

**Appendix B**  
**Round 2 Questionnaire**  
**Study of Selected Economic Variables**  
**Using the Delphi Method**

On behalf of the Society of Actuaries, I have the honor to invite you to participate in the second Round of a Study to make long term (20 year) forecasts of four selected economic variables (annual increase in CPI, 10 Year Treasury yield, S&P 500 total return, Corporate Baa yield) and the factors that can change their direction. The first round was successfully completed in December of last year and involved experts who provided judgments about the likely course of these variables and the reasons for their views. The responses were extensive, imaginative, and very helpful.

In this questionnaire we present the results of the first Round and ask for reassessments and comments on some of the emerging perceptions. **You need not have participated in the first round to participate in this Round Two. As you will see, three questions are posed in this questionnaire; in the case of Question 3 a portion is directed only to those participants involved in modeling the future courses of economic variables.**

The Society of Actuaries is a nonprofit educational, research and professional society of 17,000 members in the modeling and management of financial risk and contingent events. The mission of the SOA is to advance actuarial knowledge and to enhance the ability of actuaries to provide expert advice and relevant solutions for financial, business and societal problems involving uncertain future events. This Study is being conducted to provide actuaries and other financial professionals with an alternative framework with which to project future values of economic variables, an alternative which relies more on judgments from a diverse panel of experts than is usually utilized under more traditional stochastic and deterministic methods.

**No attributions will be made**, but respondents will be listed as participants in the final report which will, as appropriate, be widely disseminated in the professional literature.

A final report will be issued based on the responses to the first round and the enclosed questionnaire for Round 2; it will be sent to you in two or three months. **Please contact us with any questions and return your responses in time to arrive at the Society by April 15, 2005.** You can respond (email preferred) to Ronora Stryker (email [rstryker@soa.org](mailto:rstryker@soa.org), fax 847 273-8514, ph 847 706-3614) with a copy to Ted Gordon (email [tedjgordon@att.net](mailto:tedjgordon@att.net), fax 860 434-0870). If you find that you have questions about the questionnaire, please call Ted Gordon (860 434-8608) or Steve Easson (905 606-1214).

We appreciate your willingness to participate in this initiative.

Sincerely yours,

Steven Easson, FSA, FCIA, CFA  
Chairperson of the Society of Actuaries Project  
Oversight Group on the Study of Selected Economic  
Variables Using the Delphi Method

# Round 2 Questionnaire Draft

## OVERVIEW OF QUESTIONNAIRE

Please complete the portions of this questionnaire in which you are expert or interested. You may omit any of these questions without affecting the analysis planned for this Study.

The first round questionnaire as well as this one asks for judgments about four variables:

Annual increase in the Consumer Price Index  
10 Year Treasury Spot Yields  
S&P 500 Total Rate of Return  
Corporate Baa Spot Yields

All data are for the U.S. and brief definitions and historical data sources for each variable appear in Appendix A of this questionnaire.

This Round 2 questionnaire has three parts. You will be asked:

- First, we have provided feedback on the projections made by the participants in Round 1 about the future values of the variables and their key reasons for high and low estimates. In view of these data, we ask you to provide estimates of expected value, lowest plausible value, and highest plausible value of the four variables in 2024 and the reasons for your responses.
- Second, we list some prospective possible developments provided by the experts in Round 1 for each variable that were suggested as being important to the track of the variables. We ask you to provide your judgments about the likelihood and impacts of these developments. We intend to use these judgments in a Trend Impact Analysis to project the ranges of the variables over time.
- Finally, we list answers to the question posed in Round 1 in which respondents were invited to provide their views on how the judgmental process employed in this Study might be applied to enhance the traditional modeling and estimation process or to aid in planning. A number of possible uses were listed and the respondents were asked to provide answers. Now, based on these answers, we ask more specific questions about the applicability of utilizing the judgments and forecasts obtained in this Study to enhance these forecasting methods.

**PARTICIPANT’S BACKGROUND**

No attributions will be made, but for demographic analysis, please check the appropriate boxes (answering more than one slot in each list is OK).

**Name:**

**Address:**

**Phone:**

**My primary employment is in:**

- Government Agency \_\_\_\_\_
- Insurance Industry Corporation \_\_\_\_\_
- Other Corporation or Business \_\_\_\_\_
- Non Government Organization \_\_\_\_\_
- University \_\_\_\_\_
- Independent Consultant \_\_\_\_\_
- Other \_\_\_\_\_

**Years of experience in the following fields:**

- Economist:
- Actuary \_\_\_\_\_
- Investment Manager \_\_\_\_\_
- Futurist \_\_\_\_\_
- Modeler \_\_\_\_\_
- Politician \_\_\_\_\_
- Scientist \_\_\_\_\_
- Other (Specify profession) \_\_\_\_\_

### **Question 1.**

In this section we provide quantitative feedback from the first round about the projected values of the variables and some of the reasons given by the respondents for their views (in edited form). We ask you to please consider these results and provide new estimates for the variables in 2024.

The graphs and tables below show the respondents' expectations for each of the variables from Round 1. For example, in the graphs the vertical bars on the right show the inter-quartile ranges for the expected value, the highest plausible value, and the lowest plausible value of each variable in 2024. The round dots next to each bar show the median of the group's judgments.

The lists below each of the graphs present the reasons given by the respondents for high and low estimates,

The final table presents the numerical values used in the graphs; the median value is in **bold** type, and UQ and LQ refer to the upper quartile and lower quartiles of the group's responses, respectively.

In view of the group's Round 1 qualitative and quantitative responses, please enter your judgments about the values you think each variable may attain in 2024 in the third column of the final tables. Please enter three numbers for each variable:

The lowest plausible value; that is the value that you believe has a 90% chance of being exceeded.

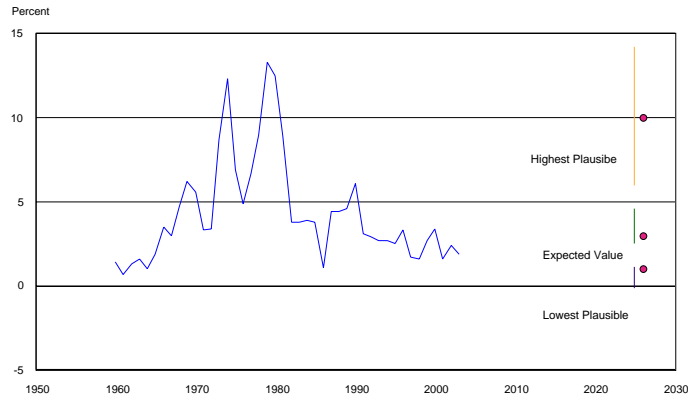
The expected value; that is the value that is equally likely to exceed or fall below the actual result in 2024.

The highest plausible value; that is the value which you believe has a 10% chance of being exceeded.

In the final column, please note the reasons for your views, particularly if you differ significantly with the median judgments of the group. You may refer to the lists by number or enter new information. If you participated in Round 1 and want a copy of your responses, please contact Ronora Stryker at 847 706-3614.

# 1. Annual increase in Consumer Price Index

Number of Respondents = 28



## Reasons for high estimates

1. Tight energy and commodity markets: price shocks, oil shortages; rising oil prices
2. Widening of the US budget and trade deficits
3. The rise in China's economy with resulting higher wages and prices for exports to the U.S.
4. The retired baby boom generation demanding huge amounts of services, especially health care
5. Growth in the number of elderly and concomitant cost increase in medical care expenses
6. The current economic recovery slowly gaining strength
7. Consumers with a "buy now" attitude, discounting the future in pursuit of comfort in the present
8. The Fed increasing money supply to help avoid a collapse in housing and reduce the trade deficit
9. The Fed's credibility being eroded by deteriorating debt
10. Fiscal and trade issues triggering a return to more stimulative monetary and fiscal policies
11. Geopolitical issues: e.g., instability in the Middle East or wartime conditions, such as 1917 – 18
12. A shock due to terrorism or natural catastrophe (earthquakes, hurricanes, influenza pandemic)

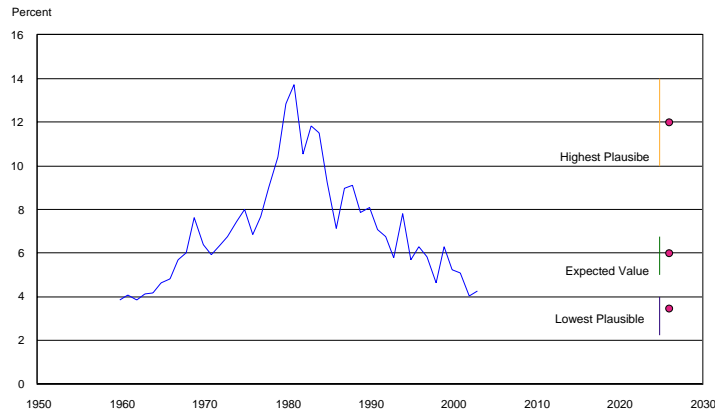
## Reasons for low estimates

13. Productivity increases continue
14. Commodities- even energy becoming less important
15. The Fed policy for controlling inflation remaining effective
16. Fed putting liquidity into the market
17. Global depression or a period of prolonged weak economic growth
18. A shift to rebuild savings by over-indebted consumers
19. Exchange rates not being allowed to adjust to offset competitive and trade imbalances.
20. Baby boomers & younger generation spending less, saving more over concern for social security
21. Deflationary pressures continuing as Asia develops
22. Jobs traveling to poorer countries and consequent dramatic growth in unemployment
23. A technology driven continued steady decline in the real prices of natural resources
24. Capital market discipline on government inflation.

Respondents' Estimates Of the Variable in 2024	Prior Panel Responses LQ MED UQ	Your Current Estimates (Please provide three numbers in each cell)	Reasons for your Responses
Lowest plausible value	-0.1 <b>1.0</b> 1.1		
Expected value	2.5 <b>3.0</b> 4.6		
Highest plausible value	6.0 <b>10.0</b> 14.2		

## 2. 10 Year Treasury Spot Yields

Number of Respondents = 27



### Reasons for high estimates

1. Tight energy and commodity markets: price shocks, oil shortages; rising oil prices
2. Labor unrest as the dependency ratio rises with the baby boomers retiring
3. Continuing wave of technological change driving robust economic growth
4. Need to attract foreign capital to finance the enormous U.S. budget deficit
5. High inflation from combination of the budget and trade deficit
6. Foreign investors diversifying portfolios away from U.S. dollar assets
7. Highly stimulative U.S. monetary and fiscal policies
8. Inability to generate domestic savings to reduce reliance on foreign borrowing
9. People continuing to favor current consumption over saving
10. Calls on government promises for retirement income and medical care straining federal budgets
11. The growth in demand for treasuries falling behind the growth in federal commitments
12. U.S. dollar losing value
13. Foreign governments switching to place funds in euros
14. Government inability to “manage” mid or long term rates
15. Competition to Treasury bonds for investment: other alternatives including global capital markets.
16. Combination of projected labor force growth, productivity growth and the achievement of the inflation target

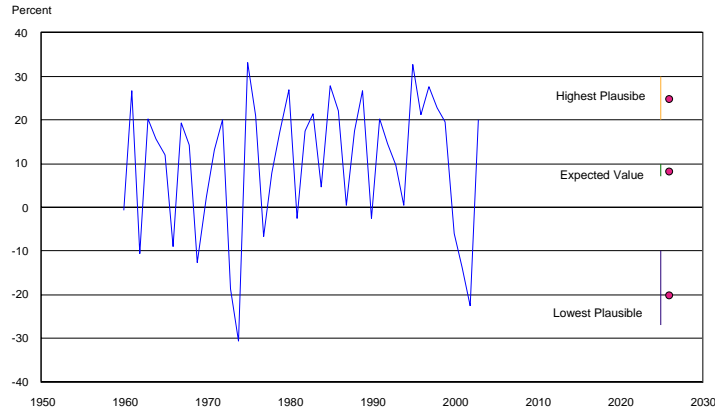
### Reasons for low estimates

17. Low CPI and the Fed putting liquidity into the market
18. Combination of projected labor force growth and productivity growth
19. Extreme Fed controls such as in the early cold war/McCarthy period
20. A prolonged period of US fiscal austerity in an attempt to balance its budget
21. The Fed commits to and achieves inflation in a 0-2% range
22. Delays in retirement and new retirement careers resulting in improved tax revenues and slowing the growth of calls on Social Security and Medicare
23. The extra productivity of the post-retirement workers increasing the amount of money looking for secure investments while reducing the need for government borrowing
24. Government policies reacting quickly to inflationary pressures

Respondents' Estimates Of the Variable in 2024	Prior Panel Responses LQ MED UQ	Your Current Estimates (Please provide three numbers in each cell)	Reasons for your Responses
Lowest plausible value	2.2 <b>3.5</b> 4.0		
Expected value	5.0 <b>6.0</b> 6.7		
Highest plausible value	10.0 <b>12.0</b> 14.0		

### 3. S&P 500 Total Rate of Return

Number of Respondents = 27



#### Reasons for high estimates

1. This is a highly volatile series: above 24% gain or below -10% loss due to immediate growth, irrational exuberance, recession or under & over valuations in recent years
2. Exceptionally volatile, but globalization and cross-linking of exchanges dampening overall fluctuations
3. Very volatile; capital can be repositioned quickly. New records are possible
4. A continued wave of technological change should drive robust economic growth
5. Taxes being reduced and income taxes possibly being replaced by consumption taxes.
6. Good returns can be realized even in crisis years
7. An environment that supports the lowest plausible value of the other variables
8. Significant increases in service sector productivity, particularly medical services
9. Though implausible, an exuberant bull market in 2024
10. A balance existing between those who cash out their equity portfolios to meet current spending needs or to find more stable investments, and those who hold on to equities for their potential to deliver solid income
11. Many companies shifting their focus to provide solid dividend income to their shareholders, mitigating the impact of declines in equity prices

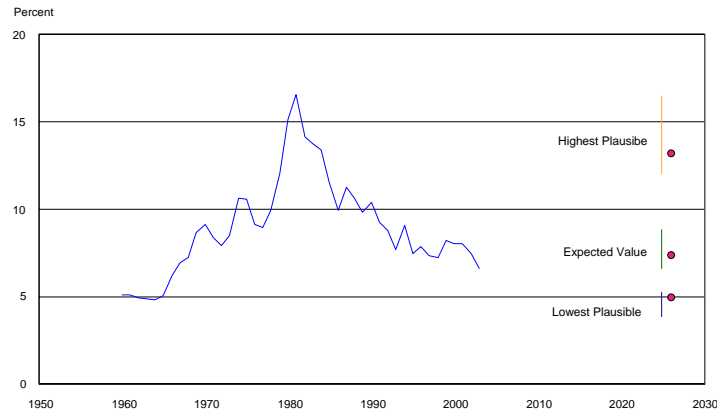
#### Reasons for low estimates

12. High interest rates and poor fiscal policy damaging corporate earnings and hurting investor confidence
13. Rising discount rate, but highly volatile
14. Poor and pessimistic years
15. Increased cross-border, competition in both goods and services reducing the return of equities
16. An environment that supports the highest plausible value of the other variables
17. A bear market
18. The baby boom reaching the Social Security retirement age, with the U.S. the last of the major industrialized nations to reach this point of a massive proportion of its population in retirement
19. A flight from equities resulting from retirees' needs for cash...
20. The next generation creating another bubble in the market, this will burst as always

Respondents' Estimates Of the Variable in 2024	Prior Panel Responses LQ MED UQ	Your Current Estimates (Please provide three numbers in each cell)	Reasons for your Responses
Lowest plausible value	-27.0 -20.0 -10.0		
Expected value	7.2 8.3 10.0		
Highest plausible value	20.0 25.0 30.0		

## 4. Corporate Baa Spot Yields

Number of Respondents = 26



### Reasons for high estimates

1. Tight energy and commodity markets: price shocks, oil shortages; rising oil prices
2. Labor unrest as the dependency ratio rises with the baby boomers retiring
3. A recession involving a credit crunch, raising yields
4. A continued wave of technological change driving robust economic growth
5. Rising inflation and a continuation of inflationary expectations
6. Need to attract foreign capital to finance the enormous U.S. budget deficit
7. Increasing competition for savings; the retirement of the baby boomers will mean dis-saving on a massive scale as they quit paying into IRAs and start withdrawing funds
8. High inflation
9. Lack of government prudence
10. A perception of relatively high corporate risk because of unhealthy balance sheets, low earnings momentum and unfavorable economic conditions
11. Investment grade corporate bonds appearing more conservative than the government bonds (as calls on government promises of retirement income and medical care accelerate)
12. Rising political risk

### Reasons for low estimates

13. A boom, creating an excess of demand for credit risk, lowering yields
14. Extreme fed control as in the early cold war/McCarthy era
15. It is possible, incidentally, that the issuance of long-term corporate bonds will have ceased entirely by 2024. This would go along with aversion to long term liabilities generally
16. Good profitability and strengthened corporate governance keeping the spread over treasuries relatively tight
17. Government prudence and a perception of relatively low corporate risk because of healthy balance sheets, strong earnings momentum, and favorable economic conditions.
18. Credit spreads over treasury securities becoming smaller because of a growing preference for corporate bonds (resulting from a reduction in confidence in government bonds) as the credit risk seems increasingly insignificant compared to the large-scale federal commitments

Respondents' Estimates Of the Variable in 2024	Prior Panel Responses LQ MED UQ	Your Current Estimates (Please provide three numbers in each cell)	Reasons for your Responses
Lowest plausible value	3.8 <b>5.0</b> 5.4		
Expected value	6.5 <b>7.4</b> 8.9		
Highest plausible value	12.0 <b>13.2</b> 16.5		



## **Question 2**

In the first round, respondents also provided judgments about plausible future developments that could influence the variables in the period from the present to 2024. The responses of the participants have been edited and where one or more were similar, combined. This question is based on a summary of the key responses.

In the tables below we ask for your judgments about the likelihood of these developments and their impacts on the variables. We are asking for this information as input to a Trend Impact Analysis that will amend extrapolations of the four variables to account, probabilistically, for the perturbing developments listed in this question, using Monte Carlo methods.

The first column lists the suggested developments.

The second column deals with the likelihood of the developments by 2024. Please use this scale in providing your judgments:

- 5= Almost certain (90% or more)
- 4= Likely (65-90%)
- 3= As likely as not (35-65%)
- 2= Unlikely (10-35%)
- 1= Almost impossible (10% or less)

The final four columns deal with the impacts of the developments. We define “peak impact” as the maximum amount that the value of the variable will shift up or down within the next 20 years as a result of the occurrence of the development.

To provide estimates of the impacts please assume each development occurs independently and judge its effect on the variable. **Please use a minus sign to indicate a downward impact.**

As an example please consider the first row in the table below. If you thought that the first development in this table

Oil prices rise over \$ 60 / barrel for at least 5 years

was almost certain to occur by 2024, you would enter a “5” in column 2.

If you also thought that an oil price of \$60 / barrel over a five year period would result in a later change in the “CPI annual % change” from say 5% (your own estimate of CPI without this spike in oil prices) to 15% (your estimate of CPI with this spike in oil prices) at some point before 2024 you would enter 1000 in the third column.

**If you wish, you may omit any answers. You may also add items to the bottom of the table and you may comment on and qualify your answers with notes.**

1. Development	2. Likelihood by 2024	3. Peak Impact (basis points)  Consumer Price Index (% annual Increases)	4. Peak Impact (basis points)  10 Year Treasury Spot Yields	5. Peak Impact (basis points)  S&P 500 Total Rate of Return	6. Peak Impact (basis points)  Corporate Baa Spot Yields
1. Oil prices rise over \$ 60 / barrel for at least 5 years					
2. Global political instability, Iraq-like wars and terrorist activities and threats become the norm					
3. The terrorist threat under control (number of terrorist incidents 20% of current levels, worldwide, and remaining low)					
4. New technologies dropping costs of production of most products by 10% or more					
5. The U.S. assuming and accepted in a moral, political, and economic leadership role					
6. CPI pressures from growing budget deficits, rising demand for services (e.g., health care costs), stable or declining labor force, and concomitant growth in retirements					
7. U.S. balances its budget					
8. U.S. dollar currency collapse vs. Euro					
9. Globalization lowers labor costs by 10% average					
10. Savings rate grows 10%					
11. Significant climate change affecting food supply and costs					
12. New technologies improving productivity in services by more than 10%					
13. Confidence in US drops; direct foreign investment reaching 50% of current levels					
14. U.S. current account deficit increases to 10% of GDP					
15. U.S. investment climate proves attractive					
16. Changes in Social Security permit individual investment decisions					
17. Productivity increases 5% for five consecutive years					
18. Significant corporate defaults (tripling over current rates)					
19. Profit margins of most U.S. companies drop to 50% of current levels for 10 years					
20. Economic depression for a seven year period					
21. Significant bear market returns for a ten year period					
22. Prime rate above 9% for 5 years					


**Question 3**

In Round 1, respondents were invited to provide their views on how the judgmental process employed in this Study might be applied to enhance traditional modeling (e.g., stochastic, deterministic) and estimation processes or to aid in planning. A number of possible uses were listed and the respondents were asked to provide answers using the following scale:

- 5= Use of judgmental processes is essential
- 4= Extremely useful
- 3= Somewhat useful
- 2= May help or hurt
- 1= Counter productive

The table below summarizes the results from Round 1. The number responding ranged from 23 to 27 (out of 27 respondents).

Possible Use	Applicability (average)
The historical period used to calibrate stochastic models	3.64
Expected values of variables	3.64
Identification of potential developments that could affect forecasts	4.42
Mean reversion assumptions in stochastic models	3.30
The period over which the current assumption reverts to the mean	3.05
The volatility assumptions used in stochastic models	3.52
Validity of outliers that stochastic models may forecast	4.00

In this Round 2, based on the results of all three questions from Round 1, please again provide your assessment of the applicability of judgments and forecasts obtained in this Study. In the table below, potential uses are listed in Column 1. Using the same 1 to 5 scale above, please enter your judgments in Column 2.

Column 3 lists some additional qualitative and quantitative questions. Please provide your answers to these questions in Columns 4 and 5 and where appropriate, why you have reached this opinion. You may provide answers for as many of the four variables as you wish. We are interested in learning, specifically, how the methods and forecasts used in this Study would influence or change the use of forecasting models and estimation processes and your reasons for believing so. Since we are interested in learning about the uses of judgmental methods in conjunction with all types of models, please do not limit your comments to only those models which you currently use.

**Due to the expanded length of this questionnaire, columns 3-5 are directed to those participants involved in modeling the future courses of economic variables.**

Here is an example of an answer to this question; the actual question starts on the next page.

1. Possible Use	2. Please Provide Answer  Applicability of Judgmental Methods	3.  Qualitative/Quantitative Questions	4. Please Provide Answer to Qualitative/Quantitative Questions  Please mention which variables you are commenting on; you may comment on more than one variable	5. Please Provide Reasons for Your Answers
The historical period used to calibrate stochastic models	<b>4</b>	Do you think that this Study provided potential developments and forecasts that could lead to revision of the historical period used in calibration? <u>  x  </u> Y <u>  </u> N  If yes, how would you revise the number of years you use to calibrate your models?	Re 10 year treasuries: I have been using the low interest rate environment of 1951-1965 to calibrate my model, but now I am considering expanding the period into the late 1960s	Re 10 Year Spot Yields, seeing some of the potential high estimate developments has caused me to re-think my philosophy that the world will be operating in a low interest rate environment for decades to come

1. Possible Use	2. Please Provide Answer  Applicability of Judgmental Methods	3.  Qualitative/Quantitative Questions	4. Please Provide Answer to Qualitative/Quantitative Questions  Please mention which variables you are commenting on; you may comment on more than one variable	5. Please Provide Reasons for Your Answers
The historical period used to calibrate stochastic models		<p>Do you think that this Study provided potential developments and forecasts that could lead to revision of the historical period used in calibration?  <input type="checkbox"/> Y <input type="checkbox"/> N</p> <p>If yes, how would you revise the number of years you use to calibrate your models?</p>		
Expected values of variables		<p>Do you think that this Study provided potential developments and forecasts that could lead to changes in estimates of the expected value of the variables?  <input type="checkbox"/> Y <input type="checkbox"/> N</p> <p>If yes, by how much do you think the expected values might change? (e.g., if you would now use 6% instead of 5%, enter 100).</p>		

1. Possible Use	2. Please Provide Answer  Applicability of Judgmental Methods	3.  Qualitative/Quantitative Questions	4. Please Provide Answer to Qualitative/Quantitative Questions  Please mention which variables you are commenting on; you may comment on more than one variable	5. Please Provide Reasons for Your Answers
Identification of potential developments that could affect forecasts		List one potential development or forecast identified in this Study that you think may cause changes in your model.		
Mean reversion assumptions in stochastic models		Do you think that this Study identified potential developments or forecasts that could lead to increasing or decreasing strength of reversion? ___Y ___N		

1. Possible Use	2. Please Provide Answer  Applicability of Judgmental Methods	3.  Qualitative/Quantitative Questions	4. Please Provide Answer to Qualitative/Quantitative Questions  Please mention which variables you are commenting on; you may comment on more than one variable	5. Please Provide Reasons for Your Answers
The period over which the current assumption reverts to the mean		<p>Do you think that this Study identified potential developments or forecasts that could lead to a lengthening or shortening of the mean reversion period?  <input type="checkbox"/> Y <input type="checkbox"/> N</p> <p>If so, by how much?</p>		
The volatility assumptions used in stochastic models		<p>Do you think that this Study identified potential developments or forecasts that could lead to an increase or decrease in volatility assumptions?  <input type="checkbox"/> Y <input type="checkbox"/> N</p>		

1. Possible Use	2. Please Provide Answer  Applicability of Judgmental Methods	3.  Qualitative/Quantitative Questions	4. Please Provide Answer to Qualitative/Quantitative Questions  Please mention which variables you are commenting on; you may comment on more than one variable	5. Please Provide Reasons for Your Answers
Validity of outliers that stochastic models may forecast		<p>Do you think that this Study identified potential developments or forecasts that could cause you to reassess the influence of outliers? ___Y ___N</p> <p>If so, which outlier do you now consider having more of an influence in your model? What outlier do you now consider having less of an influence in your model?</p>		

Please list below other applications that have not been mentioned in this table that might also benefit from the use of judgmental methods of the sort employed in this Study.

Thank you for your participation. The final report will be sent to you in 2-3 months.