

WDST – World (Static) Net Trade Model

WDST is a working world trade model which roughly estimates the impact of changes in trade policy. The model is constructed to readily calculate the impact of trade liberalization (including world free trade), common market formation, and the implementation of free trade agreements. In addition, the user can specify the degree of non-competitiveness of markets and explore the added impact of trade liberalization on less than competitive markets.

WDST is a static model; world trade (exports and imports) starts out in an equilibrium state (world exports = world imports, trade balance of payments for each country equal capital flows). Then trade policies (applied tariffs) are changed and world prices and country exchange rates are changed by the model to restore world trade and country balance of payments equilibrium. The differences between the two equilibrium states can then be compared in terms of changes in trade flows, producer and consumer benefits, and welfare. The results are interpreted as medium-long term changes that might result from a set of trade policy changes.

Design of this synthetic (non-econometric) model focuses on simple export supply and import demand equations and prices modified by applied tariffs. Model equations have identical form for all countries but are differentiated by equation parameters and intercepts based on country data. Variables are included in equations to easily form common markets or free trade agreements among countries in the model. The design emphasis is to create a practical useful model that can estimate a variety of changes in trade policies in countries.

WDST uses balanced world trade data centered on 2005 for 44 countries and the rest of the world. Export and import data (measured in 1000 US\$) come from United Nations' data sets while applied tariff data comes from World Trade Organization and United Nations sources. Data is organized into 10 product groups using the one digit SITC classification. Actual trade data was supplemented by mirrored data in some cases and adjustment in rest of the world trade so that world exports equaled world imports for all product groups. The model contains simple constant elasticity export supply and import demand equations with world prices clearing world product markets and exchange rates maintaining the balance of payments for each country/region in the model. All exchange rates are shown as an index relative to the US\$.

Supply and demand elasticities are all set at 1 and -1, respectively but the user can supply their own elasticities and change them at will (VORSIM allows you to re-write equations with new parameters with the click of a button). WDST can solve complex scenarios. As a tool, it allows the user to input their own assumptions about economies and then calculate the results of policy changes. Policy changes can include tariff changes for one or many or all countries, the imposition of a common tariff in the formation of a common market, and the estimate of the impact of the formation of a free trade agreement among countries in the model. In addition, exogenous supply and demand shocks can be modeled as well as exogenous changes in capital flows. Parameters can be set to

emulated non-competitive domestic markets as well as less than perfect transmission of world prices to domestic markets.

Scenarios can be generated in several ways. Trade policy changes of all sorts are accomplished by changing the applied tariffs in WDST. Setting them all to zero yields a world free trade scenario for example. Common markets can be formed among selected countries and a common tariff can be applied (the default is the import weighted average tariff of common market members but the user can set their own tariffs). Free trade areas (FTA) are a little more difficult to simulate. Here WDST assumes that if the FTA as a whole is a net exporter of a product, world prices will prevail in the FTA. However if the FTA is a net importer, members will divert their exports into the FTA to take advantage of an internal export premium which is set by FTA member exports equaling intra-FTA imports (i.e. member's trade is diverted into the FTA as long as it pays to do so). WDST crudely estimates what this premium might be as a default and applies it. However here also, the user has an option to set the FTA premium.

Several tutorials in the use of the model for various purposes are found on the VORSIM website (and are available if you buy the WDST on CD). Scenario solutions and reports derived from them are included to show the potential of the WDST model.

Learn about the WDST world model with the following files on the VORSIM website:

Overview – Video overview of the WDST model (wmv video file *)

Summary – Summary of the WDST model (pdf file**)

Definition – the model definition – countries, regions – product groups – variables (pdf)

Equations – WDST equations for a country (pdf)

Equation List – List of a country's equation matrices with sample Excel equations (pdf)

Country Equation Summary – Summary of a set of country equations (pdf)

World Equation Summary – Summary of equations for world market – clearing world markets (pdf)

Common Market Equation Summary – Equations for any common market formed (pdf)

Free Trade Area Equation Summary – Equations for a free trade agreement (pdf)

A Scenario – Sample scenario generated with WDST model (pdf)

WDST Model – View of the WDST model (pdf)

Compare Scenarios – A report comparing the impact for three countries of a) world free trade, b) a common market for the three countries and c) a free trade agreement between the three (pdf)

Draw Supply-Demand Results for a Scenario – Illustrates how a feature of Report Writer can be used to show scenario changes in terms of supply and demand schedule shifts and how simple welfare (surplus) calculations can be made (pdf)

Welfare Calculations – A report giving the country/region welfare and other impacts of a free trade agreement between three countries (pdf)

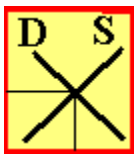
Surplus Calculations – Explanation of the simple producer and consumer calculations made in the Indicators workbook for the WDST model

WDST requires that VORSIM be installed on your computer. The model makes extensive use of all of VORSIM's facilities. Before a typical user starts to use WDST, they should experiment with the static demonstration models (STAT, LUMP) that come with VORSIM and they should try to build their own small static model. It is important to have an understanding of VORSIM models and file structures through experience before starting with WDST. Once you understand how to work with and build a small static model in VORSIM, it is relatively easy to scale up to a model the size of WDST.

WDST is large and therefore complex even if the equation structure is simple. It shows the potential of what can be done with spreadsheet modeling with VORSIM. Some scenarios, such as free trade agreements may take some time to solve and as always, large models may experience solution problems. However the scenarios that come with WDST model installation offered no serious solution problems. The more apparent problem with large models such as WDST (3330 equations) is the difficulty of keeping track of things and understanding complex results. Fortunately, VORSIM is very helpful in this regard. See page 7 of "The Economic Impact of a Free Trade Agreement (FTA) With the United States" in the "Studies based on VORSIM models" section of the VORSIM website for a more detailed explanation of how a net trade model might be used to evaluate a free trade agreement.

The scenarios shown in the solutions and reports provided are for illustration purposes only, although a world free trade scenario does provide a maximum of trade liberalization benefits from a global viewpoint (assuming competitive markets for all products in all countries and regions). If non-competitiveness assumptions are in a base scenario, then impact of liberalization, including its forcing of competitiveness on markets, can be much larger.

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* pdf files are read with the Adobe Acrobat Reader – available free from Adobe Systems

** wmv (Windows Media Video) video files can be played with Windows Media Player