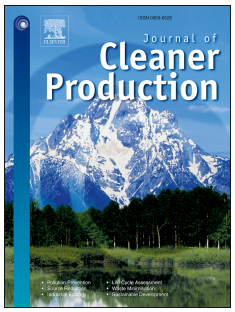
Accepted Manuscript



Changes of CO_2 emissions embodied in China-Japan trade: Drivers and implications

Rui Wu, Yong Geng, Professor, Huijuan Dong, Dr., Tsuyoshi Fujita, Xu Tian

PII: S0959-6526(15)00897-5

DOI: 10.1016/j.jclepro.2015.07.017

Reference: JCLP 5823

To appear in: *Journal of Cleaner Production*

Received Date: 19 April 2015

Revised Date: 12 June 2015

Accepted Date: 3 July 2015

Please cite this article as: Wu R, Geng Y, Dong H, Fujita T, Tian X, Changes of CO_2 emissions embodied in China-Japan trade: Drivers and implications, *Journal of Cleaner Production* (2015), doi: 10.1016/j.jclepro.2015.07.017.

Changes of CO_2 emissions embodied in China-Japan trade: drivers and implications

Rui Wu[a,d], Yong Geng[b*], Huijuan Dong[c*], Tsuyoshi Fujita[c], Xu Tian[a,d]

[a] Key Lab on Pollution Ecology and Environmental Engineering, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110016, China

[b] School of Environmental Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

[c] National Institute for Environmental Studies, Tsukuba 305-8506, Japan

[d] University of Chinese Academy of Sciences, Beijing 100049, China

*Corresponding author:

Professor Yong Geng

School of Environmental Science and Engineering

Shanghai Jiao Tong University

No. 800 Dongchuan Road, Minhang, Shanghai

China 200240

E-mail: ygeng@sjtu.edu.cn

Telephone: +86-21-54748019

Fax: +86-21-54740825.

Dr. Huijuan Dong

Email: dong.huijuan@nies.go.jp (H. Dong) Telephone: +81-29-850-2184,

Fax: +81-29-850-2960;

Abstract

CO_2 emission embodied in trade is an important aspect to respond international carbon mitigation. Half of China's emission increase was due to production of exports. In order to analyze the reason of such a rapid emission increase, embodied CO_2 emission flows between China and Japan for the period of 2000-2009 were estimated in this study by using emission embodied in bilateral trade (EEBT) approach in order to raise policy implications for both countries from trade perspective. Decomposition analysis was further conducted in order to identify driving forces underlying changes during the study period. Moreover, the concept of dependence on traded CO_2 was proposed for analyzing mutual dependence of China and Japan's carbon emission and economy. The results show that China was a net exporter of embodied CO_2 emissions between China-Japan trade, but both China's exported emissions and net emission transfer to Japan began to decrease after 2007. More emissions were embodied in more advanced and less carbon intensive products, especially for China's exports. Driving force analysis shows that trade volume was the main driver for the increase of embodied emissions and technology effect contributed mainly to the decrease. The absolute value of technology effect was even larger than activity effect in some years. This study also reveals that Japan was relatively more dependent on China's CO_2 emissions and showed an increasing trend over the last decade, while China's economic development was more dependent on imports from Japan and such a situation reversed after 2006. This study suggests that China should further reduce its emission intensity for narrowing