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Estimating the Information Value of Immediate Disclosure of the FOMC Policy Directive

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ABSTRACT

This paper studies the information value of immediate disclosure of the FOMC policy directive. The value of disclosure is measured by its ability to reduce investors' expected uncertainty about futures interest rates where uncertainty is defined as the conditional variance of forecast errors. Analytical relationships between new information and the conditional variance of forecast errors are developed and the relation of the "uncertainty-reducing" value of information to its social value, as defined in recent literature, is indicated. In the empirical work, forward interest rates are treated as reflecting market expectations conditioned on existing information. The empirical tests indicate that information in the undisclosed, prevailing policy directives (1974–79) were able to make only a very marginal improvement in the predictive accuracy of forecasts relying only on the forward rates. Thus, the hypothesis that immediate disclosure has a significant information value to market participants is not supported.

IT IS VERY COMMON in public policymaking to assume that disclosing policy intentions which relate to intervention into money, bond, or foreign exchange markets would have undesirable destabilizing effects on these markets. The Federal Open Market Committee recently expressed this view in its appeal to the U.S. Supreme Court to overturn a federal district court ruling that the Committee was obliged under the Freedom of Information Act to disclose immediately the prevailing policy directive.[1] The destabilizing argument has also been used by some to question the practice of the weekly release of the monetary statistics by the Federal Reserve.[2] Presumably reflecting a similar view, intervention in foreign exchange markets by the Federal Reserve and other central banks is generally not disclosed to the public either. Those who have advocated (immediate)

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[1] The policy directive gives instructions to the System's account manager for the conduct of open market operations which constitute the FOMC's short-run monetary policy objectives. Currently, the policy directive is disclosed only after a new directive becomes effective. A lower court initially ruled that the directive was subject to the Freedom of Information Act without considering the FOMC's substantive arguments against disclosure. The Supreme Court sent the case back to the lower court to consider the substantive arguments. The lower court ruled against disclosure, referring to a lack of evidence by the plaintiff that immediate disclosure would not harm the Federal Reserve's monetary function or the government's commercial interest in profitably trading government securities.

[2] Conrad [2] found no evidence of over-reaction in the Treasury bill market to the weekly release of the monetary statistics. However, a proposal to stop or alter the weekly release procedure is under consideration by the Federal Reserve.

disclosure have argued that the information will help individuals to make more appropriate economic decisions under uncertainty.

This paper is concerned with immediate disclosure of the FOMC policy directive, although the methodology used should have wider applicability. The argument over immediate disclosure can be separated into two issues. One is whether the prevailing policy directive contains information which individuals could use in making economic decisions. A second issue is whether, in some sense, the public disclosure of that information would be socially beneficial. This paper addresses primarily the first issue. Nonetheless, it will be useful to briefly state an argument for disclosure based on the social value of informed trading as developed in some recent literature, notably papers by Hirshleifer [5] and Starr [10].[3]

Consider an initial situation where individuals, having certain perceptions of future states of nature, utility functions, and endowments, find it mutually advantageous to engage in trade (of securities, goods, or the means of production) so as to maximize their individual expected utilities. The equilibrium set of trades will serve to equilibrate expected marginal rates of substitution among traders. Suppose, however, that someone in authority (a nontrader) has information of a special condition unknown to the traders. Assume further that this condition, when combined with traders' own information, implies a set of conditional probabilities which are different from those determining the traders' expected marginal rates of substitution in the initial equilibrium. If markets are not complete or if expectations are not homogeneous, the marginal conditions and consequent set of trades which served to maximize expected utilities in the initial equilibrium will not generally be the same as those maximizing expected utilities based on the *conditional probabilities.*[4] Consequently, there exists another set of potential trades which could make everybody better off in terms of improving their individual *conditional* expected utilities. Under the appropriate competitive assumptions, assuming that individuals calculate the conditional probabilities correctly and ignoring wealth distribution effects, disclosure of the information and the resultant informed trading will lead to the appropriate marginal conditions for maximization of the *conditional* expected utilities. In this sense, we can say that public disclosure of the information will have social value. It is beyond the scope of this paper to inquire about the appropriateness of the underlying assumptions, although at least the argument does indicate an element of social gain in information disclosure which is analogous to usual efficiency arguments

[3] Arrow [1] provides a clear statement of the value of information to the individual but, unlike Hirshleifer [5] and Starr [10], does not consider the general equilibrium consequences (i.e., market impacts) of new information. As Hirshleifer points out, information having value to an individual is a necessary but not sufficient condition for it to have social value (pp. 563–66).

[4] If markets are complete and expectations are homogeneous, the optimality conditions will be invariant to changes in the probabilities of the future states of nature—see Hirshleifer [5, pp. 563–66] and Starr's [10] proof of the *ex post* optimality of *ex ante* trades (Theorem 3, p. 88). These arguments are for an exchange economy but Starr extends the argument to a production economy (pp. 89–91 and Theorems 4 and 5, p. 92). If markets are complete but expectations are not homogeneous, an alteration in the probabilities of future states of nature generally alters the optimizing marginal conditions and equilibrium set of trades (see Starr's Corollary 3.1, p. 88).

made in cases where there is no uncertainty.[5] We also note, but will not consider further, an additional aspect of the social value of publicly disclosing information which is any reduction in or elimination of real costs individuals incur in attempting to learn of the information possessed by the public officials.

Because the policy directive currently in effect is not disclosed, it is not possible to study directly the information value of disclosure in terms of effects on market trades (and prices). Instead, estimates are made of the potential ability of immediate disclosure of policy directives to reduce individuals' uncertainty about future interest rate levels, one particularly important economic variable. First, however, we develop some formal relationships between information and the variance of forecast errors which will be our measure of interest rate uncertainty. These relationships are then used in specifying and interpreting the empirical work. In addition, they are also used to suggest the connection between the social value of information, as defined above, and the "uncertainty-reducing" value of information. Throughout the analysis, expectations are assumed to be rational in the sense that, given a set of information, subjective probabilities are consistent with the event's conditional long run relative frequency of occurrence.

I. Information and Uncertainty

Assume that in period t, individuals are concerned about a market interest rate that will prevail in period $t + j$. This stochastic variable is denoted by r_{t+j}. Uncertainty about r_{t+j} is measured by its variance as conditioned on the set of available information. Let X_t denote this set of information. The conditional variance of r_{t+j} is defined by

$$V(r_{t+j} \mid X_t) = E(r_{t+j}^2 \mid X_t) - (E(r_{t+j} \mid X_t))^2 \tag{1}$$

This is also equal to the conditional variance of forecast errors, i.e., $V[r_{t+j} - E(r_{t+j} \mid X_t) \mid X_t]$. It is preferable to interpret X_t somewhat generally as an information variable which might take on any one of a set of values (messages) at time t. These values occur according to a well defined probability distribution and we treat the expected value of the conditional variance defined over the p.d.f. of X_t as our measure of expected uncertainty. Denoting E_x as the expectations operator defined over X_t, we have

[5] We should note, however, several of the arguments made by the Federal Open Market Committee in its petition to the Supreme Court to prevent disclosure (October 1977). One of the more important arguments was that market participants may not correctly interpret the directive leading to inappropriate expectations revisions and, hence, price movements (pp. 8, 15). However, a second argument was that market professionals would understand the directive better than less sophisticated traders and could thereby take advantage of the latter (pp. 10, 15). The first of these arguments violates an assumption of rational expectations since more information cannot (persistently) lead to less accurate forecasts which are formed rationally. The second argument appears to be incomplete. In particular, trading advantages caused by disclosure will depend on *relative* and not absolute information value to the trader. Professionals may better understand the policy directive but less sophisticated investors' information on current policy intentions may be increased relative to that of the professionals through disclosure, putting the former in a better *relative* trading position. Moreover, competition among "professionals" should serve to limit their ability to exploit less sophisticated traders through any common information advantage.

$$E_x[V(r_{t+j}|X_t)] = E_x[E(r_{t+j}^2|X_t) - (E(r_{t+j}|X_t))^2] \quad (2)$$

Now let Y_t be a second information variable and consider how investor uncertainty, defined in (2), would be altered if Y_t were added to investors' information set along with X_t. Also, let Y_t represent a random variable. The expected uncertainty about r_{t+j} when information consists of both X_t and Y_t is the expected value of the variance of r_{t+j} conditioned on both X_t and Y_t,

$$E_{xy}[V(r_{t+j}|X_t, Y_t)] \quad (3)$$

where E_{xy} is the expectations operator defined over the joint distribution of X_t and Y_t.

The difference between (2) and (3) represents the expected effect of new information Y_t, on investor uncertainty about r_{t+j}. To relate (3) to (2) we can expand (2) so as to explicitly recognize the potential role of a second information variable, in this case Y_t:[6]

$$E_x[V(r_{t+j}|X_t)] = E_x[V_y(E(r_{t+j}|X_t, Y_t)|X_t)] + E_{xy}[V(r_{t+j}|X_t, Y_t)] \quad (4)$$

The first term on the r.h.s. of (4) is the expected value of the variance of the conditional expectation of r_{t+j}. The second term is the expected value of the conditional variance of r_{t+j}. The second term is also our measure of investor uncertainty when expectations are conditioned on both X_t and Y_t. Since the first term is the expected value of a variance, it must be nonnegative. Consequently, (3) cannot exceed (2).

$$E_{xy}[V(r_{t+j}|X_t, Y_t)] \leq E_x[V(r_{t+j}|X_t)] \quad (5)$$

It is in the expectations sense of (5) that information must reduce (or at least not increase) uncertainty. The nature of this solution is suggested by (4), particularly the first term on the r.h.s. of (4). Any reduction in expected uncertainty results because Y_t is able to predict part of the variation in r_{t+j} not predictable on the basis of X_t alone. However, (5) generally holds only in terms of expected values of conditional variances. It does not imply that, for every $x_t, y_t \in (X_t, Y_t)$, the conditional variance given x_t and y_t can never exceed the conditional variance given only x_t. This would hold only in special cases.[7]

To relate the uncertainty-reducing value of information, as defined in (5), to the social value of information, as defined in the Introduction, let X_t be individuals' initial set of information, let r_{t+j} represent the uncertain future and recall that Y_t can have social value only if it alters the posterior probabilities, i.e., $p(r_{t+j}|X_t, Y_t) \neq p(r_{t+j}|X_t)$. This necessary condition will be satisfied if Y_t reduces expected uncertainty, i.e., if (5) holds with a strict inequality: a strict inequality in (5) requires that the first term on the r.h.s. of (4) be nonvanishing which, in turn, requires that $p(r_{t+j}|X_t, Y_t) \neq p(r_{t+j}|X_t)$. On the other hand, if Y_t alters the posterior distribution of r_{t+j} but does not affect the mean of the posterior distribution, the second term on the r.h.s. of (4) would vanish and (5) would be an

[6] A proof of this theorem is derived from a proof of a similar theorem presented in C. R. Rao [9, p. 97].

[7] An example of such a case would be where r_{t+j} was linearly related to X_t, Y_t and a set of other variables, W_t, where Y_t and W_t were orthogonal.

equality: information having social value need not reduce uncertainty (defined as the conditional variance). Nonetheless, if Y_t alters the posterior distribution of r_{t+j}, it is most likely going to alter the mean of the distribution as well. Thus, it would seem reasonable to infer that if (5) holds as an equality, it is because Y_t does not alter the posterior distribution of r_{t+j}, and, hence, does not have social value.

Finally, we show the relation between the expected variance of forecast errors and the variance of expectations as new information is acquired. First note that the variance of the conditional expected value will be related to the variance of the conditioning variables in the form

$$V_{xy}[E(r_{t+j}|X_t, Y_t)] = V_x[E(r_{t+j}|X_t)] + E_x[V_y(E(r_{t+j}|X_t, Y_t))] \quad (6)$$

where V_{xy} is the variance of the conditional expectation defined over the joint p.d.f. of X_t and Y_t.[8]

The second component of the r.h.s. of (6) appears in (4) as the difference between the conditional variance of r_{t+j} with X_t and Y_t as the conditional variance with only X_t. Therefore, the difference between the variance in expectations which are conditioned on X_t and Y_t and the variance in expectations conditioned only on X_t is equal to the expected reduction in the variance of forecast errors when Y_t is added to the information set. This relation between the variance of expectations and the variance of forecast errors is used in the empirical work to which we now turn.

II. Estimating the Information Value of Immediate Disclosure of the FOMC Policy Directive

To correctly estimate the interest rate information value of immediate disclosure of the FOMC policy directives, we would want to ascertain the variance of the interest rate expectations errors of each market participant with and without disclosure. While this is not possible, we can proceed at a more aggregated level by assuming that forward rates calculated from yield curves aggregate investors' expectations, although the aggregation may not be perfect due to other residual influences on the forward rates.[9, 10] If information in the policy directives significantly improves on the forecast accuracy of the forward rates and if the forward rates closely reflect market expectations, immediate disclosure is likely to generally improve the forecast accuracy of the expectations of market participants. In

[8] If X_t and Y_t were independent and the expectation of r_{t+j} was linearly related to X_t and Y_t, the r.h.s. of (6) would take the more familiar form $a^2V(X_t) + b^2(V(Y_t) + 2ab\,\mathrm{Cov}(X_t, Y_t)$ where $E(r_{t+j}|X_t, Y_t) = aX_t + bY_t$. A proof of the more general (6) is easily derivable from Rao's [9, p. 97] Theorems (2b. 3.5) and (2b. 3.6).

[9] See, for example, Hamburger and Platt [4], Nelson [8] and Fama [3] on the expectations interpretation of Treasury bill forward rates.

[10] While we restricted our analysis to the use of forward rates, other market forecasts might also have been tried. Futures market interest rates and interest rate surveys (e.g., Goldsmith and Nagen) are two obvious candidates. These series are, however, more limited than forward rates because of the limited number of futures contracts which are traded and the limited frequency of survey forecasts. Also, if the forward rates are optimal forecasts, combining them with other public forecasts should not improve their accuracy.

this sense of reducing interest rate uncertainty, defined more precisely by (5), immediate disclosure would have information value. If immediate disclosure of the policy directives did not measurably improve on the forecast accuracy of the forward rates, it would not be likely to produce any general improvement in the forecast accuracy of market expectations. In the sense defined in this paper, disclosure would not have information value.

A. Estimating Forward Rate Forecast Errors

In the empirical work, the forward rate, f_t^j, will be assumed to embody the information initially possessed by market participants. This was denoted by X_t in the theoretical analysis. We can thus write an empirical analogue to (2) as

$$E_f^j[V(r_{t+j} \mid f_t^j)] = E_x[V(r_{t+j} \mid X_t)] \tag{7}$$

On the assumption that the forward rate forecast errors are generated by a stationary (but not necessarily homoskedastic) process, an estimate of (7) can be obtained from a time series of forward rate forecast errors.[11] To get an estimate of (7) we simply used the linear prediction equation

$$\hat{r}_{t+j} = a + bf_t^j \tag{8}$$

The variance of the forward rate forecast errors over the sample period, $\sum_{t=1}^{T} (r_{t+j} - \hat{r}_{t+j})^2/T - 1$, is our estimate of (7).

The sample period for which the forecast errors were studied was January 1974–May 1979. To obtain a series of forward rate forecast errors, we calculated forward rates over this period using Treasury bill yield curves. The future spot rates were then regressed on the corresponding forward rates to obtain estimates of a and b in (8) and, hence, a series of forward rate predictions and prediction errors. On the assumption that the forward rates approximate market expectations, the prediction errors are estimates of the actual market forecast errors. Furthermore, we would expect the estimated constant term not to be significantly different from zero, the slope coefficient not to be significantly different from unity (an unbiasedness property), and the error term to be serially uncorrelated (an efficiency property.)

The forward rate forecast equations estimated for this study were for predictions of 91-day Treasury bill rates expected to prevail approximately one to three weeks ahead. We restricted the forecasts to near-term predictions since it is near-term movements in interest rates which are most likely to be related to the FOMC's policy directives (see below). To avoid obtaining any special day-of-the-week or day-of-the-month effects, forecast equations were variously estimated with forward rates prevailing on a variety of days between each FOMC meeting over the 1974–79 sample period. The results, some of which are presented in Table I, were generally consistent with the hypothesis that the forward rates are market expectations.[12] All of the equations had nonsignificant intercepts and

[11] Homoskedasticity is not needed since, according to (7), our interest is only in the expected value of the variance of forecast errors defined over the p.d.f. of f^j.

[12] The actual forecast horizons reported in Table I were dictated by the maturity structure of outstanding Treasury bills. Bill rate quotations are annualized yields derived from bid-side prices quoted by Treasury securities' dealers as reported to the New York Federal Reserve Bank.

Table I

Regression of Future Spot Rates on Forward Rates[a, b]

$$R_{t+j} = a + bf_t^j + u_{t+j}$$

Forecast Horizon	a	b	R^2	Standard Error (Basis Points)	D-W	Average Absolute Forecast Error (Basis Points)
A. Forward Rates Prevailing Day After FOMC *Meeting*						
11 days	0.08	0.97	.95	32	2.31	18
	(0.44)	(35.70)				
18 days	−0.00	0.99	.94	38	2.16	25
	(−0.01)	(30.68)				
23 days	−0.12	1.00	.92	45	2.05	30
	(−0.46)	(26.28)				
B. Forward Rates Prevailing Second Friday After FOMC *Meeting*						
13 days	−0.10	1.00	.95	33	1.97	21
	(0.52)	(35.17)				
20 days	0.04	0.96	.93	37	2.09	25
	(.20)	(30.02)				
C. Forward Rates Prevailing Third Friday After FOMC *Meeting*						
13 days	0.26	0.93	.93	39	2.45	26
	(1.16)	(28.47)				
20 days	0.24	0.94	.88	52	2.36	35
	(0.82)	(21.31)				

[a] R_{t+j} is the spot interest rate on 91-day Treasury bills prevailing j days beyond the day the forward rate f_t^j prevailed.

[b] t-statistics in parentheses.

most slope coefficients were not significantly different from unity.[13] Moreover, none of the Durbin-Watson statistics indicated first-order serial correlation in the residuals. The only exceptions to this general pattern were the forecast equations using forward rates prevailing on the third Friday after the FOMC meeting (Set C Table I) which exhibited somewhat larger intercepts and smaller slope coefficients and D-W statistics close to the "indeterminancy region" (at the .05 level) for negative serial correlation.[14] As seen from the Table, the regression standard errors ranged from 32 to 52 basis points.[15]

[13] Nonetheless, the various forward rates did show a small but persistent tendency to understate the future spot rates, on average.

[14] The two equations were re-estimated with a Cochrane-Orcutt procedure. The estimated serial correlation coefficients were both negative but were not significantly different from zero at the .05 level.

[15] The day after the FOMC meeting is, of course, the earliest day for which the directive could be disclosed, while on Friday investors have the most recent weekly monetary statistics which were released on late Thursday during the 1974–79 period. Besides the results for these days reported in Table I, six other forecast equations were estimated: two for Thursday after the FOMC meeting and two each for the first and second Mondays after the FOMC meetings with forecast horizons varying from 7 to 21 days. The intercepts ranged from −.11 to .19, all with very small t-statistics, and the slope coefficients were between .95 and 1.00, all with very large t-statistics. The regression standard errors ranged from 30 to 46 basis points, with the longer-term forecasts having the greater standard errors and none of the D-W statistics indicating first order serial correlation.

B. Estimating Forecast Errors with Disclosure

To estimate the information value of immediate disclosure, define D_t as the information in the prevailing policy directives used in the empirical work, more generally denoted by Y_t in the theoretical analysis. Then the empirical analogue to (3) is

$$E^j_{fD}[V(r_{t+j}|f^j_t, D_t)] = E_{xy}[V(r_{t+j}|X_t, Y_t)] \tag{9}$$

Estimates of (9) were made by first estimating the linear prediction equation

$$\hat{\hat{r}}_{t+j} = k + mf^j_t + nD_t \tag{10}$$

by ordinary least squares. The sample variance of the prediction errors, $\sum_{t=1}^{T}(r_{t+j} - \hat{\hat{r}}_{t+j})^2/T - 1$, is our estimate of (9) which is to be compared to the estimates of (7) reported in Table I.

Before discussing the FOMC policy directives, several limitations on the interpretation of (10) and the corresponding estimates of (9) should be noted. One is that the estimate of (10) represents the maximum (linear) predictive power of f^j_t and D_t over the sample period since investors would have only gradually obtained the sample with which to estimate, explicitly or implicitly, (10). A second limitation is that if the information in the policy directives turns out to be important, we can suggest this but our actual estimates need not indicate precisely how important because, in this case, disclosure could have produced a "change in structure" from that which actually prevailed over the 1974–79 period. If, on the other hand, the directives are not important, "changes in structure" are less likely and it would be reasonable to conclude that disclosure would not have improved the accuracy of interest rate forecasts.

The FOMC's short-term policy is set at a policy meeting which is typically held monthly and is carried out over the ensuing month by the System's account manager at the New York Federal Reserve Bank (the "Desk"). The policy directive issued to the account manager is publicly released at the time a new directive becomes effective so that there is typically a one-month lag in release. Prior to the recent (6 October 1979) policy changes, the policy directive consisted of a set of instructions to the manager to maintain a funds rate believed to be consistent with desired two-month growth rates in the aggregates, generally M-1 and M-2, over the month in which the meeting was held and the following month. The directive also contained further instructions on how the funds rate was to be varied in response to Board staff projections of deviations of the two-month aggregate growth rates from their desired rates. These deviations were expressed either in terms of exceeding (or approaching) upper or lower tolerance ranges.[16]

Knowledge of the directive's funds rate target, and the occasional interim changes in the target deemed necessary by the FOMC, could be useful to market participants as an indication of levels of short-term interest rates likely to prevail over the month. Knowledge of the two-month growth rates could be used as an indicator of potential changes in the Committee's interest rate objectives from those currently being pursued by the Desk.[17] The funds rate objective and the

[16] For a more detailed discussion of procedures see Kaminow [6].

[17] Projected deviations of a two-month growth rates in the aggregates from the desired two-month

two-month aggregates targets, the key measures of policy intentions, were used to estimate the value of disclosure of the FOMC's policy directive in the following way.

The current funds rate objective was that specified by the Committee in the directive or, if changed during the intermeeting period, the prevailing target. The aggregates policy variable was constructed so as to capture the information in the two-month aggregates targets concerning whether or not the FOMC (or Desk) would be likely to alter its interest rate objective in the near term.[18] To construct this variable, we first made two estimates of two-month M-1 forecasts to approximate market estimates of the Board staff's two-month projections prevailing at the times of the forward rate forecasts.[19] The first set of M-1 forecasts was simply the actual growths in M-1 over the appropriate two-month periods. The second set of two-month M-1 forecasts was obtained using a projection of M-1 growth over the part of the two-month period still remaining. The projection was made with an univariate ARIMA equation for predicting weekly M-1 growth rates (estimated over the 1974–79 period).[20]

Each of the two alternative M-1 forecasts was subtracted from the midpoints of the two-month M-1 target specified in the FOMC's policy directive, with the projected deviation of M_1 from its two-month target divided by the size of the M-1 tolerance range. For each of the two constructed M-1 policy variables, the numerator indicates the deviation in (projected) M-1 growth from the FOMC's target midpoint while the denominator gives recognition to the influence of the size of the tolerance range on the likelihood that such a deviation would lead to a change in the FOMC's interest rate objective.[21, 22]

The funds rate and M-1 measures of the FOMC's policy directive were included in least squares regression equations along with the appropriate forward rates to estimate (10). Summary statistics for the estimated forecasting equations are presented in Tables IIa and b. Table IIa contains results when the actual two month growth in M-1 was used as the market forecast of the M-1 policy variable.

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growth rates will tend to produce a change in the Desk's funds rate objective in the same direction, in accord with the Committee's instructions.

[18] This form of the aggregates policy variable was suggested by Kaminow [6].

[19] Since the Federal Reserve does not have close control over the aggregates in the short run, these staff forecasts need not, and often do not, coincide with Fed intentions. As indicated above, the FOMC (or the Desk) uses Board staff forecasts of the aggregates in judging the need for a change in its interest rate objective. The most precise estimate of the staff forecast would, of course, be the forecast itself. Staff aggregates forecasts, however, are confidential for a period of 5 years and, as such, are not available to the public. Lombra and Moran [7] provide a detailed description and analysis of the Board staff's monetary forecasts for 1970–73.

[20] For example, for the two month forecast prevailing on the day after the FOMC meeting, the ARIMA equation was used to project M-1 for the remainder of the two month-period. With this projection and actual growth up to the projection period, the implied growth over the entire two-month period was then determined.

[21] The width of the tolerance range is used only as an approximation. The FOMC did not always specify to the Desk the same response in its funds rate target to deviations in M-1 from the target midpoint for a given tolerance range.

[22] The use of a similarly defined variable for M-2 in addition to the M-1 variable did not signficantly affect the results and the equations using both M-1 and M-2 are not reported here.

Table IIa

Regression of Future Spot Rates on Forward Rates and FOMC Policy Variables[a, b] (Using Actual Money Growth Forecast)

$$R_{t+j} = k + mf_t^j + gFF_t + hM_t + v_{t+j}$$

Forecast Horizon	k	m	g	h	R^2	Standard Error (Basis Points)	D-W	Average Absolute Forecast Error (Basis Points)
A. Forward Rates Prevailing Day After FOMC *Meeting*								
11 days	0.08	0.98	−0.01	−0.01	.95	32	2.31	18
	(0.36)	(12.98)	(−0.17)	(−0.18)				
18 days	0.05	0.95	0.03	0.01	.94	38	2.13	25
	(0.20)	(10.81)	(0.53)	(0.25)				
23 days	0.10	0.84	0.12	0.06	.92	44	2.03	29
	(0.34)	(8.25)	(1.81)	(1.03)				
B. Forward Rates Prevailing Second Friday After FOMC *Meeting*								
13 days	0.07	0.86	0.10	0.04	.96	32	2.02	21
	(0.35)	(12.47)	(2.24)	(0.90)				
20 days	0.07	0.88	0.07	0.16	.95	34	2.18	22
	(0.29)	(11.67)	(1.40)	(3.27)				
C. Forward Rates Prevailing Third Friday After FOMC *Meeting*								
13 days	0.37	0.79	0.11	0.15	.94	36	2.39	23
	(1.65)	(11.31)	(2.50)	(2.93)				
20 days	0.21	0.85	0.08	0.25	.91	47	2.39	32
	(0.70)	(9.29)	(1.38)	(3.83)				

[a] The forecast horizon of "j" days refers to the number of days after the forward rate prevailed, as in Table I. Other variables are: FF, funds rate target, and M, M-1 policy variable.

[b] t-statistics in parentheses.

Table IIb

Regression of Future Spot Rates on Forward Rates and FOMC Policy Variables[a, b] (Using ARIMA Money Growth Forecast)

$$R_{t+j} = k + mf_t^j + gFF_t + hM_t + v_{t+j}$$

Forecast Horizon	k	m	g	h	R^2	Standard Error (Basis Points)	D-W	Average Absolute Forecast Error (Basis Points)
A. Forward Rates Prevailing Day After FOMC *Meeting*								
11 days	0.04	0.99	−0.01	0.03	.95	32	2.34	18
	(0.19)	(13.05)	(−0.22)	(0.59)				
18 days	−0.01	0.96	0.02	0.09	.94	38	2.15	24
	(−0.40)	(11.03)	(0.41)	(1.27)				
23 days	0.03	0.85	0.11	0.13	.93	43	2.05	28
	(0.10)	(8.47)	(1.61)	(1.72)				
B. Forward Rates Prevailing Second Friday After FOMC *Meeting*								
13 days	0.06	0.86	0.10	0.05	.96	32	2.04	20
	(0.30)	(12.49)	(2.20)	(0.95)				
20 days	0.10	0.87	0.07	0.10	.94	36	2.15	23
	(0.43)	(10.91)	(1.29)	(1.85)				
C. Forward Rates Prevailing Third Friday After FOMC *Meeting*								
13 days	0.37	0.79	0.11	0.11	.94	38	2.35	24
	(1.62)	(10.96)	(2.23)	(2.04)				
20 days	0.28	0.84	0.08	0.15	.89	51	2.35	33
	(0.87)	(8.49)	(1.18)	(2.07)				

[a] The forecast horizon of "j" days refers to the number of days after the forward rate prevailed, as in Table I. Other variables are: FF, funds rate target; and M, M-1 policy variable.

[b] t-statistics in parentheses.

Table III

Reduction in Forecast Errors due to Disclosure
(Basis points)

Forecast Horizon	Reductions in Average Absolute Forecast Errors[a]		Reduction in Standard Errors[a]		*F*-Statistics: Error Variance Reductions[b]	
	I[c]	II[c]	I	II	I	II
A. Forecasts Made Day After FOMC						
11 days	0	0	0	0	.03	.39
18 days	0	1	0	0	.52	.85
23 days	1	2	1	2	2.49	3.50*
B. Forecasts Made Second Friday After FOMC						
13 days	0	1	1	1	1.68	2.20
20 days	3	2	3	1	6.81**	2.67
C. Forecasts Made Third Friday After FOMC						
13 days	3	2	3	1	7.00**	5.07*
20 days	3	2	5	1	8.08**	2.93

[a] Rounded to the nearest basis point.

[b] *F*-statistics are calculated for the significance of the reduction in the sum of squared residuals when the two policy variables are added. Degrees of freedom in the numerator is two and the denominator is sixty. For test statistics, See A. Goldberger, *Econometric Theory*. New York: John Wiley & Sons, Inc., 1963, p. 177.

[c] Column I reports results obtained using forecast equations from Table IIa and Column II reports results using Table IIb. Forecast errors from these equations are being compared to those reported in Table I.

* Significant at .05 level. The *F*-value at this level is 3.15.

** Significant at .01 level. The *F*-value at this level is 4.98.

Table IIb contains the results when the M-1 ARIMA forecast was used. Both tables produce fairly similar results, although the M-1 policy variable in Table IIa shows greater significance for the last three forecast regressions than it does in Table IIb. The signs of the coefficients for the policy variables are generally in agreement with what would be expected from the above discussion on the policy directive. The *t*-statistics indicate, however, that the forward rates dominate the forecast equations. In Table III, the size of the forecast errors with and without the policy variables are compared. The *F*-statistics indicate that in only about one-third of the equations did inclusion of the policy varibles significantly reduce the variance (standard error) of the forecast below that obtained when only the forward rates were used in the forecast equations. Moreover, the size of the reductions, indicated by the first two sets of columns in the table is only a few basis points. These results suggest that immediately disclosing monetary policy intentions over the 1974–79 period would have been of only minor help to investors in projecting future levels of short-term interest rates.[23]

We suggest that the policy directives have little forecast value because the

[23] The results obtained using the Thursday and two sets of Monday forward rates and policy variables were very similar to those reported in Tables IIa and b. Of 12 equations estimated, only 4 equations had significant coefficients associated with the policy variables and only 3 equations had regression standard errors which were significantly lower than those for equations using only the forward rates (according to the *F*-statistics at the .05 level). The reduction in the regression standard errors when the policy variables were added to the forward rates ranged from 0 to 3 basis points.

forward rates embody reasonably accurate market expectations about current policy objectives; rather than because of the lack of a reliable relationship between policy objectives, as specified in the directive, and policy actions. In his study of System policy behavior, Kaminow [6] found strong evidence that the manager generally followed the directive's specifications in moving the funds rate target in response to projected deviations in M-1 (and M-2) from the middle of the tolerance range, and that the response varied in accord with the width of the tolerance range. The manager is able to keep the funds rate close to the target through the addition or absorption of reserves.[24]

The absence of substantial information value of the FOMC policy directives, indicated in Table III, further implies that disclosure would typically create only modest revisions in interest rate expectations. This consequence was established above, (6), where it was shown that the increase in the variance of expectations due to new information will equal the reduction in the variance of the forecast error. However, we can get a more intuitive idea of the effect of immediate disclosure on interest rate expectations by considering the relative size of expectations revisions in response to the disclosed information. To do this, we first estimated actual one-day revisions in the forward rate forecasts: expectations revisions made between the day of the FOMC meeting and the day after the meeting, between the second Thursday and the second Friday after the meeting, and between the third Thursday and the third Friday after the meeting. The expectations prevailing on the day after the FOMC meetings, as the second and the third Fridays following the meetings are, of course, those presented in Table I. Forecasts of the same future interest rates made on each of the three preceding days were similarly estimated with appropriate forward rates.[25] The differences between the interest rate forecasts presented in Table I and these preceding day forecasts represent estimates of actual revisions in forward interest rate forecasts. Summary statistics indicating the size of these expectations revisions are reported in Table IV.

Hypothetical revisions in expectations with immediate disclosure of the policy directive were also calculated. This was done by taking interest rate forecasts incorporating the policy information, reported in Tables IIa and IIb, and subtracting from these the respective forward rate forecasts made on the preceding day (without the policy information). The resulting estimates of expectations revisions *with disclosure* are presented in Tables Va and Vb. A comparison of these results with those of Table IV suggests that being informed of the FOMC policy directive on the day after the FOMC meeting would have produced one-day revisions in market expectations only slightly greater, in absolute size, than the revisions that actually occurred.

Revisions in expectations, with disclosure, are larger for the second and third Friday forecasts, though still not very large. These latter two sets of expectations revisions, even if capturing effects on market expectations, need not be interpreted as one-day revisions. The information in the directive could have been available

[24] The account manager's annual reports on open market operations, published in *Federal Reserve Bulletins*, indicate in detail how the funds rate targets are achieved (e.g., *Federal Reserve Bulletin*, April 1978, pp. 265–78.)

[25] The forecast horizons of these forecasts would, of course, have one more day than those reported in Table I.

Table IV

Estimated Revisions in Market Expectations without Disclosure

Forecast Horizon*	Average Absolute Revisions (Basis Points)	Fraction of Revisions More Than 25 (50) Basis Points
A. Between Day of FOMC *Meeting and Following Day*		
11 days	6	.03 (.00)
18 days	5	.03 (.00)
23 days	5	.00 (.00)
B. Between Second Thursday and Second Friday After FOMC *Meeting*		
13 days	6	.02 (.00)
20 days	6	.02 (.00)
C. Between Third Thursday and Third Friday After FOMC *Meeting*		
13 days	8	.05 (.03)
20 days	8	.06 (.03)

* The forecast horizon for the preceding-day forecasts contains one additional day.

Table Va

Hypothetical Revisions in Expectations with Disclosure[a] (Disclosure Forecast Taken from Table IIa)

Forecast Horizon	Average Absolute Revisions (Basis Points)	Fraction of Revisions More Than 25 (50) Basis Points
A. Between Day of FOMC *Meeting and Following Day*		
11 days	6	.03 (.00)
18 days	7	.03 (.00)
23 days	12	.13 (.00)
B. Between Second Thursday and Second Friday After FOMC *Meeting*		
13 days	8	.03 (.00)
20 days	13	.17 (.00)
C. Between Third Thursday and Third Friday After FOMC *Meeting*		
13 days	16	.27 (.03)
20 days	22	.38 (.05)

[a] Expected interest rates using forecasts from Table IIa are compared to forward rates prevailing one day earlier.

Table Vb

Hypothetical Revisions in Expectations with Disclosure[a] (Disclosure Forecasts Taken from Table IIb)

Forecast Horizon	Average Absolute Revisions (Basis Points)	Fraction of Revisions More Than 25 (50) Basis Points
A. Between Day of FOMC *Meeting and Following Day*		
11 days	6	.05 (.00)
18 days	8	.09 (.00)
23 days	13	.16 (.02)
B. Between Second Thursday and Second Friday After FOMC *Meeting*		
13 days	8	.05 (.00)
20 days	10	.03 (.00)
C. Between Third Thursday and Third Friday After FOMC *Meeting*		
13 days	13	.16 (.02)
20 days	16	.23 (.03)

[a] Expected interest rates using forecasts from Table IIb are compared to forward rates prevailing one day earlier.

between the day after the FOMC meeting and the second (third) Friday when the forecasts were estimated. As such, this information would have become useful to market participants somewhat gradually over the 1½ (2½) week period. The expectations revisions (with disclosure) reported for the second and third Fridays would, therefore, represent the cumulative effect of disclosure on expectations revisions over these several-week time periods.

III. Conclusion

In this paper, we have tried to estimate the effects of immediate disclosure of the Federal Reserve's FOMC policy directives on investors' interest rate uncertainty over the period 1974–79. It was argued that if the prevailing policy directives have (interest rate) information value to investors, disclosure can be expected to reduce their uncertainty about future interest rate levels where uncertainty is measured as the conditional variance of forecast errors. Forward rates derived from Treasury bill yield curves were used as a representation of the expectations of market participants. The main result was that the addition of key information from the policy directives made an improvement over the forecast accuracy of equations using only forward rates by at most a few basis points. In the majority of tests , these improvements were not significant. This result suggets that the prevailing policy directives may have had no more than marginal interest rate information value to market participants. This suggests that immediate disclosure may not have much social value in the sense defined in papers by Hirshleifer [5] and Starr [10] and discussed above. However, we have not considered the possible value of disclosure in terms of other non-interest rate information and its potential for reducing information-gathering costs. Also, the results are limited to near-term forecasts of short-term rates, although the short-term nature of the policy directive suggests that this is where the directives would be most likely to have information value. Finally, the FOMC policy procedures have been altered since late 1979; the effects of immediate disclosure of the more recent policy directives might differ somehat from those estimated here.

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