

The Effect of Aggregation Bias: an NTB-Modeling Exercise for Turkey's Agro-food Trade with the EU

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Introduction

There is always a debate among modelers about the choice of the model to apply for policy analysis. However, there is not a straightforward answer to define the most favored model in terms of its data aggregation level or its structure. While the highest possible data disaggregation level is preferred for in-depth analysis, highly disaggregated models are mainly set in partial equilibrium (PE) frameworks, which do not capture all accounts in an economy. General equilibrium (GE) models, on the other hand, are predominantly more aggregated. GE models are able to give a picture of the entire economy, but criticized in terms of neglecting detailed sectoral effects. Comparing the results of a PE model constructed with disaggregated data to the results of a GE model developed with aggregated data is common in current literature (e.g., Charteris and Winchester, 2010; Grant et al., 2007, 2008; Narayanan et al., 2010a, 2010b, Nielsen, 1999), although this approach does not allow identifying the effects of the sector breakdown solely. To the best of our knowledge, only Alexeeva-Talebi et al. (2012) and Brockmeier and Bektasoglu (2014) use two different versions of the same computable general equilibrium (CGE) model that are aggregated at different sector levels to reveal aggregation bias.

Aggregation bias is also observed in econometric estimations (e.g., Agostino et al., 2007; Hillberry, 2002). With the decreasing level of tariffs due to the increasing number of economic unions or free trade agreements (FTAs), the importance of non-tariff barriers (NTBs) in trade has risen. Especially food and agriculture sector is characterized by high NTBs. Thus, especially in the evaluation of FTAs, NTBs show great importance. Recent literature shows that NTBs have greater impact on welfare results than effect of tariffs due to regional trade agreements (e.g., Engelbert et al. 2014, Lejour and Mooij, 2001). However, to the best of our knowledge, comparing the effect of different sector aggregation level in terms of evaluation of NTBs is missing in the literature. Only Haveman and Thursby (1999) and Haveman et al. 2003 emphasize the importance of analyzing the effects of

NTBs at disaggregated level in policy analysis. Authors argue that by using disaggregated data, aggregate impacts of trade barriers can be separated and compared at sectoral level.

In this article, we take the importance of food and agriculture trade between Turkey and the EU, the highly faced NTBs in this sector and Turkey's potential accession to the European Union (EU) as our modeling exercise. By doing so, we quantify the effect of data disaggregation level. We calculate the ad-valorem equivalents (AVEs) of NTBs using the gravity approach at two different aggregation levels; first at the Central Product Classification (CPC) 4 digit level for food and agriculture sector and then at the Global Trade Analysis Project (GTAP) sector level. We already notice the impact of data aggregation level here. Thereafter, we incorporate the estimated AVEs of NTBs into the GTAP model to reveal aggregation bias on simulation results in terms of the EU's extension to include Turkey. Hence, our article contributes to the literature by revealing the impact of data aggregation in the estimation of NTBs and simulation results.

Our analysis is divided in two parts. In the first part, we use the gravity approach to estimate the AVEs of NTBs both on disaggregated and aggregated level. In the second part, we incorporate these AVEs into the GTAP framework to see the effect of NTBs that are calculated at different aggregation levels.