

WDST – World (Static) Net Trade Model

WDST is a working world trade model which calculates the impact of changes in applied tariffs. The model is constructed to calculate the impact of various trade liberalization scenarios including world free trade, common market formation, and the implementation of free trade agreements. The user can specify varying states of the world for countries and regions in the model, including the degree of non-competitiveness of import markets. This allows the exploration of the added impact of trade liberalization on less than competitive markets. On the export side, equations can be engaged which simulate productivity gains as liberalization proceeds. These latter items are added to the model as possible explanations for trade liberalization gains which seem to be larger than most static models would suggest.

WDST is a static model; world trade (exports and imports) starts out in an equilibrium state where world exports equal world imports and the trade balance of payments for each country equal capital flows. Then applied tariffs are changed and world prices and country exchange rates are changed by the model to restore world trade balances 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 economic welfare.

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 an 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 and other policies in countries. Generally, the specification of model equations and indicators is as simple as possible on the grounds that key tariff and sector elasticity data is not robust enough to warrant anything more complicated.

WDST uses balanced world trade data centered on 2005 for 44 countries with the largest economies and the rest of the world. Export and import data 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.

Default 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). As a tool, the WDST model allows the user to input assumptions about economies and then calculate the results of policy changes. Policy changes can include tariff changes for one or many or all

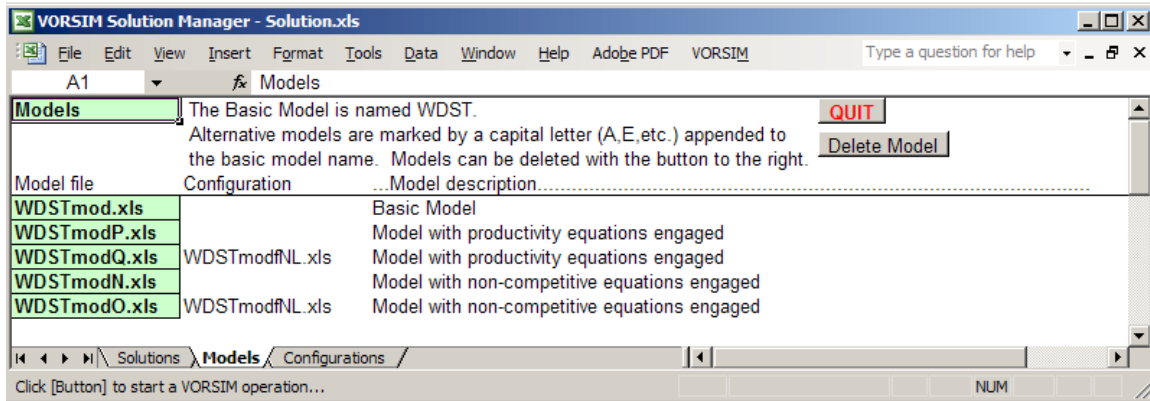
countries, the imposition of a common tariff in the formation of a common market, and the estimate of the impact of the formation of a free trade agreement among countries in the model. In addition, exogenous supply and demand shocks can be modeled as well as exogenous changes in capital flows. Parameters can be set to emulate non-competitive domestic markets, less than perfect transmission of world prices to domestic markets, and productivity increases in response to trade liberalization. Once parameters are and data values are reset for a model, equations can be re-written and a new model re-constructed. WDST comes with a basic static model, a model where productivity equations have been engaged (made operable), and a model where non-competitiveness has been assumed everywhere. Parameters for these alternative models were arbitrarily set for demonstration purposes; a serious setting of non-competitive parameters requires judgment about sectors of a country's the economy. While we know the basic world equilibrium embedded in the data, we may not know the economic structure that determined the existing equilibrium. However we can make assumptions about the economies that created that equilibrium. Are they competitive or non-competitive or do they respond strongly in terms of productivity gains or not if export prices increase? Are the rules set so that world prices fully or only partially transmit to domestic prices? We can then set model parameters to reflect these assumptions and then calculated the impact of liberalization. Results of a non-competitive option along with productivity response are reflected in two models and their solutions. The basic model contains an assumption of competitiveness and no extra productivity response. Scenario solutions and reports derived from them are included to show the potential of the WDST model. The scenarios shown in the solutions and reports provided are for illustration purposes only, although a world free trade scenario does provide a global viewpoint of trade liberalization benefits. Learn more about the WDST world model from the following file on the VORSIM website or on the WDST CD:

- 1-WDSToverview.wmv – Video overview (2-WDST.pdf – this file)
- 3-WDSTdef.pdf – the model definition – countries, regions – product groups –variables
- 4-WDSTeqp.pdf – equations for USA as an example of an equation page
- 5-SumeqCty.pdf – summary of equations for a sample country (the USA)
- 6-SumeqWld.pdf – summary of equations for the world market clearing mechanism
- 7-SumeqCmk.pdf – summary of equations for a common market common tariff
- 8-SumeqFta.pdf – summary of equations generating a premium for a free trade area
- 9-Details.pdf – a report page showing sector results for a simulation in 3 models
- 10-Compare.pdf – a report page comparing the aggregate impact of world free trade with 3 different model assumptions; competitive markets, non-competitive markets, and productivity responses to liberalization
- 11-Results.pdf – a report page showing country and sector results for a simulation
- 12-WDSTmod.pdf – a view of part of the configured basic WDST model itself

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. Since WDST is a large model (4790 equations), it is important to have experience with VORSIM models

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.

WDST comes with 3 unconfigured models and 2 models configured for solution. They are listed on the Model sheet of the Solutions workbook accessed with the [Manage Solutions, Models] button on the Solution Manger control screen (below).



The models with no configuration are the ones you can use once they have been configured for solution with the configuration WDSTmodfNL.xls (your only choice on the menu that appears when you click the [Option: USE PREVIOUS CONFIGURATION] button). Remember that configuration for solution means telling the model where the Solver is located on your computer, a process automatically done when VORSIM attaches the Solver to a model on your computer during installation. When you want to change structural parameters for counties' competitiveness or productivity response, the following procedure does the job.

1. Change any parameters in the equation workbook and save the workbook.
2. Change the NCI, ESS, or SONOFF parameters in the green cells on the definition workbook. Calculated the workbook will apply the same parameters to all countries. If you want to have different parameters among countries, put numbers in the gray cells to replace the formulas there. Then save the definition workbook (these parameters determine the degree of non-competitiveness and productivity response – NCI=0 means competitive, SONOFF=0.000001 means no productivity response).
3. From the Report Writer control screen, load the Movelist NCfx.rpt and Click the [Update source..] button to move parameters you have set in the definition workbook to the data and equation workbooks (save them after you look over them).
4. Load the equation workbook and click the [Update Basedata...] button on the Basedata sheet to bring in the new parameters from the data workbook.
5. Re-write all model equations and create a new model with your new parameters (you may want to save it as an alternative model).
6. Configure your new model using the WDSTmodfNL configuration

7. Simulate your new model, add indicators, and pull results into pre-make reports