

TariffCalc is a spreadsheet which gives you a simple estimate of the impact of a tariff change on a product. The sheet is self-contained and does not require VORSIM software (but does require the Excel spreadsheet on your computer). You enter data and parameters for a simple linear supply and demand model. Then the spreadsheet updates calculations, tables, and charts. Producer and consumer benefits are calculated. The model embodied in the sheet is a simple linear one (although some calculations are repeated with a non-linear version). An accompanying tutorial shows how to use TariffCalc.



Instructions for the Preparation of a Tariff Calculation Sheet

Enter current data, value units, product description, and chart parameters into the cells with **GREEN** text on the SupplyDemand sheet. After data entry or whenever you change a data entry, click the [Re-Draw Chart] button to update the tables and charts. You may want to save the workbook under a name related to the product whose data you have entered. You can change data, chart parameters, elasticities, etc. in the green cells and instantly observe the results in tables and charts on the the SupplyDemand sheet. Once current data and parameters have been entered, you change change tariffs in the cell with **RED** text at the top and instantly see the results when the [Re-Draw Chart] button is clicked. The Demand and Supply chart at the top of this sheet shows the simple economics of a change in tariff rates.

No password is needed to unprotect all of the cells but you can do all of your work with the SupplyDemand sheet with protection in place (the green and red cells are unlocked so you can enter data even if the sheet is protected); however you might want to unprotect the sheet to change the value units in the chart titles, for example. Be sure to read the TariffCalc.pdf file in the TariffCalc directory. Also, view the tutorial that comes with this workbook to see TariffCalc in operation. For questions about this product, contact support@vorsim.com.

Some elasticities that might be used or serve as a guide

	Supply	Demand
HS Chapter		
A - LIVE ANIMALS AND ANIMAL PRODUCTS - I	0.75	-0.40
B - VEGETABLE PRODUCTS - II	0.75	-0.95
C - FATS AND OILS - III	0.75	-1.10
D - MANUFACTURED FOODSTUFFS- IV	0.75	-1.15
E - MINERAL PRODUCTS - V	0.50	-1.21
F - CHEMICALS - VI	1.00	-1.65
G - RUBBER AND PLASTICS - VII	1.00	-1.60
H - HIDES AND LEATHER PRODUCTS - VIII	1.00	-0.70
I - CORK AND WOOD ARTICLES - IX	1.00	-1.40
J - PULP AND PAPER PRODUCTS - X	1.00	-1.25
K - TEXTILES AND APPAREL - XI	1.00	-1.30
L - FOOTWEAR AND OTHER MADE-UP ARTICLES - XII	1.00	-2.50
M - STONE AND MINERAL PRODUCTS - XIII	1.00	-1.60
N - PRECIOUS STONES AND JEWELLERY- XIV	1.00	-2.25
O - BASE METALS AND METAL PRODUCTS - XV	1.00	-2.00
P - MACHINERY- XVI	1.00	-2.00
Q - TRANSPORT EQUIPMENT - XVII	1.00	-2.25
R - PROFESSIONAL EQUIPMENT - XVIII	1.00	-2.50
S - ARMS AND AMMUNITION - XIX	1.00	-0.80
T - MISCELLANEOUS MANUFACTURES - XX	1.00	-1.40
U - WORKS OF ART - XXI	1.00	-1.00

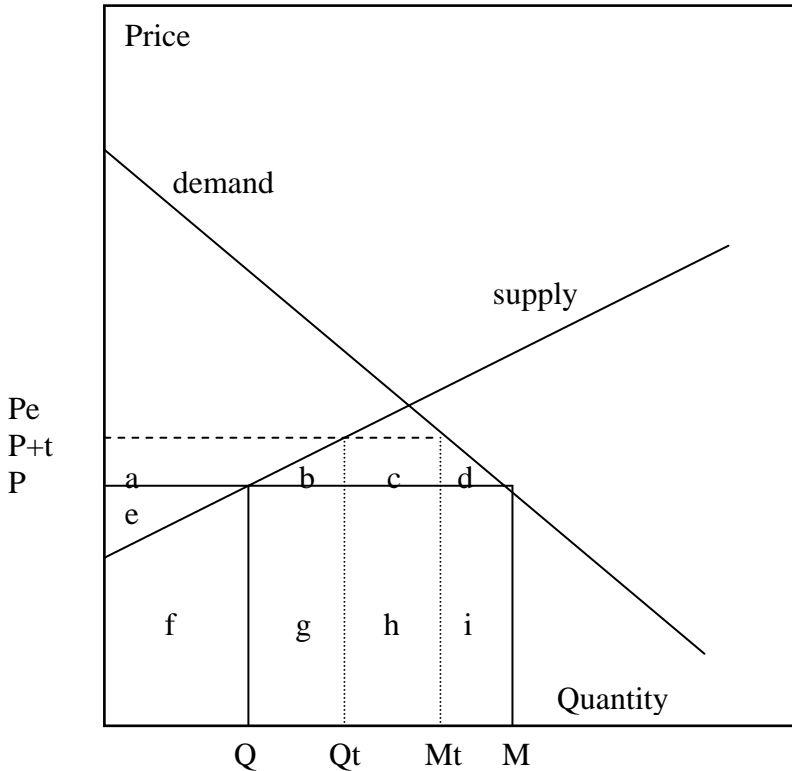
More detailed food demand elasticities for countries are available from the GTAP project on the Internet

[Read the TariffCalc.pdf file](#)

[Run the TariffCalc.wmv tutorial](#)

Data and Model Considerations for TariffCalc

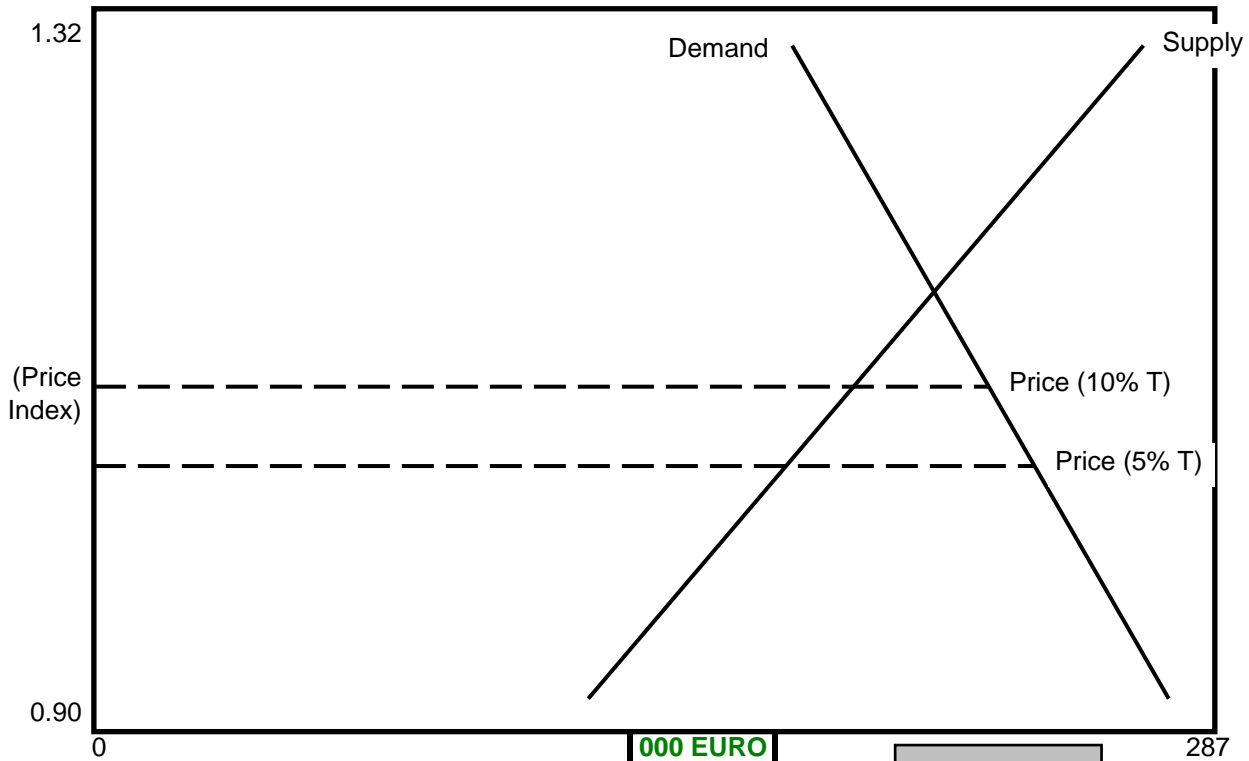
The simplest model to implement in a spreadsheet is the linear one shown in the figure below.



A product amount Q is produced at the world import price P and area $(e+f)$ represents production value. $(M-Q)$ is imported with an import value represented by area $(g+h+i)$. Consumption value is the sum of both areas $(e+f+g+h+i)$. Now a tariff t is imposed and the domestic and import price becomes $P+t$. Then domestic production increases to Q_t and imports decrease to $(M_t - Q_t)$. Production value becomes area $(a+b+e+f+g)$. Import value at the world price P has decreased to area (h) . Tariff revenue is area (c) . Area under the supply represents the cost of production. Therefore area $(b+g)$ is the extra cost of increasing production from Q to Q_t . Producer gain (surplus) over

increased cost is represented by area (a) . Consumers now have to pay the tariff (c) plus the extra price for the domestic product $(a+b)$ and consumption has declined from M to M_t . Area (d) represents a loss to consumers. Consumer surplus is $(a+b+c+d)$ and includes extra payment for production, tariff payment, and the loss (d) . If production Q employs X people, one can roughly calculate that $X \cdot Q_t / Q$ is the new number of people employed. If input costs of production are considered, then a more complex model would be needed. Prices in domestic currency are related to foreign prices by an exchange rate. Assumptions implicit in this model as drawn are a) there is one product price, b) imports are perfect substitutes for domestic products at the prevailing price, c) supply (production) increases with product price, d) demand (consumption) decreases with price, and e) the product is imported and not exported. In this figure if the product were to be exported, price would have to rise so that supply exceeded demand. For this example however, P is the world price exports would not occur at a higher price; if the tariff was large enough, imports would simply cease at price P_e . This simple model is implemented in TariffCalc. 1. Matching data in common value units is needed for production and imports (consumption would be the sum of the production and imports). 2. The price P is set to 1 or to $1 + t$ if a current tariff is in place. Then a new tariff is entered to replace the existing one. Tariffs are entered in %. 3. Supply and demand response parameters (elasticities). If supply is expected to increase very much with price or value added, then it might be 1 or greater; if not, less than 1. If demand does not respond much to price, then it might be less than -1, etc. While general elasticities can be used, knowledgeable judgment about industry or consumer behavior can be used to modify them. 4. Employment numbers associated with production are required if employment or labor calculations are to be made. 5. A VAT or sales tax rate is needed if other tax revenue changes are to be included with tariff revenue changes. Results are also given for the tariff impact calculation if a non-linear (constant elasticity) supply and demand model were assumed instead of a linear one.

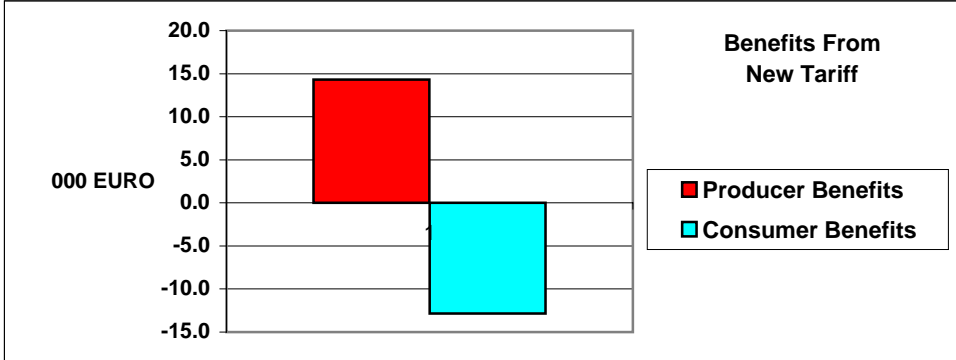
Impact of Proposed Import Tariff of: **10.0%** for Product: **aluminum rods - SITC 4055**



Enter data and parameters into GREEN cells; then click the [Re-Draw Chart] button to update the tables and charts. Linear equations are used.

Re-Draw Chart

	Current Data	With Proposed Tariff	Difference	Percent Difference
Imports (000 EURO) - M	66	36	-30	-44.8%
Production (Supply) (000 EURO) - S	185	203	18	9.5%
Employment (# persons)	121	133	12	9.5%
Consumption (Demand) (000 EURO) - D	251	239	-12	-4.8%
World Price Index	1.00			
Domestic Price (with Tariff) - P	1.05	1.10	0.05	4.8%
Tariff (%) - T	5.0%	10.0%	5.0%	100.0%
Tariff Revenue (000 EURO)	3.3	3.6	0.3	10.4%
Producer Benefits (Surplus) (000 EURO)		14.3		% C.Sup. 7.7%
Consumer Benefits (Surplus) (000 EURO)		-12.8		% C. Dem. -5.1%



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Supply/Demand Chart Parameters

Supply Elasticity	2.00
Demand Elasticity	-1.00
Top setting	1.20
Bottom setting	0.90

Calculated Chart Parameters

Maximum quantity	287
Minimum quantity	0
Maximum price	1.32
Minimum price	0.90
Zero trade price - linear model	1.16
Maximum possible tariff	16.2%

Linear Equations (used in tables, charts)

Imports (M) $M = D - S$
 Supply (S) $S = Sa + Sb * P$
 Demand (D) $D = Da + Db * P$

Linear Equation Parameters

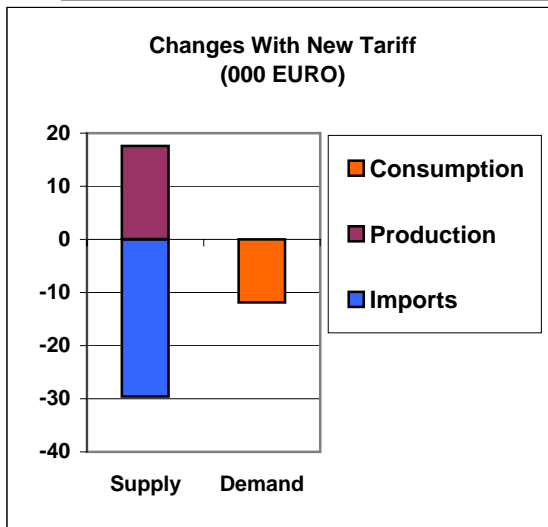
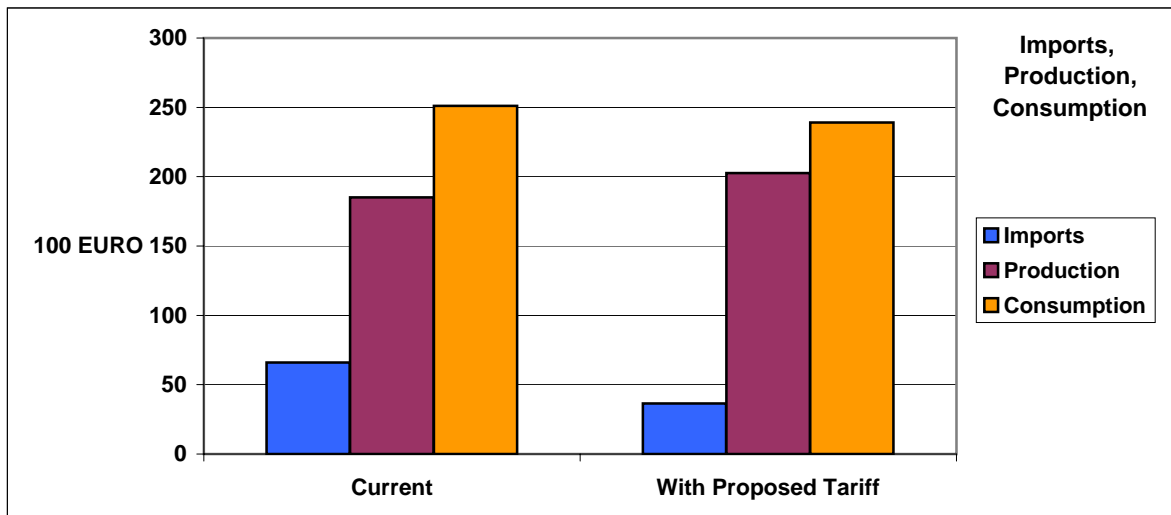
Sa	-185.0	Sb	352.4
Da	502.0	Db	-239.0

Non-Linear Equations

Imports (M) $M = D - S$
 Supply (S) $S = Snl * P^{es}$
 Demand (D) $D = Dnl * P^{ed}$
 Domestic Price (P)

Non-Linear Equation Parameters

Snl	167.80
Dnl	263.55



Non-Linear Model Results With Proposed Tariff

	Non-Linear Model Results	Percent Diff. from Current Data Values	Linear Model Results
Imports	37	-44.6%	0
Production	203	9.8%	0
Employment	133	9.8%	0
Consumption	240	-4.5%	1

Zero trade price - non-linear model 1.16

These key results are for a non-linear (constant elasticity) model as opposed to a linear one.