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Consequence of sequential trade interventions: Evidence from the U.S. coated paper products

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ABSTRACT

Up to 40% of the total consumption of coated paper products in the United States has been met by imports in recent years. To protect domestic industry, two sequential antidumping and countervailing investigations against several major supplying countries (e.g., China) were conducted in 2006 and 2009. In this study, the effectiveness of these trade interventions is evaluated with the almost ideal demand system and cointegration techniques. Three types of trade effects are found through the analysis: trade investigation effect during the 15-month investigation process, trade depression effect on targeted countries subject to duty collection, and positive trade diversion effect on non-targeted suppliers. Imports from China and Indonesia have been suppressed since the duties were levied in 2010. However, other suppliers (i.e., Korea and Germany) have filled the market gap and gained a larger market share over time. The findings reveal that market competition in a specific sector has become more complicated within the increasingly globalized world economy, and sequential trade interventions can generate unpredictable results.

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1. Introduction

In the era of globalization, it is a feasible business strategy to mass-produce goods in countries with comparative advantage and then ship them to consumers worldwide. Hence, increasing domestic demand of many commodities in the United States has been met by imports. This is also true for certain coated printing paper products suitable for graphic usage (thereafter, coated paper products), which have been widely used in high-quality colored printing, such as advertisements, catalogues, magazines, and books. Based on the statistics from the United States International Trade Commission (U.S. ITC, 2016a,b), the import value of coated paper products by the United States from 2003 to 2016 was \$1.7 billion per year on average and ranged between \$1.3 and 2.5 billion.

More specifically, the import of coated paper products by the United States reached the peak volume in 2006, with 39% of the total domestic consumption of coated paper products being met by imports (U.S. ITC, 2010). China became one of the leading suppliers in this market after it joined the World Trade Organization in 2001. Its market share increased from <1% in 2003 to >20% in 2009. Along with the fast-growing import, two antidumping and countervailing investigations on the coated paper import were initiated in the United States, and by regulation each took about

15 months to finish. The first investigation was initiated in October 2006. A group of American coated paper manufacturers filed the petition and alleged that certain coated paper products from China, Indonesia, and Korea were subsidized and dumped in the United States at less than fair value (U.S. ITC, 2007). This investigation finished in December 2007 with a non-affirmative decision. Encouraged by this decision, the import of coated paper products from China and Indonesia grew even faster over 2007–2009. The second investigation was initiated in September 2009 and it targeted China and Indonesia only (U.S. ITC, 2010). The final decision in November 2010 was affirmative. Various antidumping duties (7.60–135.83%) and countervailing duties (17.64–178.03%) have been imposed on individual Chinese firms since then. For Indonesian firms, the duty rate has been fixed at 20.13% for the anti-dumping purpose and 17.94% for the countervailing purpose. In October 2015, a sunset review for coated paper import was instituted since five years have passed. In January 2016, the U.S. Department of Commerce decided to continue the imposition of trade remedies on these coated paper products imported from China and Indonesia (U.S. ITC, 2016a).

The market of paper and allied products has been analyzed in a number of studies. For example, Buongiorno and Uusivuori (1992) examined the law of one price for the export of paper and pulp products in the United States through a cointegration analysis. Zhang and Buongiorno (1997) evaluated the demand for printing and publishing paper products with a demand system and a

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translog cost function. Hetemaki and Mikkola (2005) predicted printing and writing paper import in Germany with several econometric models. More recently, Hujala et al. (2013) examined the trend and driving force in the pulp and paper sector by estimating an augmented gravity model of bilateral trade worldwide. Overall, previous studies related to paper and allied products trade have mainly focused on intermediate products (e.g., pulp) or paper products at the aggregate level.

Interventions on forest products trade have been examined in a few cases. For instance, Kelson and Lilieholm (1994) estimated the effect on international timber supply of applying a regulation from Washington State to the entire Pacific Northwest region. Zhang (2001) investigated the welfare impact of the 1996 U.S.-Canada softwood lumber agreement. Wan et al. (2010b) examined the impact of the antidumping investigation by the United States on wooden bedroom furniture import from China. Li et al. (2007) analyzed the impact on the world forest sector of reducing the risk of exotic pest spread by curtailing the roundwood trade. In summary, although there exists extensive empirical evidence with regard to interventions on forest products trade, previous studies usually focus on a single trade intervention. The effectiveness of sequential interventions such as those on coated paper products in the United States, however, has not been examined in any study so far.

The objective of this study is to analyze the import demand of coated paper products from 2003 to 2016 in the United States and the effectiveness of two sequential trade interventions in this market. The framework employed is the almost ideal demand system (AIDS), augmented by several policy dummy variables. Market competition in the long run and short run is analyzed with the cointegration technique and error correction model. The sequential antidumping and countervailing investigations in 2006 and 2009 are a unique combination of interventions on the market, and both of them are covered in the analysis. The major suppliers of coated paper products in this import market are Canada, China, Finland, Germany, Indonesia, Japan, and Korea. From the analysis, several possible effects of the trade interventions will be quantified explicitly, including trade investigation effect during the long investigation process, trade depression effect on targeted suppliers, and trade diversion effect on other suppliers after duty levy. Given the uniqueness of two sequential interventions in one market, the empirical evidence from this study will allow us to gain a better understanding of the effectiveness of trade interventions, and help industrial firms and government agencies address the increasing pressure from the global competition.

2. Methods

When large import demand of a commodity is met by several supplying countries, a demand system can be used to evaluate market dynamics and the impact of exogenous events. In this study, the linearized almost ideal demand system is utilized to analyze the import market of coated paper products in the United States. This model was originally derived by Deaton and Muellbauer (1980) based on the assumption of consumer utility maximization under a budget constraint. Theoretical properties from consumer theory can be tested and restrictions can be imposed on parameters. Furthermore, properties of individual time series can be considered through cointegration and error correction techniques (Engle and Granger, 1987). As a result, the static model has been extended into a dynamic model (Karagiannis et al., 2000). In the literature, the AIDS model has been used to analyze trade issues related to many commodities, such as meat products (Yang and Koo, 1994), cereals (Nzuma and Sarker, 2010), and bedroom furniture (Wan et al., 2010a; Luo et al., 2015). In this study, both the static and dynamic AIDS models are employed to examine the import market of coated paper products in the United States.

2.1. The static model

The static model in this study is specified as follows:

$$w_{it} = \alpha_i^s + \beta_i^s \ln(m_t/P_t^*) + \sum_{j=1}^N \gamma_{ij}^s \ln p_{jt} + \sum_{k=1}^K \varphi_{ik}^s D_{kt} + \sum_{h=1}^H \theta_{ih}^s M_{ht} + \mu_{it} \tag{1}$$

where w is the budget share; m denotes the total expenditure for coated paper import by the United States; P^* is an aggregated price index; p is the average unit price of coated paper products from one source; D is a set of policy dummy variables; M is a set of monthly dummy variables for seasonality; μ is the disturbance term; and $\alpha, \beta, \gamma, \varphi,$ and θ are parameters. For the indexes, t is for a month, s for the static model, i and j for a supplying source ($N=8$), k for the policy variables ($K=4$), and h is for monthly variables ($H=11$). A total of 166 months from January 2003 to October 2016 are covered in the study.

The total expenditure term (m_t) is defined as the sum of the product of price and quantity from each source. The budget share for a country (w_{it}) is the ratio of the import value from this country over the total expenditure. The aggregate price index (P_t^*) is approximated by the Stone price index (Deaton and Muellbauer, 1980). Mathematically, the relations can be expressed as follows:

$$m_t = \sum_{i=1}^N p_{it} q_{it}$$

$$w_{it} = p_{it} q_{it} / m_t$$

$$\ln P_t^* = \sum_{j=1}^N w_{jt} \ln p_{jt} \tag{2}$$

where q_{it} is the quantity of coated paper products imported from source i at month t .

Four policy dummy variables are set to account for the impacts from two sequential investigations, the duty collection, and the economic recession of 2008. The first investigation was conducted from October 2006 to December 2007, and the second was from September 2009 to November 2010. The trade remedy measures, i.e., antidumping and countervailing duties, have been in effect since December 2010, thus the time span is from December 2010 to October 2016. The variable for the economic recession covers the period from July 2008 to June 2009. For each dummy variable, its value is equal to one during the event period, and zero otherwise. In addition, 11 monthly dummy variables from January to November are added to account for possible seasonality in the import.

To be consistent with economic theory, several restrictions need to be met, or otherwise imposed on the model. These include the adding-up, homogeneity, and symmetry restrictions:

$$\sum_{i=1}^N a_i = 1, \sum_{i=1}^N \beta_i^s = 0, \sum_{i=1}^N \gamma_{ij}^s = 0, \sum_{i=1}^N \varphi_{ik}^s = 0, \sum_{i=1}^N \theta_{ih}^s = 0,$$

$$\sum_{j=1}^N \gamma_{ij}^s = 0,$$

$$\gamma_{ij}^s = \gamma_{ji}^s \tag{3}$$

where the symbols denote the coefficients in Eq. (1). These restrictions allow the specification in the AIDS model to satisfy the properties of a demand function, so the sum of budget shares is one, the AIDS model is homogenous in prices and total expenditure, and it also satisfies the symmetry of the Slutsky matrix (Deaton and Muellbauer, 1980). The adding-up restriction can be satisfied through dropping one equation from the estimation. The homogeneity and symmetry restrictions can be imposed on the parameters and then evaluated by a likelihood ratio test.

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