

## Trade Impacts of Codex Standards on Kimchi

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### Introduction

The volume of world food exports has been increased sharply since 2000 due to the China's import increase and world economic growth and reached above \$1.4 trillions on 2013( WTO). With the increased food trade, the concerns of food safety and consumer's health resulted in several mandatory laws and regulations on food imports. The Codex Alimentarius Committee (Codex) was established by FAO and WHO in 1963 in order to harmonize international food standards, guidelines and codes of practice to protect consumers' health and ensure fair practices in the food trade (Codex). Codex approved the Codex standards on Kimchi in July, 2001. Korea, the Kimchi origin, welcomed its Codex accreditation on kimchi as a globalization of kimchi so that its export could be promoted with the increased quality incredibility to the world customers. Non-harmonized variety types of Kimchi were sold as named kimuchi in japan and paocai in China before a Codex accreditation named as kimchi (Albala, 2011; Ang, et al., 1999). The Codex accreditation is nondiscriminatory and universal standard to the whole nations. The origin country of a product accredited would have an advantage of production technology and quality for international markets, but the same advantage could be applied to the others as long as they follow the same standard. The Codex may encourage the product quality and food safety as well as the international competition for the same products.

The purpose of this paper is to evaluate the economic impacts of the Codex accreditation on kimchi through its exports and imports in the origin country of Korea. After reviewing the previous literature on Codex impacts, the paper will review the impacts of Codex standards on Korea kimchi's export and import. In the end the implication of the analysis will be discussed.

### Literature Review

A World Bank study by Wilson and Otsuki (2001) estimated the impacts of the uniform adoption of a Codex food safety standard in 15 importing countries on 31 exporting countries. The Codex food safety standard would increase trade of grain and nuts by more than \$6 billion, or more than 50 percent, compared with the divergent standards in effect during 1998. Otsuki et al. (2001) found that the developing export countries which have

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lower standard food safety would be more negatively affected under a strong standard rather than a lax standard. The analysis is done by using a gravity econometric model including a codex standard.

### Impacts of the Codex standards on Kimchi Export from Korea

The export of Korea Kimchi increased until 2004 up to 34,827 tones and it has been decreased afterwards due to the parasite detection in the China Kimchi, the competition of the Korea kimchi with China kimchi in Japan and the extended economic recession after 2008. In 2011, 83% of the Korea kimchi export went to Japan, and 2.7%, 2.3% and 2.2% of it went to US, Hong Kong and Taiwan, respectively. The export of Korea kimchi is analyzed focused on Japan. The real price of Kimchi export to Japan decreased from ¥405/kg in 1991 to ¥310/kg in 2012. The increase of the real GDP per capita in Japan also increased the kimchi export to Japan.

The impacts of Codex standards on Korea kimchi export is analyzed by a multivariate regression considering own price, income and Codex standard together as follows;

$$Exp_t = \beta_0 + \beta_1 p_t + \beta_2 y_t + \beta_3 y_t^2 + \beta_4 codex_t + \varepsilon_t, \quad t=1991-2012.$$

Where  $Exp_t$  stands for Korea's kimchi exports in year  $t$  (MT),  $p_t$  for the real export prices (¥100/kg) in year  $t$ ,  $y_t$  for the real GDP per capita (¥1000) in year  $t$ ,  $codex_t$  for a dummy variable of a codex standard accreditation on kimchi in and after 2001, and  $\beta_i$  for marginal export contributions of each variables. The estimation result of the stationary export data by OLS is;

$$Exp_t = -817751.8 - 13051.44p_t + 462.4925y_t - 0.0605204 y_t^2 + 6185.407codex_t + \varepsilon_t$$

(-1.60)      (-2.61)\*\*      (1.79)\*      (-1.82)\*      (1.97)\*  
 $R^2 = 0.8847, F=32.60.$

Where ( ) represents t-statistics of each coefficients, and \*, \*\* represents statistical significance at 10% and 5% respectively.

Once all other variables are constant, the Codex standard on Korea kimchi increased 6,185 tones per year. When the export price of \$3.85/kg in 2012 is applied, the export impact value of the Codex standards is \$23.8 million annually.

The Korea kimchi export with or without the Codex standards is forecasted until 2020 by forecasting price and income by the first difference equations as follows,  $\Delta p_t = -0.05445 - 0.07985 \Delta p_{t-1}$ , and  $\Delta y_t = 30.93243 - 0.2396596 \Delta y_{t-1}$ . Without Codex standards of Korea kimchi, export will be further lower than the current levels.

### Impacts of the Codex standards on Kimchi Imports into Korea

The 100% of kimchi import to Korea comes from China. The import started since 1996, but increased greatly starting from 200. The real import price has been decreased from ₩549/kg in 2003 to ₩498/kg in 2012, only the reduction of 9.2% comparing to 812% increase of import volume. The high domestic kimchi price (₩8,908/kg in 2012) compared to the low import price was one of the main determinant of the sharp import increase. Even the parasite detection in China kimchi couldn't halt the increasing import trend except the economic crisis in 2008. It means that the Korea income is the good factor to explain the import variation. The import equation is proposed as follows,

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$$Imp_t = \beta_0 + \beta_1 p_{Ct}^i + \beta_2 p_{Kt}^i + \beta_3 y_{kt} + \beta_4 codex_t + \beta_5 d2009_t + \varepsilon_t, \quad t=1997-2012.$$

Where,  $Imp_t$  represents kimchi import (MT),  $p_{Ct}^i$  the real import price of China kimchi (₩/kg),  $p_{Kt}^i$  the real Korea kimchi domestic price (₩/kg),  $y_{kt}$  the Korea GDP per capita (₩ millions),  $codex_t$  a dummy variable of Codex standard introduction, and  $d2009_t$  a dummy variable of the sharp import decreased in 2009.  $\beta_i$  are the marginal import contribution of each variables. The non-stationarity of the import time series data results in the OLS estimation by the first difference equation.

$$\Delta Imp_t = -43538.67 - 38.45956 \Delta p_{Ct}^i + 32.69458 \Delta p_{Kt}^i + 31708.62 \Delta y_{kt}$$

(-1.64)            (-1.35)            (1.67)            (1.73)

$$+39675.14 codex_t - 70892.59 d2009_t, \quad t=1996-2012$$

(2.03) \*\*            (-2.92)\*

$$R^2 = 0.7901, F=6.77.$$

Where, ( ) represents t-statistics of each coefficients, and \* and \*\* are 10% and 5% statistical significance.

The impacts of Codex standards on China kimchi imports to Korea is the import increase of 39,675 tons to Korea. When the import price of \$0.51/kg is applied, the import impact value of Codex standards to Korea is \$20.1 million annually.

### Conclusion and Implication

Codex standards on Korea kimchi not only increased the export to Japan, but also increased the imports from China. The increased export volume of 6,185 tons is inundated by the more increased import increase of 39,675 tons. However, in terms of impact values, export increase of \$23.8 million results in a slight positive margin from import increase of \$20.1 million annually. The Codex standards for kimchi does provide benefits not only to the origin country, Korea, but also the other country, China. It implies increased international trade by building consumer trusts about the safety and quality of the food products.

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