Preliminary Draft
Comments Welcome

Inflation, Inflation Expectations and Core Inflation

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1. Introduction

This paper examines the information content of forecasts of inflation versus measures of core inflation. Previous work by Smith (2004) shows that the weighed median Consumer Price Index (CPI) inflation rate is a better forecaster of future inflation than lagged inflation and the traditional core inflation measure, inflation minus food and energy. Research by Romer and Romer (2000) demonstrates that the Greenbook forecast has more information about future inflation than commercial forecasts. This paper brings together these two parts of the inflation literature by comparing the informational content in forecasts versus lagged inflation measures.

The main focus of Romer and Romer's (2000) paper is to examine if there is additional information in the Greenbook inflation (GNP deflator) forecasts over commercial forecasts. They compare the Greenbook inflation forecast to the Blue Chip forecast, DRI (Global Insight) forecast, and the Survey of Professional Forecasters (SPF) forecast. They find that the Greenbook does contain additional information over that contained in commercial forecasts and that the weight that should be placed on the Greenbook forecast is generally close to one. Romer and Romer (2000) also examine the information in the CPI forecasts and find that there is additional information in the Greenbook forecast over what is contained in commercial forecasts.

Gavin and Mandal (2001) examine the relationship between the Greenbook and Blue Chip forecasts and the inflation forecast of the GDP deflator given by the Fed's chairman's twice yearly Congressional testimony. They find that the Greenbook is a better forecaster than the Blue Chip but that both are similar to the forecast given in the Congressional testimony.

Another paper that studies the Greenbook forecasts is by Atkeson and Ohanian (2001). Their main question is the evaluating the usefulness of Phillips Curves for forecasting inflation (GNP/GDP deflator). They find that Phillips Curve models are not more accurate than a naïve

model (random walk). In addition, they compare the naïve model to the Greenbook forecast and find that the errors from each are about the same over 1984-1996.

Carroll (2003) models inflation expectations of households and professionals. In a preliminary exercise, he shows that the SPF forecast does have additional information above what is contained in lagged inflation. This paper expands the set of lagged inflation measures to also include the CPI minus food and energy and the CPI weighted median.

Smith (2004) uses both in-sample prediction and simulated forecasting to test whether the weighted median inflation rate can forecast next year's CPI inflation better than lagged inflation or lagged inflation minus food and energy. She finds that the weighted median forecasts better than these other measures.

This paper combines the literature on forecasts and core inflation by testing whether forecasts generated by large econometric models such as the Greenbook and surveys of professionals contain more information than a simple backward looking measure of inflation such as the weighted median. This paper finds that the Greenbook forecast and the SPF forecast both contain additional information over that contained in lagged inflation measures. I test the robustness of this result by using a variety of models. I also find that the Greenbook forecast may contain more information than the SPF forecast but my results are not as strong as those presented by Romer and Romer (2000).

An interesting question to examine given the result that the Greenbook forecast has substantial information about future inflation is what is a good proxy of the Greenbook forecast? Most of the previous literature[1] on forming inflation expectations has not examined the Greenbook forecast since these papers are modeling either household's or professionals' forecast

[1] See Sheridan (2003), Carroll (2003 and 2006), Ball and Croushore (2003), Orphanides and Williams (2004) and Branch (2004) for more details.

formation. The Greenbook forecast are produced by the Board of Governors staff with the help of a large scale econometric model (Atkeson and Ohanian, 2001). Since the Greenbook is confidential and only released with a five-year lag households may want a proxy of the Greenbook forecast that they can use to keep them informed of the Fed's inflation projections.

I examine lagged inflation measures (lagged headline, lagged minus food and energy and lagged median) and the SPF forecast as possible proxies for the Greenbook forecast of inflation. When only considering lagged inflation measures as possible proxies, the CPI minus food and energy inflation rate is a better proxy as the forecast horizon increases. Once the SPF inflation forecast is included, the SPF inflation forecast is a good proxy for the Greenbook inflation forecast. By using the SPF forecast as a proxy, the public is able to have an accurate gauge of what the Fed believes are future inflation pressures in the economy.

2. Data

The data are publicly available. I obtain price indices of the CPI and CPI minus food and energy (CPIX) from the Bureau of Labor Statistics website. The weighted median CPI inflation rate (CPIMED) is from the website of the Federal Reserve Bank of Cleveland. For the weighted median I take the monthly inflation rates and compute a price index. From this price index, I then obtain the inflation rates at any frequency. The measures of inflation expectations are the median forecast of the CPI inflation rate from the Survey of Professional Forecasters and the quarterly and four-quarter CPI forecasts from the Greenbook of the Federal Open Market Committee, which are both available from the Federal Reserve Bank of Philadelphia. I will discuss in next section the different inflation rates that are used in empirical analysis.

The Greenbook forecasts are released with a five-year lag so the latest Greenbook available is from the FOMC meetings in 2000. In addition, earlier work by Smith (2005)

indicates that the measure that is core inflation, defined as the best forecaster of inflation, does vary across monetary policy regimes; therefore, the sample starts in 1984. The end of sample is December 2000 for the Greenbook forecasts and April 2005 for the remaining variables. I present the results from the 1984-2000 sample in the paper; the results with the April 2005 end sample date can be obtained from the author upon request.[2]

3. Empirical Analysis

The simplest regression to start the analysis is a modified version of equation 2 from Romer and Romer (2000). They examine if the Greenbook forecasts have additional information over the information contained in commercial forecasts. Romer and Romer find that the Greenbook forecasts do contain additional information about future inflation.[3] The equation is modified since I compare the forecasting ability of the Greenbook forecast and SPF forecast with lagged inflation measures. These lagged inflation measures are lagged inflation, lagged inflation minus food and energy and lagged weighted median inflation. The regression is

$$\pi_{ht} = a + b_1 * \pi^a_{ht-3} + b_2 * \pi^f_{ht} + u_{ht} \qquad (1a)$$

where π_{ht} is the actual inflation rate in the quarter *h* quarters after the month *t*, π^a_{ht-3} is the lagged inflation measure (aggregate, minus food and energy and median) and π^f_{ht} is the forecast (SPF or Greenbook (GRF)) of π_{ht}.[4] In addition to this first variation, I examine the information content of the two forecasts in the following regression, which is the Romer and Romer (2000) equation 2:

[2] Additionally, the results from the 1984-2005:04 sample support the same conclusions.
[3] Most of Romer and Romer's analysis is for the GNP deflator but footnote 16 discusses the information content of the Greenbook and commercial forecasts of the CPI.
[4] A procedure similar to the one in Romer and Romer is followed to calculate the inflation rates for both the dependent variable and the lagged inflation measures. The annualized quarterly inflation rates are calculated from the quarterly averages of the price indices. The data are at a monthly frequency. For the inflation variables each month in a given quarter has the same inflation rate. See Romer and Romer (page 434) for more details. The lagged inflation measures are lagged by three months or 1 quarter to ensure only data known prior to time *t* are used.

$$\pi_{ht} = a + b_1 * \pi_{ht}^{f1} + b_2 * \pi_{ht}^{f2} + u_{ht} \quad (1b)$$

where π_{ht}^{f1} is the SPF forecast and π_{ht}^{f2} is the Greenbook forecast.

Also, borrowing from Romer and Romer (2000) I run a modified version of equation 3. The first variation is

$$\bar{\pi}_{ht} = a + b_1 * \bar{\pi}_{ht-15}^{a} + b_2 * \bar{\pi}_{ht}^{f} + \bar{u}_{ht} \quad (2a)$$

and the second variation is

$$\bar{\pi}_{ht} = a + b_1 * \bar{\pi}_{ht}^{f1} + b_2 * \bar{\pi}_{ht}^{f2} + \bar{u}_{ht} \quad (2b)$$

where $\bar{\pi}_{ht}$ is average inflation up to *h* quarters, $\bar{\pi}_{ht-15}^{a}$ is the *h* quarter previous inflation rate and $\bar{\pi}_{ht}^{f}$ is the average over the forecast over the next *h* quarters. In this paper *h=4*.[5]

Tables 1A, 1B and 1C present the results from equations 1 and 2. In Tables 1A and 1B, the results indicate that the SPF forecast and the Greenbook forecasts provide additional information about future inflation over the information provided in lagged inflation measures including the weighted median. It is also interesting that the forecasts perform best at the shortest forecast horizon. Both the SPF and the Greenbook forecast can predict current and next quarter's inflation well and both perform poorly at longer horizons. Also, examining the regressions using the averages, the results provide evidence that the forecasts again provide more information than the lagged inflation measures. Predicting the quarterly inflation rate several quarters ahead is difficult since there may be a large amount of noise (due to shocks) in the quarter-over-quarter inflation rates. These supply shocks may hit one quarter and then be reversed the next. By averaging the quarterly forecasts, the quarter-to-quarter fluctuations are smoothed out and the forecast may perform well over the entire forecast horizon even if the

[5] The inflation rate is lagged 15 months to ensure that data in the dependent variable do not overlap with the lagged inflation rates.

forecasts further out perform poorly since the high frequency noise is removed. In Table 1C, it seems that the Greenbook forecast does not provide additional information above the information in the SPF forecast. According to these results, the Fed's forecast is not more informative than a public forecast.

Since these forecasts perform poorly at the longer horizons, we might question their usefulness for monetary policy. Generally, for monetary policy purpose, the Fed would like a forecast of inflation over the next year. The average forecast may provide a proxy for this but it does not seem that, at least in the case of the Greenbook, monetary policy makers have this statistic directly in the Greenbook. In light of the fact that policy makers care about more than the quarterly inflation rate, I propose several additional regressions that test the power of the information available in the SPF forecast and the Greenbook forecast to predict next year's inflation. I undertake this analysis in two ways. First, I study how well the quarterly forecasts and inflation measures predict future inflation and second, I use year-over-year inflation rates for both the dependent and independent variables.

For the regressions using quarterly forecasts and inflation measures, I calculate the dependent variable as the year-over-year inflation rate from the quarterly average of the CPI price index. Once again there are two variations of the regression. The first combines lagged inflation measures and forecasts in the following regression:

$$\pi_{t+4,t} = a + b_1 * \pi_t^a + b_2 * \pi_{t-3}^a + b_3 * \pi_{t-6}^a + b_4 * \pi_{t-9}^a + b_5 * \pi_{1t}^f + b_6 * \pi_{2t}^f + b_7 * \pi_{3t}^f + b_8 * \pi_{4t}^f + u_{t+4} \quad (3a)$$

and the second combines the two forecast measures in the following regression:

$$\pi_{t+4,t} = a + b_1 * \pi_{1t}^{f1} + b_2 * \pi_{2t}^{f1} + b_3 * \pi_{3t}^{f1} + b_4 * \pi_{4t}^{f1} + b_5 * \pi_{1t}^{f2} + b_6 * \pi_{2t}^{f2} + b_7 * \pi_{3t}^{f2} + b_8 * \pi_{4t}^{f2} + u_{t+4} \quad (3b)$$

where $\pi_{t+4,t}$ is the four-quarter ahead inflation rate and the other variables are defined as in equation 1.

The results in Tables 2A and 2B present the coefficient estimate of the constant and the Wald tests testing the restrictions that sum of the coefficients on the lagged inflation rates and the sum of the coefficients on the forecasts equal one. All the constants are insignificant. The sum of the coefficients on the forecasts in most cases cannot be rejected as significantly different from one whereas the sum on the lagged inflation rates can be rejected. The exception is when the forecast is combined with the weighted median. Initially, this might indicate that the median provides some information about future inflation. Upon further examination, I find that none of the coefficients on the lagged weighted median inflation rates are significant. Finally, taking a look at the regression with both forecasts indicates that more of the information about future inflation comes from the Greenbook forecast than the SPF forecast. This result suggests that the Greenbook forecast is useful for monetary policy decisions.

Given that the monetary policy makers care about inflation over the next year another regression of interest is to regress the 12-month ahead CPI inflation rate on the inflation measures over the previous 12 months and on the forecast of inflation over the next 12 months. For the SPF forecast, the forecasters are specifically asked for a forecast of the CPI inflation rate over the next year. For the Greenbook, I use the four-quarter ahead forecast. In the Greenbook, the forecasts are given by year so I use the same year forecast for the January through June FOMC meetings and I use the next year forecast for the July through December FOMC meetings. The data for these Greenbook forecasts start in 1990; therefore, I limit the sample from 1990 to 2000.

For the regression with annual forecasts and previous year's inflation measures, I calculate the dependent variable as the percentage change in the monthly CPI, $\left(\frac{P_{t+12}}{P_t}-1\right)*100$. The previous year's inflation measures (CPI, CPIX and CPIMED) are also calculated as the percentage change, $\left(\frac{P_t}{P_{t-12}}-1\right)*100$. Again, there are two variations of the regression. The first combines an inflation measure with a forecast in the following regression:

$$\pi_{t+12,t} = a + b_1 * \pi^a_{t,t-12} + b_2 * \pi^f_{t+12,t} + u_{t+12} \quad (3a)$$

and the second is the following:

$$\pi_{t+12,t} = a + b_1 * \pi^{SPF}_{t+12,t} + b_2 * \pi^{GRF}_{t+12,t} + u_{t+12} \quad (3b)$$

where $\pi^a_{t,t-12}$ is the previous 12-month inflation rate of the CPI, CPIX and CPIMED and $\pi^f_{t+12,t}$ is the forecast of next year's inflation rate for both the Greenbook and the SPF.

The results in Tables 3A, 3B and 3C show that the Greenbook has information about next year's inflation. The coefficients on the Greenbook forecasts are also not significantly different from one indicating that the Greenbook forecast is a fairly accurate predictor of future inflation.[6] The SPF forecast does not perform well or seem to have much information about future inflation.[7] Finally, turning to the regression with the Greenbook forecast and the SPF forecast, I find that the Greenbook forecast does have more information that the SPF forecast.

Another simple way to examine the information in the Greenbook forecast and the SPF forecast is to examine what Atkeson and Ohanian (2001) call the naïve model. Their naïve

[6] I also ran regressions in which the Greenbook forecast variable was lagged one month. The results are similar to those presented here.

[7] The sample for the SPF forecast is longer than for the Greenbook. However, when running regression 3a using the 1984-2000 sample the results are roughly consistent with those presented here. There was not overwhelming significance of the SPF forecast variable in those regressions.

model is the lagged quarterly inflation rate of the GDP deflator. I extend this idea to apply not only to the lagged CPI but also to the lagged CPIX and the CPIMED inflation rates. I then compare the Sum of Squared Residuals (SSR) from the inflation measures to the forecast measures. Table 4 presents these results. The forecasts are better predictors at all time horizons but as the forecast horizon extends, the forecasts worsen. I do not find as Atkeson and Ohanian do (2001) that the Greenbook forecast and the naïve model are "basically the same." Additionally, from these naïve models it appears that the SPF is a better forecast than the Greenbook.[8] Overall, these results suggest that the Greenbook forecast and the SPF forecast have substantially more information than lagged inflation measures including the weighted median inflation rate, which has been found to be a good forecaster of future inflation in previous studies. One noticeable difference from the findings of Romer and Romer (2000) is that the Greenbook forecast is not shown to be more informative than the SPF forecast under all specifications. This result suggests some convergence of forecasts, which may be due to less variation in inflation since the disinflation of the early 1980s or perhaps professional forecasts have learned about the goals and targets of the Fed through greater Fed transparency.

Determining how forecasts are made is an expanding part of the economic literature. Recent work by Sheridan (2003), Carroll (2003 and 2006), Ball and Croushore (2003), Orphanides and Williams (2004) and Branch (2004) explore how agents (either households or professionals) form their inflation expectations. The question I am interested in that most of these papers have not examined is what is a good proxy of the Greenbook forecast? A proxy of the Greenbook forecast is of interest since the Greenbook is used for monetary policy decisions. It is not feasible for the public to put together a large econometric model of the economy to

[8] The SSRs for the equation 1 regressions with the Greenbook forecasts are slightly smaller than the SSR from the naïve model and with the SPF forecast, the SSRs from equation 1 are smaller.

forecast inflation but if the public can use simple inflation measures and/or other forecasts to deduce the Greenbook forecast it may lead to a better understanding of monetary policy decisions.

The second question that this paper examines is finding a good proxy for the Greenbook inflation forecast. I start by testing if any of the lagged inflation measures (CPI, CPIX and CPIMED) or the SPF forecast is a good proxy. Future research will expand this analysis by incorporating real variables and possibly changes in monetary policy. Given that I have forecasts over several future time horizons, I also examine whether the measure that is the best proxy changes as the forecast horizon changes.

The first regression determining the proxy of the Greenbook forecast compares the relative contribution of each of the lagged inflation measures (CPI, CPIX and CPIMED). The regression is

$$\pi_{ht}^{GRF} = a + b_1 * \pi_{ht-3}^{cpi} + b_2 * \pi_{ht-3}^{cpix} + b_3 * \pi_{ht-3}^{cpimed} + u_t \qquad (4a)$$

where π_{ht}^{GRF} is the Greenbook CPI forecast of the inflation rate in the quarter *h* quarters after the month *t*, $\pi_{ht-3}^{cpi}, \pi_{ht-3}^{cpix}, \pi_{ht-3}^{cpimed}$ are the lagged inflation measures. In Table 5, it seems that the proxy of the Greenbook forecast changes over the forecast horizon. During the current quarter (forecast horizon=0) the best proxy is combination of the lagged CPI and lagged CPIX inflation rates. As the forecast horizon lengthens, more of the weight shifts to the CPIX inflation rate. This result may arise since the Fed may be using the minus food and energy inflation rate as its goal ('target') inflation rate for monetary policy. The CPIMED inflation rate is not relevant as a proxy for the Greenbook but perhaps this is because it is a relatively new inflation measure that has not made its way into models of the economy or policy makers' radar screen.

Besides examining past inflation rates, the public can also use professionals' forecast of inflation as a proxy for the unknown Greenbook forecasts. I test if this would be useful for the public through the following regression:

$$\pi_{ht}^{GRF} = a + b_1 * \pi_{ht-3}^{cpi} + b_2 * \pi_{ht-3}^{cpix} + b_3 * \pi_{ht-3}^{cpimed} + b_4 * \pi_{ht}^{SPF} + u_t \qquad (4b)$$

where all variable are defined as in equation 4a and π_{ht}^{SPF} is the SPF forecast of the inflation rate in the quarter *h* quarters after the month *t*. The results are also presented in Table 5. The SPF inflation forecast is an excellent proxy of the Greenbook forecast. Generally, placing a weight of one on the SPF inflation forecast will provide a good proxy of the Greenbook inflation forecast. This information that the SPF is a good proxy for the Greenbook is useful to the public who then can rather cheaply gather the SPF inflation forecast every quarter. The public will have an excellent idea of where the Fed and FOMC believe inflation is headed.

4. Conclusions and Future Research

This paper has examined the information content in forecasts of CPI inflation from the Greenbook and the Survey of Professional Forecasters compared to the information in lagged inflation measures. I find that the Greenbook and the SPF forecast contains more information about future inflation than any lagged inflation measure including the weighted median, which had been found to be a good forecaster of inflation. Given these results and the fact that the Greenbook is only released with a five-year lag, I examine if any of the lagged inflation measures or the SPF inflation forecast provides a good proxy of the Greenbook inflation forecast. I find that households may want to use the SPF inflation forecast as a proxy of the Greenbook inflation forecast. This result gives households a better way to have an accurate idea of the forecast that the Federal Reserve is using when making monetary policy decisions and may help align the Fed's and household's inflation expectations.

In the first part of the paper, which examines the informational content of the forecast, I may expand the set of commercial forecasts to also include the Blue Chip and DRI (Global Insight) inflation forecasts. Also, in the year-over-year analysis I will include the Michigan Survey of Consumers inflation forecast. In the second section of the paper that tests to find a good proxy of the Greenbook inflation forecast, I plan to include measures of real activity and possibly measures of past, current and future monetary policy. The SPF forecast may already take this information into account so it might be difficult to find a proxy that can beat the SPF inflation forecast but it is worth examining these additional variables to find out how they might contribute to understanding the Greenbook forecast in a simplified model.

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Table 1A- Tests of Additional Information for Inflation (Greenbook)

$$\pi_{ht} = a + b_1 * \pi^{a}_{ht-3} + b_2 * \pi^{GRF}_{ht} + u_{ht}$$

Sample: 1984 - 2000

Forecast horizon **(Quarters)**	**a**	**b1**	**b2**	**Adjusted R^2**	**N**
CPI					
0	0.03(0.12)	0.03(0.04)	0.95(0.04)*	0.86	136
1	0.06(0.48)	0.16(0.10)	0.78(0.17)*	0.41	136
2	0.89(0.42)*	0.35(0.11)*	0.35(0.14)*	0.25	136
3	0.66(0.46)	0.41(0.11)*	0.34(0.18)	0.26	136
4	0.45(0.51)	0.35(0.08)*	0.46(0.15)*	0.32	136
Average	0.51(0.40)	-0.03(0.13)	0.82(0.12)*	0.50	136
CPIX					
0	0.04(0.17)	0.02(0.06)	0.96(0.03)*	0.86	136
1	0.05(0.51)	0.07(0.25)	0.86(0.25)*	0.40	136
2	0.88(0.55)	0.42(0.31)	0.25(0.24)	0.19	136
3	0.91(0.61)	0.52(0.34)	0.14(0.28)	0.17	136
4	0.54(0.60)	0.60(0.33)	0.16(0.28)	0.27	136
Average	0.63(0.40)	-0.19(0.14)	0.96(0.14)*	0.51	136
CPIMED					
0	0.01(0.25)	0.02(0.08)	0.96(0.03)*	0.86	136
1	-0.24(0.72)	0.18(0.33)	0.84(0.22)*	0.41	136
2	0.39(0.89)	0.45(0.40)	0.36(0.21)	0.19	136
3	0.70(1.08)	0.29(0.50)	0.42(0.25)	0.14	136
4	0.23(0.94)	0.36(0.44)	0.47(0.27)	0.22	136
Average	0.48(0.61)	0.00(0.24)	0.80(0.14)*	0.50	136

* indicates significance at 5%

Table 1B- Tests of Additional Information for Inflation (SPF)

$$\pi_{ht} = a + b_1 * \pi^{a}_{ht-3} + b_2 * \pi^{SPF}_{ht} + u_{ht}$$

Sample: 1984 - 2000

Forecast horizon (Quarters)	a	b1	b2	Adjusted R^2	N
CPI					
0	-0.46(0.31)	-0.18(0.09)	1.30(0.11)*	0.77	68
1	0.37(0.57)	0.21(0.12)	0.63(0.20)*	0.27	68
2	0.49(0.56)	0.35(0.12)*	0.45(0.18)*	0.25	68
3	0.53(0.68)	0.38(0.13)*	0.40(0.24)	0.24	68
4	0.24(0.69)	0.42(0.12)*	0.42(0.21)	0.27	68
Average	0.29(0.48)	-0.06(0.11)	0.89(0.13)*	0.44	68
CPIX					
0	-0.29(0.36)	-0.16(0.08)	1.24(0.09)*	0.76	68
1	0.18(0.63)	0.09(0.35)	0.80(0.40)*	0.25	68
2	0.72(0.62)	0.42(0.42)	0.30(0.44)	0.19	68
3	0.96(0.75)	0.64(0.35)	0.01(0.40)	0.19	68
4	0.70(0.74)	0.65(0.32)	0.06(0.32)	0.20	68
Average	0.32(0.48)	-0.17(0.12)	1.00(0.14)*	0.45	68
CPIMED					
0	-0.03(0.46)	-0.23(0.12)	1.23(0.08)*	0.77	68
1	-0.02(0.82)	0.15(0.46)	0.79(0.34)*	0.25	68
2	0.25(0.86)	0.36(0.54)	0.48(0.38)	0.18	68
3	0.32(0.98)	0.44(0.45)	0.36(0.32)	0.15	68
4	0.16(1.06)	0.35(0.44)	0.47(0.30)	0.14	68
Average	0.20(0.63)	0.05(0.21)	0.80(0.14)*	0.44	68

* indicates significance at 5%

Table 1C- Tests of Greenbook Additional Information for Inflation

$$\pi_{ht} = a + b_1 * \pi_{ht}^{SPF} + b_2 * \pi_{ht}^{GRF} + u_{ht}$$

Sample: 1984 - 2000

Forecast horizon

(Quarters)	**a**	**b1**	**b2**	**Adjusted R^2**	**N**
0	-0.23(0.27)	0.33(0.17)	0.72(0.13)*	0.88	50
1	0.002(0.75)	0.15(0.65)	0.81(0.64)	0.30	50
2	0.91(0.73)	0.09(0.53)	0.57(0.46)	0.21	50
3	1.13(1.27)	-0.28(1.05)	0.88(0.81)	0.14	50
4	1.30(1.22)	-1.04(1.15)	1.60(0.94)	0.19	50
Average	0.52(0.60)	-0.07(0.77)	0.85(0.66)	0.47	50

* indicates significance at 5%

Table 2A- Tests of Greenbook Additional Information (Quarterly lags)
Sample 1984-2000

GRF & CPI

Constant	0.69	(0.45)
Adjusted R^2	0.34	
N	136	
		Probability
Sum of lags of CPI	0.00	0.00
Sum of leads of GRF	0.72	0.10

GRF & CPIX

Constant	0.72	(0.46)
Adjusted R^2	0.35	
N	136	
		Probability
Sum of lags of CPIX	-0.22	0.00
Sum of leads of GRF	0.94	0.76

GRF & CPIMED

Constant	0.44	(0.73)
Adjusted R^2	0.36	
N	136	
		Probability
Sum of lags of CPIMED	0.25	0.03
Sum of leads of GRF	0.54	0.03

GRF & SPF

Constant	1.22	(0.85)
Adjusted R^2	0.36	
N	50	
		Probability
Sum of leads of SPF	-0.78	0.03
Sum of leads of GRF	1.41	0.53

Table 2B - Tests of SPF Additional Information (Quarterly lags)
Sample 1984-2000

SPF & CPI

Constant	0.51	(0.61)
Adjusted R^2	0.27	
N	68	
		Probability
Sum of lags of CPI	-0.06	0.00
Sum of leads of SPF	0.84	0.47

SPF & CPIX

Constant	0.54	(0.63)
Adjusted R^2	0.26	
N	68	
		Probability
Sum of lags of CPIX	-0.05	0.00
Sum of leads of SPF	0.83	0.55

SPF & CPIMED

Constant	0.25	(0.75)
Adjusted R^2	0.29	
N	68	
		Probability
Sum of lags of CPIMED	0.35	0.03
Sum of leads of SPF	0.51	0.01

Table 3A - Tests of Greenbook Additional Information (Year-over-year)

$$\pi_{t+12,t} = a + b_1 * \pi^{a}_{t,t-12} + b_2 * \pi^{GRF}_{t+12,t} + u_{t+12}$$

Sample 1990-2000

	a	b1	b2	Adjusted R^2	N
CPI	0.77(0.48)	-0.11(0.11)	0.80(0.20)*	0.38	88
CPIX	0.77(0.44)	-0.22(0.16)	0.92(0.23)*	0.40	88
CPIMED	0.97(0.60)	-0.12(0.19)	0.75(0.16)*	0.38	88

Table 3B - Tests of SPF Additional Information (Year-over-year)

$$\pi_{t+12,t} = a + b_1 * \pi^{a}_{t,t-12} + b_2 * \pi^{SPF}_{t+12,t} + u_{t+12}$$

Sample 1990-2000

	a	b1	b2	Adjusted R^2	N
CPI	1.43(0.51)*	-0.05(0.29)	0.50(0.37)	0.23	44
CPIX	1.45(0.49)*	-0.01(0.25)	0.45(0.31)	0.23	44
CPIMED	1.25(0.75)	0.14(0.29)	0.36(0.19)	0.24	44

Table 3C - Tests of Greenbook Additional Information (Year-over-year)

$$\pi_{t+12,t} = a + b_1 * \pi^{SPF}_{t+12,t} + b_2 * \pi^{GRF}_{t+12,t} + u_{t+12}$$

Sample 1990-2000

	a	b1	b2	Adjusted R^2	N
SPF	0.97(0.60)	0.00(0.17)	0.60(0.31)	0.32	32

* indicates significance at 5%

Table 4 - Naïve forecast (Sum of squared residuals)

Quarterly data

Forecast horizon (Quarters)	CPI	CPIX	CPIMED	GRF	SPF
0	449.28	383.70	383.45	36.14	36.09
1	443.23	390.19	370.24	167.62	104.19
2	434.90	380.38	371.46	257.90	121.75
3	443.31	379.13	391.50	297.22	137.61
4	449.47	399.57	439.23	254.91	154.53

Year-over-year data

1-year previous	288.01	277.71	205.10		
1-year ahead				39.58	75.13

Table 5 - Proxy for Greenbook Inflation Forecast

Sample 1984-2000

Forecast Horizon	Constant		CPI		CPIX		CPIMED	SPF		Adjusted R2	N
0	0.61		0.21	*	0.41	*	0.15			0.34	136
	(0.66)		(0.09)		(0.18)		(0.28)				
1	1.28	*	0.22	*	0.46	*	-0.07			0.47	136
	(0.39)		(0.08)		(0.11)		(0.17)				
2	0.83	*	0.06		0.62	*	0.08			0.61	136
	(0.39)		(0.06)		(0.13)		(0.16)				
3	0.52		-0.05		0.67	*	0.23			0.69	136
	(0.35)		(0.05)		(0.14)		(0.16)				
4	0.72		-0.09		0.83	*	0.06			0.67	136
	(0.38)		(0.06)		(0.15)		(0.18)				
0	0.10		-0.04		0.00		-0.19	1.19	*	0.86	50
	(0.32)		(0.12)		(0.14)		(0.18)	(0.07)			
1	0.37		-0.05		0.26	*	-0.40	1.07	*	0.81	50
	(0.31)		(0.05)		(0.12)		(0.14)	(0.17)			
2	-0.14		0.02		0.11		0.03	0.86	*	0.84	50
	(0.27)		(0.03)		(0.11)		(0.13)	(0.12)			
3	-0.84	*	0.05		-0.05		0.12	1.08	*	0.92	50
	(0.19)		(0.03)		(0.09)		(0.08)	(0.08)			
4	-0.67	*	0.02		0.08		0.06	0.99	*	0.92	50
	(0.21)		(0.02)		(0.06)		(0.09)	(0.06)			

* indicates significance at 5%