Monday, October 14, 2002

Decision Making in Complex Environment
Fall 1 - 2002

- Group Project -

Topic

Imposed Tariff on Steel Imports by the U.S. Government

- An ANP approach -

Prepared By:

Yong Cheng
Klaus Tenderich

Topic

Evaluation of the U.S. imposed tariff on imported steel from Europe and Asia.

Introduction

The objective of our analysis is to use the Analytical Network Process (ANP) to evaluate the decision by the U.S. government on the imposed steel tariff. We will compare the U.S. decision to alternative solutions to the trade dispute and evaluate them along the following dimensions:

- National Interest and National Security
- Domestic Economy and Domestic Policy
- International Relationship
- Trade Relations and Diplomatic Relations

The evaluation is carried out using the Benefits, Costs, Opportunities and Risks (BCOR) model in the *Super Decisions* software. Finally, we will draw some conclusion resulting from the model.

Background

In accordance with World Trade Organization rules designed to allow for the temporary restructuring of a domestic industry, President Bush announced temporary steel safeguard measures on March 5, 2002, ranging to 30 percent on steel imports under Section 201 of U.S. trade law. The President imposed the remedy for three years to give the beleaguered U.S. steel industry an opportunity to restructure. Steel companies have to demonstrate action steps they are taking to achieve this goal. Under the law the president may reduce, change or end the safeguard action if the steel industry fails to make adequate efforts to become more competitive. U.S. trading partners criticized the tariffs imposed in March as a protectionist measure and threatened to retaliate.

Alternatives

As stated above the U.S. Government decided to impose a temporary tariff on steel products up to 30 percent. In addition to the Government's decision we evaluate another two alternatives. First, what will be the impact along our dimensions if the government decides *not* to impose a tariff on steel products at all? And second, resolve the world-wide existing overproduction of steel by negotiating a solution to mutual benefit of all parties involved in the World Trade Organization (WTO). In sum, our ANP model includes the following three alternatives.

- Alternative 1: Impose Temporary Tariff on imported steels
- Alternative 2: Not Impose Tariff on imported steels
- Alternative 3: Solve the Steel-overproduction Issue under WTO

The Model

1 Ratings

To establish Ratings scales and evaluate the importance of Benefits, Costs, Risks and Opportunities of the Decision Making Model, we developed a hierarchy of personal value criteria and sub-criteria. The three criteria in our model are National Interest, Domestic Politics and International Relationship. The sub-criteria under National Interest are Domestic Economy and National Security, and those under International Relationship are Trade Relations and Diplomatic Relations. (Figure 1)

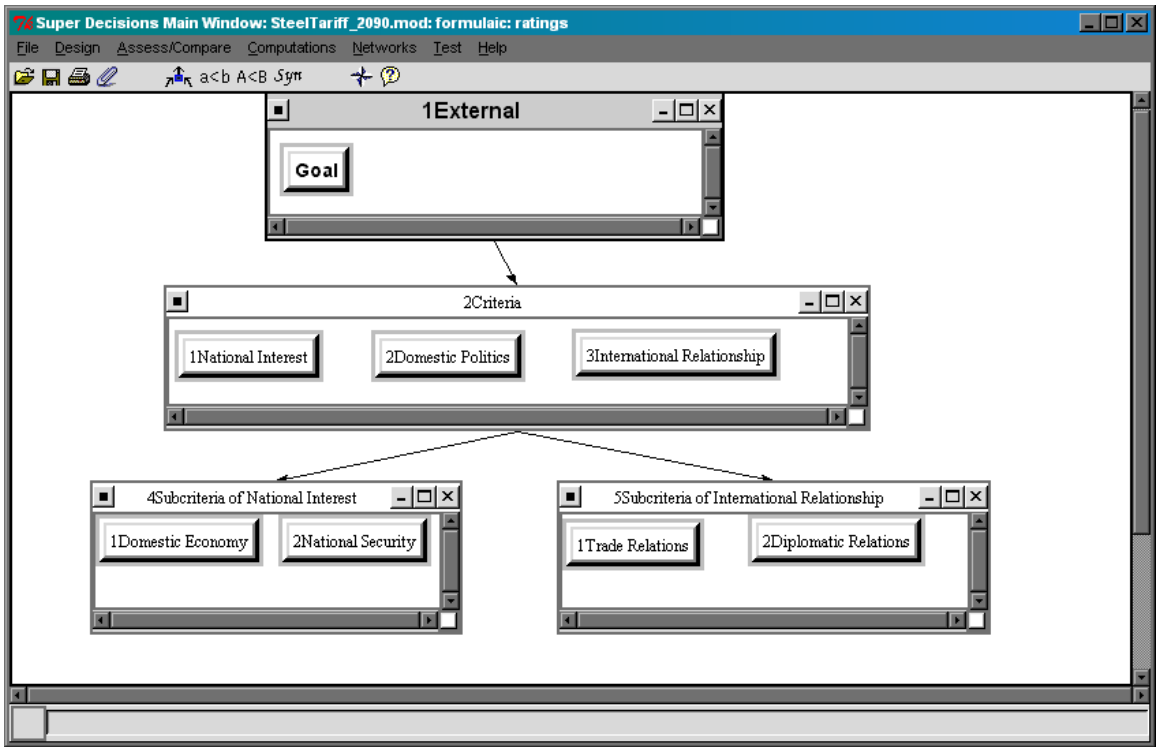


Figure 1

The results of the pair-wise comparisons between the criteria (and sub-criteria) are shown in Figure 2.

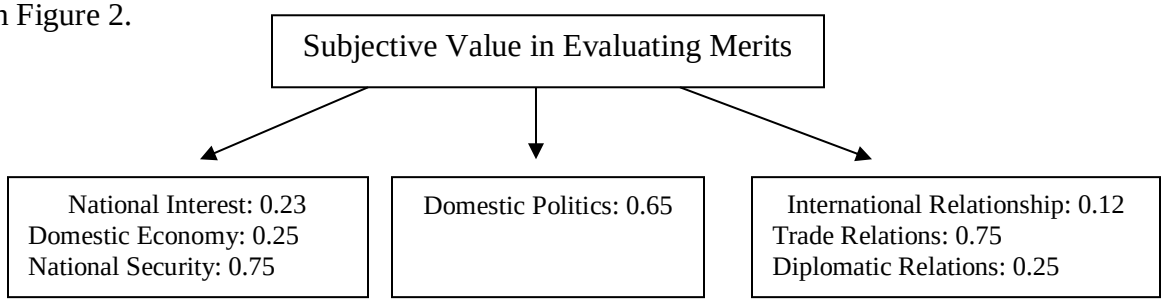


Figure 2 Hierarchy of Criteria for Rating Benefits, Opportunities, Costs and Risks

The four merits of BOCR were rated according to five intensities listed below along with their priorities. The outcome is summarized in Table 1.

Table 1 Priority Ratings for the Merits: Benefits, Opportunities, Costs and Risks

Very High (0.47), High (0.27), Medium (0.14), Low (0.08), Very Low (0.04)

		Benefits	Opportunities	Costs	Risks
National Interest	Domestic Economy	Medium	Low	High	Medium
	National Security	Medium	Low	Very Low	Very Low
Domestic Politics		High	High	Low	Low
International Relationship	Trade Relations	Low	Low	Very High	Very High
	Diplomatic Relations	Low	Low	Very High	High
Priorities		**0.326**	**0.303**	**0.196**	**0.175**

2 BOCR Network

The overall BOCR network is illustrated in a tree hierarchy format in Figure 3. The top level is a cluster that contains the Goal node, which connected to the second-level clusters that contain the BOCR nodes: Benefits, Opportunities, Costs and Risks.

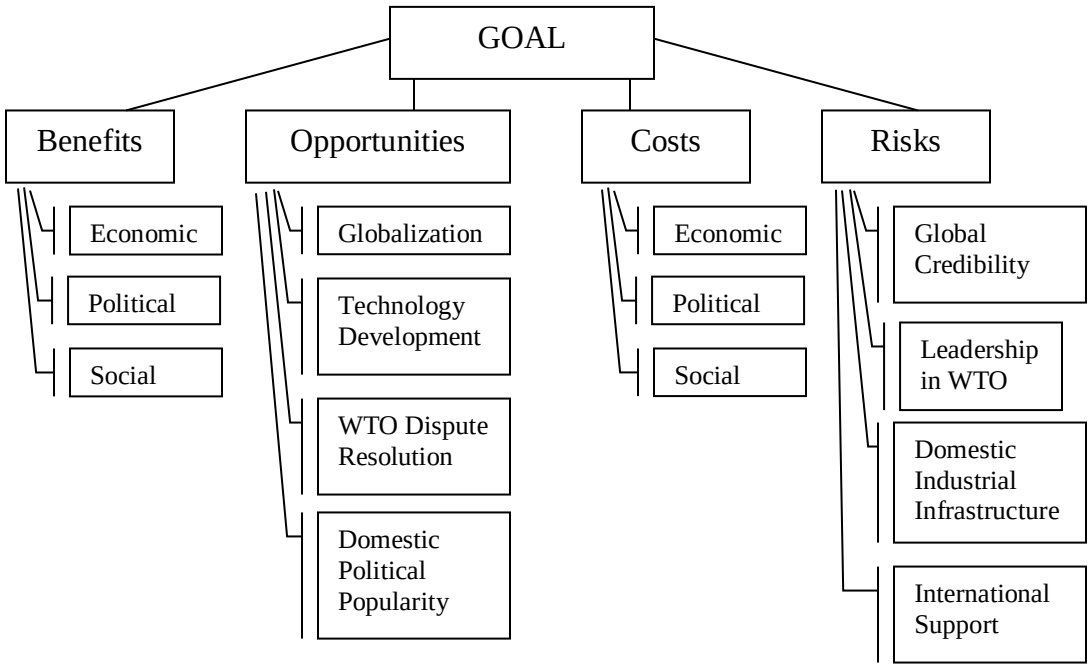


Figure 3 Overall BOCR Network

3 Definition of criteria and sub-criteria

The definition of criteria and sub-criteria of Benefits, Opportunities, Costs and Risks within the BOCR network are given in the following four tables. (Table 2 to Table 5)

Table 2 Definition for Benefits Model:

Control Criteria	Sub-criteria	Description
Economic	Economic Structure	Economic infrastructure of USA
	Steel Industry Recovery	Recovery of steel industry in the USA
	Supply & Demand	Impact on supply and demand of steel in the USA
Political	Domestic Political Credibility	Credibility of the ruling party in the USA
	Domestic Political Stability	Stability of political structure in USA
	Military Defense	Impact on raw materials for military armory
Social	Employment Rate	Impact on overall employment rate in the USA
	Environment	Steel industry's impact on environment - pollution

Table 3 Definition for Opportunities Model:

Control Criteria	Description
Domestic Political Popularity	Reinforcing the popularity of the ruling party among the citizens
Globalization	Increased mobility of goods, services, labor and technology throughout the world
Technology Development	Technology development within the steel industry with the goal to increase productivity
WTO Dispute Resolution	The solution of trading dispute between countries in WTO

Table 4 Definition for Costs Model:

Control Criteria	Sub-criteria	Description
Economic	Inflation	A persistent increase in the level of consumer prices
	Steel Price	The price of steel in the USA
	Price of Industry-related Goods	The price of steel-related goods in the USA. (e.g. auto parts)
	Retaliation on US Exported Products	Tariff imposed on US export goods by other countries
Political	International Credibility	Credibility of USA in the world
	International Support on Free-Trade	Support on free-trade around the world
Social	Crime Rate	Crime rate due to high unemployment in USA
	Social Security	Ensuring acceptable standard of living

Table 5 Definition for Risks Model:

Control Criteria	Description
Global Credibility	Credibility of USA in the world
International Support on Political Issues	Support on political issues around the world
Leadership in WTO	Leading position within WTO
Domestic Industrial Infrastructure	Industrial infrastructure of USA to meet future challenge

4 High priority covering criteria selection

We determined the control criteria and sub-criteria in the four control hierarchies one each for Benefits, Opportunities, Costs and Risks of the decision we need to make and obtained their priorities from paired comparison matrices. The summarized results are shown in Table 6.

Table 6 Criteria and their priorities

Merit	Criteria	Sub-criteria	Local Priorities	Global Priorities
Benefit 0.326	Economic 0.256	**Economic Structure**	0.571	**0.048**
		Steel Industry Recovery	0.143	0.012
		Supply & Demand	0.286	0.024
	Political 0.671	**Domestic Political Credibility**	0.309	**0.068**
		Domestic Political Stability	0.582	**0.127**
		Military Defense	0.109	0.024
	Social 0.073	Employment Rate	0.857	0.020
		Environment	0.143	0.003
Opportunities 0.303		**Domestic Political Popularity**	0.630	**0.191**
		Globalization	0.058	0.018
		Technology Development	0.042	0.013
		WTO Dispute Resolution	0.270	**0.082**
Costs 0.196	Economic 0.717	Inflation	0.089	0.013
		Steel Price	0.100	0.014
		Price of Industry-related Goods	0.177	0.025
		Retaliation on US Exported Products	0.634	**0.089**
	Political 0.205	**International Credibility**	0.750	**0.030**
		International Support on Free-Trade	0.250	0.010
	Social 0.078	Crime Rate	0.250	0.004
		Social Security	0.750	0.011
Risks 0.175		Global Credibility	0.059	0.010
		International Support on Political Issues	0.097	0.017
		Leadership in WTO	0.098	0.017
		Domestic Industrial Infrastructure	0.746	**0.131**

Deriving from table 6, only criteria with a global priorities of 3 percent or higher are considered further in the decision making process. Hence, we created a decision network and prioritize its elements for each of the following high priority covering control criterion. (Table 7)

Table 7 High priority covering control criteria for further consideration

Merit	Criteria	Sub-criteria	Global Priorities
Benefit	Economic	**Economic Structure**	**0.048**
	Political	**Domestic Political Credibility**	**0.068**
		Domestic Political Stability	**0.127**
Opportunities		**Domestic Political Popularity**	**0.191**
		WTO Dispute Resolution	**0.082**
Costs	Economic	**Retaliation on US Exported Products**	**0.089**
	Political	**International Credibility**	**0.030**
Risks		**Domestic Industrial Infrastructure**	**0.131**

5 Synthesized Results from Super Decision program

By using Super Decisions program, we obtained the synthesized results for all of the above networks, and therefore achieved the results with regard to Benefits, Opportunities, Costs, Risks and the final result of the whole model. The results are illustrated from Table 8 through Table 12.

Table 8 Results of Benefits Model

Ranking	Alternatives	Ideals	Normals	Graphic
1	1Impose temporary tariff on imported steel	1.0000	0.4197	
3	2Not impose tariff on imported steel	0.3873	0.1626	
2	3Solve the steel-overproduction issue under WTO	0.9952	0.4177	

Table 9 Results of Opportunities Model

Ranking	Alternatives	Ideals	Normals	Graphic
1	1Impose temporary tariff on imported steel	1.0000	0.4487	
3	2Not impose tariff on imported steel	0.4381	0.1966	
2	3Solve the steel-overproduction issue under WTO	0.7907	0.3548	

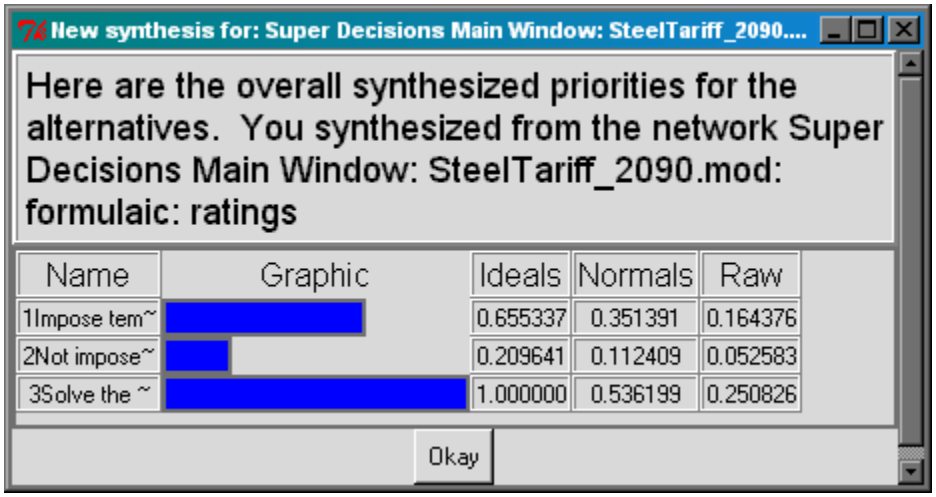
Table 10 Results of Costs Model

Ranking	Alternatives	Ideals	Normals	Graphic
1	1Impose temporary tariff on imported steel	1.0000	0.4670	
3	2Not impose tariff on imported steel	0.4907	0.2292	
2	3Solve the steel-overproduction issue under WTO	0.6504	0.3038	

Table 11 Results of Risks Model

Ranking	Alternatives	Ideals	Normals	Graphic
1	1Impose temporary tariff on imported steel	1.0000	0.5025	
3	2Not impose tariff on imported steel	0.4103	0.2062	
2	3Solve the steel-overproduction issue under WTO	0.5797	0.2913	

Table 12 Final Results of the Whole Model



6 Sensitivity Analysis

From the sensitivity graph for each of the BOCR node, we had the following results.

- The changes in the priority of Benefits will not change the final outcome of the steel-tariff decision and alternative 3 "Solve the steel-overproduction issue under WTO" is always the best option.
- As the priority of Costs increased, alternative 2 "Not impose tariff on imported steel" becomes the best option.
- As the priority of Opportunities increased, alternative 1 "Impose temporary tariff on imported steel" becomes the best option.

- As the priority of Risks increased, alternative 2 "Not impose tariff on imported steel" becomes the best option.

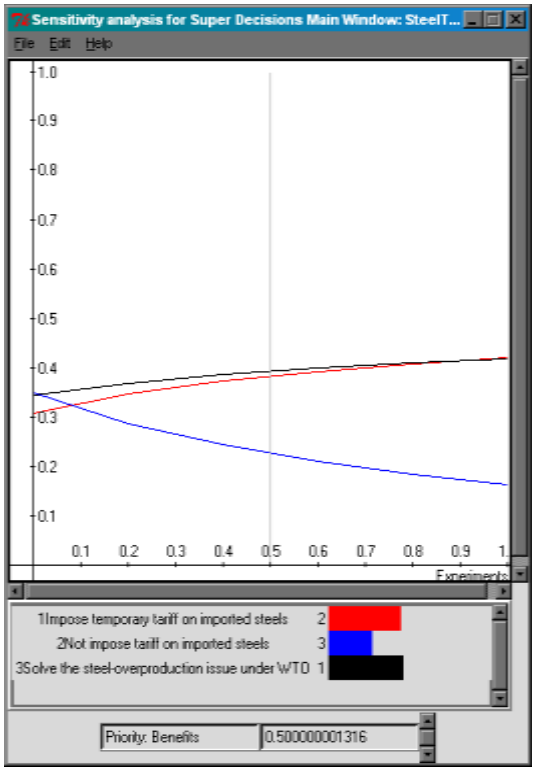


Figure 4 Sensitivity Analyses for Benefits Node

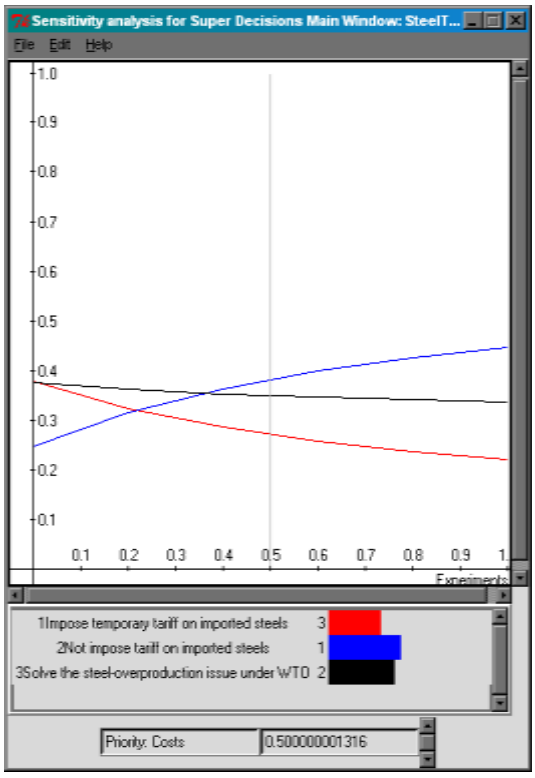


Figure 5 Sensitivity Analyses for Costs Node

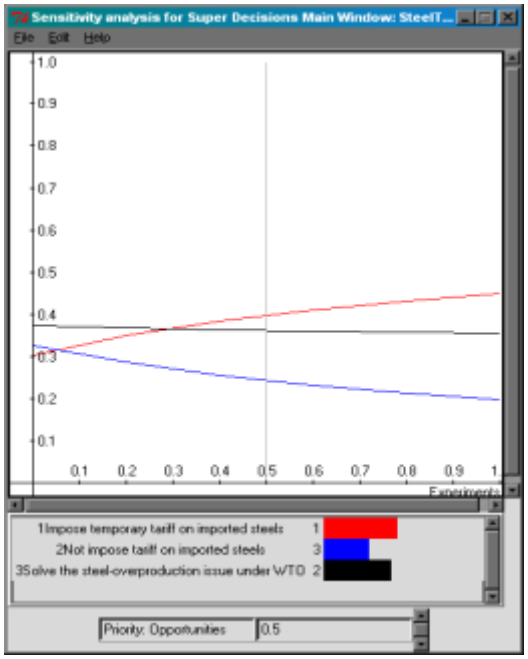


Figure 6 Sensitivity Analyses for Opportunities

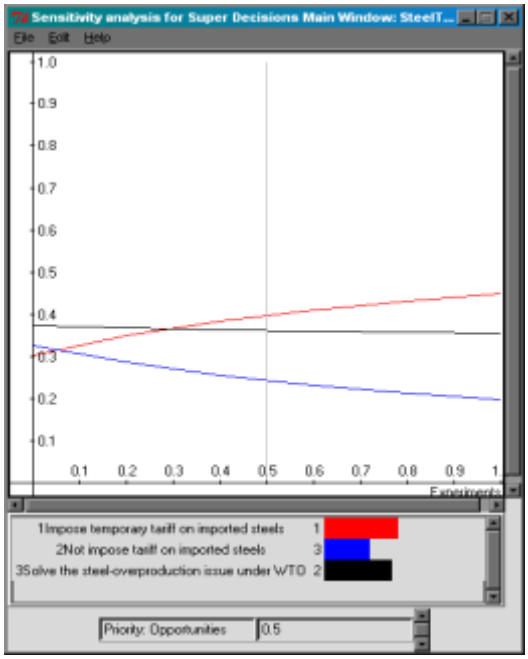


Figure 7 Sensitivity Analyses for Risks Node

Conclusion

Our model results clearly support the alternative to resolve the steel-overproduction issue under the WTO. The result is inconsistent with the government's decision to impose a temporary tariff on steel. There are several factors contributing to the out coming: First, the fact that the USA demands free trades from others while practicing protectionism itself heavily weighted against the U.S. decision of imposing the steel tariff. Second, we felt that the retaliation factor has been highly underestimated in the government's decision. The immediate international response to impose trade tariffs on U.S. goods had a counter impact on the U.S. export industry. Third, the argument that the domestic steel production plays an important role for the defense sector seems to be flawed. The U.S. military today uses far less steel than broadly believed. Hence, the Defense Department could easily stockpile as much steel as it will ever need in an emergency. It can also relay on the steel production on its allies, for instance, Canada. Last but not least, the government's motivation was ill-founded by believing that the imposed steel tariff will "secure" jobs in the damaged steel industry. However, studies have shown that the impact on the steel consuming sectors will be disastrously and results in thousands of job losses in the steel consuming industry.

The latest steps taken by the U.S. government show more and more exclusions from the imposed steel tariffs. The government realizes that the protectionism has a cost which has not been taken sufficiently into consideration so far. Hence the latest developments support the out coming of our analysis.