Does the FOMC Have Expertise, and Can It Forecast?[1]

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Abstract

The primary purpose of the paper is to answer the following two questions regarding the performance of the influential Federal Open Market Committee (FOMC) of the Federal Reserve System, in comparison with the forecasts contained in the "Greenbooks" of the professional staff of the Board of Governors: Does the FOMC have expertise, and can it forecast better than the staff? The FOMC forecasts that are analyzed in practice are non-replicable forecasts. In order to evaluate such forecasts, this paper develops a model to generate replicable FOMC forecasts, and compares the staff forecasts, non-replicable FOMC forecasts, and replicable FOMC forecasts, considers optimal forecasts and efficient estimation methods, and presents a direct test of FOMC expertise on non-replicable FOMC forecasts. The empirical analysis of Romer and Romer (2008) is re-examined to evaluate whether their criticisms of the FOMC's forecasting performance should be accepted unreservedly, or might be open to alternative interpretations.

Key words: Direct test of FOMC expertise, FOMC forecast, forecast performance, replicable FOMC forecast, staff forecast.

> "We also investigate the possible consequences of the FOMC's misguided information." (Romer and Romer (2008, p. 230))

> "This may indicate that the FOMC's attempts to add information to the staff forecast are not just unsuccessful, but may lead to inappropriate actions." (ibid, p. 230)

> "The fact that for inflation and unemployment, the coefficient on the staff forecast is large and significant while that on the FOMC forecast is effectively zero implies not just that FOMC members fail to add information, but that their efforts to do so are counterproductive." (ibid, p. 232)

> "The failure of the FOMC to bring useful additional information to the monetary policymaking process raises an obvious question: do policymakers act on their apparently useless information? To put it even more bluntly, are the FOMC's efforts to improve on the staff forecasts just ineffective, or are they a potential source of monetary policy mistakes?" (ibid, p. 233)

> "It appears that monetary policymakers may indeed act on information that is of little or negative value." (ibid, p. 234)

> "Policymakers appear to base at least some decisions on their apparently useless information." (ibid, p. 235)

1. Introduction

> "Misguided, unsuccessful, inappropriate, effectively zero, fail to add, counterproductive, failure, apparently useless, ineffective, mistakes, negative value."

Such powerful criticisms of the influential Federal Open Market Committee (FOMC) of the Federal Reserve System by Romer and Romer (2008) present a timely, challenging and controversial empirical assessment of the FOMC's purportedly deeply flawed forecasts of inflation, unemployment and real growth, in comparison with the forecasts contained in the "Greenbooks" of the professional staff of the Board of Governors.

Taken at face value, the message is clear and disturbing: The FOMC's forecasting performance has been decidedly unimpressive, at best. This paper examines whether the

FOMC has what might be called latent expertise, and thereby re-examines the forecasting performance of the Board of Governors staff and the FOMC to determine if the critical assessment in Romer and Romer (2008) should be accepted unreservedly, or might be open to alternative interpretations.

A forecast is an inference about an event that was not observed at the time of the inference. Forecasts generated from econometric models are replicable. Depending on the loss function, replicable forecasts may be optimal as consistent estimates of the conditional expectation of a variable of interest, given the information set (see Patton and Timmermann (2007a, 2007b)).

FOMC forecasts can have significant value in forecasting key monetary and macroeconomic variables. Although FOMC expertise is unobserved, it can nevertheless be estimated using an appropriate econometric model. Replicable FOMC forecasts can also be obtained from an appropriate econometric model. When FOMC forecasts are expressed as quantitative measures, they contain a qualitative (or latent) component, and hence also measurement error.

The primary purpose of this paper is to answer two questions regarding the FOMC and staff forecasts:

(i) Does the FOMC have expertise?

(ii) Can the FOMC forecast better than the staff?

In order to answer these questions, we develop a model to generate replicable FOMC forecasts, and compare the replicable and non-replicable FOMC forecasts using efficient estimation methods. A direct test of FOMC expertise on the FOMC forecast is also given.

The plan of the remainder of the paper is as follows. Section 2 presents and compares the staff forecast, non-replicable FOMC forecast, and replicable FOMC forecasts, considers optimal forecasts and efficient estimation methods, and presents a direct test of FOMC expertise on non-replicable FOMC forecasts. The empirical analysis of Romer and Romer (2008) is critically re-examined in Section 3. Concluding comments are given in Section 4.

2. Model Specifications

> "We compare these staff and policymaker forecasts for the period 1979-2001 with actual data to see if the FOMC forecasts contain useful information. We find that, for the most part, they do not." (Romer and Romer (2008, p. 230))
>
> "The FOMC should be able not just to match the staff, however, but to do better." (ibid, p. 232)
>
> "Since the staff forecast reflects a great deal of effort by hundreds of highly trained professionals, it is not especially surprising that policymakers do not have useful additional information." (ibid, p. 234)
>
> "But since policymakers know the staff forecast when they make theirs, the finding that the staff forecast contains information beyond what is in policymakers' forecast indicates that the FOMC is not using its available information optimally in constructing its forecast." (ibid, pp. 234-235)

The staff model and forecast, non-replicable FOMC forecast, and replicable FOMC forecasts, are discussed in the following sections.

2.1 Staff Model

The variable of interest, X_t, in Romer and Romer (2008) is given as

$$X_t = a + bS_t + cP_t + e_t, \tag{1}$$

where S_t is the Staff forecast of X_t, P_t is the Policymaker (or FOMC) forecast of X_t, and a, b and c are constant parameters, where the notation is the same as in their paper. Although Romer and Romer (2008, p. 231) state that "Our main interest is in whether c is positive", it is clear that a finding of $c \neq 0$ will reject the null hypothesis, $c = 0$, that the staff forecast alone is needed to predict X_t (for an interpretation of equation (1) as two competing simple non-nested hypotheses, and hence also of the coefficients *b* and *c*, in the context of a comprehensive approach to testing non-nested models, see McAleer (1995)). In the empirical analysis of Romer and Romer (2008), the variable X_t is taken to be the inflation rate, unemployment rate, and real growth rate.

Let $M_t = X_t - E(X_t \mid I_{t-1})$, where I_{t-1} is the information set available at time *t*-1 to Romer and Romer (2004), who have constructed various series of monetary shocks. Subtracting the conditional mean from (1) leads to the following equation:

$$M_t = a + b(P_t - S_t) + e_t. \qquad (2)$$

Equations (1) and (2) are used to test if the FOMC has anything to add to the staff forecast in explaining X_t, and if the difference between P_t and S_t can explain M_t, respectively. However, as explained in the Appendix, equation (2) can be derived from (1) only under highly implausible assumptions, and hence is unlikely to be consistent with the existence of (1). For this reason, we will not discuss (2) any further.

If the econometric model underlying the staff forecast is correctly specified, Ordinary Least Squares (OLS) will be consistent and efficient, and hence optimal in estimation. In addition, under the assumption of mean squared error (MSE) loss, the optimal forecast of X_t, given the information set available to the staff, is its conditional expectation (see Patton and Timmermann (2007a, 2007b)).

However, if the staff forecast of X_t is not replicable because it is not based on an econometric model, it is neither optimal in estimation nor is the conditional expectation of X_t optimal with respect to a MSE loss function.

2.2 FOMC Forecasts and Replicable FOMC Forecasts

The staff forecasts of X_t, that is, S_t, are made available to the FOMC, which is expected to improve on the forecast through adding information to S_t. The FOMC expertise is latent, but it can be estimated. Therefore, an important issue to be addressed is whether the FOMC forecast can be replicated.

Let P represent the FOMC forecast, where the relationship between the FOMC forecast and latent FOMC expertise is given as

$$P = P^* + \eta, \qquad \eta \sim (0, \sigma_\eta^2 I)\,, \tag{3}$$

where P, P^* and η are (T x 1) vectors, P^* represents the latent FOMC expertise, η is the measurement error, and P^* and η are assumed to be uncorrelated.

Let the FOMC forecast be given as

$$P = W\delta + \eta, \qquad \eta \sim (0, \sigma_\eta^2 I)\,, \tag{4}$$

where the (T x k) matrix W is in the information set available to the FOMC at time t-1, and the first column of W is the unit vector. It is assumed that E($W'\eta$) = 0, δ is a (k x 1) vector of constant parameters,

$$W = \{S, W_1\} \subset I_{-1}^E,$$

which is the information set of the FOMC at time t-1, W_1 is (T x (k-1)), and S is available to the FOMC before it announces P.

If the model in (4) is correctly specified, under the assumption of a MSE loss function, the optimal replicable FOMC forecast of P, given the information set I_{-1}^{E}, is its conditional expectation, so the FOMC forecast is optimal. OLS estimation of the parameters in (4) is consistent and efficient, and hence is also optimal in estimation. However, if the FOMC does not have an appropriate econometric model in forming P, the resulting non-replicable FOMC forecast will not be optimal under a MSE loss function.

It follows from (4) and I_{-1}^{E} that

$$\mathrm{E}(P \mid I_{-1}^{E}) \equiv P^{*} = W\delta, \tag{5}$$

so that W denotes expertise as P^{*} is a linear combination of the columns of W. The rational expectations estimate of $\mathrm{E}(P \mid I_{-1}^{E})$, which is a replicable FOMC forecast, is given as

$$\hat{P}* = \hat{P} = W\hat{\delta} = W(W'W)^{-1}W'P, \tag{6}$$

so that the estimate of FOMC expertise, P^{*}, is equivalent to the estimate of the FOMC forecast, P.

The FOMC model for forecasting X is given by

$$X = ai + \delta_0 S + \beta P^{*} + u, \qquad u \sim (0, \sigma_u^2 I), \tag{7}$$

where a, δ_0 and β are scalar parameters, and i is a vector of unit elements. As P^{*} is latent, an observable, and hence estimable, version of (7) is given as

$$X = ai + \delta_0 S + \beta \hat{P} + \varepsilon, \tag{8}$$

where

$$\begin{aligned} \varepsilon &= u + \beta(P^* - \hat{P}) \\ &= u + \beta(W\delta - P_W P) \\ &= u + \beta(W\delta - P_W(W\delta + \eta)) \\ &= u - \beta P_W \eta \end{aligned} \tag{9}$$

and $P_W = W(W'W)^{-1}W$. As the measurement error, η, enters (9), the covariance matrix of ε is not proportional to the identity matrix, and ε is serially correlated and heteroskedastic. However, OLS estimation of the parameters in (8) will be consistent (see Franses et al. (2008) for a general discussion).

The novelty of our approach is that, in contrast to (1), the model in (8) relates X to S and the replicable FOMC forecast, $\hat{P}$, rather than X to S and the non-replicable FOMC forecast, P. As S is replicable, at least in principle, whereas P is not, (8) provides a fairer comparison of replicable forecasts by the staff and FOMC, as compared with (1), which compares a replicable staff forecast with a non-replicable FOMC forecast. In this sense, comparing S and $\hat{P}$ will provide a more powerful test of FOMC forecasting performance than comparing S and P. Moreover, (8) provides a test of whether the FOMC uses the staff forecast, S, as a complement to the replicable FOMC forecast, $\hat{P}$.

2.3 Efficient Estimation

Franses et al. (2008) establish the conditions under which OLS estimation of the parameters in a more general version of (8) is efficient by appealing to Kruskal's Theorem, which is necessary and sufficient for OLS to be efficient (see Fiebig et al. (1992) and McAleer (1992) for further details). In the context of OLS estimation of (8), the necessary and sufficient conditions for OLS to be efficient will be satisfied if either the variables used to obtain the staff forecast are contained in the information set of the FOMC, or are orthogonal to the variables in the information set of the FOMC.

Of the two alternative necessary and sufficient conditions, it is more likely that the former condition will hold. It was also shown by Franses et al. (2008) that, if the incorrect downward biased OLS standard errors are used, then the incorrect OLS t-ratios will be biased upward. They suggest that the correct OLS covariance matrix in (8) should be estimated consistently using the Newey-West HAC standard errors.

2.4 A Direct Test of FOMC Expertise on FOMC Forecast

Substituting for P^* from (3) into (7) gives

$$X = ai + \delta_0 S + \beta P + (u - \beta\eta) . \tag{10}$$

Equation (10) is equivalent to (1), with $e = u - \beta\eta$. It is clear that OLS will be inconsistent in (10) as P is correlated with η. Therefore, IV or GMM estimation should be used whenever the non-replicable FOMC forecast is used to forecast X. Romer and Romer (2008) used OLS to estimate the parameters in (15). Moreover, under a MSE loss function, the conditional expectation of X in (10) is not optimal as a forecast, given the information set (S, P).

The effect of FOMC expertise on the non-replicable FOMC forecast can be tested directly by testing appropriate hypotheses in (4), which may be rewritten as

$$P = W\delta + \eta = \delta_0 S + W_1\delta_1 + \eta, \qquad \eta \sim (0, \sigma_\eta^2 I) . \tag{11}$$

OLS is efficient for δ_0 and δ_1 in (11).

A direct test of FOMC expertise, namely whether the FOMC adds any additional information to S in formulating the FOMC forecast, P, is given by

$$H_0: \quad \delta_1 = 0. \tag{12}$$

If the null hypothesis in (12) is not rejected using a Wald or F test, FOMC expertise does not add significantly to the staff forecast in determining the FOMC forecast.

As a special case of (11), the auxiliary regression equation to correlate the FOMC and staff forecasts is given by

$$P = ai + \delta_0 S + v. \qquad . \tag{13}$$

In comparison with (11), it is clear that OLS applied to (13) omits W_1 (apart from an intercept term), which denotes FOMC expertise. As it is likely that W_1 and S are correlated, OLS will be inconsistent and inferences will be invalid. It is also likely that v in (13) will be serially correlated, especially if the omitted W_1 contains lagged values of variables. Therefore, inferences based on (13) will be biased and invalid. Moreover, under a MSE loss function, the forecasts from (13) will not be optimal.

3. Empirical Analysis

We now turn to a detailed analysis of the Romer and Romer (2008) empirical results, and add some insights.

The data are described in Romer and Romer (2008, pp. 230-231), and are available in an appendix on the AEA website (http://www.aeaweb.org/articles/issues_datasets.php). For the reasons given in the Appendix, equation (1) in Romer and Romer (2008) will be estimated for the inflation rate, unemployment rate and rate of real growth, but not equation (2).

As discussed in Romer and Romer (2008, pp. 230-231), the FOMC prepares forecasts in February and July each year. The February forecasts for inflation and the growth rate are for the four quarters ending in the fourth quarter of the current year, and the unemployment rate forecast is for the fourth quarter of the current year. The July forecasts are for the same variables for both the current and next year. The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts, giving a total of 68 observations.

[Insert Figures 1, 2 and 3 about here]

The actual inflation rate, unemployment rate and real growth rate, as well as the corresponding staff and FOMC forecasts, are shown in Figures 1-3, respectively. It is clear that the staff and FOMC forecasts are very similar, but it is also clear that they are not particularly close to the actual rates they are forecasting. The similarity in the two sets of forecasts is supported by the correlations in Table 1 between the staff and FOMC forecasts, which are obviously very similar.

[Insert Table 1 about here]

The similarity in forecast performance is also shown in Table 2, which reports the mean and median squared prediction errors for the staff and FOMC forecasts for the three variables. The staff is clearly better than the FOMC in forecasting the inflation rate, the reverse holds in forecasting the real growth rate, and it is too close to call for the unemployment rate, with the staff only slightly better (worse) than the FOMC in terms of the mean (median) squared prediction error. In terms of forecasting performance, therefore, it would be fair to call the outcome a tie.

[Insert Table 2 about here]

In terms of formal tests of the forecasting performance of the staff and the FOMC, the OLS and GMM estimates of equation (1) (equivalently, equation (10), which shows that P is correlated with the error term), are given in Table 3. As discussed previously, OLS is inconsistent and the forecast is not MSE optimal, while GMM is consistent. The instrument list for GMM uses the one-period lagged values of inflation, unemployment rate and real growth rate (except for the case of real growth, where only the second lag is used). The inconsistent OLS estimates correspond to those in Table 1 in Romer and Romer (2008), where it was inferred that the staff forecasts dominated those of the FOMC for inflation and the unemployment rate, though not for the real growth rate. It is instructive that the GMM estimates indicate that the staff is better than the FOMC in forecasting inflation, but not in forecasting the unemployment rate or the growth rate, where the effects of both the staff and FOMC forecasts are insignificant.

[Insert Table 3 about here]

Although the OLS and GMM estimates of the coefficients are markedly different, it is worth noting that the sums of the estimated staff and FOMC marginal effects are very similar, namely 1.00 and 1.13 for inflation, 0.94 and 1.01 for the unemployment rate, and 0.88 and 1.19 for the growth rate. In this sense, the sum of the parts would seem to be greater than the whole.

[Insert Table 4 about here]

The OLS estimates of equations (4) (equivalently, equation (11), which makes the role of the staff forecast explicit) and (13), which deletes the effect of the FOMC expertise, are given in Table 4. For purposes of estimating (4) and (11), OLS is efficient and the forecast is MSE optimal, but OLS is inconsistent and the forecast is not MSE optimal for estimating (13).

In the absence of FOMC expertise, the inconsistent OLS estimates for (13) might seem to suggest that the effect of the staff forecast on the FOMC forecast is very close to unity for all three variables. However, the inclusion of FOMC expertise, as approximated by one-period lagged inflation, unemployment and real growth rates, shows that the effect of the staff forecast, while remaining significant, is considerably less. The F test of the significance of FOMC expertise makes it clear that expertise does matter, and significantly so, in obtaining the non-replicable FOMC forecast, P. In short, the FOMC has statistically significant expertise. This answers our first question.

[Insert Table 5 about here]

The empirical performance of the staff and replicable FOMC forecasts are compared in Table 5. Although OLS is efficient and the forecast is MSE optimal for equation (8), the standard errors are not proportional to the identity matrix, so the Newey-West HAC standard errors are also given. The staff is seen to dominate the FOMC for the inflation rate, but both the staff and FOMC forecasts are insignificant for the unemployment and real growth rates. Although the goodness of fit of the OLS estimates in Tables 3 and 5 are virtually identical, the corresponding coefficient estimates are markedly different. However, the sums of the estimated staff and FOMC marginal effects in Table 5 are very similar to their OLS counterparts in Table 3, at 1.01, 0.95 and 0.98 for inflation, unemployment rate and real growth rate, respectively.

In summary, in a comparison with the staff forecasts, the use of FOMC forecasts and replicable FOMC forecasts yield considerably different empirical results. The answer to our second question, therefore, is that the FOMC does not forecast well, but neither does the staff!

4. Conclusion

> "Our findings could also have implications for policymaking in other countries … monetary policymakers elsewhere might wish to consider the possibility that they do not have additional information, and to encourage empirical testing of this proposition." (Romer and Romer (2008, p. 235))

We agree wholeheartedly with the sensible empirical recommendation of testing the proposition that policymaking bodies should have their forecasts tested against objective criteria. To this end, the primary purpose of the paper was to answer the following two questions regarding the influential Federal Open Market Committee (FOMC) of the Federal Reserve System, in comparison with the forecasts contained in the “Greenbooks” of the professional staff of the Board of Governors:

(i) Does the FOMC have expertise?

(ii) Can the FOMC forecast better than the staff?

The FOMC forecasts that are analyzed in practice are non-replicable forecasts. This paper developed a model to generate replicable FOMC forecasts, and compared the replicable and non-replicable FOMC forecasts using efficient estimation methods. A direct test of FOMC expertise on the FOMC forecast was also given. The paper compared staff forecasts, non-replicable FOMC forecasts, and replicable FOMC forecasts, considers optimal forecasts and efficient estimation methods, and presented a direct test of FOMC expertise on non-replicable FOMC forecasts. The empirical analysis of Romer and Romer (2008) was re-examined to evaluate whether the criticisms of the FOMC’s forecasting performance should be accepted unreservedly, or might be open to alternative interpretations.

It is not easy to forecast economic fundamentals such as the inflation rate, unemployment rate and the rate of real growth. With this caveat in mind, the answers to the two questions posed in this paper are:

(i) Yes, the FOMC has significant expertise;

(ii) The forecasts of the FOMC and staff are very similar, and are equally good or equally bad.

Appendix: The Implausibility of Equation (2) in Romer and Romer (2008)

The variable of interest, X_t, is given as

$$X_t = a + bS_t + cP_t + e_t, \qquad (1)$$

In which Romer and Romer (2008, p. 231) suggest that $c > 0$. However, $c \neq 0$ is sufficient to reject the null hypothesis, $c = 0$, that the staff forecast alone is needed to predict X_t (for an interpretation of equation (1), and hence also of the coefficients b and c, in the context of a comprehensive approach to testing non-nested models, see, for example, McAleer (1995)).

Let $M_t = X_t - E(X_t \mid I_{t-1})$, where I_{t-1} is the information set available at time t-1 to Romer and Romer (2004). Subtracting the conditional mean from (1) gives

$$M_t = X_t - E(X_t \mid I_{t-1}) = b(S_t - E(S_t \mid I_{t-1})) + c(P_t - E(P_t \mid I_{t-1})) + e_t, \qquad (1a)$$

where it is assumed that $E(e_t \mid I_{t-1}) = 0$.

In order to derive equation (2) in Romer and Romer (2008), it is necessary to make certain restrictive assumptions. If $b + c = 0$, equation (1a) may be rewritten as

$$M_t = c(P_t - S_t) + c(E(S_t \mid I_{t-1}) - E(P_t \mid I_{t-1})) + e_t. \qquad (1b)$$

If $E(S_t \mid I_{t-1}) - E(P_t \mid I_{t-1}) = a / c$, then equation (1b) may be rewritten as

$$M_t = a - b(P_t - S_t) + e_t, \qquad (2)$$

which is equivalent to equation (2) in Romer and Romer (2008), as c can be positive or negative, so that b can be negative or positive.

There is no reason to believe that $E(S_t \mid I_{t-1}) - E(P_t \mid I_{t-1}) = a / c$, as S_t and P_t can have time-varying conditional means that do not differ by a constant. It is also unlikely for $b + c = 0$ to hold, especially given the empirical evidence in Romer and Romer (2008) and in this paper (see Tables 3 and 5), which suggest that $b + c = 1$ is more likely to hold. If $b + c = 1$, equation (2) would be even less plausible, given equation (1)..

Therefore, equation (2) in Romer and Romer (2008) is implausible as it is not consistent with equation (1).

Table 1

Correlations between Staff Forecasts and FOMC Forecasts

Variable	Correlation
Inflation	0.99
Unemployment	0.99
Real growth	0.97

Note: The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts, giving a total of 68 observations.

Table 2

A Comparison of Staff Forecasts and FOMC Forecasts

	Squared Prediction Errors			
	Mean		Median	
Variable	Staff	FOMC	Staff	FOMC
Inflation	0.71	0.89	0.19	0.28
Unemployment	0.54	0.57	0.16	0.15
Real growth	2.10	1.99	1.22	1.04

Note: The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts, giving a total of 68 observations.

Table 3

A Comparison of Staff and FOMC Forecasts in Predicting Actual Values (Standard errors are in parentheses)

Estimation method	Intercept	Staff (S_t)	FOMC (P_t)	R^2
		Inflation		
OLS	-0.20	1.10**	-0.10	0.86
	(0.22)	(0.39)	(0.37)	
GMM	-0.26	4.77**	-3.64	0.64
	(0.34)	(2.32)	(2.26)	
		Unemployment		
OLS	0.26	0.97*	-0.03	0.79
	(0.41)	(0.38)	(0.40)	
GMM	-0.37	3.41	-2.40	0.64
	(0.76)	(2.78)	(2.87)	
		Real growth		
OLS	0.43	0.25	0.63	0.44
	(0.36)	(0.49)	(0.52)	
GMM	-0.22	1.70	-0.51	0.31
	(0.83)	(3.61)	(3.42)	

Notes: The regression model is

$$X_t = a + bS_t + cP_t + e_t,$$

which is equation (1) in Romer and Romer (2008)), and equations (1) and (10) in this paper. The OLS estimates correspond to those in Table 1 of Romer and Romer (2008). The instrument list uses the one-period lagged values of inflation, unemployment rate and real growth (except for the case of real growth, where only lag 2 is used).
* and ** denote significance at the 5% and 1% levels, respectively.

Table 4

Testing the Effect of Expertise on Expert Opinion
(Standard errors are in parentheses)

	Inflation		Unemployment		Real growth	
Variables	(4)	(13)	(4)	(13)	(4)	(13)
Intercept	-0.18 (0.16)	0.01 (0.07)	-0.00 (0.13)	0.19 (0.12)	-0.22 (0.20)	0.28 (0.08)
Staff Forecast, S_t	0.91^{**} (0.06)	1.03^{**} (0.02)	0.77^{**} (0.06)	0.96^{**} (0.02)	0.86^{**} (0.04)	0.93^{**} (0.03)
P_{t-1}	0.38^{**} (0.12)		0.32^{**} (0.12)		0.33^{**} (0.12)	
S_{t-1}	-0.26^{*} (0.13)		-0.14 (0.12)		-0.19 (0.11)	
Inflation_{t-1}	-0.03 (0.04)		-0.00 (0.02)		0.02 (0.03)	
$\text{Unemployment}_{t-1}$	0.04 (0.03)		0.04 (0.05)		0.03 (0.03)	
Real growth_{t-1}	0.01 (0.02)		0.01 (0.02)		0.02 (0.03)	
R^2	0.99	0.98	0.98	0.98	0.96	0.94
F test		4.86^{**}		5.79^{**}		5.87^{**}

Notes: The regression equation correlates P_t and S_t through

$$P_t = a + \delta_0 S_t + v_t,$$

which is equation (13), but omits FOMC expertise, W_1, as approximated by one-period lagged inflation, unemployment and real growth, in equations (4) and (11).
* and ** denote significance at the 5% and 1% levels, respectively.

Table 5

A Comparison of Staff and Replicable FOMC Forecasts in Predicting Actual Values (Standard errors are in parentheses)

Estimation method	Intercept	Staff (S_t)	FOMC (P_t)	R^2
		Inflation		
OLS	-0.20 (0.23)	1.89** (0.72)	-0.88 (0.70)	0.85
HAC	[0.25]	[0.55]	[0.56]	
		Unemployment		
OLS	0.22 (0.42)	0.80 (0.67)	0.15 (0.69)	0.79
HAC	[0.67]	[0.71]	[0.71]	
		Real growth		
OLS	0.10 (0.45)	-0.28 (0.84)	1.26 (0.91)	0.45
HAC	[0.48]	[1.07]	[1.06]	

Notes: The regression model is

$$X_t = a + \delta_0 S_t + \beta \hat{P}_t + \varepsilon_t ,$$

which is equation (8). The Newey-West HAC standard errors are given in brackets.
** denotes significance at the 1% level.

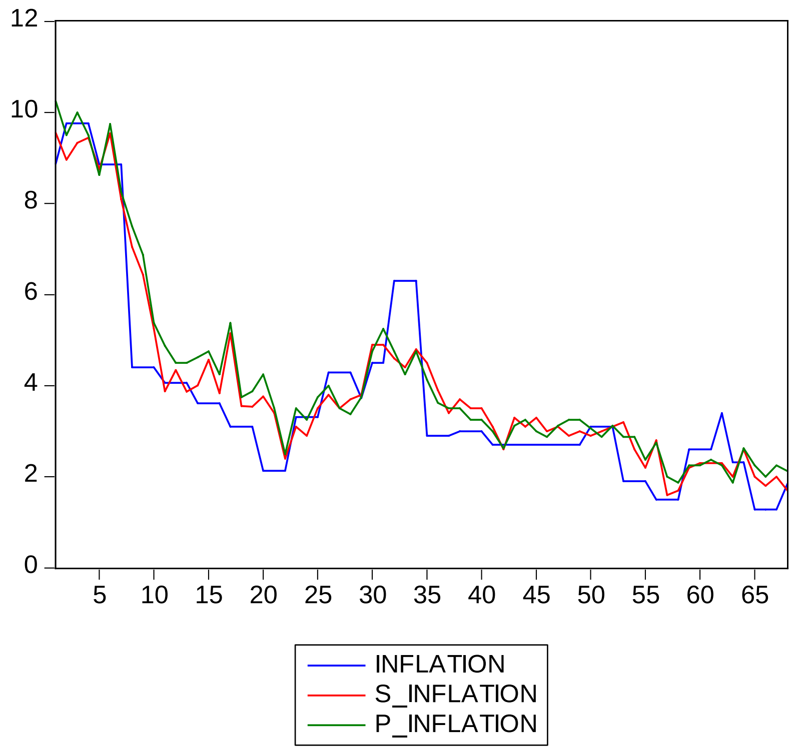

Figure 1

Inflation rate, Staff forecasts (S_inflation) and FOMC forecasts (P_inflation)

The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts (1979 is observation 1 and 2001 is observation 68).

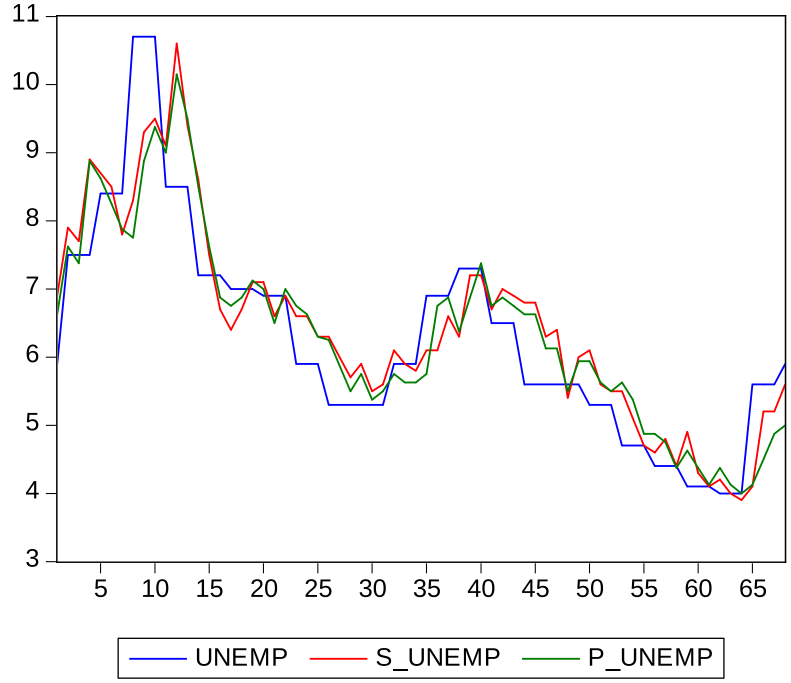

Figure 2

Unemployment rate, Staff forecasts (S_unemp) and FOMC forecasts (P_unemp)

The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts (1979 is observation 1 and 2001 is observation 68).

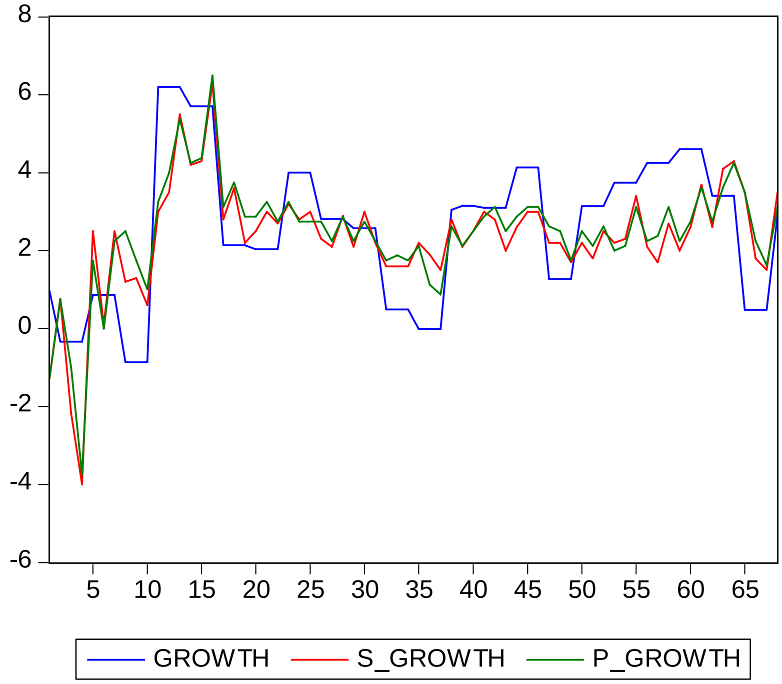

Figure 3

Growth rate, Staff forecasts (S_growth) and FOMC forecasts (P_growth)

The sample is from 1979 to 2001, with 22 February forecasts and 46 July forecasts (1979 is observation 1 and 2001 is observation 68).

References

Fiebig, D.G., M. McAleer and R. Bartels (1992), Properties of Ordinary Least Squares Estimators in Regression Models with Non-Spherical Disturbances, *Journal of Econometrics*, 54, 321-334.

Franses, P.H., M. McAleer and R. Legerstee (2008), Expert Opinion Versus Expertise in Forecasting, Econometric Institute Report 2008-30, Erasmus University Rotterdam.

McAleer, M. (1992), Efficient Estimation: The Rao-Zyskind Condition, Kruskal's Theorem and Ordinary Least Squares, *Economic Record*, 68, 65-72.

McAleer, M. (1995), The Significance of Testing Empirical Non-nested Models, *Journal of Econometrics*, 67, 149-171.

Patton, A.J. and A. Timmermann (2007a), Properties of Optimal Forecasts Under Asymmetric Loss and Nonlinearity, *Journal of Econometrics*, 140, 884-918.

Patton, A.J. and A. Timmermann (2007b), Testing Forecast Optimality Under Unknown Loss, *Journal of the American Statistical Association*, 102, 1172-1184.

Romer, C.D. and D.H. Romer (2004), A New Measure of Monetary Shocks: Derivation and Implications, *American Economic Review*, 94, 1055-1084.

Romer, C.D. and D.H. Romer (2008), The FOMC Versus the Staff: Where Can Monetary Policymakers Add Value?, *American Economic Review: Papers & Proceedings*, 98, 230-235.