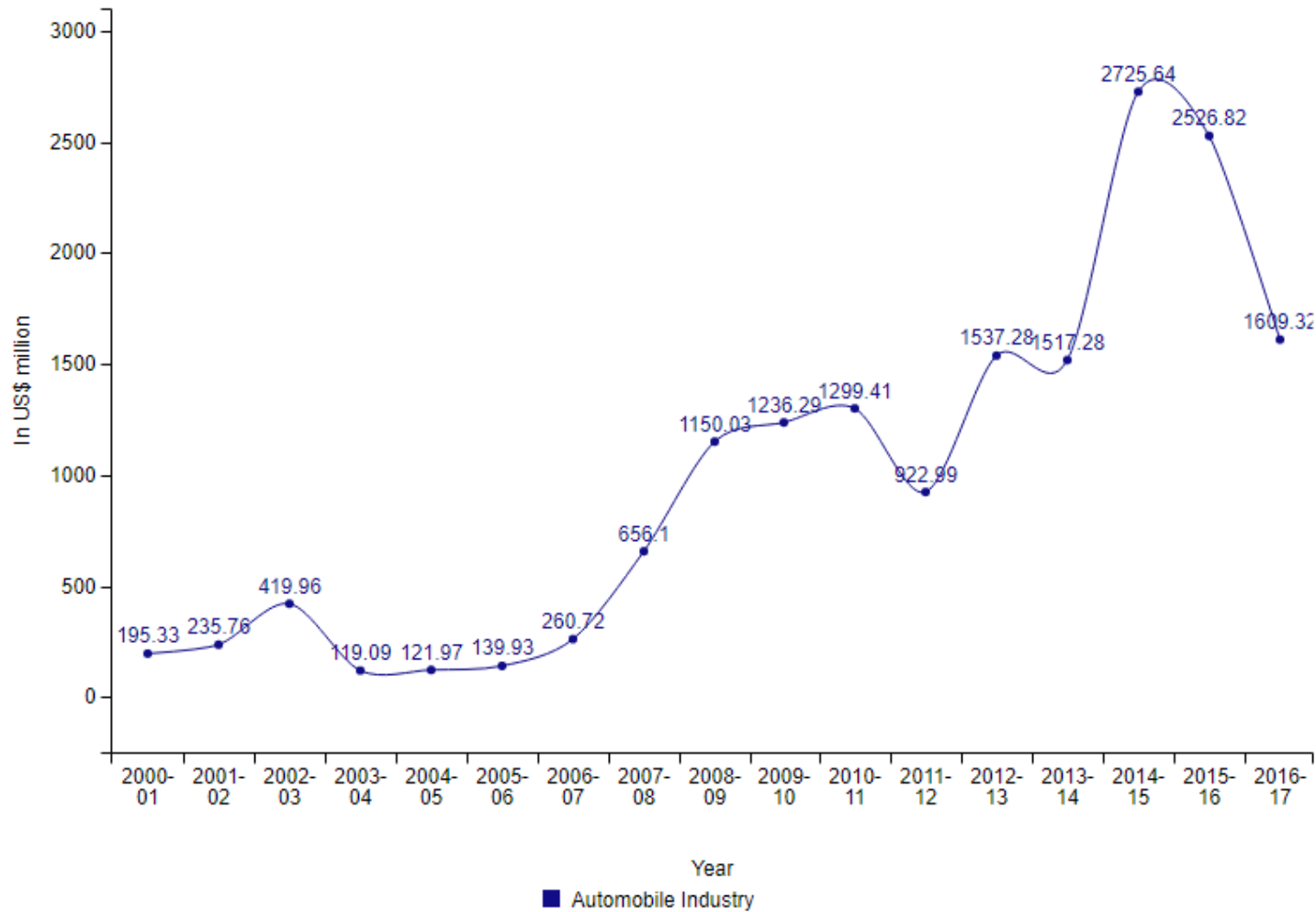
WHY +VE ? : ↑ FDI → ↑  
 Land vehicles that cause CO<sub>2</sub>LIQKT

WHY -VE ? :  
 Following slides will explain it

# FINDINGS

## Conclusions

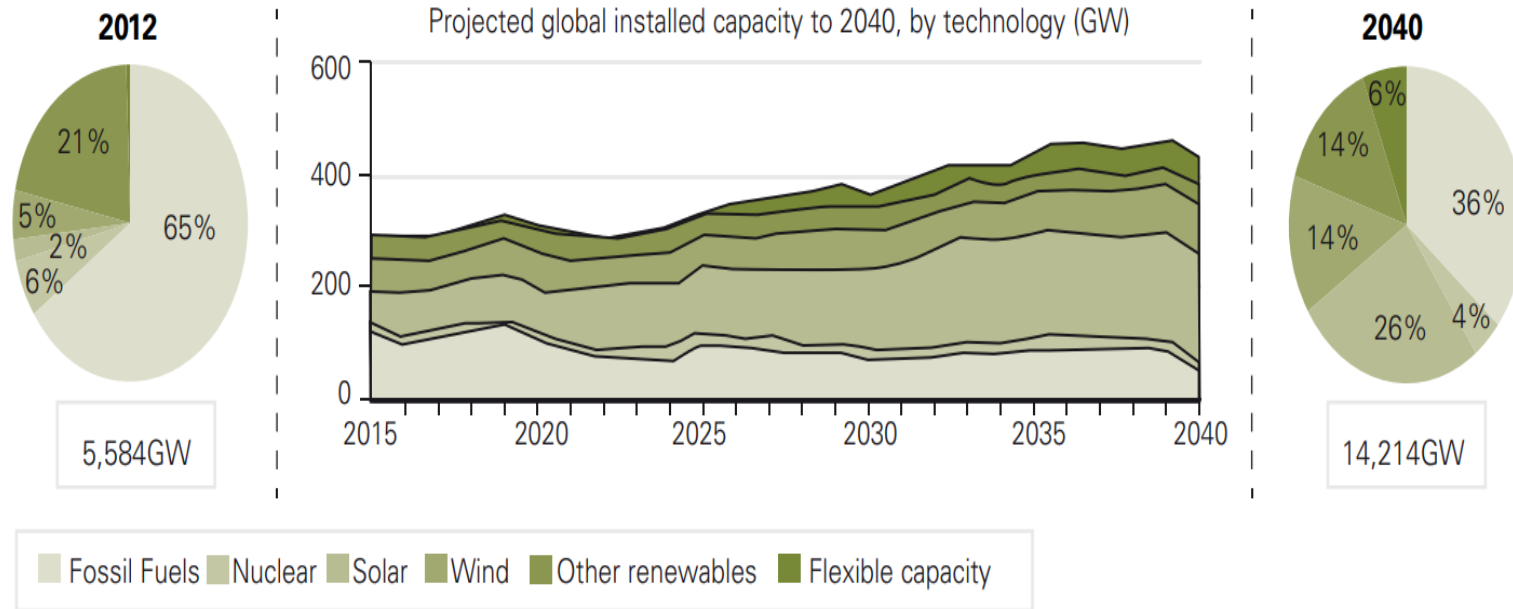
FDI Equity Inflows in Automobile Industry from 2000-01 to 2016-17



# FINDINGS

## Conclusions

### Annual Capacity additions, 2015-40 (GW)

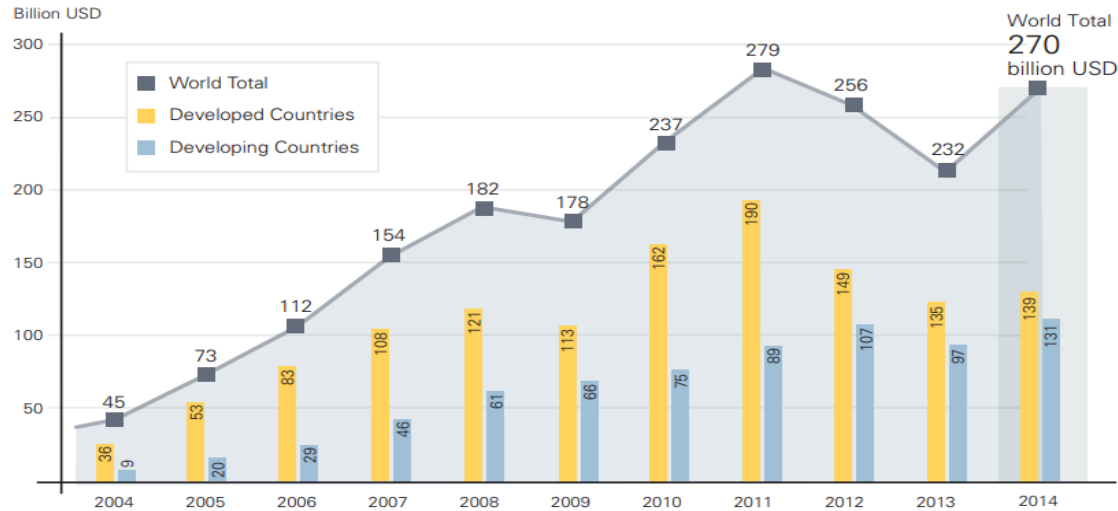


Source: Bloomberg New Energy Finance

- Fossil Fuel expected to decrease 20% from 2012 to 2040.
- Solar Energy expected to increase 24% from 2012 to 2040..

# Global investment in renewable energy production

Global New Investment in Renewable Power and Fuels, Developed and Developing Countries, 2004–2014

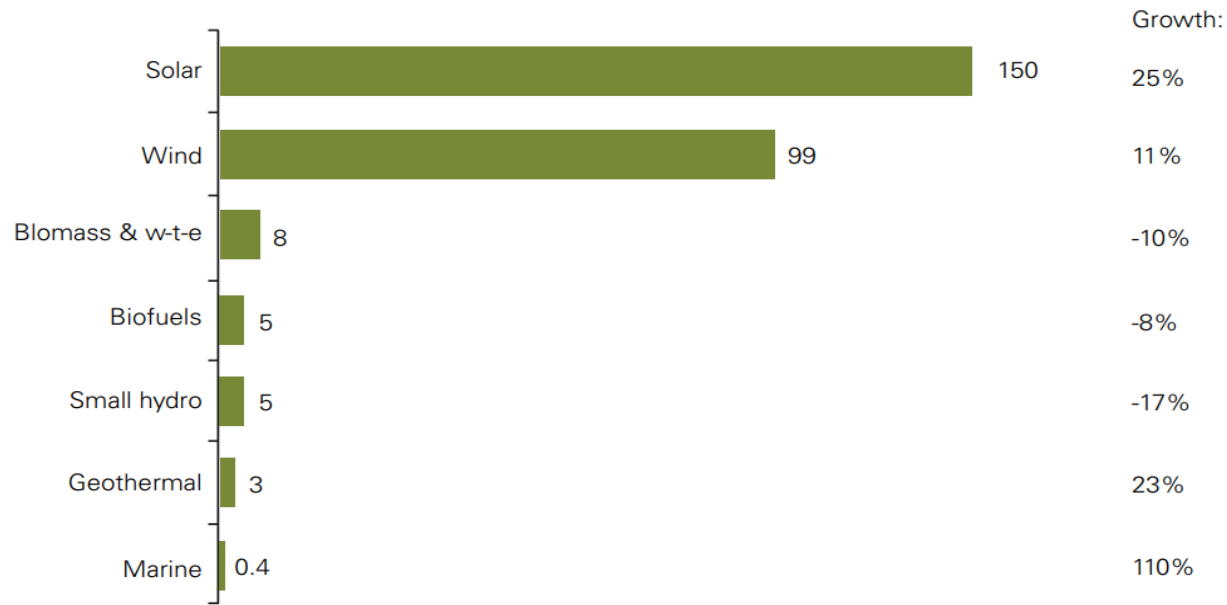


Does not include investment in hydropower > 50 MW

## FINDINGS

## Conclusions

### Global new investment in renewable energy by sector, 2014 compared to 2013, US\$ billions



New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals.

Source: UNEP, Bloomberg New Energy Finance.

# FINDINGS

## Conclusions

# QUESTIONS

