

Procedure to Estimate Price Expectations

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Summary

This memo details the procedures currently used to construct estimates of inflation expectations from household survey data. The exact questionnaire wording is detailed for both the year-ahead and five-year inflation expectations questions, as are the changes in the question wording that have been introduced over time. In addition, the memo details the procedures used to impute missing data, adjust for extreme values, and adjust for changes in questionnaire wording so as to provide a consistent time-series of measurements.

The two most important enhancements over prior measurement procedures involve the interpretation of "same" responses and the incorporation of more accurate estimates of expected price declines. In comparison to the prior measurement procedures, only minor and insignificant differences resulted from the changes in the procedures for the surveys conducted since the 1980's. The differences were larger for the late 1970's and early 1980's due to a special adjustment factor needed to correct for the misinterpretation of the "same" response code prior to March 1982. The most important enhancement is that the current procedures incorporate more accurate estimates of expected price declines. Although data on the expected rate of decline in prices has been collected since the early 1980's, this information was not used. The procedure now uses the actual percentage figures given by the respondent. In addition, imputations for missing data cases are now distributed across the entire range of responses instead of using point estimates. The current procedures provide more robust estimates of the variance and the median of the distribution.

A review of the estimates of inflation expectations indicated that for comparisons over time, the median, rather than the mean, may be a more reliable measure of the central tendency of the response distribution due to the changing influence of extreme responses. In addition, it was found that the percentile range of responses is the preferred measure of dispersion; month-to-month changes in the estimated variance of the distribution were dominated by rather small changes in the tails of the distribution.

Question Wording

For the vast majority of cases, estimates of price expectations can be easily and directly obtained from the questionnaire responses. Nearly all respondents provide a straightforward response to the following questions on the expected inflation rate over the next one and five to 10 year time horizons:

One-year: “During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?”

“By about what percent do you expect prices to go (up/down) on the average, during the next 12 months?”

Five-year: “What about the outlook for prices over the next 5 to 10 years? Do you think prices will be higher, about the same, or lower, 5 to 10 years from now?”

“By about what percent per year do you expect prices to go (up/down) on the average, during the next 5 to 10 years?”

The questions cited above represent the core measures; the actual questionnaire form includes several additional probes to confirm the accuracy of the responses (see the end of the paper for a reproduction of the actual format used in the questionnaire). Also note that the abbreviation “five-year” is used in the text as a matter of convenience; the actual time horizon used in the questionnaire is five to ten years.

All responses are coded in an open-ended format, with any answers outside of the range -95% to +95% truncated to $\pm 95\%$ prior to coding.¹ The coded responses to these questions are included at the end of the paper (note that some of the responses were grouped into ranges to limit the size of these tables, and that all data are shown as collected, that is, prior to any of the adjustments discussed in the text).

The following sections document three types of adjustments that are made to these response distributions: imputations for missing information, corrections for the misinterpretation of response codes, and the truncation of outliers.

¹Virtually all responses fall within the $\pm 95\%$ boundary, and thus responses were rarely truncated in the coding process. Note that the range from -1% to -95% includes nearly the entire meaningful range of potential responses, while the range from 1% to 95% covers a smaller subset of potential, even if unrealistic, responses.

Missing and Incomplete Data

There are three missing data codes that are used to document the type and extent of the missing information to the questions on price expectations:

NA Indicates that no information is available. In most cases, NA reflects a respondent's refusal to answer the question. At the beginning of each interview, respondents are told of the voluntary nature of the interview. Specifically, respondents are told that they can skip any question at their discretion.

This type of missing data is relatively uncommon. From 1978 through 1995, NA responses were recorded for just 0.2% of all cases for the question on one-year price expectations. For the question on five-year price expectations, NA responses have averaged 0.4%.

DK IF Signifies that in response to the first question on the expected direction of change in prices, the respondent replied that they did not know whether prices would increase or decrease. Typically, this response simply reflects the respondent's lack of knowledge or understanding, and hence lacks any information content. Rarely does it signify a reasoned judgement that future prospects are so uncertain that increases are as likely as decreases.

This type of missing data has also been relatively uncommon, averaging 1.1% for the one-year price expectations question from 1978 through 1995, and 3.0% for the five-year price expectations question.

DK UP
DK DW These missing data codes signify that only partial information was obtained: the respondents indicated the direction they expected prices to change but replied that they "didn't know how much prices would increase" (DK UP) or "didn't know how much prices would decline" (DK DW).

Although DK DW has never been very common (mostly because very few consumers have ever expected price declines), the proportion coded DK UP has been relatively common, and has shown significant variation over time. For the one year price expectations question, 6.5% of all respondents were coded DK UP, ranging from a high of 22.7% to a low of 1.5%. High levels of DK UP (more than 10%) were recorded during years of high inflation rates (1978 - 1981); since 1981, DK UP has accounted for less than 10% of all responses for both the one year and five year questions.

How should the missing and incomplete data codes be taken into account when calculating estimates of the sample mean and median? The decision to eliminate the cases

from analysis or to impute an estimate of the missing data was based on the extent of the missing information and the potential for bias.

Respondents coded as giving no answer (NA) or “don’t know the direction of expected change” (DK IF) were eliminated from the calculated estimates. By excluding these cases, the implicit assumption is that the overall sample mean or median is the best estimate of the missing information. For these cases, the available information was judged to be insufficient to generate a more specific proxy. Importantly, identical estimates of the mean and median are obtained regardless of whether these cases are eliminated or assigned values based on the overall sample estimates.

The partial information codes DK UP and DK DW provide important information about the direction of expected change in prices (but not the extent of expected change). The elimination of these cases would bias the estimates by disregarding whether the respondent expected prices to increase or decrease. Since the proportion of respondents coded DK UP has always been greater than those coded DK DW, the exclusion of these codes would bias the estimates downward. Moreover, since the proportion of respondents coded DK UP varies considerably over time, the size of the downward bias would also vary considerably over time.

For these cases, the usual procedure is to impute the mean/median increase or decrease calculated among the complete data cases. Rather than imputing a “point estimate” of the mean or median, a distribution of responses is imputed whose mean/median is identical to the point estimate. This is done by distributing the DK UP and DK DW cases across all response codes in the same proportions as cases with complete information. For example, if 25 percent of the respondents that expected prices to increase expected prices to increase at a rate of 3%, then 25 percent of the DK UP cases were assigned a value of 3%. To insure an exact representation of both the point estimate as well as the distribution of responses, the procedure assigned “fractional” cases to the response codes when needed. Using the above example, if there were a total of 39 DK UP cases, 9.75 cases (25 percent of the 39) would be assigned a value of 3%.

It should be noted that the estimated sample mean is unaffected by whether the DK UP or DK DW cases are assigned a single point estimate or are distributed across all “up” or “down” codes respectively. The distribution procedure, however, does provide for better estimates of the variance and the median. The imputation of a single point estimate to DK UP cases would artificially reduce the variance in the data. Moreover, for time series analysis, the downward bias would vary from month to month, reflecting changes in the proportion of cases coded DK UP or DK DW.

The improvement in the estimates of the median is due to more accurate interpolation between adjacent codes that results from imputing a distribution of responses rather than a point estimate for DK UP and DK DW cases. The problem with point estimates is magnified by the survey practice to only code integer values, as well as rounding the imputed point

estimates to integer values.² If the single assigned value for the DK UP cases were used in the interpolation, it would bias the overall median upward—since whenever the assigned value is involved, it is part of the upper bound of the interpolation range. This problem would occur whenever the median increase among those that expected increases (the value assigned to the DK UP cases) was within one percentage point of the median increase for the sample as a whole—a situation that was likely when nearly all respondents expected prices to increase.

Moreover, since all DK UP cases are assigned a single value, the point estimate procedure would increase the likelihood that the assigned value would be involved in the interpolation. The procedure that distributes all DK UP cases across all “up” response codes resolves this problem. In addition, the distribution of cases across the entire range of “up” codes avoids the unwarranted assumption that all of the DK UP cases should contribute to an increase in the overall median. This upward bias results from the assigned point estimate always being larger than the overall median for all imputed cases, whereas under the revised procedure this would occur in the same proportion as for the complete data cases—which at most could occur in half of the DK UP cases (if all respondents expected prices to increase).

Missing Data on Expected Declines

Although the question about the size of expected price increases has always been included in the questionnaire, respondents have only been asked about the extent of expected price declines since the February 1980 survey. It was originally omitted as unnecessary since very few respondents expected price declines in the late 1970's. Interestingly, the addition of this question in early 1980 occurred just as the one-year price expectations question reached its peak level.

In the surveys conducted from January 1978 to January 1980, the proportion of respondents that expected prices to decline was typically 1% to 2%. These cases were assigned a value of -3%, representing no change from the previous procedure. Although the assignment of a single value to all of these cases does slightly reduce the estimated variance, the number of cases was judged to be too small to warrant any special adjustments. Unlike the prior procedure, starting in February 1980 the actual percentage declines expected by respondents were used in all calculations rather than assigning -3% to all cases that expected declines.

²All range responses (for example, 1% to 3%) are initially probed by the interviewer to obtain the respondents “best estimate” within that range. If the respondent could not narrow the range, the midpoint is coded (rounded to the nearest odd number if necessary).

Misinterpretation of “Same” Responses

The price expectations questions were designed to avoid confusion between changes in the level of prices and changes in the rate of inflation by using a two-step procedure: initially asking about the expected direction of change, and then asking about the expected extent of change. Although the first question asked about the direction of change in the *level* of prices, some respondents misinterpreted that question as asking about the direction of change in the *rate* of inflation. This misinterpretation is of no consequence for respondents that replied “increase” or “decrease,” since all of these respondents were asked the appropriate follow-up question on the extent of change that they expected. For respondents that replied “same,” however, whether they interpreted the question as referring to the level of prices or the rate of inflation does have serious consequences on the subsequent estimates: these respondents were not asked any follow-up question, but simply assumed to expect a zero rate of inflation. To the extent that these respondents expected the rate of inflation to remain the “same,” rather than the level of prices, this misinterpretation would bias the resulting estimates downward.

To assess this potential bias, starting in the March 1982 survey, all respondents that answered “same” were specifically probed to determine whether they expected the level of prices or the rate of inflation to remain unchanged. The probes used for the one-year and five-year price expectations questions are as follows:

“Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during the next 12 months?”

“Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during the next 5 to 10 years?”

The responses to these probes indicated that the extent of the misinterpretation was widespread. Since the introduction of the “same probe” in March 1982, one-third to one-half of all the initial “same” responses were subsequently clarified by respondents as meaning that they expected the same rate of inflation rather than the same level of prices. The replies of all respondents that initially misinterpreted the question were reclassified from “same” to “increase,” and these respondents were then asked the standard follow-up question on what rate they expected prices to increase (see the questionnaire form in the Appendix.)

To provide for consistent estimates over time, the survey data collected prior to the introduction of the probe needed to be adjusted to compensate for the downward bias created by the misinterpretation of “same” responses. This adjustment was especially important given the high prevalence of the misinterpretation. In the month prior to the introduction of the

probe, 33 percent of all respondents replied “same” when asked about the expected direction of price changes during the year ahead (and thus were coded as expecting a zero rate of inflation). In the following month, a similar proportion (31 percent) initially replied “same,” but this proportion fell to just 22 percent after the special probe was used—meaning that nearly one-third misinterpreted the meaning of the “same” response code. Similar results were obtained for the five year price expectations question. In the month prior to the introduction of the same probe, 15 percent were coded as expecting the level of prices to remain unchanged. Although 12 percent of respondents initially replied “same” in the following month, the special probe revealed that just 8 percent actually expected prices to remain at the same level—again indicating about one-third of the respondents that initially answered “same” had misinterpreted the response code.

The first step in the adjustment procedure was to estimate how many of the “same” responses were likely to be in error. The strategy involved modeling the observed errors in the surveys that included the same probe, and then, based on that model, estimate corrections to the earlier surveys. The model was based on the assumption that the proportion of respondents that misinterpreted the “same” response varied along with the proportion that expected prices to increase. That is, the misinterpretation was expected to be most frequent when most other respondents expected price increases, and least frequent when relatively few respondents expected price increases. Thus, the error rate was hypothesized to vary inversely with the size of the “same” category: relatively high error rates when the proportion of respondents in the same category was low (when most other respondents expected increases), and relatively low error rates when the proportion in the same category was high (when fewer respondents expected increases).

The error proportion was defined as

$$SameError_t = \frac{\sum_n Same\ Rate}{\sum_n Total\ Same\ Responses}$$

This variable was then regressed on the percent of respondents that expected price increases (PctUp), with the equation constrained to have a zero intercept, meaning that the error was assumed to approach zero as the proportion of respondents that expected increases approached zero. The regression results for the question on one year price expectations, fitted from March 1982 to December 1995, was (t-statistic in parenthesis):

$$SameError_t = 0.007 * PctUp_t \quad RSQD = 0.97$$

(75.0) OBS = 166

An identical estimate of the coefficient was obtained for the five-year price expectations question, fitted for all of the surveys from March 1982 to December 1995 in which the question was asked:

$$SameError_t = 0.007 * PctUp_t \quad RSQD = 0.96$$

(50.0) OBS = 99

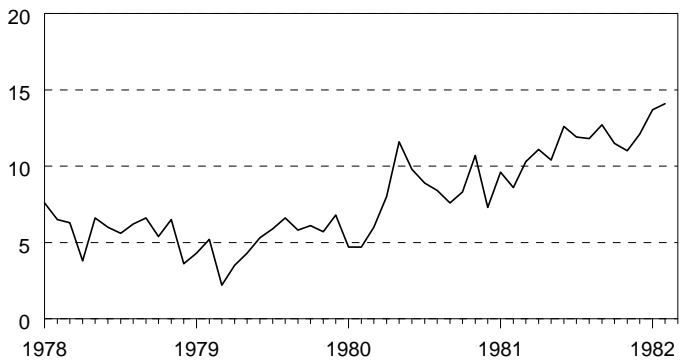
Using the estimated correction coefficient, the “same” proportions for the surveys conducted prior to March 1982 were adjusted as follows:

$$PctUpAdj_t = SameError_t * PctSame_t + PctUp_t$$

$$PctSameAdj_t = (1.0 - SameError_t) * PctSame_t$$

From January 1978 to February 1982, the average adjustment to the one-year price expectations question was 7.8 percentage points, and the average adjustment to the five-year price expectations question was 6.3 percentage points. As a result of the adjustment, the average “same” proportion for the one-year price question fell to 6.8 from 14.6 percent, and for the five-year price question it fell to 6.1 from 12.5 percent. As shown in the chart to the right, the percentage point adjustments for the one-year expectations question were relatively flat in 1978 and 1979, and then trended upward from 1980 to early 1982.

**Same Adjustment: Percentage Point Shift
From Same to Up Response Codes**



The final step was to impute an estimated rate of increase for these cases. This was done using the same procedure as for DK UP cases: the procedure assumed that the expected increases for these cases were distributed the same way as all other cases that expected increases.

Outliers

The presence of extreme responses or “outliers” distort estimates of the characteristics of a response distribution. There are two basic issues: what criteria should be used to define outliers, and what should be done with outlying observations once they are identified.

There is no unique statistical method to identify whether any specific extreme value is an “outlier.” A wide variety of statistical tests have been proposed to assess the probability of whether a particular observation is discordant with the rest of the distribution.³ Once a particular observation is identified as an outlier, there are two alternatives: the elimination of the observation from the data set, or the accommodation of the observation by reducing or truncating its value.⁴

Whether observations are eliminated or accommodated depend on what is assumed about the process that generated those outliers as well as judgements about the information content of the extreme response. If extreme responses are assumed to contain valid information (for example, the respondent did indeed expect a very high rate of inflation, or the extreme value reflects a large amount of uncertainty about future inflation prospects), it would be preferable to preserve that information while limiting its impact on the resulting estimates. This would imply that the numeric value of the “outlier” should be truncated to some allowable maximum to both preserve its information content and avoid its undue influence on the estimates.

Alternatively, the very existence of an extreme response could be interpreted as meaning the response has no informational value at all (for example, by assuming that the extreme value indicates that the respondent did not understand the question or the appropriate response scale). If outliers are viewed as lacking any useful information content, those responses should be deleted rather than accommodated by truncation.

Such judgements about information content are quite different from concerns about incorrect or “bad” data—that is, extreme values that reflect recording or transcription errors. Every effort has been made to eliminate this source of error. At each step in the data collection process, all extreme values are verified: interviewers are instructed to probe all unusually large responses, asking respondents to confirm their answers; at each subsequent step in data processing all large values are subjected to special checking and editing procedures to verify that all responses were accurately transcribed. Although all recording and processing errors can never be completely eliminated, the remaining extreme values are assumed to accurately reflect the respondent’s answers.

Lacking any additional data that could clarify the information content of extreme

³See Barnett, Vic and Lewis, Toby, *Outliers in Statistical Data*, Third Edition, John Wiley & Sons, New York, 1994.

⁴The two basic choices correspond to what are generally called “trimmed” means (in which the outliers are eliminated) and “Winsorized” means (which truncates the outliers).

values, I favor the truncation rather than the elimination of extreme values. The presence or absence of extreme values is an important element in the study of price expectations, especially for the analysis of uncertainty.

The remaining issue was to determine the points at both ends of the distribution beyond which observations should be truncated. It is important to note that only estimates of the mean and variance of the response distribution are influenced by the exact specification of the truncation rule. Estimates of the median of the distribution are unaffected by how the tails of the distribution are truncated.

The choice of an optimal truncation rule, however, is not straightforward when the goal is the measurement of change over time. What would be considered an outlier in the context of one distribution (observed during a period of low inflation) may not be an outlier within another distribution (observed during a high inflation period). While it may seem preferable on statistical grounds to define outliers separately for each monthly survey, the month-to-month change in the truncation rule would complicate the interpretation of the month-to-month change in the estimated means.

The upper tail of the distribution is not only long but also sparse, frequently with large gaps between observations. Thus, for example, if the upper tail were truncated at the expected inflation rate recorded at the 90th or 95th percentile, that upper cap would frequently vary by 10 percentage points from month-to-month. As a result, the means calculated for two adjacent months (when little else changed in the overall distribution except a small shift at the upper tail) would show a significant difference simply because 5 or 10 percent of the sample was truncated at an inflation rate that was 10 percentage points higher in one of the months. Indeed, a number of experiments with various sample specific truncation rules confirmed that month-to-month changes in the means were dominated by the month-to-month changes in the truncation limits.

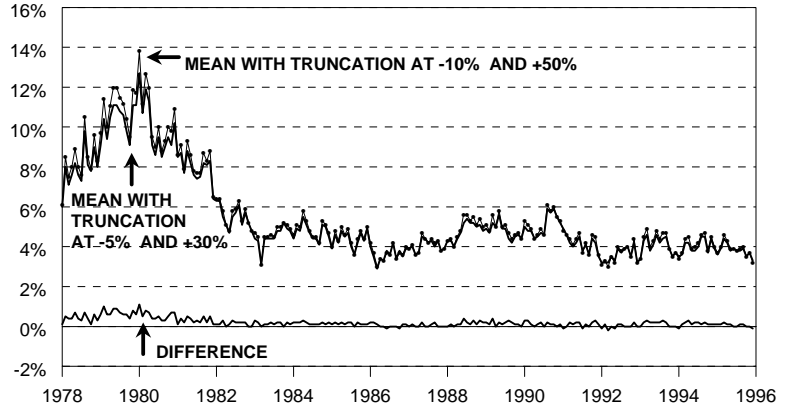
A single definition of truncation limits, applied to all monthly surveys, also has clear drawbacks. A specification of a relatively restrictive limit would mean that during high inflation periods some observations would be inappropriately considered outliers. Conversely, relatively wide limits would mean that during low inflation periods some observations that should be considered outliers would be unaffected by the truncation limit.

To assess the impact of fixed truncation rules, two alternatives were applied to the data: truncation at -10% and +50%, and truncation at -5% and +30%. The wider range covers nearly the entire response distribution, with only 1% or less of the distribution typically outside of this range. The narrower truncation range covers approximately the middle ninety percent of the response distribution. In both cases, however, the lower truncation value is less restrictive than the upper value. Strictly symmetrical limits would have meant that nearly all negative values would be considered outliers. While observations of -5% or -10% were rare and at the extreme tail of the distribution (and thus qualify under a pure statistical definition

of outliers), any reasonable standard would surely not consider -5% an extreme expectation.⁵

As shown in the chart below, the difference in the estimates of the mean using these alternative truncation rules is minimal for the one-year price expectations question.⁶ The two alternatives yield nearly identical trend information, as they were correlated at 0.999. Over the entire time period, the difference in the mean estimates for both the one-year and the five-year price expectations questions was just 0.2 percentage points.

Impact of Truncation Limits on Mean of One-year Price Expectations



During the early part of the period, when price expectations were relatively high, the difference in truncation limits did have an impact, although a relatively minor one.

From 1978 through 1981, the narrower truncation limit lowered the mean by 0.5 percentage points (from 9.5 to 9.0) for the one-year price expectations question and by 0.3 percentage points (from 8.5 to 8.2) for the five-year price expectations question (see the table below).

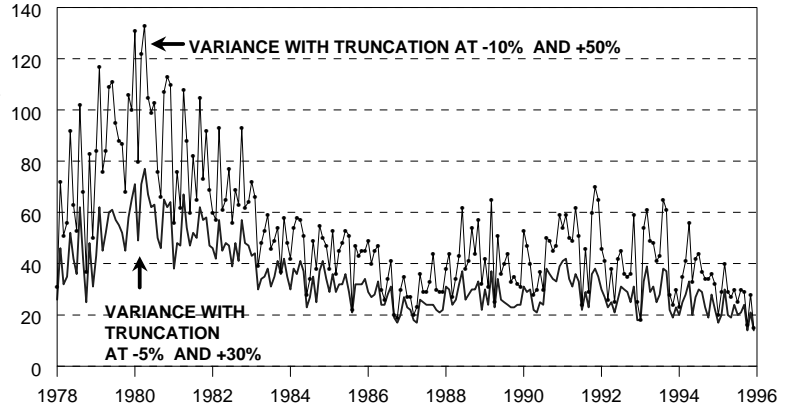
TIME PERIOD	ONE-YEAR PRICE EXPECTATIONS				FIVE-YEAR PRICE EXPECTATIONS			
	-10/+50		-5/+30		-10/+50		-5/+30	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
1978-1995	5.6	51.6	5.4	34.5	5.5	50.6	5.3	33.2
1978-1981	9.5	84.7	9.0	52.2	8.5	90.4	8.2	59.2
1982-1995	4.5	42.6	4.4	29.7	5.3	48.3	5.1	31.5

⁵While statistical tests provide useful information, Barnett and Lewis (1994) repeatedly emphasize that the decision to identify a particular observation as an “outlier” can not be solely based on statistical criteria; the identification of an outlier also requires the analyst to make judgements about the validity of the observation.

⁶ These estimates include the imputations described in the text for DK DW and DK UP, as well as the adjustment for the misinterpretation of the same response code for the surveys conducted prior to March 1982.

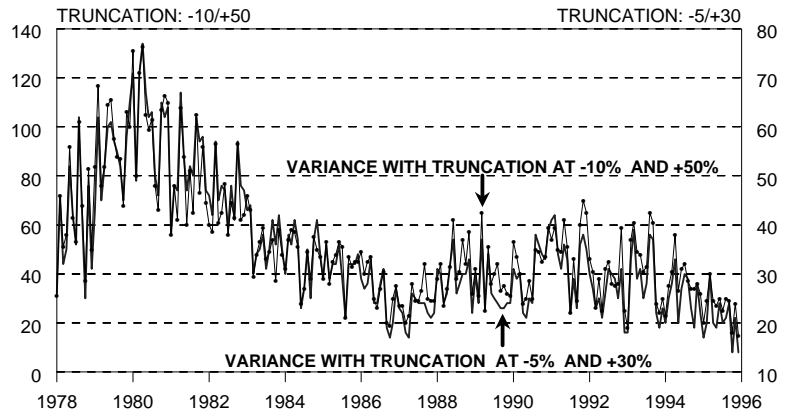
The different truncation limits did have a significant impact on estimates of the variance, as shown in the chart to the right. It should be noted that the difference is limited to the estimated *level* of variance, which is about 50 percent greater with the higher truncation limit (which approximately corresponds to the increase in the truncation range from 35 to 60 percentage points).

Impact of Truncation Limits on Variance of One-year Price Expectations



It is tempting to interpret the difference in the variance estimates as an indication that the lower truncation limits are preferable, based on the presumption that the higher limits unduly inflated the level of observed variance. For most analytic uses of these data, however, the level of observed variance is not as important as the change in the estimated variances over time. Using this criteria, the two alternative estimates yield nearly identical trend information—the time series correlations between the two variance estimates were 0.97 for the one-year question, and 0.96 for the five-year question. These nearly identical time series trends are clearly shown in chart above which repeats the same series from the prior chart but allows each to be scaled separately.

Trend Correspondence in Variances of One-year Price Expectations

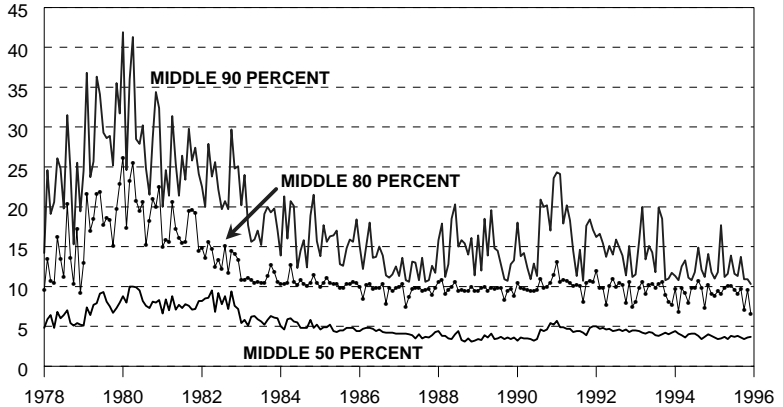


More importantly, neither truncation rule appears to yield a useful proxy for the measurement of change in price uncertainty. Whether the higher or lower truncation rule is used, the estimated variances are clearly dominated by the (truncated) tails of the distribution. The resulting erratic month-to-month change reflects noise more than it signals true change. Although one might hypothesize that this implies that even the lower truncation limit was too wide, the same trend results were obtained when even narrower truncation limits were

used—with the upper truncation limit set to 25% and 20%.⁷

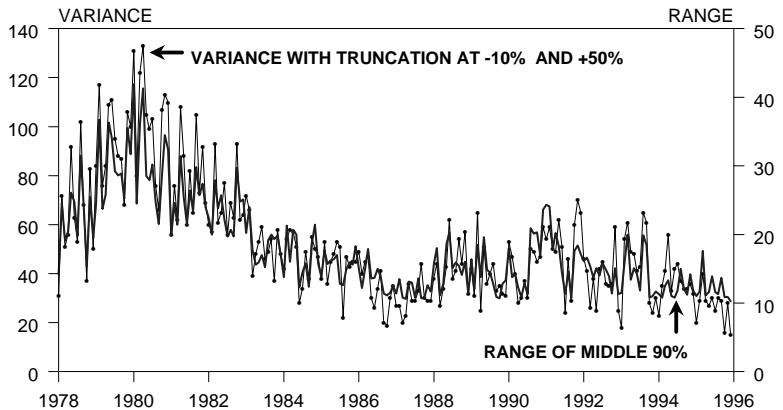
An alternate measure of dispersion is the observed range of responses. The chart to the right shows the percentage point range that accounts for the middle 50 percent of the response distribution (from the 25th to the 75th percentile), the middle 80 percent (from the 10th to the 90th percentile), and the middle 90 percent (from the 5th to the 95th percentile). The observed range for the middle 90 percent of the response distribution was widest in 1980, at just over 40 percentage points; the narrowest range was just over 10 percentage points (observed repeatedly during the past ten years). The trend in the range for the middle 90 percent, however, is clearly dominated by erratic month-to-month shifts. Those erratic shifts are significantly reduced for the trend in the middle 80 percent of the response distribution, and largely disappear for trends in the observed range for the middle 50 percent of the response distribution.

Percentile Ranges for One-year Price Expectations



It has been these erratic month-to-month shifts that have dominated the trends in the estimated variances. The chart to the right shows the correspondence of the estimated variances using the -10/+50 truncation rule and the range of the middle 90 percent of the distribution for the one-year price expectations question. These two series provide nearly identical trend information, as the time series correlation from 1978 to 1995 was 0.94 with the variance calculated using the -10/+50 truncation rule, and was 0.96 for

Correspondence Between Variance and Range of One-year Price Expectations

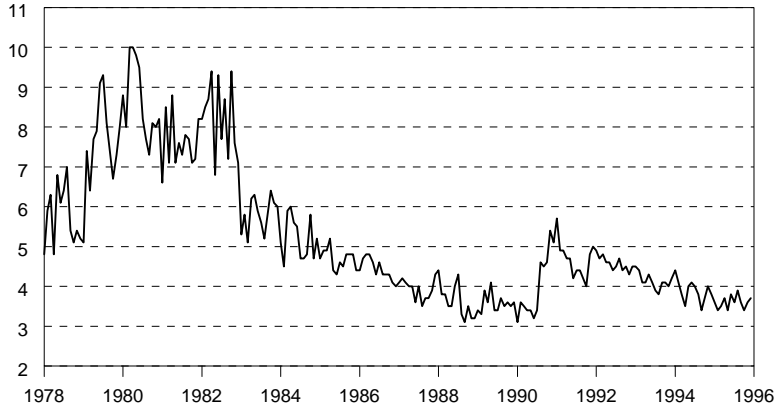


⁷Only if observed values above the limit were deleted rather than truncated to the limit would the time trend in the estimated variances significantly differ.

the -5/+30 truncation rule.⁸ The data clearly indicate that the estimated variances are dominated by the erratic shifts in the tails of the distribution, with much of the instability centered around the 5th and 95th percentiles.

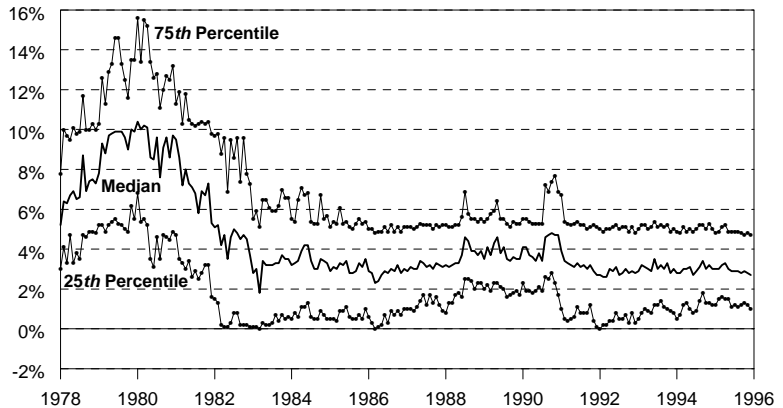
These data suggest that the response range that accounts for the middle 50 percent of the distribution would be a better trend measure of dispersion rather than the estimated variances. Importantly, this alternative measure indicates different trends during the past ten years. The trends in estimated variances indicate a sharp decline in the first half of the 1980's, and have since moved sideways with no apparent overall trend. The trend in the range of the middle 50 percent of the response distribution also shows the sharp decline in the early 1980's. In addition, this measure of dispersion shows a significant upward shift in 1990, corresponding to the oil price surge prompted by the invasion of Kuwait, followed by a gradual decline. The measure also indicates a rather concentrated distribution in recent years, with half of all responses within less than a four percentage point range around the median.

**Range of Middle 50% of Response Distribution
For One-year Price Expectations**



Rather than focusing on the net range, this same information on dispersion may be more usefully communicated by displaying the actual levels of the 25th and 75th percentiles. As shown in the chart to the right, the narrowing of the range for the middle 50 percent of the distribution for the one-year price expectations question was the result of an upward trend in the 25th percentile, while the 75th percentile remained rather flat. Thus, the percentile figures can provide data on trends in the overall size of the dispersion in responses, as well as whether the

**Median, 25th and 75th Percentiles for
One-year Price Expectations**



⁸The same results were obtained for the five-year price expectation question: the correlations were 0.92 and 0.98 respectively.

changes in the overall dispersion of responses were symmetrical or disproportionately due to changes in the upper or lower bounds.

The use of the 25th and 75th percentiles as indicators of the dispersions of responses also avoids problems associated with the relatively small sample sizes of the monthly surveys. With larger samples, the 10th and 90th percentiles may be preferred as the more comprehensive indicators of dispersion.

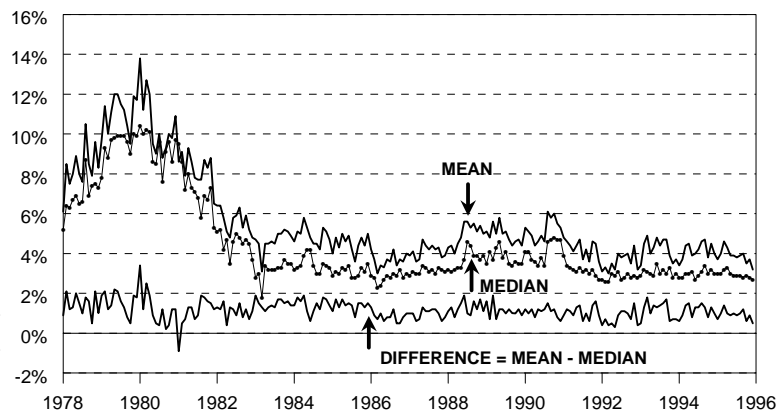
Overall, there seems to be little in the way of compelling evidence to prefer one of the tested truncation rules over the other: the means differ only marginally, and neither truncation rule yields desirable estimates of dispersion. On balance, however, small advantages point toward the -10/+50 truncation rule. The only time the estimated means differed was during the late 1970's and early 1980's, suggesting the higher limits were needed during periods of high inflation; moreover the use of those higher limits did not affect estimates during periods of low inflation.

Mean or Median as Preferred Measure of Expectations?

Although there is ample justification to provide estimates of the mean of the distribution, there seems to be little reason to favor the estimated variances as a measure of dispersion. The data indicate that a better measure of the dispersion in price expectations is the response range for the middle 50 percent of the distribution, supplemented by the 25th and 75th percentile figures. Although the mean and variance of the distribution may well serve a useful role for some analytic purposes, they should not be viewed as the primary or favored measures of the central tendency and dispersion of the response distributions for the one-year and five-year price expectations measures.

The chart at right shows the trends in the mean and median for the one-year price expectations question. The difference between the two estimates is remarkably consistent over time, with the estimated mean 1.2 percentage points higher than the median (5.6% versus 4.4%).⁹ There were only two large exceptions, and both were caused by an unusual and temporary shift in the number of cases falling into the top code of 50% or more: in early 1980 there

**Difference Between Mean and Median
For One-year Price Expectations**



⁹Nearly identical results were obtained for the five-year price expectations question: the mean was 1.2% percentage points higher (5.6% versus 4.4%).

were more respondents than usual in the top code (thus increasing the mean relative to the median by more than usual), and in early 1981 there were fewer cases than usual in the top code (thus decreasing the mean) as well as more cases in the center of the distribution (thus increasing the median). Although both series show very similar overall trends, most of the month-to-month variation in the difference was due to variations in the mean rather than in the median (especially apparent during the past few years). Overall, these results indicate that the median was a more reliable indicator of month-to-month changes in price expectations.

Questionnaire

A1. During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?

1. GO UP	STAY THE SAME	5. GO DOWN	8. DON'T KNOW
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NEXT PAGE, A2

Ala. Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during the next 12 months?

2. GO UP	3. WILL NOT GO UP
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NEXT PAGE, A2

Alb. By about what percent do you expect prices to go (up/down) on the average, during the next 12 months?
(USE PROBE BELOW IF ANSWER IS GREATER THAN 5%)

_____ PERCENT

NEXT PAGE, A2

DON'T KNOW

↓

Alc. (AFTER A DON'T KNOW RESPONSE IS PROBED, IF R SAYS, "I DON'T KNOW", USE THE FOLLOWING PROBE:)
(USE PROBE BELOW IF ANSWER IS GREATER THAN 5%)

How many cents on the dollar do you expect prices to go (up/down) on the average, during the next 12 months?

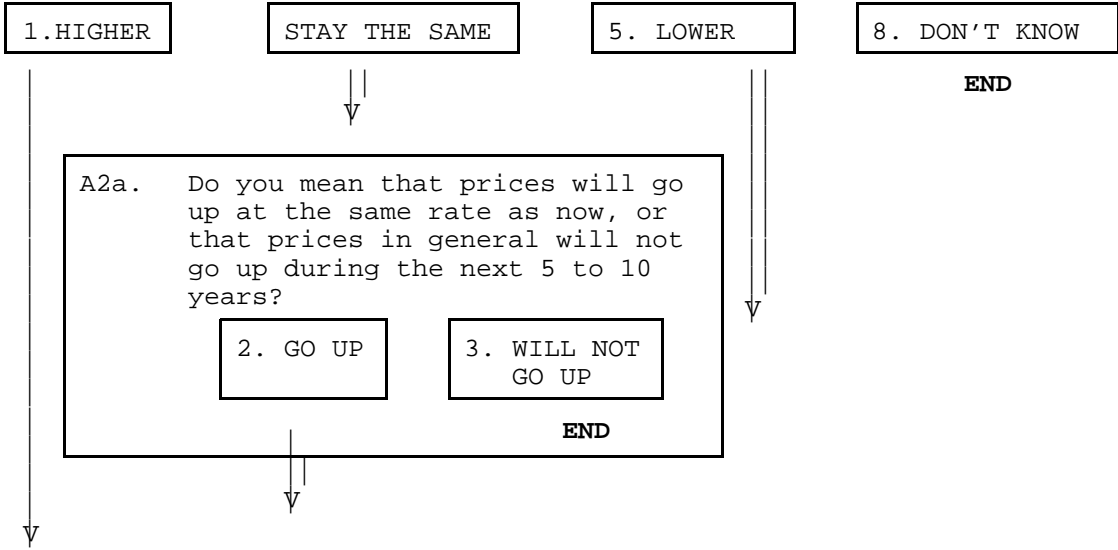
_____ CENTS ON DOLLAR

98. DON'T KNOW

IF R GIVES AN ANSWER THAT IS GREATER THAN 5%, PLEASE PROBE WITH:

"Let me make sure I have that correct. You said that you expect prices to go (up/down) during the next 12 months by (X) percent. Is that correct?"

A2. What about the outlook for prices over the next 5 to 10 years? Do you think prices will be higher, about the same, or lower, 5 to 10 years from now?



A2b. By about what percent per year do you expect prices to go (up/down) on the average, during the next 5 to 10 years? (USE PROBE BELOW IF ANSWER IS GREATER THAN 5%)

_____ PERCENT

END

DON'T KNOW

↓

A2c. (AFTER A DON'T KNOW RESPONSE IS PROBED, IF R SAYS, "I DON'T KNOW", USE THE FOLLOWING PROBE:) (USE PROBE BELOW IF ANSWER IS GREATER THAN 5%)

How many cents on the dollar per year do you expect prices to go (up/down) on the average, during the next 5 to 10 years?

_____ CENTS ON DOLLAR

98. DON'T KNOW

IF R GIVES AN ANSWER THAT IS GREATER THAN 5%, PLEASE PROBE WITH:
 "Would that be (X) percent per year, or is that the total for prices over the next 5 to 10 years?"

IF R HAS GIVEN A TOTAL FOR THE NEXT FIVE TO TEN YEARS, ASK:
 "About what percent per year would that be?"

	SURVEY DATE													
	7902	8002	8008	8009	8101	8102	8103	8107	8108	8109	8201	8202	8203	8207
EXPECTED INFLATION RATE,														
DOWN (NA PERCENT)	7.9													
DK % DW	1.9	1.6	2.0	3.8	2.7	4.6	2.3	1.7	2.8	1.0	1.8	1.5	0.6	
-10% OR LESS	1.6	0.9	1.0	2.5	0.8	2.4	2.1	2.1	1.7	2.1	2.6	3.5	1.8	
-5% - -9%	0.7	2.2	1.3	2.6	2.4	2.2	4.6	2.1	2.1	1.3	1.9	3.0	2.3	
-1% - -4%	1.1	2.3	1.1	2.9	1.9	3.3	3.9	2.0	2.8	3.0	3.1	5.3	3.5	
0%	8.2	9.1	8.4	9.6	13.2	15.7	14.5	10.9	14.3	16.1	15.1	14.5	8.4	10.0
1%	0.9	0.9	0.7	2.3	0.9	2.8	0.7	1.3	1.0	1.3	1.9	1.0	4.2	3.0
2%	2.9	1.3	1.5	2.0	1.6	0.5	2.4	2.4	3.5	1.7	2.2	2.7	3.2	3.0
3%	3.4	4.1	5.2	4.1	2.6	4.5	3.9	5.0	3.7	4.6	4.0	5.5	6.2	6.5
4%	1.8	0.7	1.4	1.3	0.8	1.4	1.3	1.9	1.8	2.6	1.4	2.2	3.4	3.1
5%	11.0	10.1	12.1	8.4	7.9	11.8	11.6	12.7	11.3	12.5	16.1	12.8	14.8	15.1
6%	2.2	1.3	1.3	1.7	1.7	2.1	2.2	2.4	3.8	2.4	3.5	2.2	2.5	2.9
7%	8.1	4.2	5.1	4.7	5.9	4.6	6.0	6.1	7.1	6.0	8.9	6.7	7.5	9.0
8%	2.7	2.8	2.3	3.2	2.0	2.1	1.9	1.1	1.5	1.7	1.9	2.6	2.2	3.7
9%	4.3	3.2	1.8	2.4	2.6	2.3	2.1	3.0	2.5	3.0	2.1	3.3	1.3	2.6
10%	10.9	14.7	16.3	14.1	12.6	11.7	10.0	11.8	12.0	9.6	12.7	12.2	10.3	10.0
11%	1.2	2.2	2.6	1.6	1.4	2.2	0.7	0.8	0.4	1.4	0.9	1.0	1.3	0.6
12%	0.5	1.6	1.5	1.9	1.2	1.7	1.0	1.5	1.2	1.1	1.1	0.4	0.5	0.3
13%	1.9	6.0	2.9	3.5	3.0	2.7	2.2	2.8	3.2	2.3	1.0	1.9	1.7	1.7
14%	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
15% - 19%	3.0	6.2	6.6	5.8	6.1	4.1	4.5	2.9	5.5	5.0	4.2	3.2	3.0	4.1
20% - 24%	2.3	3.9	3.4	3.6	1.6	1.1	2.2	1.9	2.3	2.8	1.8	3.1	3.0	1.8
25% - 29%	3.6	3.0	1.7	3.0	1.3	1.7	1.4	2.0	1.8	2.8	1.3	1.4	1.2	1.5
30% - 39%	1.1	1.2	0.2	1.2	1.3	1.1	1.4	0.5	1.4	1.2	1.0	0.8	0.9	1.6
40% - 49%	0.4	0.5	0.3	0.8	0.1	0.2	0.2	0.4	0.2	0.4	0.4	0.4	0.4	0.6
50% OR MORE	1.7	2.9	1.5	1.2	0.7	1.1	0.6	1.9	0.6	2.0	1.1	0.4	1.5	1.2
DK % UP	12.0	9.8	11.6	11.1	11.9	9.3	12.6	10.8	7.2	6.9	6.4	6.7	4.8	6.5
DK IF UP/DOWN	7.4	4.3	3.8	5.7	7.5	6.5	3.3	3.3	4.8	3.5	2.9	5.4	4.0	3.1
NA	0.6	0.5	0.9	1.4	0.2	1.0	0.5	0.9	0.2	0.6	0.7	0.2	0.2	0.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Survey data for expected inflation rate during next five years, broken down by survey date and inflation rate category.

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Jan 1978	3.0	5.2	7.8	4.8	6.1	31
Feb 1978	4.1	6.4	10.0	5.9	8.5	72
Mar 1978	3.3	6.3	9.7	6.3	7.5	51
Apr 1978	4.7	6.7	9.5	4.8	8.0	56
May 1978	3.3	6.9	10.1	6.8	8.9	92
Jun 1978	3.8	6.5	9.8	6.1	8.0	63
Jul 1978	3.5	6.6	9.9	6.4	7.6	53
Aug 1978	4.7	8.7	11.7	7.0	10.5	102
Sep 1978	4.6	6.9	10.0	5.4	8.5	68
Oct 1978	4.9	7.4	10.0	5.1	7.9	37
Nov 1978	4.9	7.5	10.3	5.4	9.6	83
Dec 1978	4.8	7.3	10.0	5.2	8.3	50
Jan 1979	5.2	7.8	10.3	5.1	9.7	84
Feb 1979	5.2	9.3	12.6	7.4	11.4	117
Mar 1979	4.9	8.8	11.3	6.4	10.0	76
Apr 1979	5.2	9.7	12.9	7.7	11.1	84
May 1979	5.4	9.8	13.3	7.9	12.0	109
Jun 1979	5.5	9.9	14.6	9.1	12.0	111
Jul 1979	5.3	9.9	14.6	9.3	11.5	95
Aug 1979	5.2	9.9	13.3	8.1	11.2	88
Sep 1979	5.0	9.6	12.5	7.4	10.4	87
Oct 1979	4.9	9.0	11.6	6.7	9.5	68
Nov 1979	6.2	10.0	13.5	7.3	11.9	106
Dec 1979	5.5	9.9	13.5	8.0	11.7	100
Jan 1980	6.8	10.4	15.6	8.8	13.8	131
Feb 1980	5.4	10.0	13.4	8.0	11.2	80
Mar 1980	5.5	10.2	15.5	10.0	12.7	122
Apr 1980	5.2	10.1	15.2	10.0	12.0	133
May 1980	3.5	8.6	13.4	9.8	9.5	105
Jun 1980	3.1	8.5	12.6	9.5	9.0	99
Jul 1980	4.6	9.6	12.8	8.2	10.0	103
Aug 1980	3.5	7.6	11.1	7.7	8.8	76
Sep 1980	4.7	9.1	12.0	7.3	9.3	66

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Oct 1980	4.6	9.6	12.7	8.1	10.0	107
Nov 1980	4.5	8.6	12.5	8.0	9.8	113
Dec 1980	4.9	9.7	13.2	8.2	10.9	110
Jan 1981	4.7	9.5	11.3	6.6	8.6	56
Feb 1981	3.5	8.6	11.9	8.5	9.1	76
Mar 1981	3.3	7.2	10.3	7.1	7.9	62
Apr 1981	3.0	8.0	11.8	8.8	9.3	108
May 1981	3.4	7.3	10.5	7.1	8.6	88
Jun 1981	2.6	7.1	10.3	7.6	7.8	60
Jul 1981	2.9	6.8	10.2	7.3	7.7	82
Aug 1981	2.5	5.8	10.3	7.8	7.7	65
Sep 1981	2.8	6.9	10.4	7.7	8.7	105
Oct 1981	3.2	6.7	10.3	7.1	8.3	73
Nov 1981	3.2	7.3	10.4	7.2	8.8	92
Dec 1981	1.6	5.3	9.8	8.2	6.5	69
Jan 1982	1.5	5.1	9.7	8.2	6.4	60
Feb 1982	1.3	5.2	9.8	8.5	6.4	57
Mar 1982	0.2	4.2	8.8	8.7	5.8	93
Apr 1982	0.1	4.7	9.6	9.4	5.1	61
May 1982	0.1	3.5	6.9	6.8	4.8	65
Jun 1982	0.3	4.6	9.5	9.3	5.8	77
Jul 1982	0.8	5.0	8.6	7.7	5.9	56
Aug 1982	0.8	4.8	9.6	8.7	6.3	69
Sep 1982	0.2	4.5	7.4	7.2	5.3	63
Oct 1982	0.2	4.7	9.6	9.4	5.9	93
Nov 1982	0.2	4.5	7.8	7.6	5.2	62
Dec 1982	0.1	3.7	7.3	7.1	4.8	64
Jan 1983	0.1	2.8	5.5	5.3	4.7	72
Feb 1983	0.1	3.0	5.9	5.8	4.5	66
Mar 1983	0.0	1.8	5.1	5.1	3.1	39
Apr 1983	0.3	3.4	6.5	6.2	4.5	48
May 1983	0.2	3.2	6.5	6.3	4.5	53
Jun 1983	0.2	3.2	6.1	5.9	4.6	59

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Jul 1983	0.3	3.2	5.9	5.6	4.5	46
Aug 1983	0.7	3.3	5.9	5.2	5.0	49
Sep 1983	0.4	3.3	6.2	5.8	5.0	54
Oct 1983	0.7	3.7	7.0	6.4	5.2	37
Nov 1983	0.5	3.5	6.6	6.1	5.1	58
Dec 1983	0.6	3.5	6.6	6.0	4.9	48
Jan 1984	0.5	3.2	5.5	5.1	4.6	42
Feb 1984	0.8	3.3	5.4	4.5	5.1	54
Mar 1984	0.6	3.4	6.5	5.9	5.0	58
Apr 1984	1.1	3.9	7.1	6.0	5.8	57
May 1984	1.1	4.2	6.7	5.6	5.3	51
Jun 1984	1.3	4.2	6.8	5.5	4.8	28
Jul 1984	0.6	3.4	5.4	4.7	4.5	34
Aug 1984	0.5	3.0	5.3	4.7	4.5	49
Sep 1984	0.5	3.0	5.3	4.8	4.2	38
Oct 1984	0.9	3.5	6.7	5.8	5.3	55
Nov 1984	0.7	3.4	5.5	4.7	5.1	50
Dec 1984	0.5	3.3	5.7	5.2	4.7	47
Jan 1985	0.5	2.9	5.1	4.7	4.0	38
Feb 1985	0.5	3.1	5.4	4.9	4.8	53
Mar 1985	0.4	3.0	5.3	4.9	4.3	36
Apr 1985	0.9	3.3	6.1	5.2	5.0	45
May 1985	0.9	3.2	5.3	4.4	4.6	48
Jun 1985	1.1	3.4	5.4	4.3	4.9	53
Jul 1985	0.6	2.8	5.1	4.6	4.2	51
Aug 1985	0.5	2.8	5.0	4.5	3.6	22
Sep 1985	0.5	2.9	5.3	4.8	4.4	47
Oct 1985	0.7	3.3	5.5	4.8	4.8	43
Nov 1985	0.5	3.1	5.3	4.8	4.4	45
Dec 1985	1.0	3.5	5.4	4.4	5.0	45
Jan 1986	0.6	2.9	5.0	4.4	4.2	49
Feb 1986	0.3	2.8	5.0	4.7	3.7	40
Mar 1986	0.0	2.3	4.8	4.8	3.0	45

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Apr 1986	0.1	2.4	4.9	4.8	3.4	47
May 1986	0.2	2.7	4.9	4.6	3.3	30
Jun 1986	0.7	2.9	5.1	4.3	3.7	26
Jul 1986	0.3	2.8	4.9	4.6	3.6	34
Aug 1986	0.9	3.0	5.2	4.3	4.2	41
Sep 1986	0.7	2.9	4.9	4.3	3.4	20
Oct 1986	0.9	3.2	5.1	4.3	3.7	19
Nov 1986	0.7	2.8	4.9	4.1	3.6	30
Dec 1986	1.0	3.0	5.1	4.0	4.0	35
Jan 1987	1.0	2.9	5.1	4.1	3.9	27
Feb 1987	1.0	3.1	5.1	4.2	4.1	27
Mar 1987	0.9	3.0	5.0	4.1	3.6	20
Apr 1987	1.1	3.0	5.1	4.0	3.7	23
May 1987	1.4	3.4	5.3	4.0	4.7	36
Jun 1987	1.7	3.3	5.2	3.6	4.4	29
Jul 1987	1.2	3.1	5.2	4.0	4.2	29
Aug 1987	1.7	3.2	5.2	3.5	4.4	33
Sep 1987	1.3	3.0	5.0	3.7	4.2	44
Oct 1987	1.6	3.3	5.2	3.7	4.3	30
Nov 1987	1.2	3.2	5.1	3.9	3.8	29
Dec 1987	0.9	3.1	5.2	4.3	3.9	29
Jan 1988	0.8	3.2	5.2	4.4	4.3	38
Feb 1988	1.3	3.1	5.1	3.8	4.4	44
Mar 1988	1.3	3.2	5.1	3.8	4.0	27
Apr 1988	1.7	3.3	5.2	3.5	4.5	34
May 1988	1.8	3.3	5.2	3.5	4.8	43
Jun 1988	1.6	3.7	5.6	4.0	5.6	62
Jul 1988	2.5	4.6	6.9	4.3	5.6	38
Aug 1988	2.5	4.4	5.8	3.3	5.3	41
Sep 1988	2.4	3.9	5.5	3.1	5.5	54
Oct 1988	2.0	3.9	5.5	3.5	5.1	44
Nov 1988	2.3	3.7	5.4	3.2	5.4	57
Dec 1988	2.3	3.9	5.5	3.2	5.0	32

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Jan 1989	2.0	3.5	5.4	3.4	5.1	42
Feb 1989	2.2	4.1	5.5	3.3	4.8	31
Mar 1989	1.9	3.7	5.8	3.9	5.6	65
Apr 1989	2.3	4.3	5.9	3.6	5.0	25
May 1989	2.3	4.6	6.4	4.1	5.8	51
Jun 1989	2.1	3.8	5.5	3.4	5.0	36
Jul 1989	2.0	4.1	5.5	3.4	5.1	40
Aug 1989	1.6	3.5	5.3	3.7	4.7	44
Sep 1989	1.7	3.4	5.1	3.5	4.4	33
Oct 1989	1.8	3.6	5.4	3.6	4.6	35
Nov 1989	1.9	3.5	5.3	3.5	4.7	32
Dec 1989	1.7	3.5	5.3	3.6	4.4	31
Jan 1990	2.3	4.1	5.5	3.1	5.3	53
Feb 1990	1.9	4.1	5.5	3.6	5.1	47
Mar 1990	1.9	3.7	5.4	3.5	4.9	40
Apr 1990	1.8	3.6	5.3	3.4	4.4	28
May 1990	1.9	3.4	5.3	3.4	4.6	30
Jun 1990	2.1	3.8	5.3	3.2	4.9	37
Jul 1990	1.9	3.4	5.3	3.4	4.6	30
Aug 1990	2.6	4.6	7.2	4.6	6.1	50
Sep 1990	2.5	4.7	6.9	4.5	5.8	49
Oct 1990	2.8	4.8	7.4	4.6	6.0	45
Nov 1990	2.3	4.7	7.7	5.4	5.5	47
Dec 1990	1.7	4.7	6.9	5.1	5.3	59
Jan 1991	1.0	3.9	6.7	5.7	4.8	54
Feb 1991	0.5	3.4	5.4	4.9	4.6	59
Mar 1991	0.4	3.3	5.3	4.9	4.4	50
Apr 1991	0.5	3.2	5.2	4.7	4.1	49
May 1991	0.6	3.1	5.3	4.7	4.4	62
Jun 1991	1.1	3.3	5.4	4.2	4.7	51
Jul 1991	0.8	3.1	5.2	4.4	3.7	24
Aug 1991	0.8	3.2	5.2	4.4	4.2	46
Sep 1991	0.8	3.0	5.0	4.2	3.6	29

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Oct 1991	1.2	3.2	5.1	4.0	4.6	60
Nov 1991	0.4	2.9	5.2	4.8	4.5	70
Dec 1991	0.1	2.7	5.1	5.0	3.6	65
Jan 1992	0.0	2.7	5.0	4.9	3.1	46
Feb 1992	0.2	2.6	4.9	4.7	3.3	41
Mar 1992	0.2	2.6	5.0	4.8	3.0	26
Apr 1992	0.4	3.0	5.0	4.6	3.5	38
May 1992	0.4	2.9	5.1	4.6	3.2	25
Jun 1992	0.8	3.1	5.2	4.4	4.0	42
Jul 1992	0.5	2.7	5.0	4.5	3.8	45
Aug 1992	0.5	2.8	5.1	4.7	3.9	36
Sep 1992	0.7	3.0	5.1	4.4	4.0	35
Oct 1992	0.3	2.8	4.9	4.5	3.5	36
Nov 1992	0.8	2.9	5.1	4.3	4.4	59
Dec 1992	0.3	2.8	4.8	4.5	3.2	25
Jan 1993	0.5	2.9	5.0	4.5	3.4	18
Feb 1993	0.8	3.2	5.2	4.4	4.5	54
Mar 1993	1.0	3.1	5.2	4.1	4.9	61
Apr 1993	0.9	3.0	5.0	4.1	4.0	49
May 1993	0.8	2.9	5.1	4.3	4.3	48
Jun 1993	1.2	3.5	5.4	4.1	4.8	41
Jul 1993	1.2	3.0	5.1	3.9	4.4	43
Aug 1993	1.4	3.2	5.2	3.8	4.7	65
Sep 1993	1.1	3.0	5.1	4.1	4.7	61
Oct 1993	1.0	3.3	5.2	4.1	3.9	28
Nov 1993	0.9	2.8	4.9	4.0	3.5	24
Dec 1993	0.8	3.0	5.0	4.2	3.7	30
Jan 1994	0.5	2.8	4.9	4.4	3.4	23
Feb 1994	0.7	2.8	4.8	4.1	3.7	35
Mar 1994	1.2	3.0	5.1	3.8	4.4	41
Apr 1994	1.3	3.0	4.9	3.5	4.5	56
May 1994	1.0	3.1	5.0	4.0	3.9	33
Jun 1994	0.8	2.7	4.9	4.1	4.0	42

EXPECTED INFLATION RATE DURING YEAR AHEAD

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentile	Mean	Variance
Jul 1994	0.9	2.9	5.0	4.0	4.2	44
Aug 1994	1.4	3.1	5.2	3.8	4.6	37
Sep 1994	1.8	3.4	5.2	3.4	4.7	34
Oct 1994	1.3	3.0	5.0	3.7	3.8	34
Nov 1994	1.3	3.2	5.3	4.0	4.5	36
Dec 1994	1.2	3.0	5.0	3.8	4.0	32
Jan 1995	1.2	3.0	4.8	3.6	3.7	20
Feb 1995	1.5	3.0	4.9	3.4	4.0	29
Mar 1995	1.6	3.2	5.1	3.5	4.6	40
Apr 1995	1.5	3.3	5.2	3.7	4.3	29
May 1995	1.5	3.0	4.9	3.4	3.9	27
Jun 1995	1.1	2.9	4.9	3.8	3.9	30
Jul 1995	1.2	2.9	4.9	3.6	3.8	25
Aug 1995	1.1	2.9	4.9	3.9	3.9	30
Sep 1995	1.2	2.8	4.8	3.6	4.0	29
Oct 1995	1.3	2.9	4.7	3.4	3.5	16
Nov 1995	1.2	2.8	4.8	3.6	3.7	28
Dec 1995	1.0	2.7	4.7	3.7	3.2	15

EXPECTED ANNUAL INFLATION RATE DURING NEXT FIVE TO TEN YEARS

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentiles	Mean	Variance
Feb 1979	4.5	7.2	10.3	5.7	9.1	95
Feb 1980	5.0	9.7	13.2	8.2	10.9	118
Aug 1980	4.7	8.7	11.0	6.4	9.0	80
Sep 1980	4.7	9.3	12.7	8.0	9.8	94
Jan 1981	2.9	7.4	10.5	7.5	7.7	82
Feb 1981	3.1	6.7	10.3	7.2	7.8	79
Mar 1981	2.5	5.9	10.2	7.7	7.0	80
Jul 1981	2.8	5.8	10.1	7.4	7.4	98
Aug 1981	3.2	6.7	10.3	7.1	7.7	73
Sep 1981	3.1	6.5	10.4	7.3	8.4	105
Jan 1982	3.5	6.1	10.0	6.5	7.5	75
Feb 1982	2.9	5.9	9.9	7.0	6.8	61
Mar 1982	1.0	5.0	9.6	8.7	6.1	89
Jul 1982	2.4	5.3	9.6	7.2	7.0	81
Aug 1982	2.9	5.4	10.1	7.2	7.6	77
Sep 1982	2.3	5.1	9.8	7.4	6.6	76
Jan 1983	2.2	5.0	9.1	6.9	6.2	69
Feb 1983	1.1	4.8	9.3	8.2	6.0	77
Mar 1983	2.3	4.9	7.5	5.2	5.6	49
Jul 1983	2.7	5.0	9.3	6.6	6.2	53
Aug 1983	2.8	4.9	8.6	5.8	7.0	79
Sep 1983	2.7	5.0	9.6	6.9	6.6	66
Jan 1984	2.5	4.9	7.5	4.9	6.6	76
Feb 1984	2.8	5.0	8.5	5.7	6.9	69
Mar 1984	2.9	5.0	9.6	6.7	6.8	69
Jul 1984	3.0	5.1	8.5	5.5	6.6	49
Aug 1984	2.7	4.9	9.5	6.8	6.6	60
Sep 1984	2.9	4.9	9.3	6.4	6.6	54
Jan 1985	2.5	4.7	7.4	4.9	6.2	56
Feb 1985	2.7	4.8	9.6	6.9	7.1	77
Mar 1985	2.3	4.7	7.2	4.9	5.8	64
Jul 1985	2.5	4.6	6.7	4.2	6.2	73
Aug 1985	2.5	4.7	6.9	4.4	5.7	43

EXPECTED ANNUAL INFLATION RATE DURING NEXT FIVE TO TEN YEARS

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentiles	Mean	Variance
Sep 1985	2.5	4.7	8.1	5.6	6.7	86
Mar 1986	1.7	3.8	5.4	3.7	5.2	66
Jun 1986	2.1	3.9	6.1	4.0	5.1	39
Sep 1986	2.3	4.0	5.5	3.1	5.4	59
Dec 1986	2.1	3.8	5.4	3.4	4.9	37
Mar 1987	2.3	3.9	5.5	3.2	5.2	46
Jun 1987	2.2	4.3	6.6	4.4	5.5	56
Sep 1987	2.1	3.4	5.4	3.3	5.0	41
Dec 1987	2.1	4.1	6.4	4.3	5.3	56
Apr 1990	2.3	4.0	5.5	3.2	5.0	34
May 1990	2.0	4.3	5.5	3.4	5.2	58
Jun 1990	2.6	4.6	5.6	3.0	5.5	43
Jul 1990	2.3	4.2	5.5	3.2	4.9	32
Aug 1990	2.6	4.6	6.6	4.0	5.8	43
Sep 1990	2.5	4.7	6.8	4.3	5.6	43
Oct 1990	2.6	4.6	6.7	4.1	5.9	60
Nov 1990	2.5	4.6	6.8	4.3	5.7	53
Dec 1990	2.3	4.5	6.8	4.5	5.8	55
Jan 1991	2.6	4.6	6.5	3.9	5.6	45
Feb 1991	2.6	4.6	6.6	4.0	6.0	62
Mar 1991	2.6	4.6	6.8	4.2	6.2	63
Apr 1991	2.3	4.2	6.0	3.6	5.1	37
May 1991	2.1	4.4	6.6	4.5	5.4	51
Jun 1991	2.3	4.5	6.0	3.7	5.8	61
Jul 1991	2.2	4.2	5.8	3.6	5.4	52
Aug 1991	2.1	4.0	5.3	3.2	5.4	64
Sep 1991	2.1	3.9	5.2	3.1	4.5	43
Oct 1991	2.0	3.7	5.4	3.4	5.1	49
Nov 1991	2.1	3.8	5.8	3.7	5.3	42
Dec 1991	2.2	3.8	5.2	3.1	4.7	38
Jan 1992	2.2	3.6	5.5	3.3	5.3	54
Feb 1992	2.1	3.4	5.3	3.2	4.5	29
Mar 1992	2.2	3.6	5.3	3.2	4.5	28

EXPECTED ANNUAL INFLATION RATE DURING NEXT FIVE TO TEN YEARS

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentiles	Mean	Variance
Apr 1992	2.1	3.9	5.4	3.3	4.8	39
May 1992	2.4	4.0	5.5	3.1	5.4	40
Jun 1992	2.0	3.4	5.4	3.4	4.6	36
Jul 1992	1.7	3.7	5.4	3.6	4.6	39
Aug 1992	2.1	4.2	5.4	3.3	5.0	38
Sep 1992	2.2	3.5	5.5	3.3	5.0	38
Oct 1992	2.1	3.7	5.3	3.2	5.1	46
Nov 1992	2.1	3.7	5.5	3.4	5.4	61
Dec 1992	2.0	3.4	5.3	3.3	5.2	66
Jan 1993	1.8	3.4	5.3	3.5	4.8	44
Feb 1993	2.4	4.1	5.7	3.3	5.9	72
Mar 1993	2.2	3.6	5.4	3.2	4.9	37
Apr 1993	2.1	3.5	5.2	3.1	4.7	45
May 1993	1.9	3.5	5.5	3.5	5.6	66
Jun 1993	2.2	3.8	5.5	3.3	5.2	39
Jul 1993	2.0	3.5	5.3	3.3	5.0	45
Aug 1993	1.9	3.3	5.3	3.3	4.6	31
Sep 1993	1.8	3.3	5.3	3.5	4.5	35
Oct 1993	2.3	3.5	5.4	3.1	4.7	30
Nov 1993	2.1	3.4	5.2	3.1	4.4	35
Dec 1993	2.3	3.6	5.3	3.0	4.8	41
Jan 1994	2.0	3.2	5.1	3.2	4.8	49
Feb 1994	2.2	3.3	5.1	2.9	4.6	39
Mar 1994	2.2	3.4	5.3	3.0	5.3	62
Apr 1994	2.0	3.2	5.1	3.1	5.0	49
May 1994	2.0	3.4	5.2	3.2	4.5	44
Jun 1994	2.0	3.4	5.3	3.2	4.8	36
Jul 1994	1.9	3.2	5.2	3.2	4.6	42
Aug 1994	2.3	3.5	5.4	3.0	5.4	54
Sep 1994	2.0	3.2	5.1	3.1	4.8	50
Oct 1994	2.0	3.3	5.1	3.0	4.6	32
Nov 1994	1.8	3.2	5.1	3.2	4.1	21
Dec 1994	1.8	3.2	5.0	3.2	4.2	31

EXPECTED ANNUAL INFLATION RATE DURING NEXT FIVE TO TEN YEARS

Survey Date	25 th Percentile	Median 50 th Percentile	75 th Percentile	Range Middle 50% 75 th - 25 th Percentiles	Mean	Variance
Jan 1995	1.8	3.2	5.0	3.2	3.9	16
Feb 1995	2.0	3.2	5.0	3.0	4.0	24
Mar 1995	2.1	3.3	5.0	2.9	4.3	35
Apr 1995	2.0	3.5	5.2	3.2	4.4	22
May 1995	2.0	3.2	5.0	3.0	4.1	21
Jun 1995	2.1	3.1	5.0	2.9	4.4	24
Jul 1995	2.0	3.2	5.0	3.0	4.3	29
Aug 1995	1.7	3.1	4.9	3.1	4.1	30
Sep 1995	1.9	3.1	4.8	2.9	4.4	36
Oct 1995	2.0	3.2	4.9	2.8	3.7	12
Nov 1995	1.9	3.1	5.0	3.1	3.9	17
Dec 1995	1.9	3.1	4.9	3.0	3.9	15