

- Simulates the partial equilibrium impact of a tariff reduction for a single market.
- Allows for analysis of trade reforms in the presence of imperfect substitutes and is more adequate than homogenous good model when examining tariff preferences, as it avoids corner solutions.
- Allows for increasing export supply functions: part of the adjustment occurs through changes on the export price of the exporter.
- Can't easily capture the effects of a full round of tariff negotiations (one market at a time).
- Largely used to simulate the impact of preferential trade agreements (APEs...).

### SMART: Example Scenario

- Consider USA eliminates its tariffs on imports of chapters 61 and 63 (Textile products) from El Salvador, Guatemala and Honduras.
- Let's look at the consequences on:
  - The beneficiaries' exports to USA
  - The trade creation, tariff revenue and consumer surplus for USA
  - Pakistan exports to USA on these chapters

### **SMART**

### A 3 step process:

- 1. Prepare or import data for simulation
- 2. Specify the simulation parameters
- 3. Review or update the data (optional)

	Required steps:	View options:
		C Trade creation effect
	Step 1: prepare/import data for simulation	O Welfare effects
Ļ,	Step 2: set simulation parameters	C Revenue impact
	Step 3: review/update simulation data table	O Market view
		<ul> <li>Exporter view</li> </ul>
		Exclude zero effects

Click on the bu Step 1 to defin	tton corresponding to e the dataset
Required steps: Step 1: prepare/import data for simulation Step 2: set simulation parameters Step 3: review/update simulation data table	View options: Trade creation effect Velfare effects Revenue impact Market view Exporter view
	Exclude zero effects



*Save* the dataset. You can reuse it later to apply other tariff change scenarios.

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### **SMART: Simulation Parameters**

Here we are going to specify tariff cut, affected products as well as beneficiaries.

Click on Specific countries to get access to the country selection panel and select beneficiary countries.



## **SMART: Simulation Parameters**

Affected products can be either all previously selected products in the dataset or only part of them. Here we choose to apply the tariff cut to all.

Finally, we specify the cut type from the *Custom rate adjustment* panel. Here, we fix the new rate at 0. We next click on *Apply* to confirm the adjustment.

Click on *Done* when all parameters are set.



### **SMART: Simulation Parameters**

WITS acknowledges the parameter definition





### **SMART: Review Simulation Data Table**

This window allows to control that the parameters are properly set. Here we can see that tariff for El Salvador is indeed cut to 0.

ariff Line Code	Partner	Trade Value	Applied Duty (%)	Bound Duty (%)	New Duty Rate (%)	
610120	Belgium	1	16.10		16.10	
	Bolivia	0	16.10		16.10	
	Brazil	1	16.10		16.10	
	Brunei	178	16.10		16.10	
	Bulgaria	139	16.10		16.10	
	Myanmar	1,248	16.10		16.10	
	Cambodia	2,236	16.10		16.10	
	Canada	983	0.00		0.00	
	Sri Lanka	2,253	16.10		16.10	
	China	13,141	16.10		16.10	
	Colombia	5	16.10		16.10	
	Denmark	2	16.10		16.1	
	Dominican Republic	11	16.10		16.10	
_	Ecuador	4	16.10		1610	
<b>→</b>	El Salvador	3,059	16.10		0.00	
	Fiji	352	16.10		16.10	
	France	10	16.10		16.10	
	Germany	2	16.10		16.10	
	Greece	24	16.10		16.10	
	Guatemala	2,240	16.10		0.00	
			1			

## **Saving Simulation File**

ariff Line Code	Partner	Trade Value	Applied Duty (%)	Bound Duty (%)	New Duty Rate (%)	
610120	Belgium	1	16.10		16.10	
	Bolivia	0	16.10		16.10	
	Brazil	1	16.10		16.10	
	Brunei	178	16.10		16.10	
	Bulgaria	139	16.10		16.10	
	Myanmar	1,248	16.10		16.10	
	Cambodia	2,236	16.10		16.10	
	Canada	983	0.00		0.00	
	Sri Lanka	2,253	16.10		16.10	
	China	13,141	16.10		16.10	
	Colombia	5	16.10		16.10	
	Denmark	2	16.10		16.10	
	Dominican Republic	11	16.10		16.10	
	Ecuador	4	16.10		16.10	
	El Salvador	3,059	16.10		0.00	
	Fiji	352	16.10	)		
	France	10	16.10	0		
	Germany	2	16.10		16.10	
	Greece	24	16.10		16.10	
	Guatemala	2,240	16.10		0.00	
120 222 E	I Salvador	Save as Cli	ose			

This window allows to save the simulation file for external modification. This may be necessary if you have more recent or better data on your side. You can then re-import modified data in SMART.

### **SMART: The Results**

Results of the simulation are displayed using the *View Options* panel.

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Trade Creation Effect, Welfare, and Rev	enue Impact Simulation
Trade Creation Effect, Welfare, and Rev	View options:
Trade Creation Effect, Welfare, and Rev	View options:
Trade Creation Effect, Welfare, and Rev Required steps: Velocity Step 1: prepare/import data for simulation	View options:
Trade Creation Effect, Welfare, and Rev         Required steps:            Image: Step 1: prepare/import data for simulation         Image: Step 2: set simulation parameters	View options:
Trade Creation Effect, Welfare, and Rev         Required steps:            Image: Step 1: prepare/import data for simulation            Image: Step 2: set simulation parameters            Image: Step 3: review/update simulation data table	View options:
Trade Creation Effect, Welfare, and Rev         Required steps:            ✓         Step 1: prepare/import data for simulation            ✓         Step 2: set simulation parameters            ✓         Step 3: review/update simulation data table	View options:

## **SMART: The Results**

- Through a set of 5 output reports, WITS provides the following results:
  - Trade Total Effect composed of:
    - Trade Diversion Effect
    - Trade Creation Effect
  - Pre and Post Exports by Partner
  - Pre and Post cut average duty rate
  - Consumer Surplus (Welfare)
  - Tariff Revenue effect
  - Price effect only if one uses a non infinite Supply elasticity (infinite by default in SMART)

### **SMART: Result Summary**

- Deals with 1 market at a time.
- Deals with 2 categories of partners:
  - Beneficiaries: imports increase through Trade diversion and Trade creation.
  - Other partners: imports decrease through the Trade diversion, Trade creation is always null.
- For a given product, Trade diversion always equals to zero
- Tariff revenue falls with the tariff because of the value of import demand elasticities.
- Consumer welfare increases when the tariff decreases.

## **SMART: Further Analysis**

- Analysis can be extended by implementing a sensitivity analysis:
  - Increase and decrease elasticities of substitution
  - Increase and decrease elasticities of import demand
  - Decrease elasticity of export supply

### **SMART: Exercises**

#### Exercise 1:

- 1. Extract data from WITS for Bolivia, 2004, 380830 product category.
- 2. Simulate the impact of a free trade agreement with the USA for this product.
- 3. Review the consequences for Latin American exporters and in terms of tariff revenu for Bolivia.

Exercise 2: case of your choice

- Very useful if you notice some data (in general preferential tariff) are out of date or missing when extracting from WITS in SMART, and you have better information on your side.
- you may want to update the Simulation Data table in Excel before importing it back to SMART.

### 7 Step Process:

- 1. Extract data from SMART (optional)
- 2. Save the Data Simulation table from SMART Step 2
- 3. import the file in Excel
- 4. Modify or add data in Excel
- 5. Clean-up and format the table
- 6. Save as a Text (space delimited) file
- 7. Import the file back in SMART.

- I. In SMART, *Step 1*, extract the data you need.
- II. In SMART, from *Step 2, Save* the *Simulation Data table*.

- III. Open the Simulation Data table in Excel:
  - In Windows Explorer, change file extension from \*.csv to \*.txt. Otherwise, Excel opens the file automatically and makes some mistakes.
  - In Excel, choose Open, select "Text Files (\*.prn; \*.txt; \*.csv)" as File of type and open the file.



#### III. Open the Simulation Data table in Excel (cont.):

3. Excel "*Text Import Wizard*" opens. Choose *Delimited* and click *Next*:

Text Import Wizard - Step 1 of 3	<u>?</u> ×								
The Text Wizard has determined that your data is Delimited. If this is correct, choose Next, or choose the data type that best describes your data.									
_Original data type									
Choose the file type that best describes your data:									
Characters such as commas or tabs separate each field.     Fixed width     Fields are aligned in columns with spaces between each field.									
Start import at <u>r</u> ow: 1 File <u>origin</u> : Windows (ANSI)	•								
Preview of file C:\Wits\SimData\USA_2004_CH61_RawData.txt.									
1 User Product, HS Code, Tariff Line Code, Partner, PartnerCode, Trade									
200,610110,610110,Canada,124,160,0.00,,0.00,99,1.5,3.76999998092									
3 00,610110,610110,Chile,152,4,0.00,,0.00,99,1.5,3.76999998092651									
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Cancel < Back Next > Einish	1								

#### III. Open the Simulation Data table in Excel (cont.):

4. At step 2 of Excel "*Text Import Wizard*", check *Comma*, uncheck Tab and click *Next* only if the data look properly organized in the *Data preview* area:

Text Import Wiza	rd - Step 2	of 3						? ×	
This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.									
Delimiters	Se <u>m</u> icolon Other:		<u>⊂</u> omma		Treat con Text gua	secutive delimiter	s as one		
-Data preview									
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00	610110	610110			Canada	124	160		
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#### III. Open the Simulation Data table in Excel (cont.):

5. At step 3 of Excel "*Text Import Wizard*", click on the *Tariff Line Code* column in the *Data preview* and select *Text* in the *Column Data Format* options. Do the same with the PartnerCode column and click on Finish:

Text Import Wiz	ard - Step 🕄	3 of 3					? ×		
This screen lets you select each column and set the Data Format.       Column data format         'General' converts numeric values to numbers, date values to dates, and all remaining values to text.       Column data format									
© Do not import column (skip)									
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#### You should obtain a table like this one:

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3		0	610110	610110	Chile	152	4	0		0	99	1.5	3.77	0	0	0		0
4		0	610110	610110	Mexico	484	3	0		0	99	1.5	3.77	0	0	0		0
5		0	610120	610120	World	000	157,485	15.9	15.9	15.9	99	1.5	3.77	0	0	0		0
6		0	610120	610120	Australia	036	3	15.9	15.9	15.9	99	1.5	3.77	0	0	0		0
7		0	610120	610120	Bahrain	048	18	15.9	15.9	15.9	99	1.5	3.77	0	0	0		0
8		0	610120	610120	Banglades	050	2,601	15.9	15.9	15.9	99	1.5	3.77	0	0	0		0
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#### IV. Make the modifications:

Most of the time, you will want to replace initial tariffs for some partners when TRAINS does not contain proper preferential information and MFN Applied is used instead.

#### V. Clean-up and format the data table:

- 1. Remove unnecessary columns. The minimum data requirement for SMART to run the simulation is:
  - HS Code
  - Partner Code
  - Trade Value
  - Applied Duty (%) (Applied tariff before the cut)
  - Import Demand Elasticity (otherwise WITS uses 1 for all)

**Optional columns:** 

- New Duty Rate (%) if you apply the cut formula in Excel (not necessary if you cut using SMART Step 2)
- Bound Duty (%) if you plan to cut using SMART Step 2 and deal with a WTO cut type.

#### V. Clean-up and format the data table (cont.):

- 2. Remove all rows corresponding to World (Partner Code is 000). This is done very rapidly by sorting the table by Partner code and deleting all 000 rows. Those rows will be rebuilt when you'll import the table back in SMART.
- 3. Sort the table back by HS code and Partner Code.

You should obtain a table like this:

<b>N</b>	Microsoft Excel - USA_2004_CH61_RawData.txt												
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1	HS Code	PartnerCode	Trade Value	Applied Duty (%)	Import Demand Elasticity								
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3	610110	152	4	0	3.769999981								
4	610110	484	3	0	3.769999981								
5	610120	036	3	15.9	3.769999981								
6	610120	048	18	15.9	3.769999981								
7	610120	050	2,601	15.9	3.769999981								
8	610120	056	2	15.9	3.769999981								
9	610120	076	97	15.9	3.769999981	Ţ							
R A	<b>N</b> US	A_2004_CH61			<b> </b> ∢								
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- V. Clean-up and format the data table (cont.):
  - 4. Remove column titles (note them in order to avoid any mistake when importing back in SMART).
  - 5. Format all cells (for a given column) with the same number of decimals, remove 1000 separator if any, align everything left and resize column width to fit with cell contents.
  - 6. Create an additional column next to the last column with a E like End. This will help us to easily identify the end of the last column when importing back in SMART.

#### Finally, you should obtain a table like this one:

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3	610110	484	3	0.00	3.769999981	E				
4	610120	036	3	15.90	3.769999981	Е				
5	610120	048	18	15.90	3.769999981	Е				
6	610120	050	2601	15.90	3.769999981	E				
7	610120	056	2	15.90	3.769999981	E				
8	610120	076	97	15.90	3.769999981	Е				
9	610120	096	963	15.90	3.769999981	Е				
10	610120	100	18	15.90	3.769999981	Е				
11	610120	104	2300	15.90	3.769999981	Е				
12	610120	112	0	15.90	3.769999981	Е				
13	610120	116	2744	15.90	3.769999981	Е				
14	610120	124	1406	0.00	3.769999981	Е				
15	610120	144	1184	15.90	3.769999981	E				
16	610120	156	12300	15.90	3.769999981	E				
17	610120	158	3297	15.90	3.769999981	Е				
18	610120	170	67	15.90	3,769999981	Е				
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### VI. Save the file as following:

- Choose Save as;
- Choose space delimited text file (prn) in the Save as type list;
- Select "C: |WITS|SimData" as the destination folder and give a name to the file.



VII. Importing the file back in SMART:

- 1. In SMART, open *Step 1*, choose the *Import tab*.
- 2. Locate the folder where the file is stored.
- 3. In File name, replace *\*.txt* with *\*.prn*.
- 4. Select you file and click *Open*.

VII. Importing the file back in SMART (cont.): This window allows to identify data in the imported table one column at a time.

The *Sample of input* file is used to identify data location in the table.

The *Column* field is used to identify the type of data currently selected in the sample table above.

The *Input fields* area will display data names once identified.

Simulation Data	
Use Extract Import	1
	Data Table and
	Data Labie.pm
Sample of input file	
610110 124 160 0.00 3.769999981 E 610110 152 4 0.00 3.769999981 E	
610110 484 5 0.00 5.769999981 E 610120 036 3 15.90 3.769999981 E	
610120 048 18 15.90 5.769999981 E	
Calumn Start Width New D	olumn Data Type
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Product Group	
Available Product Groups Selecte	ed Product Groups
CET2 - Intermediate goods	
CET3 - Consumer goods	
WTO_HS_Aggri · WTO HS Aggric WTO_HS_Indus · WTO HS Indust	
	Cancel OK

#### VII. Importing the file back in SMART (cont.):



Lies Extract Import

### VII. Importing the file back in SMART (cont.):

ProductCode is now listed in the Input fileds list.

Browse	Wits\SimData\Revised Simulation Data Tab	ble.prn
Sample of input file		
610110 124 160 610110 152 4 610110 484 3 610120 036 3 610120 048 18	0.00 3.769999981 E 0.00 3.769999981 E 0.00 3.769999981 E 15.90 3.769999981 E 15.90 3.769999981 E	×
<b></b>		Þ
Column	S <mark>art Width New Column</mark>	Data Type
NomenCode		
Input fields*	· · · · · · · · · · · · · · · · · · ·	
ProductCode, 1, 6		Add
		Change

Replicate the process for the next column (Partner\_ISO\_N).

#### VII. Importing the file back in SMART (cont.):

Starting with the third column, we deal with data for which the number of characters may be different within the same column (trade, tariff,...).

	Use Extract Import
To make sure not to truncate any value, include the spaces after the value in the first row until the next column.	Browse         C: \Wits\SimData\Revised Simulation Data Table.pm           Sample of input file
Select <i>TradeValue</i> in the <i>Column</i> list and click Add.	610120 036 3 15.90 3.769999981 E 610120 048 18 15.90 3.769999981 E Column Start Width New Column Data Type
	Input fields*       ProductCode, 1, 6       Partner_IS 0_N, 8, 3
Repeat the process until the last column for which the selection will end right before the E character.	Product Group Product Group 35

#### VII. Importing the file back in SMART (cont.):

Import of the Simulation Data Table is completed, click OK.

	, Simulation Data
	Use Extract Import
	Browse C:\Wits\SimData\Revised Simulation Data Table.pm
	Sample of input file
	610110 124 160 0.00 3.769999981 E 610110 152 4 0.00 3.769999981 E 610110 484 3 0.00 3.769999981 E 610120 036 3 15.90 3.769999981 E
	610120 048 18 15.90 3.769999981 E
ľ	Chart Middle Man Column Data Tuna
	Input fields*
	ProductCode, 1, 6 Partner, ISO, N, 8, 3 Add
	TradeValue, 12, 7
	BaseDutyRate, 19, 6 ImportDemandElasticity, 25, 12 Change
	Product Group
	Available Product Groups Selected Product Groups
	CET1 - Raw materials CET2 - Intermediate goods CET3 - Consumer goods CET4 - Capital goods WT0_HS_Aggri - WT0 HS Aggric WT0_HS_Indus - WT0 HS Indus!

### **SMART: Working With Imported Data**

- Now that data are imported you can work with your SMART simulation as presented before.
- The only thing to do in Step 2, before specifying the cut, is to click the Reset button unless you have included the post cut tariff column in the imported table.