

# The Costs and Benefits of Deviating from the Systematic Component of Monetary Policy

John B. Taylor  
Stanford University

Keynote Address at the Federal Reserve Bank of San Francisco  
Conference on "Monetary Policy and Asset Markets"

February 22, 2008

Recent turmoil in the financial markets raises questions about whether and by how much monetary policy should deviate from its regular, more systematic, responses to economic conditions. Whether it is examined from the perspective of investors (McCulley and Toloui (2008)), academic researchers (Bauducco, Bulir, and Cihak (2008)), or policy makers (Mishkin (2008)), the question is essentially the same: How should interest rate decisions differ from the recommendations of a simple Taylor rule during times of financial market stress?

I was invited to address this question tonight and I am delighted to do so. I begin by reviewing the traditional benefits of staying close to the prescriptions of simple policy rules, with an update from the experience of the past two decades. I then consider recent technical arguments in favor of temporarily deviating from policy rules. In my view some of these arguments leave too much scope for discretion and thereby introduce unpredictability or doubts about the commitment to return to more systemic responses. I believe more rule-like departures are preferable in situations like policymakers face now.

## *Classic Benefits from Staying on the Rule*

I've been discussing the benefits of basing monetary policy decisions on the principles imbedded in policy rules for more years than I'd like to admit. I'd like to start by simply listing those benefits.<sup>1</sup> None of the benefits requires that policy makers use a rule mechanically, but rather that their decisions are consistent with the general guidelines of a policy rule. At a minimum, policy makers have to use discretion in order to forecast or nowcast<sup>2</sup> macroeconomic variables in the current quarter based on incoming monthly, weekly, and daily economic and financial data.

First, from a technical viewpoint, serious quantitative policy evaluation must take account of future expectations of policy and this requires thinking in terms of contingency plans, which lay out how policy will react to different events in the future.

---

<sup>1</sup> See Taylor (1998) for detailed explanations.

<sup>2</sup> Orphanides and Wieland (2007) have shown Fed interest rate decisions are closer to a Taylor rule if FOMC consensus forecasts are used in place of actual values.

A policy rule for the instruments obviously does that.<sup>3</sup> Second, policy rules help prevent policy makers from getting caught in the classic time inconsistency dilemma. Third, policy rules provide a transparent way to explain policy; they show how decisions are data-dependent. Fourth, they can help reduce short run pressures to deviate from what is optimal for the long run. Fifth, they reduce uncertainty by making policy more predictable. Sixth, they help teach others about the art and science of central banking, which is essential in a democracy. Seventh, they provide greater accountability. Eighth, they give a useful historical benchmark to determine if policy is different from past periods.

### ***Experience with Rule-Like Decisions since the Mid 1980s:***

In my view, experience with actual monetary policy in the past 25 years has confirmed these benefits and revealed some additional ones. Perhaps the most important benefit has been the good macroeconomic performance during this period, which economists call the Great Moderation. The evidence is now clear that during this period monetary policy was much closer to a rule that reacted more promptly and aggressively to both inflation and output in comparison with the highly unstable period of the late 1960s and 1970s. In other words Alan Greenspan's success can be explained by looking at the way that the interest rate decisions stayed much closer to this desirable systematic component of monetary policy than Fed policy did during the 1970s and earlier.

This was no mean feat, and not sufficiently appreciated. Staying on a policy course consistent with the basic principles is a difficult part of central banking. I have used a sailing ship analogy in arguing for the importance of rules for the policy instruments. It is not enough to give the target for the ship's destination, which compares to an inflation target for a central bank. You need to provide instructions (policy rules) about how to trim the sails, tack, adjust to different winds and currents, and so on.

But in addition the captain of the ship needs more than a book of rules. If there is a serious storm, and the seas get rough, leadership is needed. The crew may panic, not execute the captain's orders, even mutiny. Orders from fleet headquarters may not reflect the situation seen from the helm. Decisions can be questioned from above or from below. Paul Volcker had plenty of criticism when interest rates were taken above the inflation rate in a slowing economy. So did Alan Greenspan when the federal funds rate was taken to over 8 percent in an election year, eventually reaching nearly 10 percent in 1989. Staying the course is difficult.

Experience during the past 25 years has also shown how the private sector beneficially adjusts its own behavior once it becomes familiar with the more systematic behavior of central banks. Consider, for example, the bond market and the process through which expectations of future interest rates affect long term interest rates. Recognizing the central bank's typical interest rate responses, bond traders and investors

---

<sup>3</sup> Forecast targeting can also provide a contingency plan, but the rules for the instruments are more complicated than most policy rules.

have developed strategies—their own rules of thumb—for taking positions at various maturities. They assume that the Fed effectively will follow a policy rule in which the short term interest rate rises or falls by predictable amounts when inflation or output changes. Thus, if expectations of output growth fall, the private sector will predict that the central bank will lower short term interest rates in the future; traders will then bid up prices on long term bonds and yields will fall. And of course monetary policy must in turn take account of these market reactions, creating an interaction which McCulley and Toloui (2008) call “you, looking at me, looking at you” which they then use to recommend various yield curve positions.

Another example is the foreign exchange market. When there is a surprise increase in inflation, the currency tends to appreciate. Price theory predicts a negative correlation between exchange rates and inflation, because higher prices make goods at home relatively expensive requiring a depreciation of the currency to keep purchasing power steady. The systematic central bank interest rate response to inflation explains the positive correlation. An increase in inflation implies that the central bank will raise the interest rate, which makes the currency more attractive, bidding up the exchange rate.

I believe that these developments in the fixed income market and the currency market are just two of many examples where individuals and institutions in the private sector adapt to policy induced correlations by creating their own strategies or rules of thumb. We are probably unaware of many of them. Indeed, the individuals who act on them may not even know that they derive from the systematic behavior of policy makers.

This phenomenon is seen all over the world. People in other countries try to predict what the Fed and other central banks will do and they base their predictions at least in part on policy rules. An email I got this week from a financial economist in Mumbai India is typical: “Should [the Reserve Bank of India] cut rates because the US is cutting rates?” he asked. Of course, central banks take account of the expected actions of other central banks when they make their own interest rate decision. In a recent Monetary Policy Report, the Norges Bank stated that “It cannot be ruled out that a wider interest rate differential will lead to an appreciation of the krone. This may suggest a gradualist approach in interest rate setting.” In other words, actions by the Federal Reserve to lower the interest rate may factor into decisions by other central banks to lower interest rates. Deviating from expected responses can make it hard for other central banks to do the right thing.

### ***Experiences with Deviations from Systematic Behavior***

Despite the interesting challenges of conducting policy consistent with “on-the-rule” principles, many historical reviews of monetary policy have tended to focus on the deviations from the policy rule. Solow (2007) recently writes: “There is a lot that is predictable, and properly predictable, about monetary policy.” And then, arguing that the predictable part corresponds to a Taylor rule, he continues: “The creative part of what central banks do is written in their deviations from the Taylor rule.” Similarly, Blinder

and Reis (2005) put it this way: “...the most interesting episodes are when the Federal Reserve under Greenspan departed from its estimated rule.”

In my view the “on-the-rule” part is just as creative, just as interesting, as the “off-the-rule” part, as I explained in Taylor (2005). But now, with the benefit of hindsight, let us consider some the deviations during the past 25 years. I have looked at three times when the Fed moved away from its more systematic responses: during the 1987 stock market crash, during the 1998 aftermath of the Russian financial crisis, and during the 2003 fear of deflation period. In each of these cases the deviation was a reduction in the interest rate and the rationale was given clearly. In each case the deviation turned out to be temporary. So we can try to examine the costs and benefits of these temporary deviations. Were the initial departures beneficial? Was the length of the deviations too long?

In remarks I gave last August at the annual Jackson Hole conference (Taylor (2007a)), I studied the third of these episodes in some detail. During the period from 2003 to 2005 the short term interest rate in the United States fell below levels that would have been predicted from the behavior of the Federal Reserve during most of the period during the Great Moderation. I argued that one effect was an acceleration of housing starts and housing prices. The rising prices and the low interest rates may have upset procedures that mortgage originators were using to assess the borrower’s payment probabilities. Their programs are usually calibrated to a cross section at a point in time. If housing prices rise rapidly, the cross section will show increased payment probabilities. When housing prices reverse, the models will break down. Of course, the stated aim of the deviation was to reduce the risks of deflation, but it added fuel to a housing boom and thereby was a factor in the recent slump.

We can also examine the other two deviations. Following the 75 basis point cut in interest rates in 1998, it took at least a year before the Fed put those back into its rate decisions. This was the period that led up to the acceleration in stock price increases and an eventual increase in interest rates as inflation rose. Even the stock market induced 1987 cut in rates, which I wrote about favorably in my original Taylor rule paper, was followed by a continuation of rising inflation and eventually an increase in interest rates to nearly 10 percent.

Recently there has been some discussion about whether the *length* of the departure from the systematic component was the problem in these episodes, rather than the initial departure (McCulley and Toloui (2008)). While my simulations provide some basis for that view, I think we press our models beyond their capabilities when we make such distinctions formally.

### ***The General Case for Deviations***

Let me now take up the general case for departures from rules in the case of financial market stress. In my view we should not be ideological about this, but rather try

to use the latest research techniques and empirical evidence. As I concluded at the Dallas Fed conference last October: We need “better principles for ‘off the rule’ behavior as in the case of liquidity shortages, frozen markets, or risk management priorities.” Though I added that “studies are beginning to show that closer adherence to policy rules would be advisable,” based on the kinds of experience I just reviewed (Taylor (2007b)).

In a speech that Governor Mishkin (2008) gave last month he considers the case for such deviations. He begins with a technical critique of research on optimal monetary policy and policy rules. He points out that this research relies on linear models with quadratic objective functions, that “certainty equivalence” is assumed, that the models do not consider financial sector shocks, that the shocks which are incorporated are assumed to be Gaussian without fat tails, that “Taylor-style” rules include lagged dependent variables which imply too inflexible an interest rate response. The critique leaves the impression of an apparent void where rationales for deviations from more systematic policies in times of financial stress must be based more on intuition and on less quantifiable or predictable discretion.

I have a much different view of the research that led to an emphasis on policy rules for the interest rate. The research goes back into the 1980s. It includes non-linear models, takes fat tails into account, incorporates financial sector shocks, and, at least from my perspective, does not make use of empirical estimates of policy rules with lagged dependent variables to argue normatively for rigidity in setting interest rates. The presence of these lagged effects is mostly due to what econometricians call serial correlation of the deviations of the interest rates from the estimated policy rules. That such deviations are correlated should be obvious from my previous discussion.

In my view to answer practical questions about monetary policy, you need to have models with a financial sector rich enough to include the term structure of interest rates, the relation between interest rates and exchange rates, and the possibility of shocks to risk premia and other equations. In my view the popular three equation models are not suitable to ask such questions, however useful they are for pedagogy and other research questions.

Among the models that have the additional financial complexity, I am most familiar with a multi-country model developed at Stanford in the 1980s (Taylor (1993)). This model was used extensively in research on policy rules. It includes a financial sector and many shocks. Moreover, in many simulations used to evaluate policy rules the shocks were not assumed to be normally distributed. The shocks were drawn from history, and history is not Gaussian. For example, the equation for the price of imports had a shock which was 5.6 times the standard deviation. One shock to consumer durables was 3.6 times the standard deviation. So there are “fat tails” or “black swans” in these models. With regard to using such non-Gaussian shocks in policy analysis I argued that “An advantage is that non-normalities—such as large outliers—can be taken into account” (Taylor (1993), p. 113).

There is also uncertainty built into the financial sector, with surprise term premia shocks of the kind that are the focus in today's policy discussions. The standard deviation of the term structure shocks was large: 2 percentage points for the United States and 2.2 percentage points for Japan. There is also a correlation of shocks across different countries: the correlation coefficient between shocks to the term structure in Japan and the United States was estimated to be .39 and is about the same between the United States and the European countries. The shocks to exchange rates are particularly large. No model is perfect, especially in the eyes of the model's builders, but I cannot agree that "Formal models of how monetary policy should respond to financial disruptions are unfortunately not available" as Governor Mishkin wrote in January.

There has also been work on policy rules with "financial accelerator" concepts incorporated. An important example is the model used by Bernanke and Gertler (1999) in a paper presented at the Jackson Hole Symposium that year. Using this model they conclude that monetary policy "should *not* respond to changes in asset prices, except insofar as they signal changes in expected inflation. Trying to stabilize asset prices *per se* is problematic for a variety of reasons, not the least of which is that it is nearly impossible to know for sure whether a given change in asset values results from fundamental factors, non-fundamental factors, or both."

A common feature of this research work on policy rules is that alternative policy rules—some simple, some not so simple, some including reactions to asset prices, or to exchange rates—are tried out in rather complex models with a wide variety of shocks and financial market disturbances. I would not criticize this work for being "linear quadratic" because it is not. Indeed the most convincing work is where the entire paths of inflation and output are examined and policy rules are tried out in many different models, including models designed by other researchers, thereby adding robustness to the criteria for judging good policy rules.

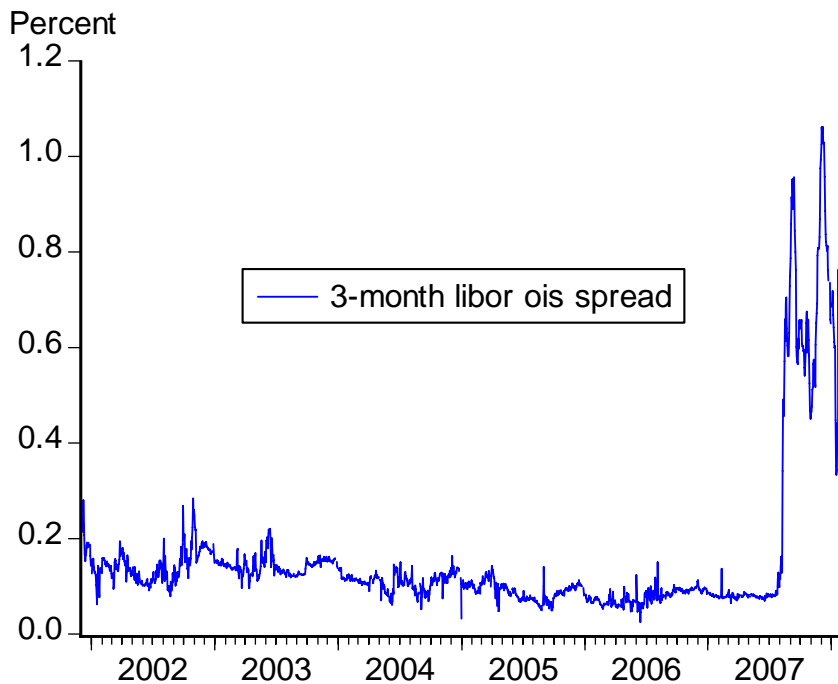
Now it is important to note that a common finding of this research is the excellent performance of simple policy rules which do not react to asset prices, whether stocks, bonds, or exchange rates. A problem with reacting to asset prices is that the interest rate responses become too herky-jerky, and feedback negatively on the economy. In any case one cannot criticize policy recommendations based on policy rules simply on the grounds that they do not take account of financial factors. In principle they do take account of such factors.

It is true that simple policy rules have usually been linear, but that does not imply that the responses of the interest rates are slow or inflexible. If the variables on the "right hand side" move quickly as they do in recessions or in inflationary surges, then the recommendation is to move the interest rate flexibly and quickly.

### *Toward More Systematic Adjustments*

Now to be sure this review of past and existing research does not mean that we cannot do a better job at finding principled ways to adjust monetary policy rules, as Bauducco, Bulir, and Cihak (2008) are trying to do. I think that recent no-arbitrage affine-yield models of risk premia, as in the paper by Monika Piazzesi and Martin Schneider presented at today's conference, are very promising for this purpose.

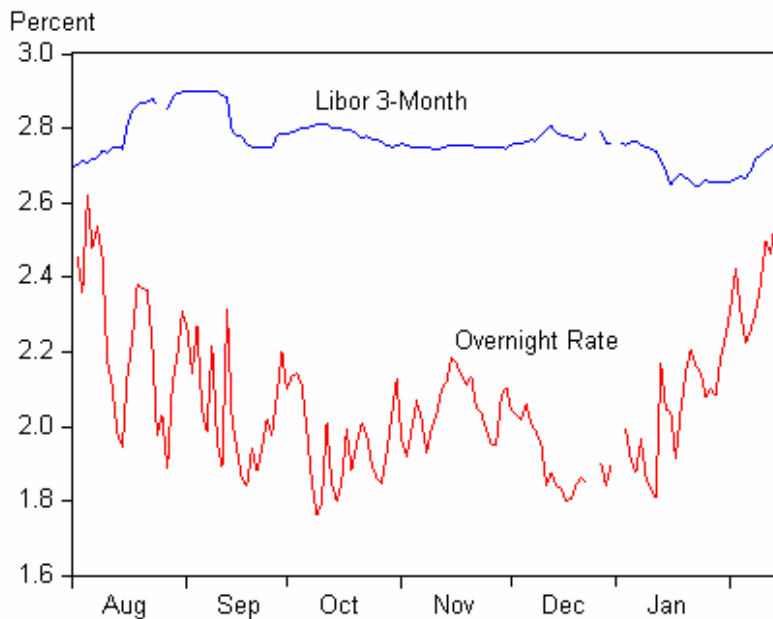
I want to refer in particular to recent research by John Williams and myself (Taylor and Williams (2008)). This research has focused on a particular measure of financial market stress in the period since August 9, 2007: The spread between the term Libor rates and the overnight fed funds rate. We document the pattern of these spreads and provide evidence that they are largely due to counterparty risk between banks, related to concerns about securities derived from subprime mortgages and other assets. The spread between Libor at 3 month maturity and the overnight index swap (OIS) jumped on August 9 from a low multiyear steady level of 11 basis points and has since fluctuated as high as 106 basis points. It is still high, in the vicinity of about 50 basis points. These term rates affect many securities including mortgage originations and resets on adjustable rate contracts. They are at the heart of the monetary transmission mechanism. Here is a chart of the spread:



One approach to adjusting or deviating from the systemic component of monetary policy is suggested by this research. It is to use a smoothed version of this spread to adjust the policy rule. Such an adjustment has the advantage of adding predictability to

the deviation and, at least to the extent that counterparty risk declines, will imply that the deviation is temporary. Since term Libor is so central to the monetary transmission mechanism, there is a rationale to focus on this rate rather than on a whole host of other possible risk premia, which would reduce predictability and interfere with needed private sector assessments and adjustments to risks. Fixed income investors could factor such temporariness into their strategies, in the ways that McCulley and Toloui (2008) have already suggested. I would like to see this kind of policy rule tried out for robustness in a series of different models which include term structure effects and other financial sector equations and dynamics. I would also like to see it stress tested against other explanations for the spread.

But in the meantime we already have some valuable real world experience with such a policy. The Swiss National Bank has followed such a policy since last August because they target three month Libor rather than the overnight rate. Hence, as the Libor spread increased in Switzerland they automatically and temporarily lowered the overnight rate as the following figure of the Swiss money market drawn from Taylor and Williams (2008) shows.



The Swiss National Bank had a target for 3-month Swiss Libor of 2.75 percent during this period and evidently did not think that rate needed to be adjusted on macroeconomic grounds. However, maintaining that spread required lowering the overnight rate by about 60 basis points. As the Swiss Libor-overnight spread has declined, the overnight rate has increased, illustrating the systematic and temporary nature of the deviation. They effectively temporarily adjusted the Taylor rule by this amount.



Such a policy could be bolstered by additional transparency through releasing the Fed's daily balance sheet, especially the "Fed balances" that banks hold at the Fed. This would make it easier to interpret episodes where the central bank decides to provide additional liquidity in the overnight money market. Available data on repos does not provide this information on a timely basis. Indeed, I see no reason why this greater degree of transparency could not be achieved right now.

### ***Conclusion***

As the experience with financial stress has made clear in the past few months, the world is complex. Hence the models we use to design and evaluate policy rules need to be complex. I reviewed how models used to design and evaluate policy rules in the past have more complexity than may be commonly understood. I also reviewed practical experience with actual policy that has been largely consistent with policy rules, but has also deviated from time to time.

This review of model complexity, the difficulty of interpreting historical experience, and the practical challenge in implementing policy rules, may seem daunting. It may tempt us to abandon the concept of policy rules for the instruments in favor of pure discretion. I agree that there are no *easy* policy rules. But I hope I have shown that there are *simple* policy rules and that they have been and can be very effective.

### ***References***

Bauducco, Sofia, Ales Bulir, and Martin Cihak (2008), "Taylor Rule Under Financial Instability" IMF Working Paper, WP/08/18, January  
<http://www.imf.org/external/pubs/ft/wp/2008/wp0818.pdf>

Blinder, Alan and Ricardo Reis (2005), "Understanding the Greenspan Standard," *Proceedings of Jackson Hole Symposium*, Federal Reserve Bank of Kansas City

Bernanke, Ben and Mark Gertler (1999), "Monetary Policy and Asset Price Volatility," *Proceedings of Jackson Hole Symposium*, Federal Reserve Bank of Kansas City

Greenspan, Alan (2004), "Risk and Uncertainty in Monetary Policy," *American Economic Review, Papers and Proceedings*, 94, 33-40

McCulley, Paul and Ramin Toloui (2008) "Chasing the Neutral Rate Down: Financial Conditions, Monetary Policy, and the Taylor Rule," Global Central Bank Focus Pacific Investment Management Company (PIMCO), February  
<http://www.pimco.com/LeftNav/Featured+Market+Commentary/FF/2008/GCBF+02-2008.htm>

Mishkin, Frederic S. (2008) “Monetary Policy Flexibility, Risk Management, and Financial Disruptions,” Federal Reserve Bank of New York, January 11  
<http://www.federalreserve.gov/newsevents/speech/mishkin20080111a.htm>

Orphanides, Athanasios and Volker Wieland (2007) “Economic Projections and Rules-of-Thumb for Monetary Policy,” October  
[http://www.volkerwieland.com/docs/orphanides\\_wieland\\_pooleconf\\_vs1.pdf](http://www.volkerwieland.com/docs/orphanides_wieland_pooleconf_vs1.pdf)

Solow, Robert M. “Rational Unexuberance,” *The New Republic*, December 31, pp 36-39

Taylor, John B. (1993), *Macroeconomic Policy in a World Economy: From Econometric Design to Practical Operation*, W.W. Norton, New York  
<http://www.stanford.edu/~johntayl/MacroPolicyWorld.htm>

Taylor, John B, (1998) “Applying Academic Research on Monetary Policy Rules: An Exercise in Translational Economics,” The Harry G. Johnson Lecture, *The Manchester School Supplement*, Blackwell Publishers, 66, June 1998, pp. 1-16.

Taylor, John B. (2005), “Commentary: Understanding the Greenspan Standard,” *Proceedings of Jackson Hole Symposium*, Federal Reserve Bank of Kansas City

Taylor, John B. (2007a), “Housing and Monetary Policy,” *Proceedings of Jackson Hole Symposium*, Federal Reserve Bank of Kansas City

Taylor, John B. (2007b) “The Dual Nature of Forecast Targeting and Instrument Rules: A Comment on Michael Woodford’s ‘Forecast Targeting as a Monetary Policy Strategy: Policy Rules in Practice’”, Federal Reserve Bank of Dallas Conference, October 13  
[http://dallasfed.org/news/research/2007/07taylor\\_taylor.pdf](http://dallasfed.org/news/research/2007/07taylor_taylor.pdf)

Taylor, John B. and John C. Williams (2008), “A Black Swan in the Money Market,”  
<http://www.stanford.edu/~johntayl/Taylor-Williams-A%20Black%20Swan%20in%20the%20Money%20Market.pdf>