BANK SUPERVISION, COMMERCIAL INFLATION FORECASTING AND INFORMATION ASYMMETRY: NEW EVIDENCE FOR THE U.S.A

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Abstract

This paper provides further evidence on the issue of the information asymmetry between the Federal Reserve Bank and commercial forecasters. Previous theoretical and empirical evidence suggest that in the absence of confidential supervisory information, commercial forecasters fail to capture the complete behaviour of economic variables. We test whether such information can improve commercial inflation forecasts during the period 1990:2 to 2000:2, using the change in the Federal Funds rate as a proxy for confidential information in the Fed’s forecasts. Our findings confirm the presence and relevance of supervisory information in inflation forecasting. When the Fed receives information that results in contractionary policy, the results show commercial forecasts are generally below those of the Fed. This evidence is consistent with the main findings of earlier U.S studies, supporting the existence of an informational advantage by the Fed and the generally accepted argument that the supervision of banks is central to central banking.

Keywords
Banking supervision, Federal Reserve Bank, Monetary policy, Inflation forecasts, Information asymmetry.

JEL Codes
E17, E52, E58
1. Introduction

The Rational Expectation Hypothesis implies that our past experiences guide our future expectations. In relation to inflation, our expectations are not separated from the behaviour of actual inflation (Dorbusch and Fischer, 1994, p. 476). People rely on information from “public” sources to make their routine expenditure or major investment decisions.

The Federal Reserve Bank (Fed) as well as commercial forecasters forms independent expectations about the course of future inflation using publicly available information. Additional, the Fed uses confidential supervisory information that is obtained through the banking system.

Banks generate information that cannot be accessed by external public agents and this information is crucial in guiding and determining monetary policy. Commercial forecasters are a subset of these external public agents who are not privy to this information. This led to the view that banks are special.

A number of studies have shown that the financial health of banks may affect either the availability and terms of credit to borrowers or the response of the economy to a change in monetary policy instruments (e.g., Bernanke and Blinder, 1988; Kashyap, Stein and Wilcox, 1993; Kashyap and Stein, 1994a; Peek and Rosengren, 1995b). From other side, Goodhart (1998) explained the importance of the role of banks into the banking system. He showed that banks form the core of the payments and settlements system, and that the failure of one bank increases the probability of failure in another. He cited the fragility of the inter-bank market in which delayed settlements can trigger liquidity problems and bank runs. In specifying the importance of healthy banks to the overall soundness of the system, he claimed that publicly available financial data does not always reflect the true finan-
cial health of a bank. Dahl, O'Keefe and Hanweck (1998) pointed out that bank manager's frequently deferred loan-loss recognition thereby understating the potential impact on a bank's profits and capital base. The possible existence of lack of transparency in public reporting by banks is clouding the ability of outsiders to assess their risks (Morgan, 1997). Kane and DeTrask (1998) supported that federal examiners may have no clear view of the true financial position of banks because banking operations are sometimes so opaque.

Central banks minimise the information asymmetry between banks and the system, through supervisory activities. The database created as a result of such action enhances inflation forecasts and has proven beneficial to monetary policy decision making (Blinder, 1998). This paper investigates the content and usage of such information in the formulation of inflation forecasts. More specifically, we try to determine whether the Fed has confidential information that is useful in targeting inflation, and if that information improves forecasts made by commercial forecasters.

Previous research on this topic confirms the existence of information not publicly available but relevant to monetary policy decisions and that the banking system is the source of such confidential information. Using inflation forecasts and the change in Fed funds rate as a policy variable with strong connections to the banking system, our results confirm the presence and relevance of confidential supervisory information in inflation forecasting and add to the general view that the supervision of banks is central to central banking.

The rest of the paper is structured as follows. Section 2 provides an overview of the theoretical framework of policy formation and banking supervision at the Federal Reserve Bank. Section 3 reviews the main existing literature on monetary policy and the role of confidential supervisory information. Section 4 presents the methodol-
ology and the data selection process. Empirical results are reported in Section 5. Finally, conclusions are presented in Section 6.

2. Monetary policy, confidential supervisory information and forecasting

Monetary policy is defined as the deliberate control of the money supply to achieve economic goals. It has caused a long debate between Monetarist and Keynesians for decades over the mechanism and timing of impact on the economy. The monetarists’ approach improves upon the strict quantity theory of proportionality between prices and the quantity of money. They hold that in the short run the supply curve is vertical; adjustments in output tend to precede price changes, which are effected after a time lag. However, money is neutral in the long run. Changes in the money supply only affect prices, all other variables are virtually unaffected.

However, how do you minimize price variability and at the same time maintain a suitable level of economic activity (the so-called monetary policy puzzle). The Fed’s primary objective is to achieve and maintain low inflation and price stability. The Fed uses commodity prices along with other price indices as a guide to inflationary forces and then adjusts the Federal Funds rate accordingly. If stable prices were predicted, a lower rate would be maintained to foster economic growth. Projected future growth at an undesirable pace would urge the Fed to react with rate increases until prices revert to stable levels (Edwards, 1996).

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1. The Fed funds rate is the price charged to banks by the Federal Reserve Bank for the use of excess reserves of other banking institutions. It is used as a monetary policy tool to regulate the supply of reserves that banks have for on-lending.
However, the funds rate is a nominal short-term rate, but economic activity is driven by aggregate demand, which reacts to real long-term rates. In acting upon the funds rate, if the Federal Open Market Committee (FOMC) chose a target rate that resulted in the real interest rate being too high, inflation levels would fall at the expense of aggregate demand. Counteracting this with an immediate upward adjustment in the funds rate would stem the growth in the real interest rate and the expansion in the GDP gap.

The Federal Open Market Committee (FOMC), which has the responsibility for monetary policy at the Fed, convenes at least eight (8) times per annum. The purpose of these meetings is to assess the state of the economy, review projections for the immediate future path of inflation and establish adjustments in keeping with its long-term goal. The FOMC analyses the behaviour of the components of aggregate demand and also prices, without making any assumptions about future policy changes. Regulatory and supervisory issues, proposed mergers and acquisitions, and past and projected Open Market Operations desk activities all form part of the FOMC proceedings. A decision is then taken on whether to tighten or relax policy.

In an attempt to mitigate the asymmetric information problem between themselves and their customers, banks gather information on individual clients. This information provides an overview of income and employment levels, production levels industry-wide, consumer preferences, future capital expenditure, international trade data, credit demand and foreign currency demands.

The long term relationship between clients and their

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2. In his seminal work on monetary policy and the banking system, Stein (1988) provides a clear understanding of how the banking system aids in monetary policy decisions. Some of his key points are (a) the importance of the submission of reports by banks, (b) the measurement of monetary aggregates, and (c) the difficulties presented by financial innovation process with respect to controlling aggregates and creating new regulations.
bankers allows bank managers to develop extensive databases which provide patterns of company growth and failures. Such information is also crucial to the bank's own survival. Managers are in a position to direct the course of economic growth by deciding which loans are approved or declined, hence the importance of ensuring that the financial health of banks is maintained.

One method used by the Fed to ensure financial health and at the same time gather relevant information on economic variables, is On-site examinations. This involves the following actions:

(I) Assessment of the institutions assets, primarily the loan portfolios;

(II) Evaluation of the institutions' internal controls policies and its adherence to banking laws and other applicable regulations; and;

(III) Assessment of the adequacy of capital levels, the level and trend of earnings, overall funds management and sensitivity to interest rate changes.

All books and records of the examined bank are open to scrutiny by the inspectors at this time. Information on current and future activities, publicly available or not, of all customers and of the examined bank is uncovered and used in the overall assessment of the bank.

Based on the findings of each examination, a numerical rating, ranging from 1 to 5 is assigned to each of the five key areas under review (Capital, Assets, Management, Earnings and Liquidity). A composite rating is assigned based on the overall condition of the institution. These ratings are not for public disclosure, and up until

3. This entails reviewing individual loan files, assessing the adequacy of loan loss provisions, the timeliness of loan loss recognition, loan commitments, and proposed fixed asset acquisitions and disposals.

4. A rating of 1 suggests a sound institution in every aspect, a rating of 2 a fundamentally sound institution, a rating of 3 a flawed performed institution, while a rating of 4 indicate potential of failure and impaired variability and a rating of 5 means that there is high probability of failure and severely deficient performance.
recently were not even disclosed to the examined institution. The CAMEL system has been traditionally used by the U.S. financial regulatory agencies as an early warning system in order to identify potential bank failures. According to Dewatripont and Tirole (1994, p. 66), the early warning systems can also define "generalized capital requirements" which, if not met, constrain the bank to issue new shares or to retain from distributing dividends.

CAMEL ratings can measure the speed with which financial health can be restored if the necessary corrective actions were taken. Compiling this information for each district and then translating it into a picture of the system, the Fed can relate any patterns to the performance of economic variables, like inflation or unemployment rate. It can then exert the necessary forces on these variables through monetary policy to resuscitate the system.

3. Literature review

A number of studies have shown that in a world where expectations are formed rationally, the conduction of effective and socially beneficial countercyclical monetary policy is possible as long as the central bank possess superior information to that available to the public (e.g., Sargent and Wallace, 1975; Barro, 1976; and Fischer, 1977). However, the source of this information is not clearly determined. Given the assumption that the expectations are rational and the agents know the reaction route of the Fed, the Fed's informational advantage must concern variables other than the future course of monetary policy that drive the economy.

Romer and Romer (1996) provided evidence about the existence of any informational advantage by the Fed. They examined whether the Fed's forecasts of the macroeconomy contain useful information not contained in private forecasts, trying to answer three main questions:
Does the Fed have private information? If it does, is this information revealed to the public? And, do commercial forecasters react to this information?

Romer and Romer (1996) claimed that market players expect that the Fed has private information and that it transmits this information through monetary policy. This is analogous to the use of dividend policy or capital structure decisions to signal company's strength and future prospects. The willingness with which commercial forecasters revise their forecasts following the disclosure of the Fed's inflation forecasts is evidence of the acknowledgement of information asymmetry.

They obtained forecasts of inflation and real GDP growth from the Federal Reserve's 'Green Book' which is compiled by staff at the Board of Governors prior to each FOMC meeting. Three of the leading commercial forecasters were selected: Data Resource, Inc. – McGraw Hill (DRI), Survey of Professional Forecasters (SPF) and Blue Chip Economic Indicators (BC).

Romer and Romer (1996) used the following equation:

$$E_{it} = \alpha_{it} + \beta_i C_{it} + e_{it}$$

(1)

where $C_{it}$ is the difference between the commercial forecast and the Fed forecast at the same horizon and $E_{it}$ is the commercial forecast error at horizon $i$. A positive value for $\beta$ confirms that the commercial forecast error is due to the difference in forecasts brought about by the Fed having confidential information.

Their findings using inflation forecasts confirmed the existence of confidential information by Fed. The estimates of $\beta$ were large and positive for all three commercial forecasts and in most forecast horizons. The coefficient estimates were between 1 and 1.5 in horizons beyond the current quarter. For the current quarter the estimates were smaller but nonetheless significant for two of the
three forecasters. The size of the estimates signaled that the forecast error could almost be fully explained by the difference between the two forecasts.

Although the Fed receives data on economic variables prior to them being released to the public, Romer and Romer (1996) argued that the timing difference was not the cause of the advantage. They performed additional tests, placing the Fed at a deliberate disadvantage vis-à-vis timing, but like previous tests, the results consistently supported the hypothesis. Additional tests were performed to remove biases that could suggest the existence of inside information. Again their results supported the argument that the nature of the confidential information was not related to the Fed’s knowledge of the direction of future monetary policy.

To determine whether the Fed reveals its information to the public, Romer and Romer (1996) tested for confidential information in the Feds’ monetary policy actions. A dummy variable was constructed with a value of −1 to represent periods of expansionary monetary policy, +1 to represent periods of contractionary policy and 0 for all other periods. The change in the Funds rate target was also used in this test.

For the individual forecasts, the test confirmed that monetary policy actions were used to convey messages to the public. When the Fed’s forecast exceeds that of the commercial forecasters this is an indication of monetary policy tightening. This is validated by the fact that the estimated coefficients of the dummy variable are positive and many are significantly different from 0. Similar results were observed when the average forecasts were used. The average difference between the Fed forecast and the commercial forecast signaled the magnitude of tightening in policy.

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5. Performing additional tests on the average of the three forecasts, the results showed immaterial differences from those of the individual forecasts.
Romer and Romer (1996) tested whether commercial forecasters respond to Fed actions. They found that commercial forecasters made interim period revisions to their original forecasts to reflect the information signaled by policy changes. When monetary policy was contractionary, they found that commercial forecasts were revised upward; the majority of the estimated coefficients were positive and significant. However, the results varied across forecasters.

The results were stronger for the monetary policy dummy variable than for the funds rate target, suggesting that greater changes were made based on the dummy variable than for the announced changes in the rate. One explanation was that “contractionary policy actions tend to reduce inflation below the path forecasted by the Fed”. This suggests that commercial forecasters react more to the qualitative rather than the quantitative signal of changes in policy.

Cole and Gunther (1995) examined the “shelf life” of CAMEL ratings and found that the relevant information content is significantly reduced after two quarters. They claimed that it is difficult to differentiate between failing and surviving banks after that period and financial statements may be a better indication of financial health. However, they argued that the credibility of reported financial data was vital to the analysis of financial statements for these purposes. If the data were inaccurate, the conclusions would be spurious.

Peek, Rosengren and Tootell (1998) testing procedure involved CAMEL5 ratings as a proxy variable for confidential information, \(Z_t\) and a vector of private forecasts of the macroeconomic variables that affect monetary policy conditional upon information available at time \(t\), \(E_t(X_{t+1} : I_t)\). These variables were tested against the realised future value of a vector of macroeconomic variables, \(X_{t+1}\). Four commercial forecasters were used: Data Resource, Inc. – Mc Graw Hill (DRI), Blue Chip Economic Indicators
(BC), George State University (GSU), and University of Michigan Research Seminar in Quantitative Economics (RSQE). The basic equation had the following form:

\[ X_{t+1} = \alpha_0 + \alpha_1 E_t (X_{t+1} : I_t) + \alpha_2 Z_t + \epsilon_t \]  \hspace{1cm} (2)

A positive and significant value for \( \alpha_2 \) indicates the presence of confidential information. The fact that CAMEL5 ratings are highly confidential adds to the significance of their research.

The results of Peek et. al. (1998) did not fully conform to the limited “shelf life” theory of Cole and Gunther (1995). For the forecasted variables, unemployment rate and the CPI Inflation rate, the estimated coefficient of the proxy variable was as expected. For the unemployment rate forecast the estimated coefficient was close to one and statistically significant. This means that for every increment in the CAMEL5 rated banks, the employment rate increase relative to private forecasts. That is consistent with private forecasters’ lack of confidential supervisory information. Moreover, they found that, as the time band increased, the estimated coefficients on CAMEL5 also increased, signifying its contribution to monetary policy.

For tests on the inflation forecasts, their results were also significant and negative as expected. However, the estimated coefficient for the one-quarter ahead forecast was not significant though correctly signed. As the horizon increased toward the two, three and four-quarter ahead horizons the estimated coefficients became significant, something which is consistent with economic theory on the effects of inflation.\(^6\)

The findings of Peek et. al. (1998) supported Romer

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6. Analyses using each individual forecaster in separate equations gave more or less the same results as the pooled data, albeit at reduced significance levels.
and Romer (1996) and go even further by detecting the nature of this confidential information. They showed a high correlation between confidential supervisory information and the forecast errors of commercial forecasters. Commercial forecasters under-predicted the unemployment and inflation rates when there was a high incidence of poor performing banks. This is consistent with the Romer and Romer (1996) in that contractionary monetary policy occurs in periods of high forecasted inflation.

Another approach on the issue of private information is that of DeYoung et. al. (1998). They examined whether specialised government examiners are better forecasters of banks’ health than are private sector monitors. Their finding in favour of specialised government monitors added to the two previous studies in showing the importance of confidential supervisory information in inflation forecasting.

They also used CAMEL ratings in order to compare these ratings against ratings made by private forecasters, which were solely based on publicly available information from annual financial statements. Testing whether ratings of private agencies would benefit from supervisory information, they found that the absence of supervisory information also affected the risk premium paid for Bank Holding Company debentures.

Their testing procedure was analogous to the signalling model of Ross (1977) in the area of Corporate Finance, which was used to present the asymmetric information problem. There is an incentive for managers to use financial statements and other methods to signal good news to existing and potential investors. Managers are generally reluctant to disclose the bad news. In banking, like other firms, managers have a tendency of postponing loan loss recognition (bad news) so that neither depositor confidence nor share prices are affected.

DeYoung et. al. (1998) supported the existence of an “information effect” in banking sector. Specifically, the
bad news uncovered by bank supervisors’ examinations is made public ex post and causes an increase in the risk premium on the banks’ debentures. If the bad news warrants disciplinary action by the supervisors, that in time would improve the health of the bank, the risk premia is reduced. Similarly, Dahl et. al. (1998) found evidence of upward revisions in banks’ loan loss recognition following an examination by bank supervisors.

4. Methodological issues and data selection

Following the basic methodological concepts of Romer and Romer (1996) and Peek et. al. (1998), we try to obtain a reason for errors in commercial forecasts over the period 1990:2 to 2000:2. Two sources of economic forecasts are used; commercial forecasts made quarterly, using publicly available information, and the Fed forecast, which uses publicly available and supervisory information. The aim is to determine whether commercial forecasters can benefit from the information known to the Fed.

The model used to test this relationship has the following form:

\[ C_{it} = \alpha_0 + \alpha_1 P_t + e_t \]  

where \( C_{it} \) represents the forecast of inflation for a given quarter \( t \), made by commercial forecasters conditional upon publicly available information at time \( t \). \( P_t \) represents private information known to the Fed at time \( t \), and on which its forecasts are based. If by adding some proportion of confidential information, \( P \), as measured by \( \alpha \),

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7. Guttentag and Herring (1986) and Kane and DeTrask (1998) also supported the tendency of managers to project only the good news. Accusations are also pointed at regulators which concretise the theory that creative accounting can be used to portray only the good news to the public.
the forecasts are affected, then there is benefit to be derived from supervisory information.

Since confidential supervisory information is unobservable, a quantitative proxy variable is used to measure the effect on commercial forecasts. The Fed can manipulate the funds rate to promote or stem the flow of funds used to facilitate loan growth. Since the Fed's actions are guided by its long-term goal of price stability, movements in the funds rate are good indications of the kind of information the Fed has about future inflation. Bad news would trigger contractionary measures and good news either an expansionary or a neutral position.

The variable used in this test to measure inflation forecasts is the commercial forecast of the GDP Implicit Price Deflator. Since this variable is in levels, it is necessary to convert it to a rate in order to record the change between quarters. When faced with this problem, Romer and Romer (1996) netted the logarithms of the forecasts between a given horizon and its one-period lagged value then multiplied the result by 400. The rationale being that the data is quarterly. The same procedure was used in this paper for consistency.

If the Fed has bad news about future inflation their forecast will reflect this and their policy would be contractionary. The funds rate would increase. If the information set used by commercial forecasters lead to the same conclusion, then confidential supervisory information does not enhance forecasts and value of the $\alpha$ would be zero. If $\alpha_1$ is significantly different from zero then the additional information that drives the Fed forecasts can improve commercial forecasts. The sign on the estimated $\alpha_1$ is also important to the findings of the tests. If $\alpha_1=0.1$,

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8. Bernanke and Blinder (1992) showed that the funds rate target is both a measure of the effectiveness of monetary policy within the economy and a signalling device for policy direction.

9. If $\alpha_1=0$ then $C_{it} = \alpha_0 + e_{it}$. If $\alpha_1 \neq 0$ then $C_{it} = \alpha_0 + \alpha_1 P_t + e_{it}$.
then each time the funds rate increases by one unit, commercial forecasts change upward by 0.1. Similarly, if \( \alpha_1 = -0.1 \), then commercial forecasts would drop by 0.1\(^{10} \).

The underlying assumption is that both forecasts are made simultaneously and using the same economically available information. A positive coefficient, would suggest an understatement by commercial forecasters and a negative one, an overstatement. What this implies is that the confidential supervisory information can temper the expectations that are derived from economic variables alone. That is both forecasts can move in the same direction but still have and under or over statement by commercial forecasters.

This can be linked to the findings of Cole and Gunther (1995). Supervisory information allows the Fed to determine whether the forces that determined the financial health of a bank(s) are generated exogenously or endogenously. It would be easy therefore for the Fed to conclude whether financial recovery hinges on improved economic growth or a reconstitution of management or its practices. If the latter obtains, then supervisory action is likely to bring about an improvement in the condition of ailing bank(s). When such supervisory information is assessed alongside existing economic conditions, the Fed's expectations are likely to differ considerably from that of commercial forecasters even if they moved in the same direction.

What is inferred here is that the response of commercial forecasts to changes in the funds rate can be marginal or substantial. It merely depends on how the Fed interprets the available supervisory information and the time frame of corrective action.

The forecasted values for the GDP Implicit Price Deflator are obtained from the Survey of Professional

\(^{10}\) The estimated coefficient of \( \alpha_1 \) was assumed to be 1 so as to emphasize the effect of the estimated value of the slope coefficient.
Forecasters (SPF). The SPF, like other commercial forecasters, makes independent forecasts of various economic variables for use by both public and private sector organisations\textsuperscript{11}. The SPF is a leading supplier of forecasted variables. Founded by Victor Zarnowitz, in the late 60's, this Survey was taken over by the Federal Reserve Bank of Philadelphia in 1992. It is conducted on a quarterly basis and represents the independent predictions of a wide cross-section of economists and practitioners. In this paper, the median forecasts of the Survey are used. The data becomes available toward the end of February, May, August and November respectively for each quarter from 1968:1 to present. Forecasts are made for the remainder of the quarter in which the forecast is made, individually for four quarters ahead and for the full year and one year ahead.

The target rates for 1990:2 to 1992:12 are obtained from the Federal Bank of New York Quarterly Review for Spring 1990 to 1992; and those for 1993:2 to 2000:2 were taken from the FOMC Minutes from February 1993 to February 2000. The decision to adjust the target funds rate is made based on the inflation forecasts, since forecasts are made prior to each FOMC meeting.

The FOMC staff prepares their forecasts within 10 days of every FOMC meeting and they are for the remainder of that quarter and quarterly thereafter for four quarters ahead. The predictions are based on the premise that no changes in monetary policy would be made over the forecast period. This is important in rejecting the hypothesis of no relevance because it removes the possibility of biases linked to the Fed's knowledge of the future path of monetary policy.

To ensure that both forecasts are made on the basis of

\textsuperscript{11} Ideally, tests for confidential supervisory information should be performed directly on the source; the Fed's inflation forecasts and/or CAMEL ratings. The Green Book, which contains the Fed's inflation forecasts, has only recently been made publicly available and access is still relatively restricted. CAMEL ratings are not publicly available.
the same publicly available information, it is important to focus on the monetary policy actions that occur around the same time as the commercial forecasts. The FOMC meets eight times per year, generally twice per quarter. The target rates available closest to the end of February, May, August and November were used.

5. Empirical results

The OLS regression results of tests performed for one, two-, three- and four-quarter ahead forecasts are presented in Table 1.\textsuperscript{12} The estimated coefficients for the proxy variable for private information (change in Fed funds rate) are statistically significant at the 1% and 5% levels for almost all forecast horizons.

The estimated coefficient for the one-quarter-ahead forecast is negative and statistically significant. This suggests that in the short-horizon, commercial forecasters over-predicted the inflation rate by over a quarter of a percentage point. This is consistent with the findings by Peek et. al. (1998) but contradicts that of Romer and Romer (1996) who found that the relationship between inflation and confidential information was weaker in the near term.

One explanation for the over-prediction is that the supervisory information that the Fed possessed was able to negate or at least moderate the potential effects based on publicly available information alone.

The estimated coefficients for the two- and three- quar-

\textsuperscript{12} In assembling the data we faced with the problem of serial correlation in the errors. Using OLS in the presence of serially correlated errors would produce unbiased and consistent, but inefficient estimates (Green, 1997, p. 587-590). To correct for serial correlation in the errors in the original data, the first difference of the forecasts and the funds rate is used. The regressions are carried out using Cochrane-Orcutt two step method auto-regressive processes (AR), which produce statistically significant results.
### Table 1. Contribution of Confidential Bank Supervisory Information to the Forecast Accuracy for Inflation Rates.

<table>
<thead>
<tr>
<th>Variable/Horizon</th>
<th>1Q</th>
<th>2Q</th>
<th>3Q</th>
<th>4Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Fed Funds rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Standard errors)**</td>
<td>-0.28**</td>
<td>0.32**</td>
<td>0.36**</td>
<td>-0.08</td>
</tr>
<tr>
<td></td>
<td>(0.785)</td>
<td>(0.835)</td>
<td>(0.692)</td>
<td>(0.655)</td>
</tr>
<tr>
<td>t-statistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(prob.)</td>
<td>-3.42</td>
<td>2.85</td>
<td>2.49</td>
<td>-0.47</td>
</tr>
<tr>
<td></td>
<td>(.023)</td>
<td>(.021)</td>
<td>(.011)</td>
<td>(.675)</td>
</tr>
<tr>
<td>R²</td>
<td>0.84</td>
<td>0.67</td>
<td>0.72</td>
<td>0.61</td>
</tr>
</tbody>
</table>

*Computed using forecasts of GDP Implicit Price Deflator.

**The Standard errors were corrected using Cochrane-Orcutt two step method AR(2) processes.

***Significant at 1% and 5% level.

...ter ahead forecasts are positive and significant at the 1% and 5% level, rejecting also the hypothesis that confidential supervisory information has no relevance. The values of the coefficients increase from one quarter to the next, something consistent with the findings of Romer and Romer (1996) and Peek et. al. (1998). The results show that with each unit increase in the funds rate, consistent with the Fed’s forecasts of adverse future inflation levels, the estimates made by commercial forecasters were understated. Given that both forecasts have the benefit of the same publicly available information, the increasing significance of supervisory information between quarters adds to the empirical findings.
The four-quarter ahead forecast is negative and insignificant. Confidential supervisory information at time $t$ does not appear to contribute to four-quarter-ahead forecast, something which contradicts the findings of both Romer and Romer (1996) and Peek et. al. (1998). This finding may be explained by the "short life-span" of confidential information of Cole and Gunther (1995).

The general conclusion is that, in the absence of confidential supervisory information commercial forecasts are likely to provide a false reading of future inflation. The relevance of the information to forecasting increases as you move further out from the first quarter, but seems to lose its effect after three quarters. This is not consistent with the findings of other studies nor does it fit to the economic theory about inflation. However, consideration must be given to the frequency with which the funds rate was adjusted over the review period. If commercial forecasters predict the behaviour of the Fed, their forecasts are likely to reflect. Frequent short term adjustments in the rate can give an indication of the overall long-term goal. If commercial forecasters are better predictors of the long-term goal, it is likely that their forecasts would be more in line with the actual results.

In essence, our empirical results confirm the presence and relevance of supervisory information in inflation forecasting. That strengthens the view that the importance of a central bank is that it acts as a signal to private agents about forthcoming policy actions, thus providing them with better information in forming expectations.

Finally, Table 2 presents a comparison between our results and the findings of both Romer and Romer (1996) and Peek et. al. (1998). Using a different route to investigate the same issue, we find striking similarities that strengthens the overall evidence in favour of confidential supervisory information.
Table 2. Comparative Results of Tests on the Contribution of Confidential Bank Supervisory Information to the Forecast Accuracy for Inflation Rates.

<table>
<thead>
<tr>
<th>Period</th>
<th>Romer and Romer (1996) (Dummy Variable*)</th>
<th>Empirical Results (CAMEL ratings**)</th>
<th>This study (Change in Funds rate*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q</td>
<td>SPF 0.11 (0.62) DRI 0.23 (1.56) BC -0.16 (-1.18)</td>
<td>DRI -0.52 (.158) BC -0.032 (.147) GSU -0.153 (.169) RSQE -0.070 (.244)</td>
<td>SPF -0.28 (-3.42)</td>
</tr>
<tr>
<td>2Q</td>
<td>SPF 0.33 (1.96) DRI 0.25 (2.15) BC -0.02 (0.18)</td>
<td>DRI -0.325 (.365) BC -0.10 (.259) GSU -0.587 (.404) RSQE -0.112 (.271)</td>
<td>SPF 0.32 (2.85)</td>
</tr>
<tr>
<td>3Q</td>
<td>SPF 0.24 (2.24) DRI 0.17 (1.56) BC 0.10 (1.63)</td>
<td>DRI -0.876 (.463) BC -0.324 (.308) GSU -1.285 (.487) RSQE -0.178 (.295)</td>
<td>SPF 0.36 (2.49)</td>
</tr>
<tr>
<td>4Q</td>
<td>SPF 0.28 (2.98) DRI 0.07 (0.62) BC 0.14 (4.34)</td>
<td>DRI -1.038 (.518) BC -0.471 (.347) GSU -1.295 (.543) RSQE -0.188 (.300)</td>
<td>SPF -0.08 (-0.47)</td>
</tr>
</tbody>
</table>

* t-statistics in parenthesis.
** Standard errors in parenthesis.
6. Conclusions

The empirical evidence presented in this paper shows that in the absence of confidential supervisory information, commercial forecasters tend to under- or over-predict the inflation rate. Our results are consistent with the primary literature reviewed in this study, using a different data set and time period.

The findings of this study confirm that in the absence of confidential supervisory information, commercial forecasts failed to capture the complete behaviour of economic variables. Using the change in the funds rate as a proxy for confidential information in the Fed's forecast, the findings are as conclusive as those performed on CAMEL ratings and the actual Fed forecast by previous U.S. studies. More specifically, the estimated coefficients are statistically significant, rejecting the hypothesis that confidential supervisory information is not relevant. They are also correctly signed and the patterns follow known theories of the behaviour of monetary policy and inflation.

Previous empirical evidence combined with our findings confirms that relying solely on publicly available information can lead to errors in inflation forecasting. The primary objective of the Federal Reserve Bank is price stability. Significant and persistent inaccuracies in forecasting can have severe impacts on the economy. The least of which, though substantial in itself, is the possible loss of credibility by the Fed. This could render monetary policy actions less effective.

Through its supervisory activities, the Fed can augment publicly available information on the performance of economic variables with confidential supervisory information to enhance its inflation forecasts. The foregoing has led to the generally accepted argument that the supervision of banks is central to central banking (e.g. Peek et. al., 1999).
References


