

Transparency and Monetary Policy:
What Does the Academic Literature Tell Policymakers?

Seth B. Carpenter^{*}
Division of Monetary Affairs
The Board of Governors of the Federal Reserve System
scarpenter@frb.gov

April 2004

Abstract

Transparency in monetary policy has become a popular topic over the past decade. However, the majority of the economic research is theoretical, calling into question its value as a practical guide to monetary policy. This paper surveys the literature to assess what conclusions a central bank can draw from the academic study of transparency and how beneficial transparency may be.

^{*} The views expressed are solely those of the author and do not necessarily reflect those of the Federal Reserve, the Board of Governors, or other members of the staff. The author had helpful conversations with Ben Bernanke, John Driscoll, Jon Faust, Donald Kohn, David Lindsey, Athanasios Orphanides, Vincent Reinhart, and Lars Svensson. Dennis Dong provided research assistance. All errors belong to the author.

1. Introduction

Transparency in monetary policy has generated a large and diverse literature among academic economists. However, the applicability of the results is not always straightforward for policymakers. In general, there is a lack of consensus on whether central bank transparency is beneficial, in part because of a lack of consensus on what constitutes transparency and in part because of the difficulties in modeling the concept of transparency. In discussing the academic literature on transparency, this paper will define the term, review selected work on the topic, and try to draw concrete implications. The paper will focus on academic discussions of the economic costs and benefits of transparency. Although it is possible that democratic societies *ought* to have public institutions that are open and accountable to the public, this paper will intentionally avoid moral or ethical discussions of transparency.¹

The purported benefits of monetary policy transparency in the literature include an increase in private sector forecast accuracy, a reduced level of inflation, a reduced variability of inflation, or a reduced variability of output. The purported costs of transparency include a reduction in forecast accuracy or a reduced effectiveness of monetary policy. In a somewhat philosophical discussion of transparency in monetary policy, Winkler (2002) emphasizes the idea that transparency needs to be better defined before it can be debated. He argues that more information divulged by the central bank does not necessarily imply a greater understanding on the part of the public, part of his definition of transparency. Further, he argues, the simplistic modeling of transparency as simply the reduction or elimination of the uncertainty around a parameter in a model is not helpful for a central bank trying to communicate with the public. These are valid points and inform much of the discussion throughout this paper, but in the context of theoretical analyses of transparency, such simplifications cannot be avoided. An important lesson, however, is that transparency is about effective communication, not simply announcements.

Three major themes emerge from the literature. First, a considerable substitutability exists across types of transparency, and as such what matters is the

¹ Stiglitz (1999) discusses the importance of transparency in a democracy from a normative point of view.

public's ability to understand the central bank's motives and actions; the specifics are less important. Second, this understanding of the central bank's actions makes inflation expectations more sensitive to changes in monetary policy, because any attempt to stimulate the economy past full employment is understood and results in heightened inflation expectations. Given a (presumed) societal distaste for inflation, this can serve to create a long-term institutional incentive for low inflation at the central bank. This benefit from transparency appears to be the most robust result of the literature, as will become clear below. Lastly, the empirical evidence is not compelling and most likely will never be. As Winkler points out, because transparency is nuanced and difficult to define, numerical measures will be at best imprecise and at worst incorrect. Further, given the differing levels, types, and definitions of transparency, clear econometric results would be more surprising than convincing.

In a previous survey of the literature, Geraats (2001) created a taxonomy of five categories of transparency. She lists *political*, *economic*, *procedural*, *policy*, and *operational* transparencies as distinct realms of possible transparency for a central bank. While each of these aspects is important and can be illustrated within several of the models to be discussed below, this degree of specificity is perhaps excessive, particularly given the substitutability across types of transparency. As a result, this paper will discuss transparency in *instruments*, *goals*, and *implementation*.

In the next several sections, I will describe the economic literature that relates to each of these three areas of transparency. These three types of transparency are not mutually exclusive, however, so having a vocabulary to describe the types of transparency will be helpful in discussing the overlap. It is important to note that I define transparency in terms of the public's understanding of the various aspects of policy making. This reflects Winkler's critique of the theoretical literature. In some of the theoretical models discussed below, unverifiable statements by the central bank have the potential to misrepresent some information. Therefore, in thinking about practical application of the results of the literature, the difference between statements by the central bank and truthful revelation can be crucial.

Section 6 of the paper discusses the small empirical literature on transparency in central banking. Section 7 concludes by tying the results of the literature to the

institutional setting of central banking. In recently released transcripts of FOMC meetings compiled on the Board's website (www.federalreserve.gov/fomc/transcripts), much of the discussion about transparency includes concern by FOMC members about overreaction by market participants to revelations about policy. This potential cost of transparency is not addressed in the academic literature because most of the models are based on a rational expectations assumption in which market participants fully understand the structure of markets, ruling out any overreaction.

2. Defining Transparency

In principle, central banks have multiple instruments from which to select an operating target. The Federal Reserve, for example, targeted nonborrowed reserves from 1979 to 1982, then switched to targeting borrowed reserves. By the end of the 1980s, the Fed had evolved from targeting borrowed reserves to explicitly targeting the federal funds rate. It was not until 1994, however, that the Fed made its intended rate explicit by publicly announcing immediately what that target was. Previously, whether for an interest rate or a reserves measure, the target was not disclosed until much later, if at all, and certainly not when a particular target was still applicable. *Instrument transparency* exists when the public knows the current policy instrument and the current targeted level for that instrument. Between 1989 and 1994, despite the absence of official announcements of the target for the federal funds rate, the Fed did give clear signals, which may have helped achieve the target rate. The shift in 1994 illustrates the fact that transparency is a matter of degree.

Central banks' goals are stabilizing prices or stabilizing both prices and output. Some central banks have adopted inflation targeting (for example, New Zealand, the United Kingdom, and Switzerland) with specific numerical ranges for desired inflation. The Federal Reserve Act mandates stable prices and full employment. While most central banks in industrialized countries are concerned with establishing and maintaining low inflation, it seems clear from their actions that they are concerned about output as well. *Goal transparency* exists when the public knows the objective of the central bank, including the relative values placed on each goal when there are multiple objectives.

In general, a central bank manipulates a policy instrument in order to achieve its goals over time. The need to adjust the policy instrument depends on the central bank's assessment of the economy, because the expected effect of policy on the economy is likewise based on the policymakers' understanding of the economy. For example, if a central bank believes a model of the economy where changes in monetary policy cannot affect output in the long run, a different value of the instrument might be chosen for a given set of goals than if the bank believes a model where monetary policy has permanent effects on real variables. The interpretation of the economy forms a bridge between policy goals and changes in the policy instrument. *Implementation transparency* exists when the public knows the manner in which information about the economy is translated into policy actions. This connection includes relevant private information the central bank may have, the economic models (if any) that policymakers use in understanding the economy, and the way policy decisions are made.

For each type of transparency, there is also the possibility of differing degrees of transparency. For example, the central bank may acknowledge that it targets interest rates, but not state what the current target is. The central bank may acknowledge that it is concerned with both inflation and output, but not give any guidance as to what it considers to be appropriate levels or the relative weights of each. In some cases, it may not be possible for a central bank to be precise. In Section 4, for example, I discuss models where the veracity of the announcements is unverifiable, and as a result, the announcements are not believed if they are too precise. On the other hand, the central bank may not believe in a single economic model, in which case explaining its understanding of the economy in precise terms may not be possible. Transparency is a multifaceted concept that can only be defined and evaluated in very specific contexts.

3. Instrument Transparency

Most central banks currently use a short-term interest rate as their policy instrument and announce the target level; this has not always been the case. In a famous court case, *FOMC v. Merrill* (1976)², the Federal Reserve argued that delay in the

² Fed. Open Market Comm. of Fed. Reserve Sys. v. Merrill, No. 77-1387, SUPREME COURT OF THE UNITED STATES, December 6, 1978, Argued, June 28, 1979, Decided

disclosure to the public of its policy directive to the open market desk was crucial in part because it mitigated fluctuations in interest rates. These fluctuations in interest rates, it was argued, would raise the cost of borrowing to the Treasury; see, for example, Goodfriend (1986). Several papers have tried to address the seemingly paradoxical notion that greater information leads to greater variability of interest rates, one metric used by the FOMC in the Merrill case to evaluate transparency.

Dotsey (1987) and Rudin (1988) develop models in which transparency about the reserves target is detrimental as measured by the unconditional variance in the interest rate of the model. Agents adjust their demand for funds on their expectation of monetary policy shifts. With no information about the central bank's activities, agents' expectation about interest rates is the unconditional mean and thus a constant in the models. However, with knowledge about the central bank's policy shifts, agents shift their expectations and thus interest rates are more volatile. In these models, conditional forecasts improve with more information, but unconditional variances increase.

In contrast to these two papers, in Tabellini (1987) agents perform a signal extraction problem on changes in the federal funds rate. An increase in the funds rate, for example, is interpreted as being partly a decrease in the target level of reserves and partly a transitory shock to demand, pushing up expectations for the funds rate next period. A higher expected funds rate next period causes a reduction in discount window borrowing this period because banks do not expect to be allowed to borrow each period. This decreased borrowing leads to an increase in demand for nonborrowed reserves, causing an even greater rise in the current period's funds rate. If the target for reserves were actually unchanged, instrument transparency allows banks to understand that the increase in the funds rate is a change in demand, not supply, and thus would attenuate the effects of reserve demand shocks instead of amplifying them.

These models of the reserves market reflect a theme in most models of uncertainty; the effect of the uncertainty depends crucially on the way it is modeled.³ Moreover, this literature highlights the need to define an appropriate metric for

³ In fact, another paper, Cosimano and van Huyck (1993) constructs a rational expectations model in which secrecy also smoothes the funds rate. However, this result depends on the arbitrary and dubious assumption that expected future increases in the supply of reserves tend to push up the funds rate in the current period.

evaluation. It is not clear that stability in interest rates caused by poor forecasting is optimal.

4. Goal Transparency

4.1 Goal and instrument transparency. A lack of transparency in both instruments and goals is at the root of one of the seminal papers in the literature. Cukierman and Meltzer (1986) present a model in the spirit of Kydland and Prescott (1977) where the weight the central bank places on stimulating output relative to stabilizing inflation is unknown to the public, time variant, and serially correlated. Its policy instrument, the money supply, is imperfectly controllable, yet observable. In this setting, the public uses the information in the noisy signal from the money supply to infer the central bank's time-varying policy goal. However, opacity in both the instrument and the goal allows the central bank to engage in inflationary surprises when the marginal benefit of output is relatively high, and thus instrument transparency is not beneficial. Transparency in this case would allow the public to infer the central bank's goals and therefore future policy. Because monetary policy is assumed to affect the real economy only through surprises, transparency would render monetary policy impotent. This ability for the central bank to affect the economy only through surprise inflations is at the core of almost all of the research that suggests that transparency may be harmful.

Following Cukierman and Meltzer, Faust and Svensson (2001) respecify the central bank's objective function to be quadratic in both output and inflation. Further, to differentiate monetary control issues from transparency, they allow part of the control error to be observable by the public. The degree to which this portion of the instrument is observable is defined as transparency. In this case, greater transparency introduces a reputational effect in the model, making deviations from low inflation more costly to the central bank because the public can (partially) observe inflationary policy and thus increase their inflation expectation, resulting in higher realized inflation. As the central bank is not assumed to target a level of output above potential and is averse to inflation,

in equilibrium this results in policy leading to lower average inflation and therefore higher social welfare.⁴

Faust and Svensson (2002) examine a model in which the degree of transparency about both the instrument and goal of the central bank is allowed to vary. In this setting, the social and central bank loss functions depend on the interaction of these parameters. For a central bank that is patient (in the sense of discounting the future very little) and that does not have a preference for inflation above the social optimum (although with a time-varying tradeoff between inflation and output stabilization), the optimal choice from the point of view of the central bank would be to have perfect control over its instrument but opacity of its goal. In this case, the central bank can inflate when the marginal benefit of output is high, while the lack of goal and instrument transparency shields it somewhat from the public understanding its motives and pushing up the inflation rate.⁵

In these models, if there is some benefit to stimulating the economy and this stimulus only works through surprising agents, a lack of instrument transparency can be beneficial. However, if the policy instrument can be used by the public to infer the long-run goals of the central bank, then transparency can inform the public about the central bank's preferences, and, in the absence of an inflation bias, result in lower average inflation. In this way, transparency in instruments is a substitute for transparency in goals.

4.2 Goal transparency. In most of the literature, the central bank is assumed to have a loss function that depends on inflation and output and perhaps smoothing of interest rates. Goal transparency involves truthfully and accurately revealing that loss function to the public. Canzoneri (1985) and Eijffinger, Hoerberichts, and Schalling (2000) present fairly standard models in which there is uncertainty about a central bank's relative preferences over inflation and output. In their models, this opacity increases the mean and variance of inflation. Essentially, the uncertainty causes the public's inference about the central bank's tolerance for inflation to be biased. Canzoneri also makes the point that increased understanding between the public and the central bank can avoid the Kydland-Prescott time-inconsistency problem. However, in Eijffinger, Hoerberichts, and Schalling, if

⁴ See, for example, Blinder (1997) who argues that central bankers feel duty bound not to expand the economy past potential.

⁵ However, in this case, the public does not know that the instrument is perfectly controllable.

monetary policy works through surprises, incomplete goal transparency can be beneficial because it can allow greater output stabilization.

The Faust and Svensson (2001) analysis of the interaction of goal and instrument transparency makes a similar point. However, the general conclusion is that transparency about goals allows the public to form more precise inflation expectations, and in a dynamic setting, this induces reputational effects. A central bank that exploits the opacity to expand the economy is punished with higher inflation expectations.

In a one-period model, Jensen (2000) argues that transparency can be detrimental through an expectations mechanism similar to that in Faust and Svensson (2001). In Jensen's model, if agents are aware of the central bank's preferences, future behavior by the bank can be inferred, and thus inflation expectations become extremely sensitive to policy actions. As a result, in equilibrium the central bank smoothes inflation more than would be socially optimal, considering the assumed social welfare trade off of inflation against output.⁶

In these models, the benefit or cost of transparency relies on how the uncertainty about goals affects inflation expectations and thus, future actions of the public and the central bank. The models listed above suggest that transparency makes inflation expectations more sensitive to monetary policy, and can have the benefit of disciplining the central bank and eliminating or mitigating a possible inflation bias. There remains the question about whether this sort of transparency reduces the central bank's ability to stabilize output fluctuations. This result requires that policy work through surprises, in which case some uncertainty can be desirable, at least from the point of view of the central bank.⁷ However, absent this channel of stabilization, it seems that in these types of models, transparency gives greater discipline through its effect on inflation expectations.

4.3 Goal transparency and announcements. Walsh (1999) develops a model in the vein of other work on goal transparency and analyzes a case where the central bank makes announcements about inflation targets. If deviations from these self-announced

⁶ Jensen's model is similar to a static version of Faust and Svensson's "extreme" transparency case.

⁷ Lewis (1991) complements Faust and Svensson's characterization of the substitutability of goal transparency and instrument transparency. She argues that if one type of transparency is forced on a central bank, the central bank will reduce another type of transparency.

goals can be punished somehow, then goal transparency combined with implementation transparency, where the central bank reveals the shocks to which it is responding, can eliminate any inflation bias and allow for optimal accommodation of supply shocks.

In Walsh's paper, however, the mechanism by which deviations can be punished is not specified and some information is unverifiable. Indeed most of the theoretical literature ignores the fact that announcements of inherently unverifiable information can be problematic. Specifically, if information revealed by the central bank can influence outcomes, then the central bank may have an incentive to misrepresent the information. This type of "cheap talk" is discussed by Stein (1989) and Garfinkel and Oh (1995). Precise statements, if they were to be believed, would tend not to be truthful, similar to the traditional time inconsistency problems with credibility. However, sufficiently vague statements, announcing a range for the target variable for instance, can be credibly conveyed because any announcement outside of the range, if believed, would leave the central bank worse off. This strand of the literature does not look for the optimal level of transparency. Instead it looks for the feasible level of transparency. The degree to which a central bank is able to reveal information seems as important as the degree to which it chooses to reveal information.

Orphanides and Williams (2003) bridge the gap a bit, modeling the public's inflation expectations as a function of realized inflation in the past. When inflation is pushed up through an inflationary shock, the public's forecast for inflation rises, making stabilization more difficult. In equilibrium, optimal policy is tighter than it would be under strict rational expectations, reducing the amount of output stabilization the central bank will perform. Indeed, "cheap talk" problems aside, in this model the simple announcement of a long-run inflation target is not sufficient to eliminate the problems with imperfect information.

5. Implementation Transparency

Of potentially greater difficulty is the revelation of the central bank's interpretation of economic data that informs policy decisions. Cukierman (2002) points out that explicit revelation of a central bank's assessment and forecast of the economy may not be possible. Central banks usually have policy committees, and it seems

plausible, if not likely, that committee members will have some disagreement over which model or models of the economy are believed. Indeed, the economics profession as a whole is far from unanimous on various analytical issues, and therefore a precise statement by the central bank about how the economy works may not be possible. This implies that implementation transparency may be crucially limited in its extent. Moreover, this type of announcement could also be subject to a “cheap talk” problem. If investment spending is key to economic growth, and businesses invest less if they expect a recession, announcing a forecast of positive economic growth could influence investment behavior, giving the central bank an incentive to misrepresent its private information about the outlook for the economy.

Precision or accuracy of the forecast notwithstanding, Cukierman (2002) and Gersbach (2003) argue that disclosure of economic forecasts by central banks would vitiate the power of monetary policy. This result stems from their use of a Lucas-type supply curve, which has the implication that monetary policy only affects output through surprises. As a result, any announced stabilization effort by the central bank would be fully expected and therefore offset by private agents. This argument rests entirely on the assumption that only surprise monetary policy can affect the economy. In this way, the mechanism is identical to the criticism of goal transparency. Cukierman (2002) points out that if one were to use a New Keynesian supply curve instead, then stabilization is possible but the central bank would need greater adjustments to interest rates than if its objectives were not known to the public. If the social loss function penalizes volatile interest rates, implementation transparency may not be optimal.

A different conclusion is presented in Geraats (2001), where the central bank’s revelation of supply and demand shocks in conjunction with policy decisions allows the public to infer the central bank’s inflation preferences. If the central bank does not maintain a low inflation strategy, inflation expectations would rise, causing a loss for the central bank. This creates a reputation effect, much like that in the Faust and Svensson (2001) model, and lowers the inflationary bias. Moreover, this model demonstrates the substitutability or equivalence of different types of transparency.

The papers that argue against implementation transparency seem to have less validity to the extent that monetary policy works through channels other than pure

inflation surprises. Further, the possibility of reputational effects that lower inflation expectations and thus realizations is somewhat robust to modeling strategies.

If issues of “cheap talk” can be resolved, there seems to be scope to improve private sector information, as Romer and Romer (2000) present evidence that central bank forecasts of inflation are better than private sector forecasts. Morris and Shin (2001) develop a model where central bank forecasts are imperfect, but better than private forecasts. Individual agents discard their private information whose idiosyncratic errors average to zero in the aggregate and use the central bank’s forecast. As a result, the economy is more volatile, as the central bank’s forecast errors become aggregate errors. However, if private agents use central bank forecasts to improve their own, as in Tarkka and Mayes (2000), then aggregate uncertainty and volatility can be reduced. Both models of the incorporation of public information into private forecasts are plausible and yet yield contradictory results. The crucial distinction is the degree to which aggregate forecasts are improved, and this seems very model specific.

Buiter (1999) and Issing (1999), among others, discuss the desirability of revealing votes and transcripts of monetary policy decisions. While these papers subscribe to the benefits of implementation policy discussed in other papers, these papers address the specific mechanism for revealing information. There is a concern by some that announcing votes or statements by policy committees could adversely alter the decisions made by those committees. For example, a member of the European Central Bank might feel pressured to put national interests above Euro-area interests if his/her vote were not anonymous. The resolution of the debate on specificity is more psychological or sociological than economic. What seems salient is that if transparency is beneficial, the details are less important than the public’s understanding of the policy decision.

6. Empirical Studies of Transparency

Although most of the literature on transparency is theoretical, there is a small set of empirical research on the topic. The fact that there is disagreement within the theoretical literature over what constitutes transparency implies that any empirical work must first contend with a serious measurement issue. Eijffinger and Geraats (2002)

compile an index of monetary policy transparency. They assign a numerical value to central banks based on the authors' assessment of such aspects as formal or quantitative goals, revelation of meeting minutes and voting records, revelation of economic data and models, and discussions of policy choices and errors. While some parts of the index, such as the equal weighting of components, seem quite arbitrary, some quantification is necessary for empirical work. Demertzis and Hughes Hallett (2002) use this index to test the effect of transparency measured this way on economic outcomes. They find that for OECD countries, when the mean of inflation is regressed on this index (or selected sub-components), the coefficient is not statistically significant. They find the same result when the dependent variable is the mean of output growth. However, regressing the variance of inflation on the index yields a negative coefficient, which the authors interpret as evidence that transparency tends to reduce the variance in inflation. As is the case with almost all of the econometric analysis in the literature, the authors fail to identify causality. A commitment to sound monetary policy could lead a central bank to both adopt inflation targeting and lower inflation variability. In this case, there could be a single variable driving both the left- and right-hand side variables in the regression, accounting for the correlation. There is not adequate identification in the regression.

Kuttner and Posen (1999) examine the behavior of inflation before and after the adoption of inflation targeting in the United Kingdom, Canada, and New Zealand and argue that the reduction in average inflation and inflation variability is consistent with flexible inflation targeting. However, the authors ignore the *post hoc ergo propter hoc* fallacy of drawing this conclusion, and the identification problems are at least as serious in this paper as in the Demertzis and Hughes Hallett paper.

Chortareas, Stasavage, and Sterne (2002) construct their own index of the transparency of published forecasts from several central banks. They find that greater transparency is consistent with lower average inflation, but not lower inflation variability. As with Demertzis and Hughes Hallett, these authors fail to control for possible endogeneity or common causality.

Ball and Sheridan (2003) try to examine the effect of inflation targeting on economic outcomes. They stress that their investigation tries to isolate the effect of inflation targeting *per se* apart from changes in the macroeconomic environment by

analyzing both targeters' and non-targeters' performance before and after the adoption of inflation-targeting regimes. They include the average inflation rate in each country before inflation targeting was adopted to account for regression to the mean. Their results suggest that there is no clear evidence that inflation targeting actually improves outcomes. The authors do point out, however, that there is no evidence that inflation targeting causes any harm, either.

7. Conclusions

In practice very little in the academic literature gives clear guidance about how the central bank should communicate its knowledge about the economy and to what degree. The most robust conclusion from the literature is that increasing the public's ability to understand the central bank's goals leads to greater sensitivity of the public's inflation expectations to changes in monetary policy. This can have the benefit of constraining a central bank that might otherwise not be able or willing to commit itself to a low inflation strategy. This is the "reputational effect" as in Faust and Svensson (2001, 2002) or Geraats (2001). Currently among industrial economies, sound monetary policy may seem more the rule than the exception, but this has not always been the case, nor is it guaranteed to continue. In that sense, enhancing transparency may institutionalize low inflation policies.

From a practical point of view, an important insight from the literature is that the different types of transparency can easily substitute for each other. Therefore the specific mechanisms are less important than the ability to clearly communicate the intentions of the central bank.

There are, of course, some theoretical examples of drawbacks to transparency. By and large, however, the models that generate a social cost to transparency rely crucially on a Lucas-type supply curve, whereby monetary policy is only effective if it is a surprise. If the economy more closely resembles a New Keynesian model, the force of these criticisms is greatly diminished.

In terms of publishing forecasts, the benefits are not clear. While a central bank may well have better information or forecasts than the public, it does not have perfect information. If the public underestimates the degree of uncertainty surrounding a central

bank's forecasts, then publishing specific forecasts that prove to be inaccurate *ex post* could, in fact, be destabilizing.

The literature on “cheap talk,” however, highlights the fact that there may be feasibility constraints on how precise a central bank can be. Moreover, because monetary policy is typically conducted by committees, the ability to reveal precise information about specific goals, transmission channels, or forecasts may be impossible. Therefore, complete, specific transparency, such as revealing votes or individual forecasts, has the possibility of confusing the public. These types of considerations require a careful definition of transparency, wherein the understanding of the public is central, not simply the quantity or precision of information announced.

The movement toward greater transparency among central banks implies that greater transparency is at least perceived to be beneficial. However, from a practical point of view, the academic literature is only of value conceptually. The major benefit of transparency seems to come from the public understanding the central bank's goals and the central bank's interpretation of the economy, both current and future. To this end, the literature suggests that policymakers ought to pursue clear communication with the public, though not necessarily complete transparency.

References

- Ball, L. and Sheridan N. (2003), "Does Inflation Targeting Matter?" NBER Working Paper No. 9577.
- Bernanke, B., Laubach, T., Mishkin, F., and Posen, A. (1999), *Inflation Targeting: Lessons from the International Experience*, Princeton University Press, Princeton.
- Blinder, A. (1997), "What Central Bankers Could Learn from Academics -- and vice versa," *Journal of Economic Perspectives* vol. 11, issue 2, pp. 3-19.
- Blinder, A. (2000), "Central Bank Credibility: Why do we care? How do we build it?" *American Economic Review* vol. 90, issue 5, pp. 1421-31.
- Buiter, W. (1999), "Alice in Euroland," *Journal of Common Market Studies*, vol.37, no.2, pp. 181-210.
- Canzoneri, M (1985), "Monetary Policy Games and the Role of Private Information", *American Economic Review*, vol. 75, issue 5, pp. 1056-70.
- Chortareas, G., Stasavage D. and Sterne G. (2002), "Does it Pay to be Transparent? International Evidence from Central Bank Forecasts." *Federal Reserve Bank of St. Louis Review*, July/August, pp. 99-118.
- Cosimano, T., Van Huyck, J. (1993), "Central Bank Secrecy, Interest Rates, and Monetary Control," *Economic Inquiry* vol. 31, issue 3, pp. 370-82.
- Cukierman, A. (2002), "Are Contemporary Central Banks Transparent About Economic Models and Objectives and what Difference does it Make?" *Federal Reserve Bank of St. Louis Review* vol. 84, issue 4, pp. 15-35.
- Cukierman, A. (2001), "Accountability, Credibility, Transparency, and Stabilization Policy in the Eurosystem," in C. Wyplosz, ed., *The Impact of EMU on Europe and the Developing Countries*, Oxford University Press, Ch. 3, pp. 40-75.
- Cukierman A., and Meltzer A. (1986), "A Theory of Ambiguity, Credibility, and Inflation under Discretion and Asymmetric Information," *Econometrica* vol. 54, issue 5, pp. 1099-128.
- Demertzis, M. and Hughes Hallett, A. (2002), "Central Bank Transparency in Theory and Practice," CEPR Discussion Paper no. 3639. London, Centre for Economic Policy Research, <http://www.cepr.org/pubs/dps/DP3639.asp>
- Dotsey, M. (1987), "Monetary Policy, Secrecy, and Federal Funds Rate Behavior," *Journal of Monetary Economics* vol. 20, issue 3, 463-74.
- Eijffinger, S., and Geraats, P. (2002), "How Transparent are Central Banks?" CEPR Discussion Paper No. 3188.

- Eijffinger, S., Hoeberichts, M., and Schaling, E. (2000), "Why Money Talks and Wealth Whispers: Monetary Uncertainty and Mystique," *Journal of Money, Credit, and Banking* vol. 32, issue 2, pp. 218-35.
- Faust, J. and Svensson, L. E. (2001), "Transparency and Credibility: Monetary Policy with Unobservable Goals," *International Economic Review* vol. 42, issue 2, pp. 369-97.
- Faust, J. and Svensson, L. E. (2002), "The Equilibrium Degree of Transparency and Control in Monetary Policy," *Journal of Money, Credit, and Banking* vol. 34, issue 2, pp. 520-39.
- Friedman, B. (2002), "The Use and Meaning of Words in Central Banking: Inflation Targeting, Credibility, and Transparency" in P. Mizen, *Central Banking, Monetary Theory, and Practice: Essays in Honour of Charles Goodhart, Vol. 1*, London, Edward Elgar.
- Garfinkel, M. and Oh, S. (1995), "When and how Much to Talk: Credibility and Flexibility in Monetary Policy with Private Information," *Journal of Monetary Economy* vol. 35, issue 2, pp. 341-57.
- Geraats, P. (2001), "Why Adopt Transparency? The Publication of Central Bank Forecasts," European Central Bank Working Paper No. 41, January.
- Gersbach, H. (2003), "On the Negative Social Value of Central Banks' Transparency," *Economics of Governance* vol. 4, issue 2, pp. 91-102.
- Gersbach, H. and Hahn, V. (2001) "Voting Transparency and Conflicting Interests in Central Bank Councils" Deutsche Bundesbank, Economic Research Center, Discussion Paper, 03/01.
- Goodfriend, M. (1986), "Monetary Mystique: Secrecy and Central Banking," *Journal of Monetary Economics* vol. 17, issue 1, pp. 63-92.
- Issing, O. (1999), "The Eurosystem: Transparent and Accountable or 'Willem in Euroland,'" *Journal of Common Market Studies*, vol. 37, no. 3, pp.503-20.
- Jensen, H. (2000), "Optimal Degrees of Transparency in Monetary Policy Making," mimeo University of Copenhagen.
- Kuttner, K. and Posen, A. (1999), "Does Talk Matter After All? Inflation Targeting and Central Bank Behavior," Institute for International Economics Working Paper.
- Kydland, F. and Prescott, E. (1977), "Rules Rather than Discretion: The Inconsistency of Optimal plans," *Journal of Political Economy* vol. 85, issue 3, pp. 473-91.
- Laubach, T. (1999), "Signaling with Monetary and Inflation Targets," Center for Financial Studies Working Paper, 1999/05, Frankfurt.
- Lewis, K. (1991), "Why doesn't Society Minimize Central Bank Secrecy?" *Economic Inquiry* vol. 29, issue 3, pp. 403-15.
- Morris, S. and Shin, H. S. (2001), "The CNBC Effect: Welfare Effects of Public Information," Cowles Foundation Discussion Paper No. 1312.

- Neuman, M and Hagen J, (2002) "Does Inflation Targeting Matter?" *Review, Federal Reserve Bank of St. Louis*, Vol. 84, no. 4, July/August 2002
- Orphanides, A., and Williams J. (2003), "Imperfect Knowledge, Inflation Expectations, and Monetary Policy," manuscript, Board of Governors of the Federal Reserve System, January.
- Palmqvist, S. (1998), "Why Central Banks Announce their Objectives: Monetary Policy with Discretionary Signaling," manuscript UC-Berkeley.
- Romer, C. and D. Romer (2000), "Federal Reserve Information and the Behavior of Interest Rates," *American Economic Review* 90, issue 3, pp. 429-57.
- Rudin J. (1988), "Central Bank Secrecy, 'Fed watching' and the Predictability of Interest Rates," *Journal of Monetary Economics* vol. 22, issue 2, pp. 317-34.
- Stein, J. (1989), "Cheap Talk and the Fed: A Theory of Imprecise Policy Announcements," *American Economic Review* 79, issue 1, pp. 32-42.
- Stiglitz, J. (1999), "On Liberty, the Right to Know, and Public Discourse: The Role of Transparency in Public life: Oxford Amnesty Lecture," <http://www.worldbank.org/html/extdr/extme/jssp012799.htm>
- Tabellini, G. (1987), "Secrecy of Monetary Policy and the Variability of Interest Rates," *Journal of Money, Credit, and Banking* vol. 19, issue 4, pp. 425-36.
- Tarkka, J. and Mayes, D. (1999), "The Value of Publishing Official Central Bank Forecasts," Bank of Finland discussion paper 22/99.
- Walsh, C. (1999), "Announcements, Inflation Targeting, and Central Bank Incentives," *Economica*, vol. 66, issue 262, pp. 255-69.
- Winkler, B. (2002), "Which kind of transparency? On the Need for Effective Communication in Monetary Policy Making," *Ifo Studies* vol. 48, issue 3, pp. 401-27.