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INDEXED BONDS AND HETEROGENEOUS AGENTS

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Abstract

Recently some economists have urged the U.S. Treasury to issue indexed securities because the yield differential between such securities and conventional securities would provide information on the public's expectations of inflation. But since indexed securities would be bought primarily by those whose inflation expectations are above average, or by those who have an unusual desire to hedge a given inflation risk their yield would provide a biased measure of inflation expectations. Data from the Livingston survey suggest that the bias would probably be substantial. But indexed securities would lower the interest cost of the debt.

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The proposals that the government issue indexed securities dates back at least as far as 1941 (See G. L. Bach and Richard Musgrave, 1941). It was later supported by James Tobin (1963), and then discussed more extensively in the 1970s and 1980s (see Bochen, 1986, Munnell and Grolnic, 1986, Dornbusch and Simonsen, 1983, Levhari and Liviathan 1976). More recently it received renewed attention when Robert Hetzel (1992, 1991a, 1991b), William Poole (in U.S. Congr., 1991a) Alan Blinder (reprinted in U.S. Congr. 1992a) and (with some qualifications) Alan Greenspan (in U.S. Congr., 1991a) argued that indexing some government debt would facilitate the making of monetary policy. If such debt were outstanding the Federal Reserve could estimate the public's expectations of inflation by comparing the yields on indexed and nominal bonds.[1] Milton Friedman (1992, pp. 227-29) went further by suggesting that the Fed be required to keep the difference between the yields on indexed and conventional bonds at a specified level. In 1992 a congressional subcommittee held hearings on a bill to require the Treasury to issue indexed securities, and subsequently it advocated their use (U.S. Congr., 1992b). While the main advantage of indexed debt cited in the hearings was the opportunity to estimate inflation expectations, a subsidiary benefit mentioned was a cost saving for the Treasury.

This paper deals only with these two issues, and not with other salient issues related to indexed bonds, such as the effect of such bonds on the government's determination to avoid inflation, or the benefit that indexed bonds would provide for risk-averse savers.[2] Specifically, I remove the implicit assumption of homogeneous agents that pervades the recent discussions, and show that once one allows for the heterogeneity of agents the relative yields on indexed and on conventional securities turn out to be an unreliable guide to the public's expectations of inflation. On the other hand, the

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[1]In addition, as Boshen (1986) has shown, insofar as the existence of indexed bonds would increase the private sector's information about inflation expectations output fluctuations would be reduced.

[2]On the other hand, Cukierman (1992) argues that the greater the extent of indexing in an economy, the less is the independence of the central banks. And independence of the central bank is negatively correlated with the inflation rate.

heterogeneity of agents enhances the cost saving that the Treasury can obtain by issuing indexed bonds.[3]

Whose Expectations?

In principle the whole distribution of the inflation expectations of agents matters for monetary policy. But if only a single measure can be obtained it should be the mean expectation. Most distributions peak at or near the mean, and one would therefore expect the distribution of inflation expectations to do the same. But what the differential between indexed and nominal bonds measures, is neither the mean inflation expectation of agents, nor the expectation of the representative agent. Instead, it measures the inflation expectation of the marginal holder of the indexed bonds who, if only a small proportion of the debt is indexed, is someone with unusually high inflation expectations. Since the literature on the cost of inflation places much emphasis on the losses occasioned by the diversity of agents' expectations, it is inappropriate to assume arbitrarily that the distribution of inflation expectations is so highly peaked that the difference between the mean expectation and the expectation of the marginal holder of indexed bonds is unimportant.

Moreover, the mean expectation of agents need not change in proportion to the expectation of the marginal holder. For example, the appointment of a new head of the central bank may increase the variance of inflation expectations, and hence increase the inflation expectation of the marginal holder relative to the mean expectation.

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[3]The effects of heterogeneity of agents seems to have been noted only to a limited extent. For example, Alan Greenspan (U.S. Congr., 1992a, p. 47) warns that: "if holders of indexed debt are drawn from a narrow segment of the investing populace, then the real rate and the implied inflation expectations derived from those instruments may not reveal economy-wide sentiments. Under those circumstances, the Treasury may have to offer an elevated real return to place its indexed debt." He overlooks that, given the proposed extent of debt indexing, drawing investors from a relatively narrow segment of the population is inevitable, and that this would lower, not raise, the interest costs of indexed bonds. Waiters (U.S. Congr., 1992a, p. 38) pointed out that in Britain the initial small issues of indexed bonds "were taken up by those people who were desperate for inflationary protection. So the real yield was quite low. ... That suggests that there is ... a supply effect." But Waiters does not link that to the feasibility of deriving inflation expectations from the yield on indexed bonds.

What makes the distinction between the mean expectation and the marginal holder's expectation important is that the prevailing proposals to issue indexed bonds project that only something like 10 to 20 percent of the federal debt, and hence approximately 2.5 to 5 percent of the total outstanding debt, be indexed.[4] Moreover, it would probably take considerable time to reach even that level, since each year only a portion of the federal debt issued in that year would be indexed.[5]

If other borrowers do not substantially increase the volume of indexed debt outstanding by following the Treasury's example, to what extent would indexed federal debt be held only by those in the upper tail of the distribution of inflation expectations? If one assumes that agents are homogeneous except for their expectations of inflation, then if, say 2.5 percent of the total outstanding debt were indexed, it would be held only by those whose inflation expectations are two standard deviations above the mean.

But agents are heterogenous not only in their inflation expectations, but also in their exposure to inflation risk and in their degree of risk aversion.[6] Thus, in the above example some, perhaps most, of the indexed bonds would be bought by those whose expectations of inflation are not in the upper 2.5 percent of the distribution of inflation expectations. If say, half the indexed bonds are absorbed

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[4]Thus the *Report* that accompanies the congressional hearings on indexed bonds calls indexing as much as 20 percent of the total federal debt: "an extremely ambitious program." (U.S. Congr., 1992b, p. 13) The relevant measure of the total debt corresponds neither to the gross debt or the net debt, but to the debt held by those who make independent decisions about whether to hold indexed or nominal securities. For example, if a mutual fund buys indexed bonds and then issues smaller denomination indexed claims on itself one should not count the indexed bonds held by this fund and also the claims that households have on this fund. On the other hand, if a bank buys indexed bonds and issues nominal deposits, then both these deposits and the indexed bonds should be counted.

[5]How long it would take depends on the maturity composition of the indexed debt, and on the Treasury's willingness to change the prevailing maturity distribution. If most of the indexed bonds are long-term debt, and if the Treasury is unwilling to lengthen the average maturity of the debt, then how fast indexed debt is issued depends largely on the maturity schedule of the outstanding long-term debt.

[6]Inflation risk is itself, in good part, the result of agents not being homogeneous. If the government is not an inflation gainer, or if Ricardian equivalence holds, and stock prices and other asset prices adjust fully to inflation, then in a closed economy of homogeneous agents there are no inflation losers.

by these agents, the marginal holder among those who hold indexed bonds because they expect a high inflation rate, would be someone close to the upper 1.25 percent tail of the distribution of inflation expectations.[7] Hence, a change in the extent of inflation exposure or in the coefficient of risk aversion could change the yield differential between indexed and conventional debt .(Cf. Greenspan in U.S. Congr., 1992a, p. 15).

A third way in which agents are not homogeneous is in their tax status. Indexed securities are more appropriate for tax exempt or lightly taxed portfolios, because indexed securities might create a cash flow problem for taxable holders. They would, like holders of zero coupon bonds, have to include in each year's taxable income the appreciation of the principal, so that they would be paying taxes on income that they have not yet received.

But, although the Treasury in its congressional testimony used this cash flow problem as a major argument against indexing government bonds, it is not likely to be important, because instead of adjusting the principal of the bond for inflation, the inflation adjustment could be incorporated in the interest rate.[8] And even if not, agents could hold indexed bonds indirectly through certain mutual funds which would hold also other securities that they could sell to generate a cash flow to meet tax liabilities.[9]

A fourth heterogeneity that is relevant is a heterogeneity, not of agents, but of debts. Suppose that for all agents federal government debt and other debt (henceforth called private debt) are perfect

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[7]The marginal holder would be close to, but not quite at the 1.25 point, because some of those with high inflation expectations are inflation gainers, and hence want to hold unindexed bonds as a hedge.

[8]It would be necessary to adjust the provision for payment of estimated taxes to exclude from estimated income those interest payments that represent the inflation adjustment.

[9]Under-Secretary of the Treasury Jerome Powell put much stress on the cash-flow problem in his opposition to indexed bonds (U.S. Congr., 1992a, pp. 110-111). The only evidence he cited for the importance of the cash-flow problem is the failure of a Canadian issue of tax exempt bonds where the syndicate was left holding some of the bonds, and where most of the bonds were sold to tax exempt institutions. But, as he pointed out, the these bonds were issued at a time when there were reports that the inflation rate was declining.

substitutes. Then what matters for determining where the marginal holder of indexed government debt is located within the distribution of the public's inflation expectations is the ratio of indexed debt to total debt. But that is not so if there is zero substitutability between government and private debts. But even if the two types of debts are not close substitutes the ratio of indexed debt to total debt does matter to some extent. Financial institutions are likely to strip indexed debt and sell the indexing feature separately, so that it can be held by those with high inflation expectations, or with high inflation aversion, without their having to hold federal debt.

Estimating the Difference in Inflation Expectations

It is not possible to estimate exactly how much all of these heterogeneities distort the information that indexed bonds would provide, in part because no market-derived data on the distribution of inflation expectations exists. But if one is willing to use survey data in place of market-generated data then it is possible to make a rough estimate of the distortion that results from *one* of the heterogeneities, heterogenous inflation expectations.

Many economists are highly critical of survey data. Thus William Poole in the hearings on indexing government debt stated that survey data on inflation expectations are not: "a satisfactory substitute for market-based data. To know what people really think we have to see where they are willing to put their money. Survey results are too easily influenced by the latest news on TV, or what has become fashionable to talk about." (U.S. Cong. 1992a p. 55) Similarly, Thomas Woodward (1992, p. 316) in his discussion of indexed bonds wrote: "Surveys are suspect because they are not market generated, the respondents have no financial stake in their answers, and the responses are not weighted in any way to reflect the relative importance of the respondents in the market." Elsewhere, (Woodward, 1990, p. 374) he stated that: "A number of investigators have found that expectation measures from surveys are not rational. ... Nothing dictates that they have to be, but this has lead some

to question the usefulness of such data. ..."[10] To this might be added that unless survey questions are formulated so that they correspond to the concepts in which the respondents themselves think they may misunderstand the question, something that happened in some early surveys dealing with marginal cost pricing.

But while market-derived data are generally superior to survey data, the latter should not be ignored, at least when the only alternative is reliance on mere assertion.[11] In particular, the Livingston survey can be a useful indicator of inflation expectations. Since the respondents are economists professionally concerned with forecasting, their expectations are no more likely to be shaped by TV programs and by "what has become fashionable to talk about", than are those of investors in indexed bonds. Their incomes, too, depend on getting it right. Nor are they likely to misunderstand the question. And if the expectations uncovered by surveys are not rational, the same is true also for some market-based sets of data.[12] This leaves Woodward's concern that surveys do not weigh the answers of respondents in proportion to each respondent's importance in the market. But that is true of indexed bonds too. These weigh the expectations of agents by their role in the market for indexed bonds, and not by their role in the market for goods and services. Thus expectations derived from an indexed bond market would give too much weight to the expectations of retirement funds, insurance companies, etc.

It is therefore useful to look at the distribution of inflation expectations in the Livingston data. In doing so, one need not assume that they provide a precise measure of the *mean* expected inflation rate. One need merely assume that their variance provides an adequate proxy for the variance of actual inflation expectations. Or, one might state the argument in a negative way. Those who advocate the

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[10]Thus Michael Bryan and William Gavin (1986) found that the Livingston survey's price expectations, unlike the Michigan's survey's, are not rational.

[11]Daniel Hausman, a philosopher of science who specializes on the methodology of economics recently criticized economists for neglecting survey information. (Hausman, 1992) See also Mayer (1992, Chapter 11).

[12]For a survey see Mayer (1993, Chapter 8).

issuance of indexed bonds because that would provide an adequate measure of expected inflation, bear the burden of the proof of showing that the marginal holder's expectation is an adequate proxy for the (weighted) average holder's expectations. They have not furnished any such evidence. Hence, even if the Livingston data can generate only weak evidence to the contrary, that would still suffice to reject the case for indexed bonds as a device for measuring inflation expectations. At the least, it would suggest that those who advocate indexed bonds as a way of measuring inflation expectations have not met the burden of the proof. Alternatively, if the Livingston data show that the variance of price expectations is very small, this evidence, even if it is considered weak, would still enhance the case for indexed bonds somewhat.

Table 1 shows the deviation from the means of inflation expectations for selected multiples of the standard deviation. Parts A and B relate to the percentage increases in the CPI (not annualized) for 8 and 14 months ahead respectively, while Parts C and D relate to the increases in the one year and two years ahead annual averages of monthly CPI values (again not annualized).[13] The first column deal with the entire period analyzed, October 1975 to October 1992. The following columns deal with three subperiods intended to approximate, first the period of relatively low inflation, then the high-inflation period of the late 1960s and 1970s, and finally the disinflationary period starting with 1982. Only surveys with responses from at least 50 respondents were included in Tables 1 and 2. (The average number of respondents was 56 for the 8 months and 14 months forecasts, and 56 and 52 respectively for the one and two year forecasts.) Because the same respondents tend to participate in many successive samples, these surveys are in one sense not independent observations.

Since it is not clear just where within the right tail of the price-expectations distribution the marginal holder of indexed bonds would be located Table 1 shows five alternatives. The first, 0.8

[13]There is a problem in interpreting the price increase data. It is sometimes not clear what was the latest CPI the respondents had available when they predicted the future CPI. Hence the data can be faulted as measures of the inflation rate. Some of the variance among the respondents may be due to some of them having a later CPI available than others. But that is not likely to account for much of the variance, and would in case, also be true also to some extent for purchasers of indexed bonds. Since I used only surveys that had at least 50 respondents, I did not adjust the sample standard deviation for sample size.

standard deviations (where the marginal holder is at the 79th. percentile) could, among other possibilities, represent a situation where 21 percent of the federal debt has been indexed, and either there is no substitution between federal and private debt (or else the private sector has also indexed 21 percent of its debt), and no indexed debt is held for portfolio-balance purposes. The other extreme shown, 2.3 standard deviations, implies that the marginal holder is at the 99th. percentile. One possible situation it represents is a case in which only 8 percent of the federal debt, and none of the private debt, has been indexed, there is perfect substitution between the federal debt and private debt, and one half of the indexed debt is held for portfolio-balance reasons by those with inflation expectations below the 99th. percentile. The four in-between cases, 1.0, 1.3, 1.6 and 2.0 standard deviations are ones in which the marginal holders are respectively at the 84th., 87th., 95 and 98th percentiles.

As Table 1 shows the difference between the mean inflation expectation and the inflation expectation of the marginal holder of indexed debt is likely to be large. Moreover, the extent of the overstatement is not constant. Not only does it vary among the three periods, but as the standard deviation among the surveys shows, it varies substantially within these periods too.

The short-run inflation forecasts discussed so far are not directly relevant for the issuance of long-term indexed bonds. The data do, however, include two 1992 surveys in which the respondents estimated the inflation rate over the next ten years. In the first sample, with 41 respondents, the sample mean is 4.00 percent and the sample standard deviation 0.55 percent. In the second sample, which had only 32 respondents, the sample mean is 3.85 percent and the sample standard deviation is 0.69 percent. Hence for long- term securities, too, the yield differential is not a good measure of the mean inflation expectation.

Even if the interest differential is a biased estimate of the mean expected inflation rate, it would still be a useful guide if the size of the bias were predictable. But to estimate the bias one would have to know ex post what the mean inflation expectation was. Otherwise one could not develop an estimate of the dependent variable to plug into a regression equation. But where would that

estimate come from? If one is willing to take it from survey data, then one might as well use these survey data themselves instead of the yield differential.

All the same, since it is relevant for the subsequent discussion of the extent to which indexed securities could lower the Treasury's interest costs given different inflation rates, Table 2 shows the results of regressing the standard deviation on the mean predicted price increase itself and also on the standard deviation of the monthly (annualized) inflation rate over the prior year and over the prior three years.[14] R^2 is high for the whole period and two of the subperiods. But for the most recent period it is low. Moreover, the results for the various subperiods suggest that the regression is subject to instability due to regime changes. In the first subperiod the standard deviation of the previous year's inflation rate dominates the three years standard deviation. In the following high inflation period the reverse holds, which is plausible, and in the last (disinflationary) period the coefficients of neither are significant. The coefficient of the mean inflation rate is positive and usually significant and not trivial, thus corroborating Laurence Ball's (1992) hypothesis that higher inflation rates are correlated with greater uncertainty about inflation.

These results suggest that issuing indexed bonds would not generate a reliable measure of the mean expected inflation rate.

Indexed securities would pay a lower rate than conventional ones even when the mean expectation of inflation is zero. And changes in the yield differential would reflect not only changes in the mean expectations of inflation, but also changes in the (1) variance of expectations, (2) in the ratio of indexed securities relative to other assets, (3) in agents' exposure to inflation risk on other assets and liabilities and (4) changes in risk aversion. Even a reallocation of a given inflation risk among agents, such as might result from a shift towards variable-rate mortgages, could affect the differential.

Whether a better alternative measure of inflation expectations is available is not clear. One alternative is to use the information contained in the term structure of interest rates (see Mishkin, 1993, Chapters 13 - 15; Robertson, 1992). Another is to use survey information. But even if the information

[14]To avoid data mining these were the only variables tried.

obtained from indexed bonds were superior to that obtained from any alternative measure, that does not necessarily mean that it is reliable enough to be useful. Since the other sources of information that the Fed uses are also unreliable it is far from certain how adding one more unreliable item would affect the efficiency of monetary-policy making. When information is unreliable more is not necessarily better. (Cf. Brunner and Meltzer, 1964)

Reducing Treasury Interest Costs

While the variance of expectations among agents therefore suggests that indexed bonds would not provide a useful way of measuring inflation expectations, in another way this variance provides a strong case for issuing indexed bonds. If - over the long run - expectations are rational, or at least not biased downward, then those who purchase indexed bonds because they expect a higher inflation rate than does the average bond holder, expect a too high rate of inflation, and are therefore willing to pay too much for indexed bonds.

The relatively large standard deviation of inflation expectations shown in Table 1, when combined with the likelihood that a substantial proportion (perhaps even the majority) of indexed bonds would be held as an inflation hedge by those whose inflation expectations do not greatly exceed the mean, suggests that indexed bonds could provide a substantial saving for the federal government. Suppose that 20 percent of the federal debt is indexed, and that the Treasury saves 100 basis points on that debt, which may well be a conservative estimate. Given the volume of the privately held federal debt in September 1992 the Treasury would then have saved $5.5 billion. State and local government might also save substantial amounts by issuing indexed bonds, though, in part, at the expense of the savings that would otherwise accrue to the U.S. Treasury.[15]

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[15]Given the much smaller size of state debts it may be more difficult for states to establish a sufficiently broad and liquid market for their indexed securities. But relative to its total interest expenses a state has more to gain from indexing its bonds than has the federal government. Since its total debt is so much smaller it can index a substantial proportion of it, and yet sell it only to those investors whose inflation expectations or inflation-risk aversion is extreme.

The conclusion that indexed bonds would significantly lower the government's interest costs is, however, subject to one qualification. Even if expectations are rational over the long run, there may be considerable periods over which investors underestimate inflation. If investors underestimate the inflation rate early in the life of an indexed bond program, while overestimating it by an equal amount and for an equal period later, the present value of the government's losses would exceed the present value of the government's gains, and conceivably might do so by more than its gain from the heterogeneity of agent's expectations and from the lower risk premium.

On the other hand, if the government has private information that the inflation rate will be lower than the market expects, perhaps because it is changing monetary policy, then it can make an additional gain by issuing indexed bonds. This was a major reason why the Thatcher government issued such bonds (Walters in U.S. Congr., 1992a)

The British experience with indexed bonds has been used to measure the savings from indexed securities. Thus Walters (U.S. Congr., 1992a, p. 36) claimed that the British government saved 200 bases points on its indexed bonds. This is not surprising because, as de Kock (1991, p. 55) pointed out, the estimate of the expected inflation rate obtained by comparing the yields of indexed and nominal bonds: "has remained above the actual rate for most of the sample period. ... [though] it has, however, been fairly close to the actual rate from late 1989 onward." But any such comparison of the actual yields on indexed and on nominal bonds may be misleading because the British indexed securities are long-term bonds that have been in existence only since 1981. One cannot rule out the possibility that over their entire life most of the bonds issued so far will have a higher yield than nominal bonds. Moreover, rational expectations theory tells us only that expectations are rational over the long run. It is therefore possible that a lower yield on indexed bonds over a say, ten year period, might just be due to a random overestimate of the future inflation rate, rather than to an inherent characteristic of indexed securities. Since the inflation rate is subject to regime changes a peso effect could operate for a long time.

The gains that the government obtains from indexing bonds are, in part, net social gains rather than just transfers from private agents who overestimate the future inflation rate. A mechanism that without creating distortions transfers income from private agents to the government increases welfare. Moreover, that part of the lower yield on indexed bonds that is due to their lower inflation risk represents a net gain in welfare. this is because the issuance of indexed bonds reduces the overall level of risk in the economy, and is not just a transfer of risk from the bondholder to the government as Michael Boskin (U.S. Congr., 1992a,) has claimed.[16]

There is, therefore, a case for the issuance of indexed government securities. But it is much stronger when it is based on interest cost savings rather than on measuring the public's expectations of inflation.

[16]In arguing that indexed bonds transfer the risk of unanticipated price fluctuations from private holders to the government, Boskin (U.S. Congr., 1992a, p. 89) implicitly assumes that the government is an inflation loser rather than an inflation gainer.

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Table 1

Differences between Mean Inflation Estimates and Higher Estimates

Estimates above the mean by:	1957-1992	1957-67	1968-81	1982-92
		Basis Points (not annualized)		
		A - 8 Months		
0.8 standard deviations	60	32	82	62
1.0 standard deviation	75	53	102	77
1.3 standard deviations	99	69	133	100
1.6 standard deviations	122	85	163	123
2.0 standard deviations	152	106	204	154
2.3 standard deviations	175	122	235	177
number of surveys	53	19	16	17
standard deviation among surveys	33	20	40	19
		B - 14 Months		
0.8 standard deviations	91	70	114	98
1.0 standard deviation	114	87	143	123
1.3 standard deviations	148	113	186	160
1.6 standard deviations	182	139	229	197
2.0 standard deviations	228	174	286	246
2.3 standard deviations	262	200	329	283
number of surveys	51	20	14	17
standard deviation among surveys	44	30	49	37
		C - 1 Year		
0.8 standard deviations	93	NA	104	81
1.0 standard deviation	116	NA	130	101
1.3 standard deviations	151	NA	169	131
1.6 standard deviations	186	NA	208	162
2.0 standard deviations	232	NA	260	202
2.3 standard deviations	267	NA	299	232
number of surveys	17	0	9	8
standard deviation among surveys	35	NA	38	25
		D - 2 Years		
0.8 standard deviations	181	NA	222	170
1.0 standard deviation	226	NA	277	213
1.3 standard deviations	294	NA	360	277
1.6 standard deviations	362	NA	443	341
2.0 standard deviations	425	NA	554	426
2.3 standard deviations	520	NA	637	490
number of surveys	5	0	1	4
standard deviation among surveys	47	NA	NA	43

Table 2

Determinants of the Standard Deviation of Expected Inflation

Period	Mean Expected Inflation Rate	Standard Deviation of CPI in prior:		R^2	D-W*
		Natural Numbers			
		8 Months Forecasts			
1957-92	.136	.050	.112	.722	1.6
	(7.3)	(1.7)	(3.2)		
1957-67	.178	-.074	.404	.661	1.8
	(2.5)	(-1.2)	(6.3)		
1968-81	1.65	.104	.051	.844	1.9
	(4.4)	(2.4)	(.9)		
1982-92	.050	.020	.083	.176	2.7
	(.3)	(.4)	(1.3)		
		14 Months Forecast			
1957-92	.089	.044	.173	.617	1.5
	(5.3)	(1.0)	(3.2)		
1957-67	.161	.018	.603	.702	1.5
	(2.8)	(.2)	(6.7)		
1968-81	.110	.179	.027	.903	2.0
	(5.1)	(4.4)	(.5)		
1982-92	.174	-.009	.098	.125	2.3
	(.9)	(-.1)	(.6)		
		Logs			
		8 Months Forecast			
1957-92	.155	.074	.747	.528	1.1
	(4.2)	(.6)	(4.8)		
1957-67	.099	-.160	1.821	.542	1.6
	(1.3)	(-.7)	(4.1)		
1968-81	.511	.334	.158	.849	1.4
	(3.4)	(2.3)	(.9)		
1982-92	.324	.040	.262	.145	2.6
	(.7)	(.3)	(1.4)		
		14 Months Forecast			
1957-92	.176	.010	.689	.547	1.2
	(4.1)	(.1)	(5.0)		
1957-67	.196	.149	1.741	.681	1.4
	(2.2)	(.8)	(5.9)		
1968-81	.466	.384	.048	.876	1.4
	(3.7)	(3.3)	(.3)		
1982-92	.681	-.106	.365	.218	2.2
	(.9)	(-.6)	(1.3)		

*The Durbin-Watson Statistic is relevant in these cross-section data since the surveys are in chronological order. In the 14 months regressions for 1957-92 the Durbin-Watson statistic is significantly different from 2. In several others it falls into the indeterminate area. Cochrane-Orcutt adjustments are inapplicable due to gaps in the data because surveys with fewer than 50 respondents were omitted.

Notes: The mean expected inflation rate is the mean expected percent increase in the consumers' price index, not annualized. The standard deviations of the CPI are expressed in annualized monthly rates of change. For the number of surveys covered see Table 1. R^2 is adjusted for degrees of freedom.

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