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Does the Federal Reserve Possess An Exploitable Informational Advantage?

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Abstract

This paper provides evidence that the Federal Reserve has an informational advantage over the public that can be exploited to improve activist monetary policy. The informational advantage derives from the Fed's role as a bank supervisor, and it is shown to be of sufficient duration to be effective in guiding activist monetary policy, even in simple rational expectations models. The informational superiority does not result from the Fed having earlier access to publicly released data about the financial condition of banks. Instead, this informational advantage is generated by confidential supervisory knowledge about troubled, non-publicly traded banks. As a result, this information can remain confidential for an extended period of time because these banks do not have an incentive to fully disclose publicly the extent of their financial troubles, and, since they are not publicly traded, are not required to do so. The improvement in forecasts using this confidential information is both statistically significant and economically important, providing a potential justification for activist monetary policy.

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One of the major insights generated by the introduction of rational expectations into macroeconomics was that discretionary monetary policy had potential costs, as highlighted in Kydland and Prescott (1977) and Barro and Gordon (1983a, 1983b), and could have no benefits unless the central bank possessed superior information or superior flexibility. While a number of papers have modeled the possible benefits of discretionary monetary policy if the central bank has superior flexibility (for example, Barro 1976; Fischer 1977; Taylor 1979; Rogoff 1985; and Walsh 1995), few have discussed the possible benefits of activist policy if the monetary authority has superior information (for example, Sargent and Wallace 1975; Barro 1976*;* and Romer and Romer 1996). Yet, given the flexibility of the U.S. economy and the long lags of monetary policy, central bank discretion based on its increased maneuverability is problematic for the United States. We examine the alternative justification for an activist Federal Reserve, the possibility that the Fed has an exploitable informational superiority. Although many have viewed with skepticism the idea that the Fed could possess such an advantage, we find strong evidence that it does.

Only recently has empirical investigation been conducted into the possible existence and potential origins of an informational superiority at the Fed. In fact, the theoretical models are vague about the source of any possible informational advantage the Fed might enjoy. Partly for this reason, Romer and Romer (1996) simply compared macro forecasts made by the Fed to those made by private forecasters in order to test whether the Fed had an informational superiority in general, without regard for its source. They found some evidence that the Fed did produce superior forecasts and concluded that better knowledge of the model was the probable reason. Peek, Rosengren, and Tootell (1999) (PRT) went one step further and attempted to

locate the source of any potential informational advantage. They found that incorporating the Fed's confidential bank supervisory data significantly improved forecasts of variables relevant for the conduct of monetary policy. While PRT showed that bank supervisory information improves macro forecasts at horizons relevant for monetary policy, they did not examine whether this information could be utilized by the Fed for economic stabilization. This paper fills that gap. It shows that the possession of confidential supervisory information by the Fed does provide some justification for activist monetary policy, even in simple rational expectations models.

To warrant activist monetary policy, it is not enough that the Fed has an informational advantage; it must have an advantage that is at an horizon far enough ahead and that persists long enough for the lagged effects of monetary policy to take effect. The Fed's informational advantage about the long-horizon forecast must be long-lived, or economic agents would have time to adjust before any effects of monetary policy could take hold. Consequently, this paper examines the persistence of the Fed's informational superiority.

Since the literature has typically assumed that any informational advantage the Fed may enjoy would take the form of earlier access to publicly released data, this paper begins by showing that the usefulness of the information contained in the bank supervisory data does not arise from the fact that the Fed has early access to banking data that are subsequently released to the public. In fact, supervisory information is shown to add significantly to forecasts made even a full year after the information is gathered and released. Thus, we present strong evidence that the Fed's informational superiority is sufficiently persistent to be exploited by activist monetary policy.

The significance of the information about bank health in the forecast equations suggests either that all the relevant information is not being disclosed to the market or, if it is, that

forecasters are not making use of the available data. Conclusions about the benefits of activist monetary policy may depend on which of these two alternatives is valid. If the useful information remains confidential for a significant length of time, then the Fed has an exploitable informational superiority. If the information is simply not being used fully in these forecasts, then the evidence that the Fed enjoys an informational advantage over the relevant economic decision makers in the economy is less persuasive, as is the case for monetary activism, since that advantage would be based on the knowledge that the information is useful, rather than on the information per se. Thus, that advantage would disappear as soon as the economic agents realize the value of the information about bank health.

Because any conclusions about the benefits of discretionary monetary policy rest on the confidentiality of the supervisory data, the origin and nature of the Fed's informational advantage are examined in a variety of ways. The informational content of the supervisory data is shown to derive from the part of the supervisory information that one would expect to be confidential and to remain confidential for a significant period of time. We begin by showing that information about troubled banks that did not fail substantially improves forecasts of both the unemployment rate and the inflation rate, while information about troubled banks that eventually failed does not. This distinction is important, since the Fed's informational advantage should not persist once the bank's failure is public knowledge. More generally, the problems in banks that are so severely troubled that they eventually fail may be more difficult to conceal from the public than the problems in banks with less severe problems that recover. If the significance of the supervisory data derived from its confidentiality, then one would expect the information about the banks that eventually failed to be less important than the information about the weak institutions that survived; we find that it is.

A more compelling test of whether the importance of the bank supervisory information derives from confidential data would be to examine whether the useful part of that information originates from institutions whose financial conditions are least likely to be known by the public - banks that are not publicly traded. Certainly, stockholders and outside monitors, as well as Securities and Exchange Commission (SEC) filing requirements, play an important role in ensuring that relevant information about the health of publicly traded banks is publicly disclosed. As a result, supervisory ratings from market-traded institutions should contribute little, if any, to improvements in forecasts of the macroeconomy. In fact, that is the case. On the other hand, the supervisory information about small, privately held banks could remain confidential for an extended period of time. These institutions are not under the same pressure as market-traded banks to disclose their financial health for at least three reasons: most equity holders in these institutions are insiders who already have access to the relevant information; most depositors are fully insured and therefore indifferent about the health of these banks; and the SEC does not impose any filing requirements upon any of these lenders. Thus, if confidentiality of the bank supervisory data is the source of the apparent informational advantage for the Fed, the importance of that advantage should emanate from knowledge about the ratings of the non-market-traded institutions. Again, we find that it does.

These results indicate that bank supervisory data provide a persistent informational advantage to the Fed when forecasting the macroeconomy, and they do so for the right reasons. The data improve macro forecasts because they are confidential, not because forecasters fail to fully utilize the available information. As a result, the Fed's possession of superior information about the health of the banking system could justify activist monetary policy.

The next section examines whether bank supervisory data improve macro forecasts persistently enough to be exploited by activist monetary policy. The second section reveals that the relevant informational advantage contained in the supervisory ratings derives from its confidentiality. In particular, the private nature of the data on smaller, non-publicly traded institutions makes them an important source of the Fed's informational advantage, consistent with the findings by Kashyap and Stein (1994a, b, 1999) that smaller banks are most useful for understanding how financial conditions of banks influence the macroeconomy. The final section considers some implications of our empirical findings for the earlier rational expectations modeling of informational advantages at central banks.

I. Duration

PRT show that confidential supervisory ratings available to the central bank can substantially improve on private sector forecasts of inflation and unemployment rates for horizons as long as one year ahead. While these findings indicate one possible source of an informational advantage by the Fed, that paper did not explore whether the informational advantage could be exploited for activist monetary policy. For an informational superiority to be exploitable, it must last long enough to allow monetary policy, with its long lags, to affect the economy before the public itself can react to the new information. It is the durability of the informational advantage that is crucial to activist monetary policy.

In a simple model in which the effects of monetary policy are instantaneous and all contracts are set simultaneously, similar to that in Fischer (1977), the duration of the informational advantage does not matter. Whether the public learns of the new information one minute after its contracts are set or six months later is irrelevant; either way, the public cannot react to the information faster than the impact on the economy caused by changes in monetary

policy. With no lags in the effects of monetary policy, the superior flexibility of the monetary authority allows it to react and affect the economy before the public can adjust. It is both the central bank's increased maneuverability and the instantaneous effect of monetary policy that justify discretionary monetary policy in this model. The duration of any central bank informational advantage is not important; in fact, the benefits to activist monetary policy remain even if the public and the central bank learn of the shock at the same time, as long as it is after the contracts are set.

However, if the model is made more realistic, duration becomes central to the analysis of the benefits of activist policy. Assume that contracts are set continuously and uniformly through time. More important, monetary policy is allowed to affect the economy only with a significant lag.[1] Under such conditions, as Figure 1 shows, there is no benefit to activist policy without an informational advantage with significant duration. In Figure 1, the Fed learns of the information at t_{CB}, the public learns at t_P, monetary policy is not assumed to affect the economy until t_M, and the length of the contracts, uniformly negotiated over time, is $(t_T - t_{CB})$. t_M is set equal to t_T to ensure that any benefits that derive from activist monetary policy derive from the Fed's informational superiority, and not from any advantage due to its increased flexibility to affect the economy, which occurs when $t_M < t_T$. Figure 1a examines the case where the duration of the informational advantage is zero; thus, in the figure, the central bank and the public are assumed to learn of a shock at the same time, $t_{CB} = t_P$. When monetary policy lags are equal to or longer than the contract length, zero duration means there is no benefit to activist policy. All the contracts will have been renegotiated based on the information known at time t_P by the time monetary policy could have an effect. The lags in monetary policy ensure that no benefits accrue to activist policy when the duration of the informational advantage is short.[2]

With significant lags in the effects of monetary policy, benefits accrue to activist policy only if the duration of the informational advantage is large. As the duration of the informational advantage increases, that is, as t_P moves away from t_{CB} in Figure 1b, the number of contracts that get locked in before the public learns of the information (segment A) also increases, and the benefits of activist monetary policy increase. Because fewer economic agents are able to react to the information before the effects of monetary policy have an impact on the economy, the benefits of activist policy increase with the duration of the informational advantage. Thus, just as the lags in the effects of monetary policy make activist policy less beneficial, the duration of any informational advantage becomes more critical to any benefits to activist policy.

The importance of duration is not just an artifact of the assumption of fixed contracts. If prices are completely flexible, as in Sargent and Wallace (1975), Barro (1976), or Lucas (1975), so that the length of the contracts is zero, duration again becomes crucial to any benefits of activist monetary policy. Even with perfect flexibility, the longer is the duration of any informational advantage, the longer the period over which the public acts based on incorrect information. In fact, even if the public uses changes in the Fed instrument at t_{CB} to estimate the realization of the shock, as Fischer (1977) proposed, the benefits to activism rise with the duration of the informational advantage, since, if the Fed does nothing, no signal is released that can provide the public with the information it needs to avoid making expectational errors.[3] In this case, the longer the informational asymmetry lasts without a policy change, the larger the benefit of activist policy would have been had policymakers reacted. The signal merely becomes the transmission mechanism of policy.

In Barro (1976), Fischer (1977), and Sargent and Wallace (1975), the central bank's hypothesized informational superiority derives from its earlier access to data that are eventually

made available to the public. If this is the origin of the informational superiority, it is doubtful that the lags in the release of data are long enough to provide the Fed with an exploitable advantage. In fact, these authors dismiss the possibility of an exploitable informational advantage for essentially this reason. Thus, we first examine whether supervisory data add to the forecasts only due to the timing of the public release of bank financial data. Specifically, during the course of an examination, supervisors may find problems with a bank's health, such as inadequate loan loss reserves, that may be revealed by the end-of-the-quarter Call Report (released with a three-month delay), which contains balance sheet and income data required to be released to the public by all banks. In fact, most studies that posit a possible informational advantage for the Federal Reserve have considered a timing advantage of significantly less than the few months lag in the release of the bank financial data. Yet, given the long lags in the effects of monetary policy, a timing advantage of only one or two months would probably not represent a significantly exploitable advantage for activist monetary policy.

To investigate the length of the timing advantage, we examine whether the Fed's supervisory information would improve on the forecasts of the macro variables of particular concern to the Fed, even if the public were to obtain the publicly released bank financial data at the same time as the Fed. We focus on the same macroeconomic variables included in most models of the Federal Reserve objective function, inflation and unemployment rates (see Theil, 1964; Kydland and Prescott, 1977; Barro and Gordon 1983a, 1983b; and Walsh 1995, for example). These variables also have an important empirical advantage: The CPI is not revised and the unemployment rate is revised only marginally when the seasonals are updated. In addition, these two variables are included in all major commercial forecasts.

Equation 1 outlines the basic test:

$$(1)\quad X_{t+i} = \beta_0 + \beta_1 E_t(X_{t+i}: I_t) + B_2 CAMEL5_t + \beta_3 S_t + \varepsilon_t.$$

The dependent variable (X) is the realized future value in quarter t+i of either the inflation rate or the unemployment rate, where i takes values from one to four. As a result, the realized one-, two-, three-, and four-quarter-ahead values of inflation or unemployment rates are compared to the corresponding forecasts of these variables, E_t (X_{t+i} :I_t), made at time t.[4] Three major commercial forecasters, Data Resources Inc. (DRI), Georgia State University (GSU) and the University of Michigan Research Seminar in Quantitative Economics (RSQE) are used, as well as the internal forecasts generated by the staff of the Board of Governors (the Greenbook). The private forecasters are selected because they clearly have financial incentives to incorporate all relevant information and have sold their forecasts for a long enough period of time to make a reasonable evaluation of their performance. While the Greenbook is not available commercially, tremendous resources are devoted to producing the forecast before every Federal Open Market Committee (FOMC) meeting. Furthermore, although Romer and Romer (1998) provide some evidence that the Greenbook performs better than commercial forecasters, PRT found that supervisory information is not the source of this superior performance, and thus, the Greenbook outlook can be included in this group.[5]

Equation 1 also includes a variable, $CAMEL5_t$, which measures the health of the banking system. We follow PRT by using the internal bank supervisory ratings to construct the proxy for the confidential bank information known by the Fed but not the public. Bank supervisors evaluate each bank based on its Capital, Assets, Management, Earnings, and Liquidity (CAMEL

ratings). The ratings range from 1 (sound in every respect) to 5 (high probability of failure). We aggregate the confidential supervisory information created in the supervisory process to create the percent of bank assets in CAMEL 5-rated institutions as the proxy for the financial condition of banks known by the Fed to be in poor health, but perhaps not yet known by the public. We use the value for the end of the month prior to the forecast.

To test whether the coefficient on CAMEL5 is significant only because the Fed receives publicly available data on bank health prior to its release to the public, a vector of variables, S, containing the financial information known to bank supervisors, but released to the public only in the following quarter, is included in the regression. The variables included in S are typical of variables commonly used by examiners and analysts for the off-site monitoring of banks, the Capital/asset ratio, Asset quality, Earnings, and Liquidity (CAEL), as well as the percent of banks with a capital ratio below 4 percent.[6] Because the end-of-the-quarter financial information from the Call Report is generally not available to the public until the third month after the end of the quarter, bank supervisors have a timing advantage in understanding the financial condition of the bank. Thus, for example, for an economic forecast of the economy made in February of 1995, the public would have only the 1994 third-quarter (September 30th) balance sheet and income data on financial institutions, while bank supervisors would have information on the fourth quarter (December 31st) results. If the only advantage provided to the Fed by its bank supervisory responsibilities were this earlier access to data, then including the financial information available to the supervisor, but not yet to the public, in the equation would result in significant coefficients on the financial variables and would eliminate the significance of the estimated coefficients on CAMEL5.

Before the results are presented, it must be pointed out that the error term in equation 1 is not assumed to be independent and identically distributed. All forecasters tend to miss major macro surprises, producing errors that are correlated across forecasters at a given time. Furthermore, macro surprises late in the forecast horizon could cause the errors to be correlated across time. We use procedures suggested by Keane and Runkle (1990) to address the potential problems with inconsistent estimates of standard errors caused by these contemporaneous and intertemporal cross-correlations in the error term. The potential correlations in the errors also dictate the way the forecasts are lined up. Since several of the forecasts are published only toward the middle of each quarter, while others are produced monthly, we use the monthly forecast from the middle month of each quarter. When a quarter contains more than one Greenbook forecast, we use the one closest to the middle of the quarter. This timing convention also ensures that all the forecasters know the actual values of the unemployment rate and the inflation rate for the prior quarter at the time the forecasts are made, eliminating the potential for a moving average process in the errors of the one-quarter-ahead forecasts. The sample period begins in 1978:I, since the CAMEL data first become available only in late 1977, and ends in 1996:II. However, the GSU forecasts begin only in 1980:III.

Table 1 provides the results from the test of whether the usefulness of confidential supervisory information can be attributed to the Fed, through its supervisory function, knowing financial information one quarter earlier than the public. The columns provide the results for the forecasts for the one-quarter period at each of four horizons. Thus, for a February forecast, 1Q would represent the unemployment rate for that quarter (the one-quarter ahead), 2Q would correspond to the unemployment rate for the second quarter (the two-quarter ahead), and so on. To continue with the example, for a February forecast, we are asking whether all the useful

information in the CAMEL5 variable derives from the December 31st financial information known to the Fed but not released publicly until after the forecast is made.

The results in Table 1 reveal that inclusion of measures for capital, assets, earnings, liquidity, and a threshold capital variable that are not yet publicly known does not remove the effect of CAMEL5. Of the 20 coefficients contained in the equations for the four forecast horizons for the unemployment rate, none provide statistically significant information. The CAMEL5 variable remains significant for the first three horizons, and is significant at the 10 percent confidence level for the four-quarter-ahead forecast. For the inflation forecasts, the inclusion of the 20 additional variables results in only three statistically significant coefficients. They are all related to measures of capital for the shortest horizons, the period for which the CAMEL5 variable provides the least improvement to the forecasts. The CAMEL5 variable significantly improves the four-quarter-ahead forecast of inflation and marginally improves the three-quarter-ahead forecast of inflation.

Table 1 shows that the supervisory data remain informative for at least one quarter. The results indicate that all the information analyzed by bank supervisors during an exam does not get revealed when banks announce financial results in the following quarter. Thus, the useful part of the information contained in the CAMEL5 variable does not originate from the earlier access to bank financial data.

How Persistent Is the Informational Superiority?

If the only source of an informational superiority is a temporary timing advantage, it is likely to be of little practical use for setting monetary policy. Yet the tests presented in Table 1 examine only whether a specific source of the CAMEL5 information has a short duration.[7] Perhaps the variables used in Table 1 were not sufficient to capture the banking information that

becomes available to the public during the quarter. Accordingly, we examine the persistence of the informational advantage contained in the supervisory data, without regard to its origin.

To investigate the persistence of the Fed's informational superiority, we estimate the following equation:

(2) $X_{t+i} = \beta_0 + \beta_1 E_t(X_{t+i}: I_t) + B_2 CAMEL5_t(k) + \varepsilon_t.$

Equation 2 focuses on whether lagged CAMEL ratings can improve the current forecasts. Here, Z(k) refers to the CAMEL5 variable lagged k months. When k=0, the supervisory rating is contemporary with the forecast, representing the supervisory information that is known to the Fed. PRT have shown that when k=0, the percent of assets in CAMEL 5-rated institutions significantly improves forecasts of inflation and unemployment rates through a four-quarter-ahead forecasting horizon. Yet, if only the contemporaneous CAMEL5 is useful, the informational superiority enjoyed by the Fed is unlikely to provide it with an exploitable advantage. To test the duration of the informational advantage, various lags of CAMEL5 are examined. The further back in time that lagged CAMEL5 measures remain statistically significant, the more durable is the Fed's informational superiority. By examining the significance of the coefficients on the lagged CAMEL5 values, instead of including other information, we also avoid the problem of omitting relevant information to which tests like those in Table 1 are prone.

Table 2 provides the estimated coefficients on the lagged values of CAMEL5 in the inflation and unemployment rate forecast equations. The results in the first row of the table correspond to the data known by the Fed at the time of the forecasts.[8] For example, for a forecast in February for each of the next four quarters, the Fed would have available the CAMEL5 value for the end of January. The remaining rows present the results when the

contemporaneous measure of CAMEL5 is replaced by its lagged value, with the row specifications differing only in the number of months the CAMEL5 variable is lagged. A lag of one month corresponds to the CAMEL5 value for the end of December of the previous year, a two-month lag corresponds to the CAMEL5 value for the end of November of the previous year, and so on. Only the estimated coefficient on the CAMEL5 variable is reported, since the table summarizes the duration of the supervisory information for eight forecasts over thirteen months.

The results for the unemployment rate are quite striking. The unemployment forecast is substantially improved by supervisory information, even after a substantial lag. For example, for the one-quarter-ahead forecast, the CAMEL5 variable from one year prior to the forecast date still improves forecasts of unemployment. Thus, a forecast made in February 1999 would be improved if the percent of bank assets in CAMEL 5-rated institutions were made available to forecasters with a one-year delay, that is, by the CAMEL5 as of January 1998, although the effect would be greater if more current information were made available. Or, to put it another way, the CAMEL5 information in January of 1998 still adds significantly to the one-quarter ahead forecasts of the unemployment rate made as late as January of 1999. In fact, CAMEL5 values as far back as five months are useful for improving the two-quarter ahead forecast horizon also.

The evidence from the inflation rate also shows persistence for the CAMEL5 effect. The three- and four-quarter-ahead inflation rate forecasts are improved even with a 12-month lag for CAMEL5. Again, not only are the results statistically significant, but the estimated coefficients represent economically relevant magnitudes. For a one-standard-deviation increase in CAMEL5 from its mean, the coefficients imply a one-quarter percentage point improvement in the one-

quarter-ahead forecast and a one-half percentage point improvement in the four-quarter-ahead forecast, using supervisory information with a 12-month lag.

The results in Table 2 extend the results in Table 1. The confidential supervisory information remains important after including financial information known to the Fed but not yet known by the public. That these results are not a temporary timing advantage attributed to delays in public disclosure of information, as suggested in the earlier rational expectations literature, makes it more likely that the information could be exploited for activist monetary policy.

II. The Source of the Informational Superiority

The significance of the coefficients on the CAMEL5 variable in the first two tables can be interpreted two ways. Either the relevant information is confidential, and remains so for quite some time, or the forecasters are not using all the important information available when constructing their forecasts. To justify activist monetary policy in these models, it is necessary to know which of these alternatives is operative. If the information remains confidential, then the results in the first two tables provide strong evidence that the Fed has an exploitable informational advantage. If forecasters and economic agents are simply not using the data effectively, then the informational advantage could disappear at any time, as soon as economic agents realize the value of the information. This section examines the issue of the data's confidentiality. Several tests indicate strongly that the data are confidential and remain so for a significant period of time, supporting the conclusion that activist monetary policy may be beneficial even in these restricted models.

CAMEL5 provides information about those institutions that bank supervisors believe have a very high probability of failure. While the Fed has an informational advantage over the

public for deeply troubled institutions that do not fail, when a deeply troubled institution fails, its failure will become public information. If the supervisory information were merely serving as a proxy for costs associated with bank failures, then supervisory information about banks that became troubled but never failed would not improve macroeconomic forecasts. However, a finding that failing banks are the source of the information advantage might be inconsistent with the persistence found in Table 2, since it may be more difficult to keep information about deeply troubled banks from the public, and, in any case, the Fed's informational advantage would disappear once the failure was announced.

Table 3 examines this hypothesis by splitting CAMEL5 into the percent of bank assets in CAMEL5-rated institutions that eventually failed (Fail CAMEL5) and the percent of bank assets in CAMEL5-rated institutions that never failed (No-Fail CAMEL5). Note that once a bank fails, it no longer files a Call Report, so that the Fail CAMEL5 variable includes banks only up to the point at which they fail.[9] These two groups are quite different, since the banks that eventually failed generally had much worse financial statistics at the time of their downgrade to a CAMEL 5 rating. For example, at the time that banks were downgraded to a CAMEL 5 rating, banks that eventually failed had a capital ratio 80 basis points lower, a nonperforming loan ratio 170 basis points higher, and a return on assets 202 basis points lower than downgraded banks that survived.[10]

The results in Table 3 show that most of the improvement in forecasts of unemployment rates and inflation rates is generated by CAMEL 5 –rated institutions that do not wind up failing. The estimated coefficients on No-Fail CAMEL5 are positive for all four forecast horizons and significant at least at the 10 percent level for the first two horizons. The results are even stronger for the inflation forecasts. The estimated coefficients are negative and significant for the two-,

three-, and four-quarter-ahead forecast horizons. On the other hand, the estimated coefficients on Fail CAMEL5 are each statistically insignificant for both the inflation and the unemployment rate forecasts.

The results strongly suggest that supervisory information is not a proxy for the financial distress associated with bank failures. It is the supervisory information about banks that supervisors know to be deeply troubled, but whose problems may not ever be fully known publicly, that consistently improves forecasts of inflation and unemployment rates. A troubled institution has a strong incentive not to precipitate a crisis of confidence among depositors and borrowers and, thus, not to reveal the full extent of the concerns that supervisors may have about the viability of the bank. That a bank may have been very close to failure may never be fully revealed publicly, consistent with information that is of long duration.

Of course, the hypothesis that a bank is able to keep its problems secret from its shareholders is suspect. First, when the shareholders are outsiders, the duration of any informational advantage over the public should be short. Second, publicly traded banks are likely to be covered by rating agencies, bank stock analysts, and bank bond analysts. These banks also frequently raise funds with large certificates of deposits, which are not fully insured, and with unsecured commercial paper, which is closely scrutinized because it is often held by money market mutual funds. Third, publicly traded banks are the most likely to pose potential systemic risks, so they may receive greater oversight by bank examiners.[11] To the extent that publicly traded firms are compelled by the SEC to disclose material adverse events, examiner findings may more quickly become public knowledge.

However, it is possible that information about banks not traded publicly could remain confidential for an extended period of time, since shareholders are insiders and already know the

information. Furthermore, since the depositors at non-publicly-traded banks are usually fully insured, they have no incentive to try to uncover this information. Finally, non-market-traded banks are not required to file with the SEC. As a result, one should expect to find that the exploitable, confidential, informational advantage of the Fed originates from the supervisory data from non-market-traded banks, not from the market-traded banks.

Table 4 contains estimates of equations that include the CAMEL5 information based on a different partition of the banks. The two CAMEL5 variables are the percent of bank assets in CAMEL5-rated institutions that are in bank holding companies that file with the SEC (Market-Traded) and the percent of bank assets in CAMEL5-rated institutions not in bank holding companies or in bank holding companies but not market-traded (Non-Market Traded).[12] Included in Market-Traded are small bank holding companies that have issued stock publicly, but whose stock trades quite infrequently.[13]

CAMEL5 for Non-Market-Traded banks substantially improves on forecasts of both the unemployment rate and the inflation rate. The estimated coefficients on Non-Market-Traded for the unemployment rate are all positive and are statistically significant for the first three forecast horizons. In addition, the estimated coefficients are each somewhat larger than the corresponding base regression coefficients on CAMEL5 reported in the first row of Table 2. Similarly, the estimated coefficients on Non-Market-Traded for the inflation rate equations are each correctly signed (negative) and are highly significant for the last three forecast horizons. Again, the estimated coefficients are each larger (in absolute value) than the corresponding coefficients reported for the contemporaneous CAMEL5 in Table 2.

In contrast, the CAMEL5 measure for Market-Traded banks does not substantially improve forecasts of the inflation rate or the unemployment rate. All of the estimated

coefficients for Market-Traded in the unemployment rate equations are positive, but none of these coefficients are significant at the 5 percent level. All of the coefficients for Market-Traded in the inflation rate equations have the wrong sign and are insignificant.

These results are consistent with financial markets incorporating most information that is relevant to forecasts of inflation and unemployment rates for market-traded banks, but not for the non-market-traded banks. These non-market-traded banks can remain opaque because they do not issue public securities and are not closely followed by market participants or most forecasters. Nonetheless, the information on their financial health provides significant improvements to forecasts of the path of inflation and unemployment rates. These findings also are consistent with the results found by Kashyap and Stein (1994b, 1999) that small banks may be particularly important for the level of economic activity because they disproportionately lend to finance inventories and small businesses, firms likely to have relatively few nonbank substitutes.

Because most of the useful information emanates from banks that become troubled but do not fail (which may have the greatest incentive to not fully disclose problems), and from banks that are not publicly traded (which are not required to provide full disclosure by the SEC), the information garnered through the supervisory process is not likely to be easily replicated from public sources. These results are consistent with the information being of longer duration and not dissipating with the release of the subsequent quarter's bank financial information. The source of the informational advantage strongly suggests that the explanation for the significance of the coefficients in Tables 1 and 2 is that the information is confidential, not that it is available but not used. The evidence suggests that the Fed does have an exploitable informational advantage.

III. Conclusion

PRT found that confidential supervisory data provide information that is highly useful in improving forecasts of inflation and unemployment rates. However, to be relevant for the conduct of activist monetary policy, the Fed's informational superiority needs to be persistent. We find that the source of the informational advantage does not arise from the Fed's knowing financial information concerning banks slightly before it is released to the public. Instead, confidential supervisory data, with as much as a one-year lag, can still provide useful information for forecasts of unemployment and inflation rates. Consistent with this persistence, the source of the useful information is institutions that are not publicly traded, which have neither the incentive nor the requirement to fully disclose the extent of their difficulties.

Models that incorporate rational expectations show that such an informational advantage could potentially justify activist monetary policy. This paper presents evidence that the Fed does possess such information. Furthermore, the size of the estimated coefficients implies that the information garnered through the supervisory process is not only statistically significant, but is also economically important. A one-standard-deviation increase in the percent of assets in CAMEL 5-rated banks would provide approximately a one-quarter percentage point improvement in the forecast of the unemployment rate and an improvement in excess of one percentage point in the forecast of the inflation rate. Thus, the Fed not only has information that is not publicly known, but the information is also of sufficient magnitude and persistence to be exploited.

Barro (1976) argues that an informational advantage at the Federal Reserve should justify greater disclosure of the information rather than use of the informational advantage for the conduct of monetary policy. The release of such information may be desirable, but in all major

industrial countries in the postwar period, bank supervisory information has remained confidential. In fact, the degree of supervisory disclosure in most countries is far less than in the United States. As long as policymakers view the release of supervisory information as potentially destabilizing to individual banks or to the banking system, the confidentiality of this information is likely to remain a constraint rather than a choice variable. As long as it does remain a constraint, this study shows that it can be exploited to conduct activist monetary policy.

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Footnotes

[1] Although the monetary authority is assumed to act as soon as it learns of the realization of the shock, the effects of the action take some time to be felt in the economy. This assumption is consistent not only with Milton Friedman's empirically based description of the long and variable lags of monetary policy, but also with theoretical explanations, such as the liquidity effect raised by Lucas (1990).

[2] Note that this model is similar to the one-period contract model in Fischer (1977), where the period is implicitly defined as the length of time it takes for monetary policy to affect the economy. Also note that a model with instantaneous effects to monetary policy would still produce benefits to activist policy, even when duration was zero, because of the contracts that are already locked in at time t_{CB}.

[3] It is assumed that the central bank cannot simply release the data. This assumption is discussed in detail later in the paper. The crucial point is that, in practice, bank supervisory data are not, and have not been, made generally available in any major country.

[4] The forecasts at a given horizon are the expectations of that quarter's unemployment rate and inflation rate, not the cumulative rates through that horizon. For example, the four-quarter-ahead forecast made in the first quarter is the average level of the inflation or unemployment rate for the fourth quarter of that year.

[5] The results in the paper remain intact if the sample excludes the Board staff's forecasts. Furthermore, although the Greenbook does not incorporate the supervisory information into its forecasts, PRT show that the FOMC does depend on the supervisory information above and beyond the Greenbook forecasts to guide monetary policy.

[6] This threshold corresponds with the definition of undercapitalized banks used in the prompt corrective action legislation adopted to force bank supervisors to intervene earlier in financially troubled banks.

[7] A potential public source of information on supervisory data is the FDIC's "problem bank" series. The problem bank asset series has only recently been made public; prior to 1991, the FDIC released only the number (and not the total assets) of problem banks at the end of each year (as reported in the FDIC annual report). In 1990, the FDIC began to provide assets in problem banks on a quarterly basis and reported the year-end total assets in problem banks back to 1984. To investigate whether the problem bank series revealed the useful confidential information in the CAMEL5 series, we reestimated our equations with a problem bank series created from information that is now public supplemented with some confidential information. This problem bank series is constructed in the same way as the CAMEL5 series, using total examined bank assets as the denominator. The numerator is constructed using the assets of confidential CAMEL 4 and 5-rated banks prior to 1984 (the aggregate CAMEL rating measure most closely related to the problem bank series), a linear interpolation of the (now public) annual problem bank assets series until 1990, and then the quarterly problem bank assets series until the end of our sample. This allows information to be used for the 1984 to 1990 period that would

not have been publicly known at the time of the forecast, but provides an indication of whether it might be useful now that it is publicly released. In addition, this series has the advantage of using confidential data on CAMEL 4 and 5 rated banks for the observations prior to 1984:IV. When we replace the CAMEL5 series with the problem bank series in the forecast equations, it improves forecasts only for the one-quarter-ahead forecast of the unemployment rate. It does not make a significant contribution to the two-, three-, or four-quarter-ahead forecasts of unemployment rates or for any of the inflation forecast horizons. Furthermore, we find that adding the problem bank series to the specification that includes CAMEL5 has no qualitative effect on the results for CAMEL5. While its estimated coefficient is correctly signed but never significant in the inflation rate equations, the problem bank series has the wrong sign in each of the unemployment rate equations. These results likely reflect that the CAMEL 5-rated banks are only the most troubled banks among those banks that would be included in the problem bank series. Thus, the recent change in disclosure policies by the FDIC whereby the problem bank asset series is made available to the public has no implications for our results or conclusions.

[8] One can compare the estimated coefficients on CAMEL5 in the first row of Table 2 to those in Table 1 to see the sensitivity of the estimates to the inclusion of the CAEL variables. The estimated coefficients tend to be slightly larger (in absolute value) when the CAEL variables are included in the equation.

[9] For the banks that failed after being downgraded to a CAMEL 5 rating (915 banks), approximately 40 percent failed in the first year. Only 28 banks (3 percent) failed during the first quarter after being downgraded to a CAMEL 5 rating.

[10] If one examines the financial statistics for banks for the entire period that they are CAMEL 5-rated, the differences are even more distinct. Failed banks have a capital ratio that is 232 basis points lower, a nonperforming loan ratio that is 271 basis points higher, and a return on assets that is 365 basis points lower.

[11] At the largest bank holding companies, examiners now maintain a continuous presence. Smaller banking institutions continue to have only periodic exams.

[12] A few banks that are not in holding companies have publicly issued equity. These are generally very small issues that trade infrequently. Unfortunately, the examiner data base does not provide reliable data to identify which of the banks not in a holding company have issued some publicly-traded equity.

[13] The amount of stock outstanding can be as small as $5 million. Such small holding companies are likely not to have significant coverage by bank analysts, to have no outstanding rated debt, and not to have examiners monitor them as extensively as larger institutions. Thus, even some of the market-traded banks will have characteristics that more closely resemble the non-market-traded banks.

Table 1
Inclusion Of CAEL Variables

Variables	Unemployment Rate				Inflation Rate			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Constant	-1.033*	-1.246	-2.775	-3.582	3.876	8.623	9.797	9.764
	(-2.199)	(-0.855)	(-1.070)	(-1.176)	(1.162)	(1.366)	(1.315)	(1.110)
Forecast	0.966**	0.904**	0.773**	0.626**	0.893**	0.941**	0.798**	0.515*
	(52.132)	(15.714)	(7.506)	(4.827)	(18.761)	(8.123)	(4.402)	(2.512)
CAMEL5	0.124**	0.226*	0.344*	0.393	-0.449	-0.488	-1.013	-1.207*
	(3.714)	(2.200)	(2.015)	(1.881)	(-1.784)	(-1.068)	(-1.892)	(-2.180)
Capital/assets	0.074	0.131	0.217	0.208	-0.906**	-1.423*	-0.937	-0.626
	(1.249)	(0.940)	(0.915)	(0.721)	(-2.622)	(-2.218)	(-1.204)	(-0.722)
NPL/assets	0.072	0.173	0.390	0.558	-0.007	-0.680	-0.047	-0.053
	(1.230)	(1.069)	(1.383)	(1.630)	(-0.016)	(-0.874)	(-0.052)	(-0.056)
Return on Assets	0.025	0.167	0.226	0.287	-0.323	-0.550	0.125	-0.761
	(0.504)	(1.274)	(1.081)	(1.090)	(-0.779)	(-0.792)	(0.162)	(-1.004)
Liquid Assets/Assets	0.012	0.005	0.037	0.076	0.109	0.114	-0.043	-0.059
	(0.628)	(0.114)	(0.536)	(0.902)	(1.264)	(0.719)	(-0.229)	(-0.290)
Capital/Assets<4%	0.003	0.013	0.029	0.040	-0.071*	-0.128	-0.043	0.032
	(0.470)	(0.959)	(1.224)	(1.372)	(-1.977)	(-1.916)	(-0.566)	(0.393)
Observations	271	271	271	271	271	271	271	271
Adjusted R^2	0.989	0.935	0.850	0.778	0.864	0.655	0.510	0.439

Note: With t-statistics in parentheses.

The standard errors in the forecast equation are corrected for the appropriate moving average error terms and for contemporaneous correlation across forecasters.

** Significant at the 1 percent level.
* Significant at the 5 percent level.

Table 2
Duration Of CAMEL5
(Coefficients and T-statistics Of CAMEL5 Lags)

	Unemployment Rate				Inflation Rate			
Lag Length	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Base	0.083**	0.165**	0.233*	0.255*	-0.220	-0.443	-0.882*	-0.959*
	(4.904)	(2.999)	(2.465)	(2.256)	(-1.525)	(-1.468)	(-2.438)	(-2.437)
One Month	0.079**	0.162**	0.226*	0.237*	-0.189	-0.464	-0.886*	-0.941*
	(4.620)	(2.945)	(2.389)	(2.096)	(-1.297)	(-1.522)	(-2.420)	(-2.384)
Two Months	0.078**	0.150**	0.207*	0.207	-0.197	-0.499	-0.899*	-0.902*
	(4.522)	(2.669)	(2.140)	(1.799)	(-1.348)	(-1.610)	(-2.423)	(-2.238)
Three Months	0.075**	0.137*	0.179	0.173	-0.188	-0.465	-0.886*	-0.866*
	(4.271)	(2.389)	(1.828)	(1.491)	(-1.278)	(-1.538)	(-2.374)	(-2.141)
Four Months	0.072**	0.132*	0.166	0.157	-0.223	-0.458	-0.884*	-0.959*
	(4.026)	(2.274)	(1.669)	(1.331)	(-1.487)	(-1.434)	(-2.327)	(-2.357)
Five Months	0.070**	0.124*	0.143	0.125	-0.244	-0.493	-0.852*	-0.960*
	(3.990)	(2.159)	(1.442)	(1.064)	(-1.631)	(-1.552)	(-2.244)	(-2.367)
Six Months	0.069**	0.110	0.119	0.095	-0.243	-0.493	-0.819*	-0.946*
	(3.880)	(1.883)	(1.197)	(0.805)	(-1.614)	(-1.539)	(-2.127)	(-2.311)
Seven Months	0.063**	0.093	0.096	0.070	-0.250	-0.495	-0.841*	-0.940*
	(3.067)	(1.547)	(0.944)	(0.586)	(-1.622)	(-1.543)	(-2.197)	(-2.304)
Eight Months	0.063**	0.079	0.073	0.049	-0.296	-0.490	-0.880*	-1.006*
	(3.055)	(1.280)	(0.705)	(0.410)	(-1.889)	(-1.514)	(-2.282)	(-2.433)
Nine Months	0.058**	0.067	0.049	0.023	-0.297	-0.460	-0.888*	-1.012*
	(2.801)	(1.089)	(0.483)	(0.188)	(-1.896)	(-1.422)	(-2.313)	(-2.461)
Ten Months	0.058**	0.065	0.041	-0.001	-0.286	-0.461	-0.844*	-0.918*
	(2.750)	(1.048)	(0.391)	(-0.005)	(-1.799)	(-1.417)	(-2.187)	(-2.253)
Eleven Months	0.054*	0.059	0.037	-0.012	-0.219	-0.505	-0.931*	-0.845*
	(2.586)	(0.965)	(0.362)	(-0.098)	(-1.371)	(-1.557)	(-2.431)	(-2.051)
Twelve Months	0.052*	0.051	0.028	-0.023	-0.209	-0.513	-0.946*	-0.816
	(2.461)	(0.833)	(0.269)	(-0.188)	(-1.293)	(-1.569)	(-2.440)	(-1.958)

The standard errors in the forecast equation are corrected for the appropriate moving average error terms and for contemporaneous correlation across forecasters.

** Significant at the 1 percent level.
* Significant at the 5 percent level.

Table 3
Fail/No-Fail Decomposition Of CAMEL5

	Unemployment Rate				Inflation Rate			
Variables	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Constant	0.067	0.167	0.165	0.046	0.524	0.736	1.082	1.215
	(0.686)	(0.552)	(0.312)	(0.073)	(1.720)	(1.133)	(1.250)	(1.164)
Forecast	0.972**	0.939**	0.929**	0.945**	0.933**	0.931**	0.941**	0.902**
	(64.287)	(20.394)	(11.780)	(10.009)	(26.159)	(11.292)	(7.639)	(5.899)
Fail CAMEL5	0.056	0.127	0.258	0.454	-0.039	0.548	0.241	0.090
	(1.313)	(0.961)	(1.130)	(1.654)	(-0.127)	(0.893)	(0.321)	(0.108)
No-Fail CAMEL5	0.105**	0.194	0.214	0.113	-0.335	-1.036*	-1.551**	-1.579**
	(2.937)	(1.830)	(1.227)	(0.543)	(-1.505)	(-2.405)	(-2.973)	(-2.760)
Observations	286	286	286	286	286	286	286	286
Adjusted R^2	0.988	0.932	0.834	0.741	0.857	0.665	0.549	0.472

Note: With t-statistics in parentheses.

The standard errors in the forecast equation are corrected for the appropriate moving average error terms and for contemporaneous correlation across forecasters.

**Significant at the 1 percent level.
* Significant at the 5 percent level.

Table 4
Market Traded/Non-Market Traded
Decomposition Of CAMEL5

	Unemployment Rate				Inflation Rate			
Variables	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Constant	0.022	0.200	0.367	0.422	0.560	0.898	1.308	1.486
	(0.273)	(0.762)	(0.836)	(0.735)	(1.792)	(1.335)	(1.500)	(1.451)
Forecast	0.979**	0.933**	0.897**	0.886**	0.929**	0.909**	0.909**	0.864**
	(78.283)	(23.415)	(13.692)	(10.409)	(25.794)	(10.667)	(7.344)	(5.777)
Non-Market Traded	0.083**	0.233*	0.356*	0.320	-0.382	-0.954*	-1.596**	-1.789**
Non-Holding Company	(2.752)	(2.565)	(2.479)	(1.753)	(-1.642)	(-2.130)	(-3.064)	(-3.154)
Market Traded	0.083	0.045	0.008	0.133	0.087	0.542	0.536	0.695
	(1.790)	(0.333)	(0.036)	(0.456)	(0.236)	(0.777)	(0.658)	(0.800)
Observations	286	286	286	286	286	286	286	286
Adjusted R^2	0.988	0.933	0.837	0.739	0.857	0.659	0.549	0.483

Note: With t-statistics in parentheses.

The standard errors in the forecast equation are corrected for the appropriate moving average error terms and for contemporaneous correlation across forecasters.

** Significant at the 1 percent level.
* Significant at the 5 percent level.

FIGURE 1a: No Duration - No Benefits to Policy

FIGURE 1b: Positive Duration - Benefits to Policy