
Central bank behaviour before and after the great recession

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To cite this article:

Mehdi Monadjemi, Kyung H. Yoon, John Lodewijks. Central Bank Behaviour before and after the Great Recession. *Economics*. Vol. 2, No. 5, 2013, pp. 55-61. doi: 10.11648/j.econ.20130205.12

Abstract: Before the Global Financial Crisis (GFC) central bank independence was a popular topic among those who favoured price stability. A conservative central banker, without being influenced by the economic policies of the government, can maintain as its primary priority the maintenance of price stability. The response of central bankers to the GFC seems to indicate a very different approach to macroeconomic targeting. In this paper we present empirical results using the Engel Granger cointegration technique for five countries and the results show that persistent cointegration of series from 2000 until 2006-2007 did not continue in the latter part of the sample period. These results are indicative of significant changes in central bank behaviour.

Keywords: Central Banking, Financial Crises, Inflation Targeting

1. Introduction

During the 1990s and early 2000s central bank independence was a popular topic among those who favoured price stability. An independent central bank will not conduct monetary policy based on the economic policy of the government which may have been influenced by political considerations. Germany (before introduction of the euro), Japan and Switzerland have the most independent central banks and their respective inflation rates are the lowest in the world. New Zealand is the classic example of the relationship between central bank independence and inflation control. During 1955-1988 when the annual average rate of inflation in New Zealand was 7.6 percent, monetary policy was conducted based on the economic priorities of the government. In 1988, legislations were introduced that supported the independence of the central bank and maintenance of low inflation. The average rate of inflation in New Zealand during 1989 – 2000 declined to 2.7 percent per year.

The independence of the central bank contributes to the control of inflation because governments generally attempt to expand output and employment by borrowing from the central bank (printing money) which may cause inflation. Accordingly, a conservative central banker, without being influenced by the economic policies of the government, can

maintain price stability. Bleaney [3], using data on 17 OECD countries, found that inflation is negatively related to the degree of central bank independence.

The global financial crises of 2007-2008, known as subprime crises, created wide-spread recession and high unemployment, not only in the directly affected countries but in many other parts of the world. The persistence and the severity of the recession is known to be the worst after the Great Depression of 1930s. Some authors have chosen to call it the “Great Recession”.

Several studies such as Greenspan [11], Paulson [18] and Romer [22] argued that a substantial capital inflow into the United States lowered interest rates causing expansion of mortgage demand, reduction of loan standard and financial innovations that caused a significant explosion of credit. Diamond and Ragharam [8] argued that there is a general consensus that the financial crisis was caused by the US financial system misallocation of resources to real estate through issuance of new “exotic” financial instruments. These instruments found their ways into the balance sheets of commercial and investment banks and were financed by short term debts.

The high rates of unemployment that resulted from the crisis have remained stubbornly high in recent periods, five

years after occurrence of the crisis. Under these circumstances, expansion of output and employment became the highest priorities of fiscal and monetary authorities. As dissatisfaction with the recovery from the financial crises grew, central banks attempted to concentrate on the real economy. The Bank of Japan's maximizing jobs, the Federal Reserve's threshold for the unemployment rate and the Bank of England's targeting nominal income where output and inflation receive the same weight, are evidence of central bank's emphasising the real sector.

The purpose of this paper is to examine central bank behaviour before and after the global financial crisis.

2. Central Bank Independence and Behaviour

The relationship between central bank independence, inflation growth and employment in 16 OECD countries was examined by Alesina and Summers [1]. The authors distinguished between political independence and economic independence. The political independence depends on the ability of the central bank to conduct monetary policy without government intervention. This ability in turn depends on the appointment of the governor and the board members of the central bank by the government, the duration of the appointments of the governor and the board members, the presence of the representative of the government in the board of the central bank, approval of the monetary decisions by the government and the extent to which the price stability is considered as the primary goal of monetary policy. Economic independence of the central bank depends on the extent to which the government can borrow from the central bank and the nature of the monetary tools under the control of the bank. The ability of the government to borrow from the central bank affects the monetary base and reduces the independence of the central bank. Alesina and Summers [1] found a negative relationship between inflation rate and the index of central bank independence. There was no specific relationship between central bank independence, the growth rate of the economy and the rate of unemployment.

Indices of central bank independence and macroeconomic variables 1973-1988 are presented in table 1. The range of the index of central bank independence is 1 – 4 with 4 being the most independent and 1 the least independent central banks. There is a positive relationship between inflation rate and the index of central bank independence. Countries such as Spain, Italy and New Zealand with weak central bank independence have experienced high inflation. On the other hand, Germany, Japan and Switzerland with high independence of central bank have lower than average rate of inflation. The table shows no specific relationship between central bank independence, growth rate and the rate of unemployment.

Table 1. Index of Central Bank Independence and Macroeconomic Variables 1973 - 1988

Country	Index of CBI	Average Inflation %	Average Growth %	Average Rate of Unemployment %
Spain	1.5	12.4	2	NA
New Zealand	1	12.2	1.5	NA
Australia	2	9.5	2.8	6.4
Italy	1.75	12.5	2.4	8.4
Great Britain	2	6.7	1.6	8.8
France	2	8.2	2.1	7
Denmark	2.5	8.6	1.9	7.5
Belgium	2	6	1.7	2.8
Norway	2	8.2	3.9	2.2
Sweden	2	8.3	1.8	2.3
Canada	2.5	7.2	3.3	8.7
Netherlands	2.5	4.3	1.7	9.7
Japan	2.5	4.5	3.7	2.3
United States	3.5	6.4	2.4	7.2
Germany	4	3.4	1.8	6.2
Switzerland	4	3.1	1.1	NA

This table is adapted from Alesina and Summers (1993). The index of central bank independence (CBI) is based on the methods proposed in Barina and Pakin (1982) and Alesina (1988). NA stands for not available.

Grilli, Masciandrea and Tabellini [12] argue that political independence means the ability of the central bank in choosing the final target of the monetary policy. They believe that economic independence means freedom of choosing monetary tools for maintaining the final target.

In their paper, political independence depends on the following factors:

1. The governor of the central bank is not appointed by the government.
2. The appointment of the governor of the central bank is longer than five years.
3. All of the board members of the bank are not appointed by the government.
4. The appointment of the board members is longer than five years.
5. The participation of the representative of the government in the board meetings is not compulsory.
6. Approval of the monetary decisions by the government is no obligatory.
7. Legally the central bank is obliged to maintain a stable currency.
8. In negotiation with the government, there are rules that increase the bargaining power of the central bank.

Based on Grilli, *et al.* [12], combined economic and political independence of OECD countries are presented in Figure 1. Those countries that are located on the upper right hand side have the most independent central banks and

those on the lower left hand side are the countries with least independent central banks. The rest of the countries are located between these two groups.

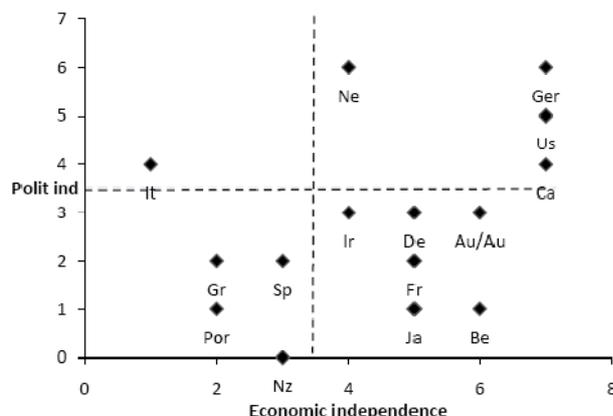


Figure 1. Economic and Political Independence of Central Banks

The theoretical analysis of central bank independence was initially discussed in Rogoff [21] where he showed that appointment of a conservative central banker increases credibility of the government to control inflation. Grilli et al [12] argued that the credibility of the central bank depends on the independence of the central bank and the extent to which the goal of price stability receives priority. The authors argue that the independence of the central bank promotes price stability and also helps the government to keep its budget in balance. The government budget will be in balance because of the unwillingness of the central bank to finance budget deficits and the absence of inflationary pressure. Accordingly, low inflation and government balanced budget co-exist in countries where their central bank conducts monetary policy independently. However, generally these countries experience excessive fluctuations of output because the central bank does not react to offset output shocks.

Walsh [25] argued that the relationship between the central bank and the government should be based on a contract in which the government is the principle and the central bank is the agent. In this contract the agent has no independent control over the final targets but can choose the instruments independently. Walsh [25] argued that in a democratic society people elect the government and the government appoints the head of the central bank. Implementation of monetary policy includes several relationships between the principle and the agent. Walsh's article became widely used mainly because in relation to the article's recommendation, in New Zealand the appointment of the governor of the central depends on the

maintenance of low inflation.

Mongano [17] questioned some of the empirical robustness of previous studies. He examined two indices of central bank independence (CBI) proposed by Grilli et al [12] and Cukierman [6] using observations on 17 OECD countries. This study finds that in the two previous studies there was no general agreement in the criteria used in the construction of indices of CBI. Mongano[17] argues that this subjectivity tends to weaken the statistically significant relationship between CBI and inflation. Mongano proceeded to establish a relationship between CBI rankings of 12 countries and average rates of inflation, average rates of growth and the variance of these rates. The empirical results showed that coefficients obtained correct signs but were mostly statistically insignificant and low budget deficits co-exist in countries where their central bank is independent. A low budget deficit is caused by the absence of inflation and the refusal of the central bank to finance government's budget deficit.

3. Empirical Results

Our empirical study attempts to examine some of the issues mentioned above but to particularly focus on central bank behaviour before and after the crisis. First we examine the relationship between inflation and budget deficits in a group of five countries with most independent central banks in two sub periods 1990-2007 and 2008-2012. The selection of the countries is based on indices of economic and political independence in Grilli et al [12]. The five selected countries are Germany, Switzerland, Canada, The Netherlands and the United States.

The empirical analysis of the study uses cointegration technique to examine the relationship between inflation and budget deficits in five selected countries in two different periods. We expect a weaker relationship to exist in the latter period, given that financial crises and recession led central banks to de-emphasise the goal of price stability. With falling output and wide spread unemployment, controlling inflation becomes a lower priority. All of the data used are quarterly observations, 1990 – 2012, collected from the DataStream.

As a preliminary investigation, Rates of inflation and budget deficits of five selected countries are shown in Figures 2.

With the exception of Switzerland, the relationship between the two series in the remaining four countries show a distinct change in trend commencing roughly about late 2007.

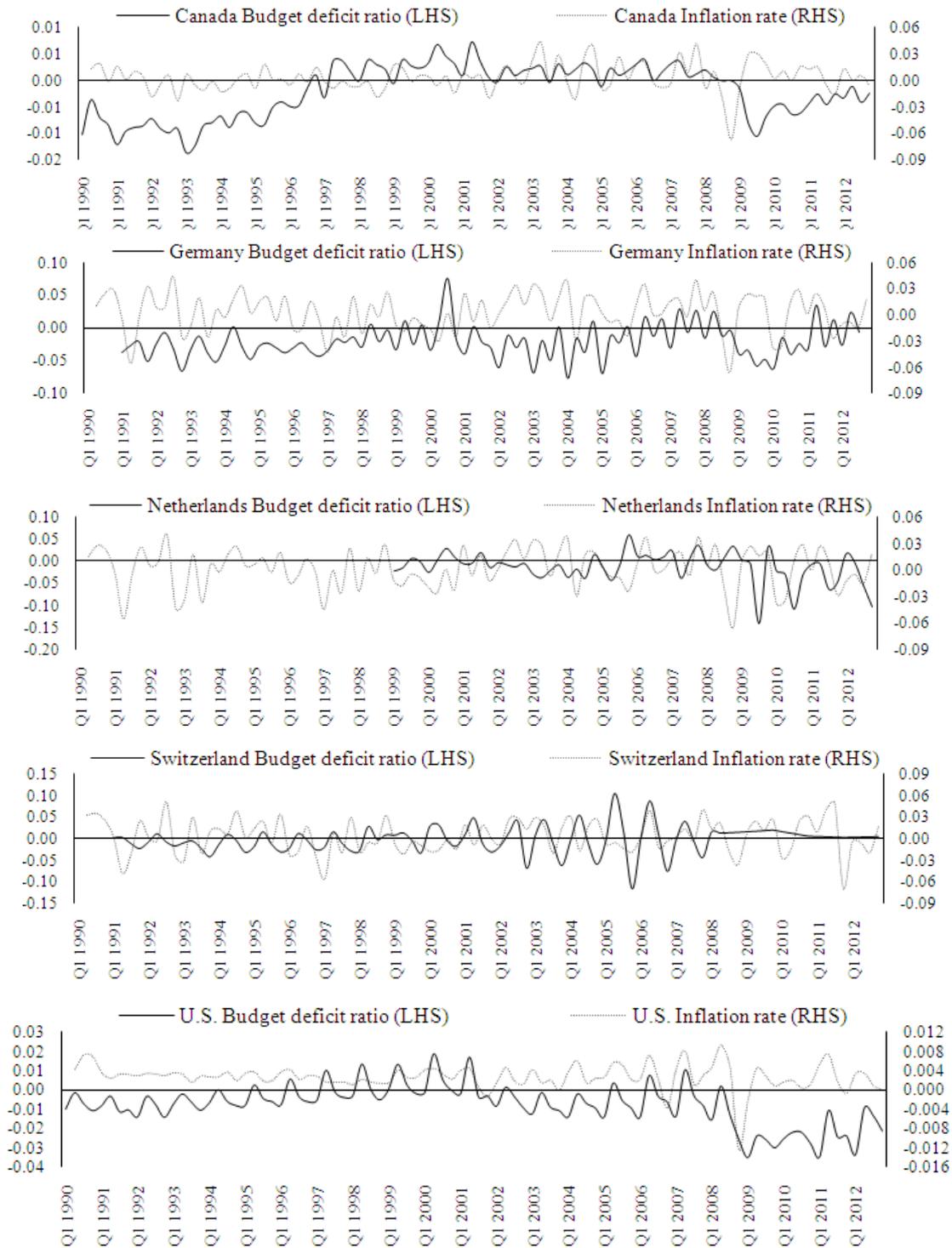


Figure 2. Budget deficit ratio and inflation rate for selected 5 countries

Country's budget deficit ratio calculated by budget deficit over GDP and country's inflation rate is calculated by log difference of CPI. Swiss data on budget deficit stating 2008 are annual data converted to quarterly observation using Eviews program. The data were collected from www.tradingeconomics.com based on information from the Swiss Federal Department of Finance.

Cointegration analysis is the appropriate technique for examining change in the trend of the two series. Many economic time series are non-stationary. However, it is possible for a linear combination of several time series to be stationary. These variables are known to be cointegrated.

Cointegration of several variables means that these variables wander around but in the long run they reach equilibrium. Cointegrated variables must be non-stationary in levels. However the residuals of the regression of these variables must be stationary. Engle and Granger [9]

proposed three steps for examining if two I(1) series are cointegrated:

1. Examine whether the series are stationary using Augmented Dickey Fuller test.
2. Estimate the long run relationship using OLS.
3. Investigate to see if residuals of the long run relationship are stationary. The original non-stationary series are cointegrated if the residuals of the long run relationship are stationary.

The Engle and Granger method, illustrated above, will be employed to determine if cointegration of budget deficits and inflation has changed after the great recession. To this end, the sample period is divided into 2000- 2006 and 2007-2012. Since inflation series are stationary, logarithms of CPI are used in all five cases. The unit root test results for the residuals of the regressions of budget deficits and the log of CPI for two sub-periods are presented in Table 2. The results presented in Table 2 show that in all of the five cases, budget deficits and the log of CPI are cointegrated in the first period but not during the second period. These results indicate that the two series that were approaching equilibrium earlier, diverged from each other in the latter period.

Table 2. Dickey Fuller Cointegration Results

Country	Before the GR	After the GR
Canada	-4.79*	-2.04
Germany	-3.83*	-1.95
Netherlands	-4.77*	-1.00
Switzerland	-13.13*	-1.75
United States	-2.79*	-2.04

Note: GR stands for Great Recession. The timing of the GR recession was not uniform for all of the 5 countries. The turning point was determined using Chow test for stability. During 2006-2012. In all cases 2008-2012 were included. Above figures are Augmented Dickey Fuller (ADF) statistics. For significant cases marked by *, the null hypothesis of a unit root test on residuals was rejected. In the long run regression, budget deficits and log of CPI are dependent and independent variables respectively. McKinnon "t" statistics for 1%, 5% and 10% levels of significance are: -3.70, -2.97, and -2.63.

4. Concluding Remarks about Central Behaviour

Inflation targeting as a strategy for conducting monetary policy became popular among the industrial and developing countries during the decade of the 1990s. The preference of putting price stability as the primary priority, rather than directly targeting growth of output and employment was supported by Rogoff [21]. Rogoff argued that the society is better-off if the objective function of the central bank is different than the objective function of the society. In other words, the monetary authorities must be conservative with an objective function that assigns higher weight to price stability than employment. Decisions made by a conservative central bank must be independent of the expansionary policies of the government. Preference of

price stability over employment followed earlier articles by Friedman [10] and Phelps [19]. Both studies showed that an expansionary monetary policy increases employment in the short run but in the long run employment returns to the natural rate and inflation remains at a higher level. In other words, in the long run an expansionary monetary policy increases inflation without affecting unemployment.

Moreover, Kyland and Prescott [14] argued that society's welfare is improved if in conducting monetary policy the central bank follows a rule rather than discretion. The authors showed that conducting monetary policy based on a rule generates no inflation whereas a discretionary monetary policy produces positive inflation. Rogoff [21] argues that in the absence of productivity shocks, inflation targeting is the best strategy because it has no trade-off between inflation and unemployment. In inflation targeting by publicly announcing targets and monetary policy strategy, the central bank becomes more transparent and responsible.

Svensson [24] identifies three features for inflation targeting:

1. Existence of a clear numerical target for inflation,
2. Forecasts of inflation as a framework for conduction monetary policy,
3. High level of transparency and responsibility.

McCallum [15] examined the success of inflation targeting in Canada, Britain, Sweden and New Zealand that conducted monetary policy in the context of inflation targeting in 1990 to 1993. All of these countries used consumer price index, excluding food and energy prices, as a measure of price level. McCallum argues that inflation targeting is preferable to the discretionary policy because in the latter method more attention is paid to the benefits of an expansionary policy than the costs of the policy.

McCallum showed that high rates of inflation that existed in the above mentioned countries in the 1970s and the 1980s, declined to 2 to 4 percent in the 1990s.

Among the developed and developing countries respectively New Zealand and Chilli were the first countries that commenced inflation targeting. Bosede [4] showed that before the implementation of inflation targeting the average rate of inflation in the developed and the developing countries were 3.72 and 13.11 percent respectively. 12 months after the implementation both rates declined to 2.71 and 8.3 percent respectively.

However, even before the crisis there were economists who objected to narrow inflation targeting. Debelle and Fischer [7] and Posen [20] argued that in Germany and Switzerland inflation targeting was successful enforced at the cost of high unemployment. Moreover, maintenance of a very low inflation target may lead to the danger of deflation. Bernanke and Mishkin [5] argue that a similar situation existed in Japan in the late 1990s. Mishkin and Posen [16] argued that those countries that implement inflation targeting must have developed financial markets, macroeconomic stability, an independent monetary policy and a credible monetary policy. Moreover, the central bank

must not be committed to maintain the exchange rate.

The purpose of this paper was to examine central bank behaviour before and after the Great Recession of late 2000s. Graphs of quarterly data on inflation and budget deficits of five selected countries showed that the trends of budget deficits in five countries changed after 2006. To examine the change of trends, to Engel Granger cointegration technique was used and the results showed that persistent cointegration of series from the 2000 until 2006/2007 did not continue in the latter part of the sample period. In other words the goal of price stability lost its priority in favour of the expansion of output and employment.

The change in central bank behaviour appears to reflect several influences. First is the persistence of recession. For example, Greece's economy is forecast to have contracted by nearly 20 percent between 2007 and 2012 and recovery is still not in sight. In Greece and Spain, more than half of young people of working age are unemployed. Second, there appears to be wide acknowledgment that central banks need to adopt a broader mandate that the narrow target of price stability. There are now calls for nominal GDP rate targeting where the central bank targets a growth rate of nominal GDP rather than inflation. This has been precipitated by interest rate policy that has seen rates drop to zero and further monetary stimulus is constrained by the liquidity-trap.

The American Federal Reserve actions in response to the financial crisis are illustrative of the change in central bank behaviour. The U.S. Federal Reserve has tripled the size of the monetary base since 2008 under its quantitative easing approach. The actions of the U.S. Federal Reserve were unprecedented [23]. In 2009 with interest rates close to zero, the Federal Reserve engaged in very unorthodox monetary measures involving quantitative easing, capital injections, and central bank swap lines that Roubini & Mihm [23] describe as having "revolutionized monetary policy". A stunning series of unprecedented interventions into the financial system rescued both illiquid and insolvent financial institutions and even involved swapping safe government bonds for toxic assets.

In the U.S forty percent of conventional deposits were uninsured and the government was forced to provide a blanket guarantee – the equivalent of deposit insurance – to all existing money market funds. They guaranteed bank debt irrespective of how prudent or otherwise these institutions had been. The Federal Reserve made loans directly to ailing financial institutions, including non-depository institutions, and bought up long term government debt and mortgage-backed securities, credit card debt and auto loans. The central bank became lender of first, last and only resort marshalling a massive expansion of government support for the financial system. The Government became effective owners of a large part of the financial system as it bought shares and injected capital to prevent foreclosures. The nature of the intervention was so extensive that the distinction between monetary and

fiscal policy is now not at all clear as the monetary interventions have clear spending and tax implications. The subsidization of the financial system - subsidizing the 'bad' investment decisions of the banks and non-banks with taxpayer money – and the purchase of risky asset-backed securities, will all leave a burden that will fall on taxpayers.

Central bank policy now appears to have come full circle. A pivotal statement in this respect is the paper by Blanchard et al [2]. This study looks at "what we thought we knew" about the benefits of having just one target of inflation and how "we were wrong" and that "what we have learned from the crisis" is that central banks aimed for too low a level of inflation. The target should be raised to provide liquidity more broadly and to reduce the value of real debt when extensive financial deleveraging is occurring. This study, coming from an institution such as the International Monetary Fund, which had been a champion of inflation targeting in the past, really does indicate how much central bank behaviour has been transformed.

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