

# **The Effectiveness of Central Bank Independence Versus Policy Rules**

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In his 1962 essay “Should There Be An Independent Central Bank?” Milton Friedman discussed three alternative institutional arrangements through which governments can exercise responsibility for monetary policy: a commodity standard, an independent central bank, and legislated rules. He focused mainly on the latter two, and he concluded—based on a review of decades of experience with central banking in the United States and other countries—that legislating rules for the instruments of policy was the better alternative.

In the half century since Friedman wrote that essay we have accumulated more information about these alternatives. In particular we have seen varying degrees of adherence to rules-based policy and varying degrees of central bank independence. We have also seen corresponding changes in economic performance.

In this paper I examine this evidence and draw implications for central banking in the future. I start with the changes in overall macroeconomic stability over the past fifty years during which time the Great Moderation came and went. I then consider associated changes in the degree that the central bank is rules-based and the degree that it is independent.

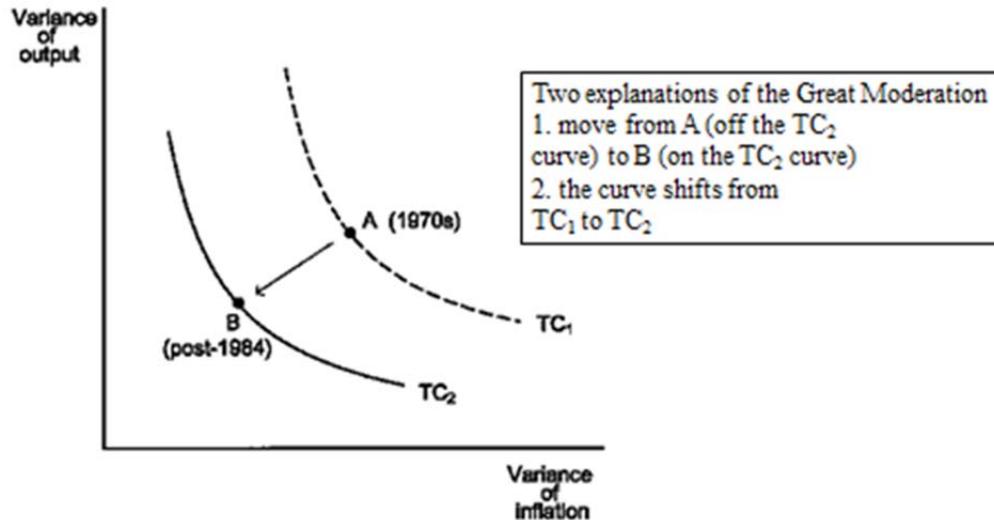
## 1. Different Paths Toward and Away From the Great Moderation

To measure changes over time in macroeconomic performance, I focus here on the size of the fluctuations in real output and inflation. A simple framework for evaluating the effect of monetary policy on such fluctuations is the tradeoff between variance of inflation and the variance of output which was developed in the years preceding the Great Moderation (see Taylor (1979, 1980)).

This is the framework that Ben Bernanke used in his assessment of monetary policy and performance in his paper “The Great Moderation” first presented in 2004. The framework has also been used by other central bankers including Mervyn King (1999, 2012) and Lars Svensson (2012). While the tradeoff between the *levels* of inflation and output (or unemployment) is very short lived, the tradeoff between the *fluctuations* of these two variables is longer lasting and appropriate for comparing economic performance for more than two or three years. This framework naturally takes research beyond the question of why the financial crisis occurred and puts it in a broader context of why the downturn was large and why the recovery so slow and, depending on the future, why the next downturn is large or small. We are considering fluctuations over longer periods of time.

Figure 1 replicates the tradeoff diagram as it appears in Bernanke (2004). On the horizontal axis is the variance of inflation; on the vertical axis is the variance of real output (deviations from potential GDP). Points more to the north or to the east represent more macroeconomic instability and thus poorer economic performance.

FIGURE 1. Chart from Bernanke (2004) “The Great Moderation”



The curve represents a tradeoff in the sense that along the curve monetary policy can achieve smaller inflation fluctuations only by generating larger output fluctuations. Points to the left or below this tradeoff curve are infeasible for a given structure of the economy. Points to the right and above are inefficient, in the sense that a better monetary policy would be on the curve.

The position and shape of the curve depend on the underlying structure of the economy and the size of the exogenous shocks to which it is subject. An economy with less rigid wage and price setting has a tradeoff curve closer to the origin than an economy with more rigid wages and prices. An economy with larger external shocks has a tradeoff curve further away from the origin than an economy with smaller shocks.

Tradeoff curves can be derived quantitatively from a wide range of estimated or calibrated macroeconomic models, including DSGE models and New-Keynesian models of the

type collected in Volker Wieland's (2009) monetary model data base. Of course the curve will differ somewhat from model to model because the economic structures of the models differ.

The position of the economy on a given curve depends on how much emphasis the monetary authority places on inflation fluctuations versus output fluctuations. For example, a higher weight on inflation in the central bank's objective function implies a position on the curve more to the upper left.

### ***The Road to the Great Moderation***

Using Figure 1 and these ideas, Bernanke (2004) examined the reasons for the Great Moderation. The momentous movement from the instability of the 1970s toward the Great Moderation can be represented in the diagram by a movement from point A to point B.

Alternative causes of such a movement can be illustrated using the curve. If the cause is smaller shocks or an improved economic structure—such as more flexible or more forward looking wage and price setting—one can represent this as a shift of the curve from  $TC_1$  to  $TC_2$ . If the cause is a better monetary policy—such as a move from go-stop policies in the 1970s to more predictable rule-like policies in the 1980s and 1990s—then the move is toward a given TC curve. In that case, one could say that the tradeoff curve was always at  $TC_2$  and policy moved from the inefficient point A to the more efficient point B. Of course, in reality, both shifts in the curve and movements toward the curve might be at work.

Arguments have been made on both sides of this debate about the causes of the Great Moderation, and many empirical papers have been written from the Stock and Watson (2002) research with time series models to the Cecchetti et al (2006) research with structural models. Complicating the empirical work is a fundamental inter-relation between the alternative causes:

an improvement in monetary policy might lead to a change in the structure of the economy if, for example, wage and price decision-making becomes less rigid as a result of the change to a more predictable policy as pointed out in Taylor (1980). Considering all these arguments, Bernanke (2004) concluded that a move toward a more efficient monetary policy was a significant cause of the Great Moderation. I completely agree with that assessment—and for similar reasons—as stated in Taylor (1998). Moreover, it is likely that the change in policy generated an improved economic structure as represented by some leftward shift on the tradeoff curve.

### ***The Road Away from the Great Moderation***

However, the Great Moderation has ended and it is time to move on to study the causes of this equally momentous change. In Table 1, I show the actual variability of the key variables. I report the variance as well as the standard deviation, which was the variability metric I originally focused on in Taylor (1979) where I drew the tradeoff curve in standard deviation space.

**Table 1. Variability of Output and Inflation in Three Periods (%)**

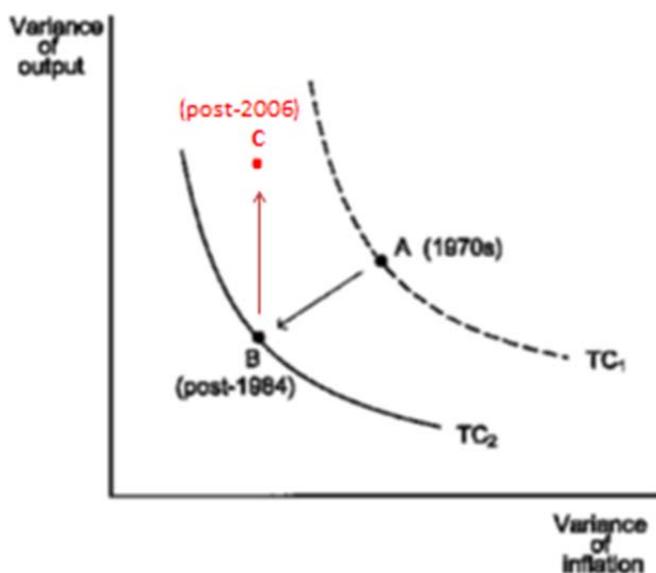
	<u>Standard Deviation of</u>		<u>Variance of</u>	
	Output	Inflation	Output	Inflation
1965.1 - 1983.4	3.6	2.4	13.0	5.8
1984.1 - 2006.4	1.5	0.8	2.3	0.6
2007.1 - 2012.3	5.4	0.8	29.2	0.6

The variability measures in Table 1 are computed for the three time periods indicated. They represent the periods before, during, and after the Great Moderation. The variance and the standard deviation of inflation are measured by the quarterly percentage change (at an annual rate) in the GDP price index. The variance and the standard deviation of output are measured from the GDP gap, or the percentage deviation of real GDP from the Congressional Budget Office's (CBO) estimate of potential GDP.

Note that the period since the end of the Great Moderation is only five years in length and shorter than the other periods. The recovery from the 2007-2009 recession does not appear to be over, and thus the change in the standard deviation may exaggerate the deterioration of performance in a post Great Moderation regime. It is very difficult to identify an emerging historical period in real time (and of course we hope the economy will go back to Great Moderation conditions soon). By way of comparison I first wrote about the post-1984 secular decline in volatility in Taylor (1998)—fourteen years after it began. By that time we had the strong recovery from the recession in the early 1980s, the small recession of the early 1990s, and the start of a long expansion in the 1990s. Nevertheless there is already plenty to study about this post Great Moderation period even though we will certainly learn more as time goes on.

To represent this change I have updated, in Figure 2, the variance tradeoff diagram used by Bernanke (2004) by adding a point C and an arrow from point B to point C.

FIGURE 2. Chart from Bernanke (2004), updated to post 2006



Observe that the line from point B to point C does not simply retrace in reverse the path from point A to point B. The movement from the 1970s toward the Great Moderation is much as in Bernanke's (2004) generic sketch. But the movement away from the Great Moderation, thus far, is much different. It is a nearly perfectly vertical move up from the in the diagram. Virtually all of the deterioration in performance is reflected in a major increase in output volatility due to the Great Recession and the very slow recovery. Inflation performance has remained steady, though that could change in the future.

The end of the Great Moderation raises many of the same questions as have been raised about Great Moderation itself. Was the end due to a change in the structure of the economy traced, for example, to less aversion to risk as argued by King (2012)? In this case the tradeoff would have shifted back away from the origin. Or was there a change in monetary policy as I

have argued in Taylor (2007, 2012), in which case the tradeoff curve did not simply move exogenously, but rather policy took the economy to point C as shown in Figure 2. That virtually all of the deterioration in macroeconomic performance has been on the output dimension, not the inflation dimension, is an important fact that helps identify the reasons for the shift.

## **2. Monetary Policy Regime Change or Other Factors?**

To answer the causation question it is helpful to address it within the broader context of why macroeconomic stability first increased and then decreased.

### ***Exogenous Shocks and the Structure of the Economy***

One of the structural explanations for the Great Moderation was that the U.S. economy became much more service-oriented than in the past. The production of services is not as cyclical as the production of goods. The problem with this explanation for the Great Moderation is that the transition to a service-oriented economy was very gradual. It could not explain the sudden shift toward greater economic stability. But it is an even less plausible explanation for the reversal of output volatility, because the move to services has not gone into reverse, even if it has slowed down.

Another explanation for the Great Moderation was better control of inventories, such as the just-in-time approach to inventory management. During recessions and recoveries, inventory fluctuations accentuate the ups and downs in GDP. Firms cut inventories when sales weaken and rebuild inventories when sales strengthen. Better inventory control could thus explain the improved stability. But this explanation also had problems. When one looked at final sales—GDP less inventories—one saw the same amount of improvement in economic stability. And as

an explanation of the higher volatility now—the depth of the recession and the weak recovery—this explanation is even less plausible because inventory management has not deteriorated.

Yet another explanation of the Great Moderation, which has more potential application for the end of the Great Moderation as described below, was a change in the size and frequency of exogenous shocks. Indeed, there were large oil shocks in the 1970s, and there were few in the 1980s and 1990s. While Stock and Watson (2002) offered some econometric support for this view, the poor economic performance of the late 1960s and 1970s began before the oil shocks of the 1970s. Moreover, the U.S. economy had serious shocks in the 1980s and 1990s, including the financial shock of the savings and loan crisis.

### *The Change in Monetary Policy*

It was through such considerations that Bernanke (2004), Taylor (1998, 2010), Meyer (2010) and others were led to consider changes in monetary policy as a major reason for the improved economic performance in the 1980s and 1990s. And in fact there were clearly identifiable changes in policy during this period, including the more rule like focus on price stability and the closer adherence to simple predictable policy rules starting with Paul Volker and continuing for much of Alan Greenspan's term.

In my view, the same monetary policy considerations—working in reverse—are relevant for explaining the recent deterioration of performance. Monetary policy became much less rule like, starting in my view in the period from 2003 to 2005 when the policy interest rate was held far below levels that would have pertained in the 1980 s and 1990s under similar conditions. Many empirical researchers have uncovered evidence of such deviations from policy rules, as reviewed by Taylor (2012), but one can also simply compare the settings of the federal funds rate

at different times and come to the same conclusion. In addition, policy became much more discretionary with the interventions into particular markets such as the mortgage backed securities market, with the expansion of the Fed's balance sheet, and with the commitment to hold the interest rate to zero after traditional rules would call for higher rates. In his comprehensive history of the Fed, Meltzer (2009) also documents this change toward discretion flowing the more rule like policy in the 1983-2003 period.

Of course, as with onset of the Great Moderation, one can point to exogenous shocks, other than these monetary policy shocks, as another factor. In examining the period up to the crisis Elliot and Baily (2009) and King (2012), for example, argue that there was a shock to preferences in the form reduced risk aversion. Indeed, King (2012) argues explicitly that this structural change shifted the tradeoff curve in Figure 2 back up and out as investors took on greater risk which led to the boom and the bust. He argues that the very stability of the Great Moderation caused this shift in preferences as people got complacent in a Minsky-like "stability breeds instability" line of argument. Of course, as discussed below, monetary policy may have caused this shift as the low interest rates led to a search for yield and risk taking.

To be sure, other government policies—largely unrelated to monetary policy—may also have contributed to these financial market shocks. Peter Wallison (2011) makes the case that federal government housing policy effectively forced risky private sector lending—through affordable-housing requirements for Fannie Mae and Freddie Mac and lax regulation of these institutions—without any change in risk aversion.

## *The Impact of the Change in Monetary Policy*

While there is already much evidence that there was a change in monetary policy regime starting around 2003, there is growing empirical and theoretical research showing that this change was largely responsible for the deterioration of performance shown in Figure 2. I consider this evidence briefly here.

Much of the research has focused on the impact of the Fed holding interest rate below what was suggested by policy rules that were effective during the Great Moderation. For example, in Taylor (2007) I showed that when rates were held too low in 2003-2005 they accentuated the housing boom and the eventual sharp bust. Work by Jarocinski and Smets (2008) and Kahn (2010) found further evidence along the same lines for the United States, and Ahrend (2010) found similar results for the OECD as a whole. More recently Bordo and Lane (2012) showed that housing booms are closely associated with deviations from simple monetary policy rules over time and across countries. As they put it, “our evidence for close to a century, for many countries, and for three types of asset booms, that expansionary monetary policy is a significant trigger, makes the case that central banks should follow stable monetary policies. These should be based on well understood and credible monetary rules.”

Another effect of extra low policy rates is on risk aversion. Using time series techniques Bekaert, Hoerova, and Duca (2012) found that this effect is empirically significant. They decompose the VIX into a risk aversion component and an uncertainty component. They then look at the cross autocorrelations between policy rates and these two components. Their empirical results show that “Lax monetary policy [below policy rule rates] increases risk appetite (decreases risk aversion) in the future, with the effect lasting for about two years and starting to be significant after five months.” These results provide a reason why a change in monetary

policy might actually shift the tradeoff curve in Figure 2 back up—a channel to poor economic performance which is quite different than the risk aversion channel of Elliot and Baily (2009) or King (2012) and with much different policy implications.

Bekaert et al. (2012) also find that increased uncertainty leads the Fed to lower rates, a policy reaction that explains deviations from conventional policy rules in recent years. A similar response has been uncovered by Steil (2012) who uses a completely different measure of risk aversion and uncertainty.

Much research over the years—including Kydland and Prescott (1977) and Lucas (1976)—has emphasized the general negative effects on macroeconomic stability of the policy unpredictability that comes naturally from discretionary policy. The impact of the recent discretionary policy interventions is uncertain and not fully understood by either the policy makers or economists. A particular source of uncertainty is the Fed's enlarged and growing balance sheet which will have to be drawn down in the future. The risk is two sided: if the balance sheet is drawn down too quickly it will cause a downturn and if it is drawn down too slowly it will lead to inflation.

Deviations from conventional monetary policy also create a number of distortions which could push the economy in a suboptimal direction as in Figure 2. In my view these distortions are akin to price controls which interfere with the functioning of markets and are known to have negative effects, though they are frequently hard to measure in practice. For example, the short term interest rate has been driven down to zero by the exploded balance sheet, and the money market is no longer providing its usual allocation and price discovery function. The Fed has effectively replaced the money market and the longer term treasury market with itself. The commitment to hold rates at zero and the large purchases of long term Treasury securities for

several years into the future reduces the usefulness of longer term treasuries as benchmarks as Pringle (2012) has emphasized.

With rates held this low there is disequilibrium in the money market. While borrowers might like the near zero rate, there is little incentive for lenders to extend business or consumer loans at that rate. It is much like the effect of a price ceiling in an agricultural market, and it can be illustrated with a standard supply and demand diagram. The supply curve of loans is upward sloping with the interest rate on the horizontal axis. The demand curve is downward sloping and also dependent on the interest rate. Firms will not supply more than what the supply curve implies at that ceiling rate, even though consumers would be willing to borrow at the low rate. The result is excess demand and lower volume than in the case of an equilibrium interest rate. As Fisher (2012) put it: “as they approach zero, lower rates will not automatically create more credit and more economic activity but, rather, run the significant risk of perversely discouraging the lending and investment we need.”

There are many other potential negative effects of the low rates and the unconventional policies. Low rates are a drag on consumption for many people whose income is significantly negatively affected by the low rates. This effect may be larger than any offsetting substitution effect which would tend to encourage consumption by households and investment by business firms. And then there is effect on pension fund solvency. In addition the low rates make it possible to roll over rather than write off bad loans at banks, and they reduce fiscal discipline on the congress and the administration. As McKinnon (2011) describes it, the bond vigilantes have been replaced by the central bank.

Recent research on the overall macro effects of the change in policy regime includes the economy wide regime switching model of Baele, Bekaert, Cho, Inghelbrecht, Moreno (2012).

They find that monetary policy regime changes are responsible for both the improved economic performance in the Great Moderation and the recent deterioration in performance. Their work thus extends the economy wide empirical work of Stock and Watson (2002) and Cecchetti et al (2006) to recent events.

### **3. Changes in Central Bank Independence?**

So there clearly have been large shifts during these three periods in the degree to which monetary policy has been rules-based in the United States. But have there been comparably large shifts in the underlying legal basis for Federal Reserve independence? To be sure, there have been several notable changes in the Federal Reserve Act during this period. The so-called dual mandate was added to the Federal Reserve Act in 1977 and the requirement to report on the monetary aggregates was removed in 2000 (see Taylor (2011)). In addition there have been changes in Section 13(3) regarding limitations on the Fed's lending authority (see Goodfriend (2012) for a discussion).

But when you look at the conventional indices of de jure central bank independence you see virtually no change in the United States. Crowe and Meade (2007) recently created indices of central bank independence based on the legal factors. They found no change over time for the Fed. Their indices are based on the standard methodology developed by Cukierman, Webb, and Neyapti (1992) and Alesina and Summers (1993) which can in turn be traced back to Bade and Parkin (1985).

There have been shifts, of course, in de facto independence. Allan Meltzer (2009) showed in his comprehensive history how the Fed sacrificed its independence in the late 1960s and 1970s, regained it in the 1980s and 1990s, and has since sacrificed its independence again by

cooperating with the Treasury and engaging in fiscal policy. Marvin Goodfriend (2012) and Otmar Issing (2012) come to similar conclusions about central bank independence in recent years.

Note that these changes in de facto independence can be driven either by the executive branch or the central bank, or both. Meltzer explains how the loss of de facto independence in the late 1960s was originally driven by the U.S. Administration, while the loss of de facto independence more recently was driven by the Fed itself. In any case there is a very close correlation between the ups and downs in de facto independence and the adherence to rules-based policy in the United States during this period.

In other words within a given legal framework, policy makers in the United States have been able to engage in varying degrees of de facto independence and adherence to rules-based policy. For these reasons we have seen major shifts in the efficiency of monetary policy within the same framework of central bank independence.

#### **4. Policy Implications**

In my view this record raises questions about the role of de jure central bank independence in generating good monetary policy. It appears that existing law about independence has not worked. It has not prevented the central bank from engaging in activities that would question its independence from the rest of government.

Looking beyond the United States an even higher degree of de jure independence in recent years has not prevented the Bank of England from largely ignoring its inflation target or the European Central bank from buying sovereign debt with the excuse of financial stability.

More generally, it has not prevented central banks from deviating from policies that lead to both price and output stability.

The record shows that in the absence of a rules-based framework the Federal Reserve has taken actions that have led to high unemployment and/or high inflation. During the period from about 1983 to 2003 Fed policy was more rule-like and less discretionary, and economic performance was good. In contrast, the discretion and interventions of the Federal Reserve increased starting around 2003 and have continued, especially in regard to large scale purchases of mortgage-backed securities and longer-term Treasuries, and the result has been poor performance.

The policy implication is that we need to focus on ways to “legislate” a more rules-based policy. We need to encourage more predictable policy that has worked and discourage the bouts of discretion and loss of de facto independence which have not worked. I have given several practical suggestions for legislation in Taylor (2011), but there are many other possibilities. The task is difficult and the field is wide open.

## **5. Concluding Remarks**

In this paper I examined historical changes in (1) macroeconomic performance, (2) the adherence to rules-based monetary policy, and (3) the degree of central bank independence. I measured macroeconomic performance in terms of both price stability and output stability. I tried to “control” for factors other than monetary policy that affect macroeconomic stability and examined possible channels of monetary impacts. I considered both de jure and de facto central bank independence.

My findings are that changes in macroeconomic performance during the past half century were closely associated with changes the adherence to rules-based monetary policy and in the degree of de facto monetary independence. But performance was not associated with de jure central bank independence. In the absence of a rules-based framework it appears that formal Federal Reserve independence does not generate good monetary policy outcomes.

These conclusions are very similar to those of Friedman (1962) who argued fifty years ago that in reality we have never had a de facto independent central bank that does not take account of the preferences of the government or does not work together with the government to encourage various interventions. He argued that the attractiveness of independent central banks at that time came from those interested in limiting the scope of government. Central bankers, being “sound money men,” as Freidman put it then, have “tended to oppose many of the proposals for extending the scope of government.” But in recent years some central bankers have been the main advocates of extending the scope of government interventions, so that attractiveness has vanished.

Friedman (1962) raised other concerns about relying on central bank independence to get good policy results. He was concerned, for example, that independence stressed the importance of personality rather than rule of law. One example he cited was how the Fed became heavily reliant on Benjamin Strong of the New York Fed. After he died in 1928, many poor decisions were made leading to and prolonging the Great Depression. Another example was Hjalmar Schacht of Germany who went from leading the central bank of Germany to create one of the most extensive systems of government control in history.

For all these reasons Friedman argued that the Fed needed to be guided by rules. And of course his particular monetary framework was centered on a money growth rule. The question for the future is how we get back to a rules-based monetary framework and stay there.

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