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Did NAFTA cause the structural changes in bilateral import functions between the US and Mexico?

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Abstract

This paper assesses the long-run bilateral trade relations between the US and Mexico. North American Free Trade Agreement (NAFTA) had no additional impacts on import functions. Gradual switching existed even before the agreement became effective.

JEL classification: F13; C22

Keywords: North American Free Trade Agreement; DOLS; Gradual switching; Bilateral import function

1. Introduction

The North American Free Trade Agreement (NAFTA) is prominent because the US, which is highly developed country and Mexico, which is relatively less developed agreed to construct a free trade area. This removal of trade barriers inevitably promotes their trade because of the difference in their development stages. This type of policy change might also introduce a structural change into

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their trade patterns. Of course, many researchers study NAFTA, but most neglect the possibility of gradual switching along with the phased reduction of tariffs (e.g., Casario (1996)). This paper assesses the long-run relations in the import functions between the US and Mexico, applying the Dynamic Ordinary Least Squares (DOLS) method by Stock and Watson (1993) together with the gradual switching model by Ohtani and Katayama (1985) and Ohtani, Kakimoto, and Abe (1990), for each country's long-run import function.

2. Modeling import functions

We modify Marquez's (1990) bilateral import function and use domestic income, domestic price, foreign price and exchange rate as determinants of bilateral imports. The general foreign export price is used as the foreign price because exact export prices for each country were unobtainable. The bilateral import function from country A to county B is specified as follows:

$$\begin{aligned} M_t^{\mathrm{A}} = {} & \alpha_1 + \alpha'_1\lambda_t + (\beta_1 + \theta_1\lambda_t)\ln Y_t^{\mathrm{A}} + (\beta_2 + \theta_2\lambda_t)\ln \mathrm{PD}_t^{\mathrm{A}} \\ & + (\beta_3 + \theta_3\lambda_t)\ln \mathrm{PX}_t^{\mathrm{B}} + (\beta_4 + \theta_4\lambda_t)\ln \mathrm{EX}_t^{\mathrm{A}} \\ & + \sum_{j=-k_1}^{k_2}(\gamma_j + \gamma'_j\lambda_t)\Delta\ln Y_{t-j}^{\mathrm{A}} \\ & + \sum_{j=-k_3}^{k_4}(\delta_j + \delta'_j\lambda_t)\Delta\ln \mathrm{PD}_{t-j}^{\mathrm{A}} + \sum_{j=-k_5}^{k_6}(\zeta_j + \zeta'_j\lambda_t)\Delta\ln \mathrm{PX}_{t-j}^{\mathrm{B}} \\ & + \sum_{j=-k_7}^{k_8}(\eta_j + \eta'_j\lambda_t)\Delta\ln \mathrm{EX}_{t-j}^{\mathrm{A}} + \varepsilon_t \end{aligned} \tag{1}$$

where M_t^{A} is the import quantity of country A from B, Y_t^{A} the real income of country A, $\mathrm{PD}_t^{\mathrm{A}}$ the domestic price (Producer Price Index) of country A, $\mathrm{PX}_t^{\mathrm{B}}$ the export price of country B, $\mathrm{EX}_t^{\mathrm{A}}$ the exchange rate (per country B's currency), and ε_t the error term. Here, the difference is represented by Δ. λ_t is a variable that called "shift variables" in this paper, which represents a gradual switching of the coefficients. The gradual switching model proposed by Ohtani and Katayama (1985) and Ohtani et al. (1990), is simplified by fixing the end point at the forth quarter of 2008 (2008(4)) when the agreement becomes mature, and modifying its transition pattern as follows,

$$\lambda_t = \begin{cases} 0 & \text{for } t = 1, 2, \ldots, t_1^* \\ \left\{\dfrac{t - t_1^*}{t_2 - t_1^*}\right\}^Z & \text{for } t = t_1^* + 1, \ldots, t_2 \\ 1 & \text{for } t = t_2 + 1, \ldots, T, \end{cases} \tag{2}$$