Data and Code for International Trade with Indirect Additivity

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Abstract

This document describes the sources and the construction of the dataset and provides instructions to implement the code used to generate all quantitative results in "International Trade with Indirect Additivity"

1 Introduction

In this document, we describe the sources and the construction of all variables used in the quantitative analysis of the paper. Additionally, we overview the steps required to replicate all the quantitative results. First, we list the data sources and outline the procedure to compute the bilateral trade shares. Second, we describe the main programs that calibrate the model and generate the results shown in the paper.

2 Data

The description below follows closely the work of Simonovska and Waugh (2014a). To construct trade shares, we used bilateral trade flows and production data as follows:

$$\lambda_{ij} = \frac{\text{Imports}_{ij}}{\text{Gross Mfg.Production}_j - \text{ Exports}_j + \text{Imports}_j},$$

$$\lambda_{jj} = 1 - \sum_{k \neq j}^{I} \lambda_{kj}$$

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The bilateral trade shares λ_{ij} are in the file tradeshare.m. To construct λ_{ij}, the numerator is the aggregate value of manufactured goods that country j imports from country i. Bilateral trade-flow data are for year 2004 from the update to Feenstra *et al.* (2005), who use UN Comtrade data. We obtain all bilateral trade flows for our sample of 123 countries at the four-digit SITC level. We then used concordance tables between four-digit SITC and three-digit ISIC codes provided by the UN and further modified by Muendler (2009)[1]. We restrict our analysis to manufacturing bilateral trade flows only - namely, those that correspond with manufacturing as defined in ISIC Rev.#2.

The denominator is gross manufacturing production minus manufactured exports (for only the sample) plus manufactured imports (for only the sample). Gross manufacturing production data are the most serious data constraint we faced. We obtain manufacturing production data for 2004 from UNIDO for a large sub-sample of countries. We then imputed gross manufacturing production for countries for which data are unavailable as follows. We first obtain 2004 data on manufacturing (MVA) and agriculture (AVA) value added, as well as population size (L) and GDP for all countries in the sample. We then impute the gross output (GO) to manufacturing value added ratio for the missing countries using coefficients resulting from the following regression:

$$\log\left(\frac{MVA}{GO}\right) = \beta_0 + \boldsymbol{\beta}_{GDP}\mathbf{C}_{GDP} + \boldsymbol{\beta}_L\mathbf{C}_L + \boldsymbol{\beta}_{MVA}\mathbf{C}_{MVA} + \boldsymbol{\beta}_{AVA}\mathbf{C}_{AVA} + \epsilon,$$

where β_x is a 1×3 vector of coefficients corresponding to C_x an $N \times 3$ matrix which contains $[\log(x), (\log(x))^2, (\log(x))^3]$ for the sub-sample of N countries for which gross output data are available.

Data on geographic barriers (distance, shared border, official common language, colonial relationship, common currency and RTA) are from Head *et al.* (2010) and are included in the file cepii.m. Data on population size for year 2004 is from the World Development Indicators, in the file output.m. Data on per-capita income is from Feenstra *et al.* (2013) (Penn World Tables 8.0), in the file pwt.m.

3 Code

The code that reproduces the results from section 3.2 (Welfare gains from trade) is welfare_gains_from_trade.m. We set $\kappa = 5$ and choose γ so that the average elasticity of price

[1]The trade data often report bilateral trade flows from two sources. For example, the exports of country A to country B can appear in the UN Comtrade data as exports reported by country A or as imports reported by country B. In this case, we take the report of bilateral trade flows between countries A and B that yields a higher total volume of trade across the sum of all SITC four-digit categories.

with respect to per-capita income is 0.14 (Simonovska, 2015). We compute the welfare cost of autarky predicted by the CES model and the IA model of international trade. The code uses data on trade shares (tradeshare.m) and population (output.m). The details of the algorithm and the welfare formulas are in the main body of the paper.

The results discussed in section 3.3 (Alternative identification strategies and the impact on welfare), and in section D (Quantitative analysis), E (Data appendix), and F (Additional Tables) of the Appendix are generated by three main files: quantitative_analysis.m, counterfactual_D6.m, and extensive_margin.do.

The program quantitative_analysis.m reproduces a number of results. First, it generates the gravity equation estimates shown in section F (Additional Tables). Second, it provides the plots and correlations between the per capita income and trade shares predicted by the model and the data, which are shown in section D.5.2. (Aggregate Moments). Third, it provides the algorithm that estimates the parameters κ and γ to match four moments from the data. Moreover, the code generates the tables of section D.5 (Quantitative results: moments, parameters and fit), which show how the model fits several additional moments from the data. Finally, the code generates a csv file that contains the extensive margin of U.S. exports predicted by the model. The csv file constitutes the main input of the program extensive_margin.do, which generates the table reported in section D.5.3 (The margins of trade).

The file counterfactual_D6.m replicates the results of section D.6 (Counterfactual: trade cost reduction between USA and EU). The program uses the parameters κ and γ estimated by quantitative_analysis.m (saved in over.m), and the data on trade share, geographical barriers, and population from tradeshare.m, cepii.m, and output.m. The program computes the change in welfare due to TTIP for the 123 countries considered. The details of the algorithm are described in the appendix to the paper.

References

Feenstra, R. C., R. Inklaar, and M. Timmer, 2013, The Next Generation of the Penn World Table, WP 19255, NBER

Head, K., T. Mayer and J.Ries, 2010, The Erosion of Colonial Trade linkages after Independence, *Journal of International Economics*, 81, 1, 1-14

Muendler, M.-A., 2009, Converter from SITC to ISIC, mimeo, University of California, San Diego

Simonovska, I., 2015, Income Differences and Prices of Tradables: Insights from an Online Retailer, *Review of Economic Studies*, 82, 4, 1612-56

Simonovska, I. and M. E. Waugh, 2014a, The Elasticity of Trade: Estimates and Evidence, *Journal of International Economics*, 92, 1, 34-50