

## CHAPTER 2

# FORECASTING THE RESURGENCE OF THE U.S. ECONOMY IN 2001: AN EXPERT JUDGMENT APPROACH

Andrew R. Blair, Robert Nachtmann, Thomas L. Saaty and Rozann Whitaker  
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### 1. INTRODUCTION

Building on work done in the early 1990s (Blair et al., 1992; Saaty and Vargas, 1994), this chapter illustrates use of the Analytic Network Process (ANP) (Saaty, 1990; Saaty, 2001; Saaty and Vargas, 1991) in April 2001 to produce a forecast of when the U.S. economy would recover from the slowdown it had been experiencing for several quarters, after almost a decade of unparalleled expansion. Using a conceptual framework grounded in modern macroeconomics, the exercise features the use of expert judgment in producing the forecast without assistance from conventional macroeconomic forecasting.

### 2. ON THE ROLE OF JUDGMENT IN ECONOMIC FORECASTING

Conventional approaches to macroeconomic forecasting tend to be constrained by the estimated values of parameters and intercept terms. These are imbedded in the multi-equation models that are typically employed to produce "first-cut" forecasts of relevant endogenous variables. Additionally, the values of a large number of "exogenous" variables (relating to the future course of monetary and fiscal policy, the value of exports, etc.) must be subjectively estimated on the basis of available evidence and consensus judgment. Initial forecasts produced by the raw models are then typically adjusted by "add" or "fudge" factors, most commonly in the form of shifts in the values of previously estimated intercept terms. This procedure is employed in order to produce forecasts that are consistent with recent values of key endogenous variables when it is evident that a shift of some kind has occurred in portions of the underlying model structure. Such exercises also provide ample opportunity for resetting the values of exogenous variables.

Studies of "ex ante" forecasts produced by the builders of major models using add factors suggest that these forecasts have been more accurate than the "ex post" forecasts produced by the models themselves, even when the same add factors were employed. Fair (1984) thus wrote:

"In other words, the use of actual rather than guessed values of the exogenous variables decreased the accuracy of the forecasts.... This conclusion is consistent with the view that

the add factors are (in a loose sense) more important than the model in determining the ex ante forecasts..."

As stated in earlier papers (Blair et al., 1992; Saaty and Vargas, 1994), all this suggests that macroeconomic model builders/forecasters are well aware of the limitations of their underlying models and the need to incorporate subjective judgments. However, these judgmental adjustments are necessarily non-systematic and ad hoc in nature. Here, we thus utilize an alternative, systematic approach – AHP – in order to remedy this deficiency. While we have not illustrated this alternative by adapting a formal macroeconomic forecasting model, the conceptual framework, as noted above, is grounded in modern macroeconomics. Our alternative approach, moreover, could also be readily employed to enrich forecasting exercises based on formal models (e.g. generating add factors more systematically and consistently; adjusting the values of exogenous variables). In this respect, the two forecasting approaches can be seen to converge quite compatibly.

### **3. THE SETTING: AN ECONOMIC SLOWDOWN AFTER YEARS OF EXPANSION**

While in popular accounts it is conventional to view the U.S. economy as being in a recession if real Gross Domestic Product (GDP) has declined for two consecutive quarters, the National Bureau of Economic Research (NBER), utilizing a panel of experts, has, by consensus, been given the responsibility for dating the actual turning points in the U.S. economic cycle. That organization arrives at its assessments by utilizing a variety of economic indicators, including industrial production, employment/unemployment, income and shipments. The existence of a recession must meet various criteria relating to duration, depth and diffusion throughout the economy. In December of 1992, the NBER announced (Hershey, 1992)) that the trough of the last cycle had occurred in the first quarter of 1991. No economist would have predicted at the time that this trough would subsequently usher in a period of steady and substantial growth of national output, low inflation, rising productivity and progressively lower levels of unemployment, which would not falter until the third quarter of 2000. In that quarter, the growth rate of real GDP slipped to 2.2% from 5.6% in the previous quarter, and to 1.0% and 1.3% respectively in the fourth quarter of 2000 and the first quarter of 2001, as compared with an average rate of real quarterly GDP growth of 3.6% for the entire period (U.S. Dept. of Commerce, 2001). A U.S. Department of Commerce advance estimate of second quarter real GDP growth suggested an annual rate of 0.7%, with many economists expecting that a more complete report would indicate an actual contraction (Kulish, 2001). During this long expansionary period, civilian unemployment fell to levels last seen in the late 1960s, and which most economists had come to believe would not again be attained: steadily declining from an average of 7.3%/7.4% in 1991/1992 to a low of 3.9% in September and October of 2000, before beginning to rise in the ensuing months (Bureau of Labor Statistics, 2001).

Even in June 2001, the unemployment rate still stood at 4.5%, though expectations were widespread that this percentage would continue to increase for a number of months in the future. Fueled *ex post* by the steady growth in national output and, most significantly in the minds of many -- including Federal Reserve Chairman Alan Greenspan (e.g., Leonhardt, June, 2001; August, 2001) -- the long-awaited impact of the widespread use of computers and information technology, average rates of labor productivity growth also improved substantially during the expansion. Holding aside cyclical swings, non-farm business productivity had begun to lag during the 1980s and early 1990s but advanced significantly thereafter, averaging almost 2.5% per year from 1996 to 1999, and rising to an average of 4.3% in 2000, before slowing to a revised 0.1% in the first quarter of 2001, as the economic slowdown presumably began to exert its influence. Quite remarkably, a preliminary estimate of second quarter 2001 non-farm business productivity suggested a “healthy 2.5 percent” annual growth rate, attributable, apparently, to companies becoming “more efficient by dismissing employees or reducing the number of hours they worked, while sustaining virtually the same level of output” (Leonhardt, August, 2001). In any event, by the middle of June 2001, the NBER had released a statement in which it concluded there was “a possibility that a recession began recently” (Leonhardt, June, 2001).

From the beginning of 2001, the Federal Reserve had sharply reversed its previous year’s monetary policy stance of raising interest rates in order to fend off inflation in what appeared to be a potentially overheating economy. No longer fearing inflationary pressure and expressing concern about the slowdown, the Federal Reserve lowered the benchmark Federal Funds rate six times between January and June 2000, for a total reduction in that rate of 2.75%, and also made it clear that it would not rule out further reductions in the future. Fiscal policy also made a late contribution in the form of the incorporation of an up to \$600 tax rebate as part of the Economic Growth and Tax Relief Reconciliation Act of 2001, which President Bush had signed into law in June. Initially conceived exclusively as a program of longer-term tax relief, bi-partisan support for the package in part reflected the desire to resuscitate the lagging economy via fiscal stimulus. Rebate checks were slated to arrive in taxpayer mailboxes in the ensuing weeks.

The final version of the current chapter was prepared in August of 2001, and some of the information cited above was obviously not available when the authors convened to conduct a forecasting exercise on April 7, 2001, although the group had sufficient data at its disposal to conclude that the United States was experiencing an economic “slowdown.” This is the term we will employ in this chapter, rather than “recession,” although subsequent data may confirm that a recession actually did take hold. The purpose of the forecasting exercise was

to estimate when the next economic recovery would occur, in the form of a resurgence of stronger rates of output growth.

As additional context, we should compare the nature of the economic environment within which the forecasting exercises described in the previous paper (Blair et al., 1992; Saaty and Vargas, 1994) were conducted with the economic environment prevailing during the time of this most recent exercise. As stated in the previous paper, the authors' judgment in May 1992 was that the strength of the eventual recovery was likely to be quite weak when compared to previous expansions, owing chiefly to the "braking" influence of major structural changes then taking place in the domestic and global economies (specifically, such factors as the de-emphasis of production based on national defense and the increasing integration of world financial markets). Accordingly, a prominent place was assigned to the role of structural change in our previous forecasting framework. In our latest exercise, however, structural economic shifts were believed to have run their course and we thus adopted a more conventional macroeconomic forecasting framework, emphasizing "Aggregate Demand" and "Aggregate Supply" factors, as outlined in such widely adopted macroeconomics textbooks as Blanchard (Blanchard, 2000).

#### **4. APPLICATION OF ANP TO THE MACROECONOMIC FORECASTING PROBLEM**

On the basis of the data available to us, our forecasting exercise employed the ANP to address the timing of the expected resurgence by seeking to answer the question "what is the most likely period in the future when the resurgence will occur?" By this term, we implicitly meant a resumption of something approaching the average growth rate of real GDP (serving as a surrogate measure of the growth of the overall U.S. economy) attained during the most recent, nearly decade-long, expansion. Like typical forecasters, we were not precise with regard to rates of growth in specific quarters, except to suggest the time period during which the resumption would occur.

##### *4.1 Decomposition of the Problem as a Hierarchy*

Decomposing the problem hierarchically, the top level of the exercise consists of the primary factors believed by our group to represent the forces or major influences driving the economy: "Aggregate Demand" factors; "Aggregate Supply" factors; and "Geopolitical Context." Each of these primary categories was then decomposed into subfactors represented in the second level. Under Aggregate Demand, we identified consumer spending, exports, business capital investment, shifts in consumer and business investment confidence, fiscal policy, monetary policy, and expectations with regard to such questions as the future course of inflation, monetary policy and fiscal policy. (We make a distinction between consumer and business investment confidence shifts and the formation of expectations regarding future economic developments.)

Under Aggregate Supply, we identified labor costs (which, in turn, are driven by changes in such underlying factors as labor productivity and real wages), natural resource costs (e.g., energy costs), and expectations regarding such costs in the future. With regard to Geopolitical Context, we identified the likelihood of changes in major international political relationships and major international economic relationships as the principal subfactors. With regard to the subfactors under Aggregate Demand and Aggregate Supply, we recognized that they are, in some instances, interdependent. For example, a lowering of interest rates as the result of a monetary policy decision by the Federal Reserve should induce portfolio rebalancing throughout the economy. In turn, this should reduce the cost of capital to firms and stimulate investment. Simultaneously, it should reduce financial costs to households and increase their disposable incomes. Any resulting increase in disposable income stimulates consumption and, at the margin, has a positive impact on employment and GNP. However, all of this assumes that the linkages of the economy are in place and are well understood. This is what the conventional macroeconomic conceptual models are designed to convey.

The third level of the hierarchy consists of the alternate time periods in which the resurgence might occur as of April 7, 2001: within three months, within six months, within twelve months, and within twenty-four months. Because the primary factors and associated subfactors are time-dependent, their relative importance had to be established in terms of each of the four alternative time periods. Thus, instead of establishing a single goal as one does for a conventional hierarchy, we used the bottom level time periods to compare the two factors at the top. This entailed the creation of a feedback hierarchy known as a "holarchy" in which the priorities of the elements at the top level are determined in terms of the elements at the bottom level, thus creating an interactive loop. Figure 1 provides a schematic representation of the hierarchy we used to forecast the timing of the economic resurgence.

#### *4.2 Pairwise Comparison*

After decomposing the problem hierarchically, the next step in the process was to pairwise-compare the relative importances of the primary factors (Aggregate Demand, Aggregate Supply, and the Geopolitical Context) as they influence (1) the timing of the economic resurgence; (2) the relative importance of each of the subfactors as drivers of the associated primary factor in the next level of the hierarchy; and (3) the relative importance of each of the subfactors under each primary factor as it influences the timing of the economic resurgence. These comparisons were carried out using the AHP's nine point scale.

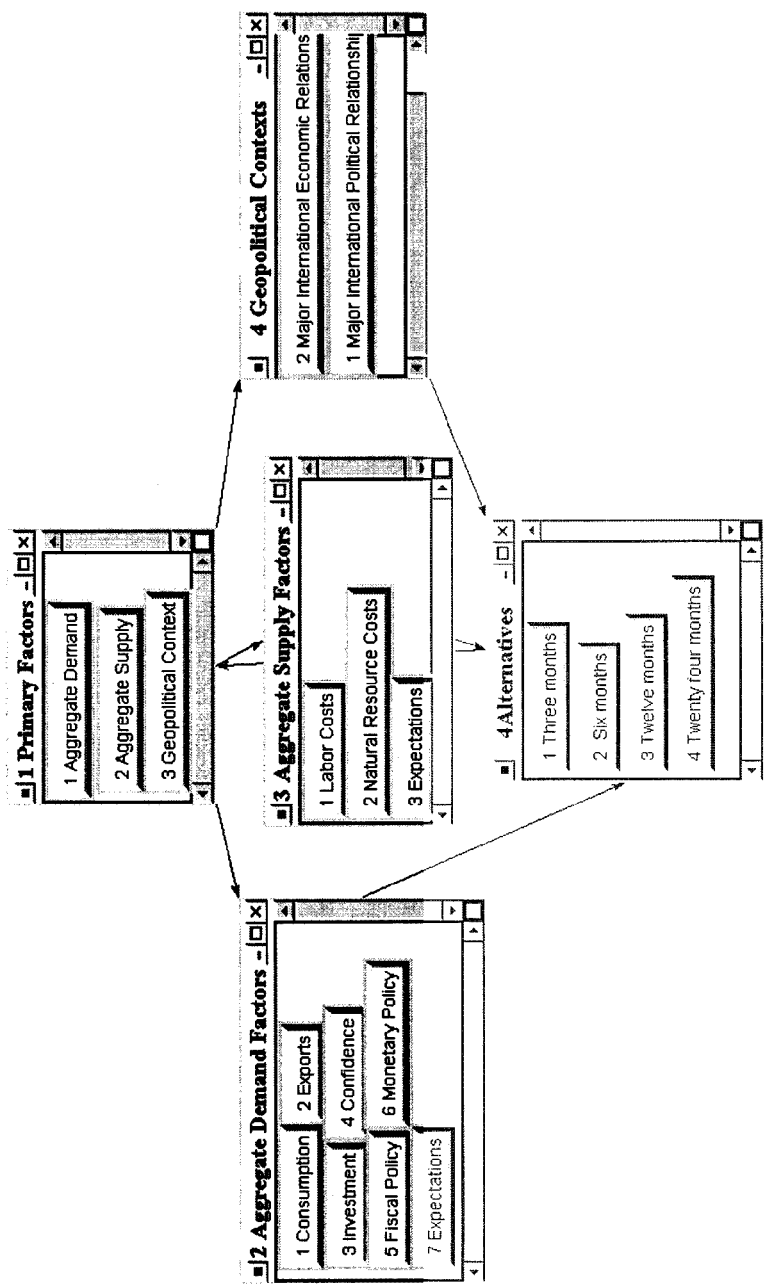


Figure 1. Overall View of the “2001” Model

The judgments with regard to identification of factors, as well as the comparisons of relative impact and strength of factors, were conducted by the authors, who assumed the role of representative "experts". Obviously, the outcomes are strongly dependent on the quality of those judgments. As noted, the exercise was conducted on April 7, 2001.

Nineteen sets of judgment matrices were generated in this exercise. Tables 3 through 21 in the Appendix present the 19 judgment matrices and their resulting priorities for this forecasting exercise. A whole number in a matrix means the element listed at the left is preferred to the element listed at the top. A fraction means the element listed at the top is preferred. Note that the bottom left triangular portion of each matrix below the main diagonal is omitted since the corresponding entries there are the reciprocals of their transposes shown above the main diagonal.

Table 19 in the Appendix provides an easily grasped illustration of the use of this scale to represent the judgments. With regard to the relative importances of the three primary factors for promoting an economic resurgence within a six-month time period, the table reveals that Aggregate Demand factors were considered to be "very strongly more important" (seven times as important) than Aggregate Supply factors, and "extremely more important" (nine times as important) than Geopolitical factors. Accordingly, the numbers 7 and 9 were inserted in the columns under Aggregate Supply and Geopolitical, respectively, to illustrate the comparisons of Aggregate Demand with these factors.

A perusal of the table reveals the following sets of judgments:

1. The monetary policy, confidence and expectational subfactors were assigned relative weights totaling almost 75% of the Aggregate Demand primary factor -- with monetary policy the highest at 35% -- in regard to promoting economic resurgence (i.e., by directly impacting on consumer spending and business capital investment).
2. With regard to the three and six-month forecasting periods, Aggregate Demand factors were judged to dominate Aggregate Supply and Geopolitical factors (79% in each period); for the longer 12- and 24-month time horizons, Aggregate Demand and Aggregate Supply factors were judged to be of equal weight (45% in each period).
3. Of the Aggregate Demand subfactors, confidence, monetary policy and expectations were judged to be most influential in the three- and six-month forecasting horizons, whereas more fundamental aspects of consumer spending and business capital investment, together with exports, began to assume greater prominence, along with the Aggregate Supply subfactors, in the 12- and 24-month time periods.

Each judgment matrix has an associated priority vector or vector of weights. (These are the numbers that appear in the supermatrix, Table 1, in the Appendix.) The limit supermatrix (Table 2 in the Appendix) is the result of raising the supermatrix to powers until it converges. In this case, the powers of the supermatrix perform a cycle, and for the overall limit, the sum of the various limiting cycle phases is taken to obtain the outcome. This is the final supermatrix of the results. The resulting final priorities for the alternative time periods are obtained from the last four rows of any column in Table 2 by normalizing the four numbers: 0.1019, 0.0686, 0.0606, and 0.1022. The resulting final priorities for the time periods are: three months, 0.3058; six months, 0.2058; twelve months, 0.1818; and twenty-four months, 0.3066.

5. PRODUCING THE FORECAST OF THE RECOVERY

To obtain our forecast, we subsequently multiplied each priority by the midpoint of its corresponding time interval and added the results (as one does when evaluating expected values):

<u>Time Period</u>	<u>Midpoint of Time Period</u> (in months from 0)	<u>Priority of Time Period</u>	<u>Midpoint x Priority</u>
3 – months	$0 + (3 - 0)/2 = 1.5$	0.3058	0.4587
6 – months	$3 + (6 - 3)/2 = 4.5$	0.2058	0.9262
12 – months	$6 + (12 - 6)/2 = 9.0$	0.1818	1.6363
24 – months	$12 + (24 - 12)/2 = 18.0$	0.3066	<u>5.5180</u>
		<b>TOTAL</b>	<b>8.5393</b>

We interpreted this to mean that the recovery would occur 8.54 months from the time of the forecasting exercise on April 7, 2001, or around mid to late December, 2001; that is to say, toward the end of the fourth quarter of 2001. Interestingly, as this chapter was drafted in July 2001, a number of private and official forecasters were also making similar projections (i.e., a recovery in the fourth quarter of 2001, or the first quarter of 2002).<sup>1</sup>

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<sup>1</sup> An economist colleague, Professor Iwan Azis of Cornell University, has suggested that instead of using the midpoints of the time intervals, which is more the practice in the physical sciences, that the endpoints should be used. His idea is that the pairwise comparisons should be formulated in terms of what is likely to happen by the end of one period (e.g. three months) versus the end of another period (such as twelve months) rather than using the mid-points of these periods. As of the starting date of a forecasting exercise, it is the end points of the various time periods which are of interest rather than the mid-points or averages for each period. In that case, the resurgence would be computed as follows:  $3 \times 0.30581 + 6 \times 0.20583 + 12 \times 0.18181 + 24 \times 0.30656 = 11.69$  (months from April 7, 2001), or approximately April of 2002 (i.e., early in the



## 6. CONCLUSION

This chapter has again demonstrated how the Analytic Network Process can serve as an additional tool for macroeconomic forecasts. In the current instance, we have used the interesting case of the U.S. economy in early 2001, which had begun to experience a slowdown during the latter part of the year 2000 after more than nine years of steady expansion, in order to forecast the time period prior to its recovery. As noted earlier, this approach could be easily adapted for use in forecasts employing formal macroeconomic models (e.g. to make judgments with respect to shifts in intercepts and changes in the values of exogenous variables). By way of validating our forecast, here is what the Wall Street Journal July 18, 2003 wrote about the subject more than two years after: “The National Bureau of Economic Research said the U.S. economic recession that began in March 2001 ended **eight months later**, not long after the Sept. 11 terrorist attacks. Most economists concluded more than a year ago that the recession ended in late 2001. But yesterday's declaration by the NBER—a private, nonprofit economic research group that is considered the official arbiter of recession timing—came after a lengthy internal debate over whether there can be an economic recovery if the labor market continues to contract. The bureau's answer: a decisive yes. “

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averages for each period. In that case, the resurgence would be computed as follows:  $3 \times 0.30581 + 6 \times 0.20583 + 12 \times 0.18181 + 24 \times 0.30656 = 11.69$  (months from April 7, 2001), or approximately April of 2002 (i.e., early in the second quarter of 2002). This compares to our result of mid- to late December, 2001 (i.e., late in the fourth quarter of 2001). Given the inherent imprecision in producing economic forecasts, this difference is clearly within the margin of error in one direction or the other. The actual timing of the resurgence will not be known until at least several quarters thereafter.

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APPENDIX

Table 1. Supermatrix. It contains the weights or priorities for the pairwise comparison matrices

	1 Primary Factors				2 Aggregate Demand Factors				3 Aggregate Supply Factors				4 Geopolitical Contexts				4 Alternatives			
	1 Aggregate Demand	2 Aggregate Supply	3 Geopolitical Context	1 Consumption	2 Exports	3 Investment	4 Confidence	5 Fiscal Policy	6 Monetary Policy	7 Expectations	1 Labor Costs	2 Natural Resource Costs	3 Major International Political Relations	4 Major International Economic Relations	1 Three Months	2 Six Months	3 Twelve Months	4 Twenty Four Months		
1 Aggregate Demand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.79	0.45	0.45		
2 Aggregate Supply	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.45	0.45		
3 Geopolitical Context	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.09	0.09		
1 Consumption	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2 Exports	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
3 Investment	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
4 Confidence	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
5 Fiscal Policy	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
6 Monetary Policy	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
7 Expectations	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1 Labor Costs	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2 Natural Resource Costs	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
3 Expectations	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1 Major International Political Relations	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2 Major International Economic Relations	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1 Three months	0.00	0.00	0.00	0.04	0.06	0.08	0.08	0.52	0.10	0.61	0.46	0.08	0.56	0.06	0.00	0.00	0.00	0.00		
2 Six months	0.00	0.00	0.00	0.11	0.08	0.08	0.08	0.30	0.09	0.26	0.37	0.15	0.12	0.29	0.12	0.00	0.00	0.00		
3 Twelve months	0.00	0.00	0.00	0.31	0.42	0.31	0.12	0.38	0.04	0.10	0.23	0.26	0.08	0.26	0.26	0.00	0.00	0.00		
4 Twenty four months	0.00	0.00	0.00	0.53	0.42	0.54	0.05	0.43	0.09	0.08	0.53	0.57	0.07	0.57	0.57	0.00	0.00	0.00		



**Table 3.** The Judgments for Aggregate Demand Factors with respect to the Aggregate Demand Node

	1Consumption	2Exports	3Investment	4Confidence	5Fiscal Policy	6Monetary Policy	7Expectations	Weights
1Consumption	1	7	5	1/5	1/2	1/5	1	.0979
2Exports		1	1/5	1/5	1/5	1/7	1/7	.0209
3Investment			1	1/5	1/3	1/5	1	.0564
4Confidence				1	5	1	1/3	.2220
5Fiscal Policy					1	1/5	1/3	.0835
6Monetary Policy						1	1/5	.3540
7Expectations							1	.1653

**Table 4.** The Judgments for the Aggregate Supply Factors with respect to the Aggregate-Supply-Node

	Labor Costs	Natural Resources	Expectations	Weights
Labor Costs	1	1/7	1	0.1194
Natural Resources		1	5	0.7470
Expectations			1	0.1336

**Table 5.** The Judgments for the Geopolitical Context Factors with respect to the Geopolitical-Context-Node

	International Political Relations	International Economic Relations	Weights
International Political Relations	1	1/2	0.6667
International Economic Relations		1	0.3333

**Table 6.** The Judgments for the Alternatives with respect to Consumption

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1/5	1/7	1/7	0.0426
6 Months		1	1/5	1/5	0.1135
12 Months			1	1/3	0.3101
24 Months				1	0.5338

**Table 7.** The Judgments for the Alternatives with respect to Exports

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1	1/5	1/5	0.0833
6 Months		1	1/5	1/5	0.0833
12 Months			1	1	0.4167
24 Months				1	0.4167

**Table 8.** The Judgments for the Alternatives with respect to Investment

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1	1/5	1/5	0.0783
6 Months		1	1/5	1/5	0.0783
12 Months			1	1/3	0.3051
24 Months				1	0.5383

**Table 9.** The Judgments for the Alternatives with respect to Confidence

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	3	5	5	0.5168
6 Months		1	5	5	0.3047
12 Months			1	5	0.1244
24 Months				1	0.0541

**Table 10.** The Judgments for the Alternatives with respect to Fiscal Policy

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1	1/3	1/5	0.0990
6 Months		1	1/5	1/5	0.0864
12 Months			1	1	0.3827
24 Months				1	0.4319

**Table 11.** The Judgments for the Alternatives with respect to Monetary Policy

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	5	7	7	0.6052
6 Months		1	5	7	0.2616
12 Months			1	1/5	0.0424
24 Months				1	0.0908

**Table 12.** The Judgments for the Alternatives with respect to Expectations

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1	5	7	0.4562
6 Months		1	3	5	0.3707
12 Months			1	1	0.0958
24 Months				1	0.0772

**Table 13.** The Judgments for the Alternatives with respect to Labor Costs

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1	1/5	1/7	0.0842
6 Months		1	1	1/3	0.1515
12 Months			1	1/3	0.2307
24 Months				1	0.5336

**Table 14.** The Judgments for the Alternatives with respect to Natural Resources

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1/3	1/5	1/7	0.0553
6 Months		1	1/3	1/5	0.1175
12 Months			1	1/3	0.2622
24 Months				1	0.5650

**Table 15.** The Judgments for the Alternatives with respect to Expectations

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	3	5	7	0.5602
6 Months		1	4	6	0.2921
12 Months			1	1	0.0807
24 Months				1	0.0671

**Table 16.** The Judgments for the Alternatives with respect to Major International Political Relations

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1/3	1/5	1/7	0.0553
6 Months		1	1/3	1/5	0.1175
12 Months			1	1/3	0.2622
24 Months				1	0.5650

**Table 17.** The Judgments for the Alternatives with respect to Major International Economic Relations

	3 Months	6 Months	12 Months	24 Months	Weights
3 Months	1	1/3	1/5	1/7	0.0553
6 Months		1	1/3	1/5	0.1175
12 Months			1	1/3	0.2622
24 Months				1	0.5650



**Table 18.** The Judgments for the Primary Factors with respect to the 3 Month Time Period

	Aggregate Demand	Aggregate Supply	Geopolitical	Weights
Aggregate Demand	1	7	9	0.7854
Aggregate Supply		1	3	0.1488
Geopolitical			1	0.0658

**Table 19.** The Judgments for the Primary Factors with respect to the 6 Month Time Period

	Aggregate Demand	Aggregate Supply	Geopolitical	Weights
Aggregate Demand	1	7	9	0.7854
Aggregate Supply		1	3	0.1488
Geopolitical			1	0.0658

**Table 20.** The Judgments for the Primary Factors with respect to the 12 Month Time Period

	Aggregate Demand	Aggregate Supply	Geopolitical	Weights
Aggregate Demand	1	1	5	0.4545
Aggregate Supply		1	5	0.4545
Geopolitical			1	0.0909

**Table 21.** The Judgments for the Primary Factors with respect to the 24 Month Time Period

	Aggregate Demand	Aggregate Supply	Geopolitical	Weights
Aggregate Demand	1	1	5	0.4545
Aggregate Supply		1	5	0.4545
Geopolitical			1	0.0909

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