Undergraduate Economic Review

Volume 4 | Issue 1 Article 12

2008

The Components of Central Bank Independence and Their Effects

Parker Sheppard
Washington and Lee University

The Components of Central Bank Independence and Their Effects

Abstract

Previous research on central bank independence has used indices as a measure of independence. This technique implicitly assumes that all aspects of independence have similar effects on macroeconomic variables. Statistical tests show that some aspects of independence reduce the inflation rate and inflation variance, while others do not. This result confirms that indices are inadequate for measuring independence. The effects of independence appear to be significant in the short run, but insignificant in the long run.

The Components of Central Bank Independence and Their Effects

By Parker Sheppard
Washington and Lee University
sheppardp@wlu.edu

Faculty Sponsor
Professor Linda Hooks
hooksl@wlu.edu

Abstract

Previous research on central bank independence has used indices as a measure of independence. This technique implicitly assumes that all aspects of independence have similar effects on macroeconomic variables. Statistical tests show that some aspects of independence reduce the inflation rate and inflation variance, while others do not. This result confirms that indices are inadequate for measuring independence. The effects of independence appear to be significant in the short run, but insignificant in the long run.

Acknowledgements

The author would like to thank Professor Linda Hooks and Professor Tom Vinson for help in conceptualizing and refining research techniques; and Randy and Debbie Sheppard, Kelly Will, and Judy Strang for helping to review drafts.

Table of Contents

The Components of Central Bank Independence and Their Effects

> *There is no subtler surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.*
> — John Maynard Keynes, *The Economic Consequence of the Peace*

Two goals of any country's economic policy should be high employment and stable prices. The reasons for wanting high employment should be obvious; the more people that are working, the more output and income a country has. The reasons for wanting price stability are less obvious. Though certain parties might benefit from falling prices, just as others might benefit from rising prices, the uncertainty associated with fluctuating prices reduces the incentive for business and consumers to take risks. In most modern economies, the task of ensuring price stability falls to a central bank, the sole issuer of a country's legal tender currency. In exchange for the right to issue currency, governments demand a certain amount influence over the bank's business, if not outright ownership. Thus, central banks are usually concerned both with promoting the general economic welfare their country, which includes both stabilizing prices and increasing employment.

However, the Phillips curve suggests that central banks cannot achieve both of these goals simultaneously. Loose monetary policy, which encourages high employment, means accepting high inflation. Tight monetary policy, which encourages price stability, restricts employment growth. Therefore, central banks must resist the temptation to increase employment by creating surprise inflation if they are to keep prices stable.

If monetary policy were run by a pure democracy, voters would prefer a loose policy with high inflation and low unemployment because they recognize the immediate and tangible benefits of higher output more easily than the less perceptible costs of inflation. Additionally,

those who gain from the redistributive effects of inflation outnumber those who lose. In the long run, unfortunately, such a policy is not what is best for social welfare.

Several researchers have developed solutions to this inflationary bias inherent in monetary policy. Most have suggested governments delegate the responsibility for monetary policy to an independent central bank. Since an independent central bank does not face political pressure to create inflation, it should pursue a monetary policy that balances output stabilization with price stabilization.

Furthermore, theory contends that an institutional structure that enhances the central bank's independence should give its policies more credibility. If a central bank's policies are not credible, the public will revise their price expectations only after the central bank takes action against inflation and slows the economy. When an independent central bank proclaims that it intends to stop inflation, the public should believe the statement and adjust their inflation expectations accordingly. Thus, the credibility obtained from independence allows the central bank to keep inflation low with lower costs in terms of forgone output.

While most researchers agree that independence is theoretically desirable, they disagree as to what constitutes independence in practice. Empirically, researchers have measured central bank independence (CBI) by creating an index that based on how each central bank relates to its national government. Characteristics that reflect independence increase the index's score. While these studies examine one or more aspects of independence, none of them can definitively say that what they measure completely constitutes independence, because creating a CBI index is an inherently subjective process. A researcher's bias will naturally affect the way in which his index measures independence. Consequently, studies that use an index to measure independence might produce skewed results.

Most indices count the number of aspects of independence present in a central bank's charter and add them together. This technique implicitly assumes that each aspect contributes equally to the effect of independence on macroeconomic variables. I contend that there is no reason to make this assumption. Certain aspects of independence are bound to have a greater or lesser effect than others. Thus, the proper method for analyzing independence is to examine each aspect independently

Creating an index requires making a subjective determination, before analysis, of the relative weights of the components of independence; my approach will determine the weights of the components based on this analysis. The results of this paper should provide a more accurate picture of how independence affects macroeconomic variables than past research. It should also indicate which institutional features of central bank independence would be the most desirable features to include in a central bank's charter, i.e. have the greatest effect on inflation and the least effect on the real macroeconomic variables.

LITERATURE REVIEW

Literature on central bank independence can be divided into three categories: theoretical papers, empirical papers, and critiques of empirical methods. In this section, I will summarize the important findings from each category of the literature.

Most authors, when writing about central bank independence distinguish between certain types of independence. Following Debelle and Fisher (1996), the most common distinction is between goal independence and instrument independence. Goal independence gives a central bank the ability to chose the final goals of monetary policy. Instrument independence gives a central bank the ability to decide the instruments it will use to pursue the final goals of monetary policy. Goal and instrument independence each address a different aspect of the inflationary bias

– goal independence takes the choice of the inflation rate out of the public's hands while instrument independence allows a bank to pursue its chosen inflation rate consistently across time.

Rogoff (1985) shows that, when policy is conducted under full discretion, a central banker with the same preferences as society at large will enact a suboptimal policy because of the labor market distortion across time periods. However, if the central banker emphasizes stabilizing inflation more than stabilizing employment relative to society at large, he will improve social welfare, defined as minimizing the variations from the predetermined price level and employment level. But, the central banker should not focus exclusively on maintaining a consistent price level because shocks would pass through entirely to employment. In a similar analysis, Faust (1996) achieves the same result with a central bank board whose preferences are more inflation-averse than society at large.

In Rogoff's model, the central bank is assumed to exogenously prefer price level stabilization more than employment stabilization. Walsh (1995) develops a contract that the government can offer a central bank governor with preferences that are the same as society's that would realign his preferences to mirror the inflation-averse banker in Rogoff's model. The optimal contract offers the governor incentives contingent on price level. Incentives for the central bank governor can take many forms ranging from financial remuneration for a job well done to dismissal for poor performance. In order to be enforceable, the contract must induce the central bank to choose a monetary growth rate that is consistent with its publicly available signals about inflation. Rogoff and Walsh both focus on ways to reduce the variation from specified targets by increasing the bank's commitment to carrying out its planned actions.

Posen (1993, 1995) examines central bank independence as part of the political process. In his model, central bank policy preferences will vary based on the amount of political support the central bank receives from anti-inflationary factions and the amount of financial sector opposition to inflation. The chief function of independence is not to make monetary policy time-consistent, but to increase the financial sector's influence in the ongoing policy debate. With empirical evidence as support, Posen contends that financial opposition to inflation is highest in countries with universal banking, with central banks that have little regulation over the financial sector, with a fractionalized party system, and/or with a federal system of government. To put it in terms of goal and instrument independence, Posen's argument is that political support for the goal of low inflation is necessary; instrument independence alone cannot guarantee a low overall inflation rate.

Though the consensus in the literature supports the inflationary bias, the case is not ironclad. The strongest critique of the inflationary bias comes from McCallum (1995). Realistically, if the central bank were to continually proclaim its intention to disinflate and then inflate, the public would become wise to the charade. Once the public expects the bank to inflate, the central bank cannot create surprise inflation and the increase in employment and GDP that comes with it. Thus, the bank would have no reason to inflate. However, McCallum's critique applies only to one of the motivations behind the inflationary bias. While it does support the idea that central banks are not likely to behave inconsistently with respect to time, central bank independence still remains an effective counterweight to the inflationary demands of society at large. In other words, if McCallum's critique is correct, instrument independence will have no effect on lowering the overall inflation rate, but goal independence may still have an effect.

Empirical studies on the link between central bank independence and inflation have had mixed results. Grilli, Masciandaro, and Tabellini (1991) compiled two indices to measure independence – one for political independence (similar to goal independence) and one for economic independence (similar to instrument independence). Banks whose governors and board were not appointed by the government, whose policy meetings were not required to involve the government, whose charters contained an explicit provision for price stability, and who have a procedure for mediating disputes with the government have greater political independence. Banks who have control over the discount rate, who control the rate, amount, and length of loans to the government, and who have supervision over the banking industry have greater economic independence. The authors found that lower and less variable inflation was associated with higher independence, but that there was no association between independence and any real macroeconomic variables. Alesina and Summers (1993) combine the Grilli et al. index with one created by Bade and Parkin (1982) and find a similar result.

Fuhrer (1997) runs another empirical test on the link between central bank independence and inflation using the indices mentioned above, as well as the Cukierman (1992) index, and accounts for variations in real macroeconomic variables across countries and across time. His results show no significant correlation between independence and inflation. Additionally, he finds no significant relationship between independence and inflation variability, real growth, and unemployment. He notes that most central banks were able to disinflate during the 1980's without changes in their institutional structures.

In fact, diverging results such as these are common in literature on central bank independence. Eijffinger and De Haan (1996) summarize, compare, and critique notable papers on the subject. They found that authors used a wide variety of variables to measure

independence, interpreted bank laws in different ways, and used a number of different techniques to analyze data. Mangano (1998) quantified the difference between the Cukierman and Grilli et al. indices. He found that about one third of the components of the respective indices disagreed about how to measure the same variable. While both indices both included a large number of components, each index leaves out about 40% of the components considered important by the other. With such a wide disagreement in two of the most prominent measurements of independence, it is no wonder that there has been such a wide disagreement in empirical studies.

Mangano argues that regressions that use the country rankings produced by an index should produce better results than ones that use index values because the rankings are less affected by the specific details of each index. Using a regression based on rankings, he finds that higher independence is associated with lower inflation and no significant (though likely negative) association between independence and growth.

To summarize, studies on central bank independence are sensitive to issues related to the complexity and unclear nature of independence itself. Because it is difficult to discern between varying degrees of independence, measurements of independence need to be as clearly defined as possible. Any analysis of independence should also take note of the different types of independence because each type should have different effects on real variables. Additionally, within each type of independence, the institutional features will not necessarily have a uniform effect on real variables. Thus, an effective study on central bank independence should make sufficient accommodations for the complexity of the issue at hand.

THEORY

Following Rogoff (1985), my model of how central bank independence affects policy decisions is based on a rational expectations IS-LM model of the economy. In this model, firms

and laborers negotiate wages a period in advance. They choose a wage such that it will be consistent with their expectations about the future price level. The wage increase for period *t* will be set high enough "so that, in the absence of disturbances, the central bank will not choose to inflate the money supply beyond the point consistent with wage setters' desired real wage" (1174).

The central bank policy is assumed to minimize the social loss function,

$$\Lambda_t = (n_t - n^*)^2 + \chi(\pi_t - \pi^*)^2,$$

where n_t and π_t are the level of employment and inflation, respectively, at time *t*, n^* and π^* are the socially desired levels of employment and inflation, and χ is the relative weight society places on inflation stability to employment stability. In order to minimize the social loss function, the central bank must choose a money supply that induces the employment and inflation levels that are closest to what is socially desired. The central bank's task would be easy, were it not for a random supply shock at time *t*, which distorts the state of the economy and requires the bank to adjust policy in order to bring it in line with the social ideal.

The public is presumed to prefer a level of employment that is higher than the actual level, which means that the central bank can reduce the employment component of the social loss function by raising the actual level. The socially desired rate of inflation is generally, though not necessarily, low, such that the central bank, more often than not, can reduce the inflation component of the social loss function by reducing the rate of inflation. However, the Phillips curve suggests that there is a short-run tradeoff between inflation and unemployment. Therefore, if the central bank wants to increase employment (reduce unemployment), it must accept a higher rate of inflation. Reducing one component of the social loss function necessarily means increasing the other.

Because wage-setters choose a wage based on predictions about the future price level, any increase in employment at time *t* will not occur in time *t*+1, unless the price level increases more than anticipated. Thus, the marginal cost of stabilizing employment in terms of destabilizing inflation increases over time. However, if the price level remains closer to the socially desired level, then employment will adapt on its own to the changes in price level. In other words, stabilizing inflation does not require increasing marginal costs in terms of destabilizing employment over time. Thus, a central bank that stabilizes inflation can improve social welfare.

Goal independence and instrument independence have different effects on final policy because they affect different components of the social loss function. Goal independence gives the central bank, not the public, the ability to choose n^* and π^*, the goal rates of employment and inflation, as well as χ, how much policy prefers the inflation rate to be closer to its goal than the employment rate. It gives the bank the ability to decide the final targets for inflation and employment; it does not necessarily increase the bank's ability to hit those targets. Goal independence should be associated with lower overall inflation rates because it removes policy decisions from the hands of those who would want higher inflation. Goal independence, because it is associated with lower average inflation and lower average growth in the money supply, should also be associated with a lower average real GDP growth and higher unemployment.

On the other hand, instrument independence makes it easier for the bank to choose the n_t and π_t, the actual rates of inflation and unemployment. It improves the bank's accuracy in hitting its targets; it does not let the bank decide what the target should be. Because a bank with instrument independence, but not goal independence, will not achieve a low average rate of inflation so long as society wants it to be high, instrument independence should not be associated

with lower average inflation rates. Instrument independence allows the bank, not the public, to decide how the effects of a supply shock are divided between employment and inflation. Given the model above, the optimal strategy for a central bank is to focus on reducing the inflation rate variance and to allow the labor market to correct itself. Therefore, instrument independence should be associated with lower inflation variance. Instrument independence should not be associated with real GDP growth or unemployment because it only affects inflation variance around the socially determined level.

MODEL

To avoid the potential pitfalls associated with measuring central bank independence with an index, my model will consider each aspect of independence separately. As much as possible, I will refrain from making arbitrary decisions that might affect the meaning of each component of independence. In such cases where variables can be measured numerically, I will do so. For example, I will measure the length of a governor's term in years, rather than pick an arbitrary length and consider longer terms to signify independence and shorter term not to signify independence. In cases where numerical measurement does not apply, I will try to define my variables on a binomial basis, i.e. either the aspect is present or it is not. For example, Cukierman (1992) tries to create a hierarchy to measure the effect on independence of explicit provisions for price stability, saying that an explicit provision for price stability alone is more independent than a provision for price stability and a conflicting goal, which is more independent than no provision for price stability. In my model, each category of price stability would constitute its own variable.

The following variables will be included in my model. With each variable, I will explain why it contributes to independence and how I expect to measure it. Each variable will be interpreted in such a way that its presence (value=1) will indicate independence.

Goal Independence Variables

Explicit provision for price stability, as determined by the bank (PSTBK): An explicit provision for price stability in a central bank's charter should give it justification for maintaining low inflation. PSTBK will be 1 if a there is an explicit provision for price stability without a specific inflation target and no provision for a conflicting goal in a bank's charter or if there is a specific target determined by the bank and no conflicting goal. If there is a provision for price stability along with a conflicting goal, such as high growth, or no mention of price stability, PSTBK will be 0.

Explicit provision for price stability, as determined by the government (PSTGT): In cases where the definition of price stability is provided by the government as an inflation target, PSTGT will be 1. If not, it will be 0. This case is separated from PSTBK because the bank does not have full control over policy goals, but, because price stability is still listed as a goal, the government cannot choose an inflation target that is too high. PSTGT and PSTBK will never both be 1.

Governor appointed by bank owners (GAPBK): The government, if given the chance to appoint the central bank governor, should look for an individual who shares its preferences about the relative importance of inflation and employment stabilization. The central bank's shareholders and the rest of the banking community should prefer a governor who is more hawkish towards inflation. Thus, GAPBK will be 1 if the governor is appointed entirely by private interests and 0 if otherwise.

Governor appointed by bank and government together (GAPMX): Governors appointed by the bank shareholders with approval of the government, by the government from a list of names produced by the bank, or by another mix of private and public interests should have goals which are different from purely private goals or purely public goals. When public and private interests have a check on each other in nominating the governor, candidates who prefer extreme price stability or extremely high levels of employment should get screened out. Thus, GAPMX will be 1 if the governor is appointed by a mix of private and public interests and 0 otherwise. GAPBK and GAPMX will never both be 1.

Board appointed by the bank owners (BAPBK): The criteria for BAPBK is the same as for GAPBK, except it applies to the members of the bank committee that actively manages monetary policy. In cases where the government appoints some, but not all members of the board, BAPBK will be the percentage of board seats that are not appointed by the government. If all of the board seats are appointed by the bank, then BAPBK will be 1.

Board appointed by bank and government together (BAPMX): The criteria for BAPMX is the similar to those for GAPMX, except it applies to the members of the bank committee that actively manages monetary policy.

Instrument Independence Variables

Management Variables

Governor's term length (GTERM): Policy is more likely to be consistent while a particular governor is in office. Thus, the longer each governor stays in office, the more consistent policy will be across time. GTERM will be measured by the number of years legally specified to be the governor's term.

Governor's turnover rate (GTURN): Though a governor may be legally allowed a certain term length, he might not always serve out his entire term, especially if the government is able to dismiss him. In regressions using average data, GTURN will be measured as the average number of years actually served by the governors. In regressions using yearly data, GTURN will be the number of years the current governor has served in office.

Board term length (BTERM): Similar criteria as for GTERM.

Board turnover rate (BTURN): Similar criteria as for GTURN.

Policy Variables

Governor dismissal procedure (GDISS): If the government has the ability to dismiss the central bank governor before his term is complete, then the governor cannot formulate policy that is too distasteful to the government. GDISS will be 1 if the governor cannot be dismissed by the government and 0 otherwise.

Policy formulation without government involvement (PFMID): If the government participates in regular policy meetings (e.g. the treasury secretary has a seat on the board), then policy will lean towards the government's preferences. PFMID will be 1 if regular policy meetings are completely independent from government influence and 0 otherwise.

Policy formed with a government representative as a non-voting member (PFMNV): When the government participates in regular policy meetings as a non-voting member, its influence is greater than if it were not involved at all, but less than if it had an official vote. When a government representative participates in regular policy meetings as a non-voting member, PFMNV will be 1. It will be 0 otherwise. PFMNV and PFMID will never both be 1.

Policy approval (PPROV): If the government has final approval over monetary policy, the central bank cannot enact policy that is distasteful to the government. PPROV will be 1 if the government does not have final approval over policy and 0 otherwise.

Government Financing Variables

Terms of lending to the government (LMAND, LRATE, LTIME, LSIZE): If the central bank is constrained in the way in which it lends to the government and finances its debt, it does not have full control over the growth of the money supply. For a bank to be independent, it must not mandatorily finance government debt. It must also lend to the government at a market rate, for a specified amount of time, and for a limited amount. LMAND, LRATE, LTIME, and LSIZE will be 1 if there exist constraints on lending in their respective categories and 0 otherwise.

Because goal independence and instrument independence have different effects on bank policy, the ways in which they affect macroeconomic variables will differ as well. I will now outline how I expect the independent variables to affect the dependent variables across the several regressions. Regardless of the dependent variable, each regression will have the same format: all of the independent variables are assumed to linearly affect the dependent variable, as shown below.

$$DEPVAR_t = \beta_0 + \beta_1 PSTBK + \beta_2 PSTGT + \beta_3 GAPBK + \beta_4 GAPMX + \beta_5 BAPBK + \beta_6 BAPMX + \beta_7 GTERM + \beta_8 GTURN + \beta_9 BTERM + \beta_{10} BTURN + \beta_{11} PFMID + \beta_{12} PFMNV + \beta_{13} PPROV + \beta_{14} LMAND + \beta_{15} LRATE + \beta_{16} LSIZE + \beta_{17} LTIME + \varepsilon_t$$

Inflation Rate

The goal of the process that determines monetary policy, which includes the public, the government, and the central bank, is to determine what the rate of inflation should be. Central banks with goal independence would be expected to choose a lower inflation rate than those who

are subject to political control because the greater public, which generally prefers high inflation and low unemployment, is removed from this process. There should be a significant negative correlation between goal independence variables and the overall inflation rate. I would expect instrument independence variables to have a negative association as well because instrument independence lowers the inflation rate in order to bring it closer to its target. Instrument independence might not be significant because a bank with instrument independence but not goal independence might be given an inflation target that is still high.

Inflation Variance

The variance of the inflation rate, i.e. how often the inflation rate changes, should be negatively associated with independence variables. Goal independence should not be significantly associated with inflation variance. If there were an association, it would most likely be positive, because goal independence increases the divergence between the bank's goals and popular goals. I will run three regressions corresponding to different possible inflation targets – one using the sample variance; one using the variance around 2%, a common inflation target; and one around 0%, i.e. absolute price stability.

GDP Growth

In the IS-LM model, increases in the money supply, *ceteris paribus,* lead to increases in output. Thus, goal independence, because it is associated with lower overall inflation and lower overall growth in the money supply, should be associated with lower average real GDP growth. Instrument independence, because it is not associated with any absolute level of growth in the money supply, should not be associated with real GDP growth.

Unemployment

According to the Phillips curve, the unemployment rate is negatively associated with the inflation rate in the short run, but not in the long run. Goal independence, because it allows a central bank to choose a lower inflation rate and therefore a higher unemployment rate, should be positively and significantly associated with unemployment in the short run. Instrument independence, because it only affects how close the actual inflation rate is to its target should not necessarily be associated with unemployment in the short run. If it is always the case that the actual inflation rate is higher than the target rate, then instrument independence will reduce inflation and therefore increase unemployment. In the long run, because the labor market corrects to the natural rate of employment, which is determined by factors other than the independence of the central bank, neither goal nor instrument independence should be associated with unemployment in the long run.

Data on the aspects of central bank independence comes from central bank charters, statutes, constitutions and websites. Data on the inflation rate, real GDP growth rate, and unemployment rate comes from the International Monetary Fund. The data is available for the years 1980-2006. During the time period, many of the central banks included in the sample made major changes to their charters that enhanced the bank's independence, as a response to the initial papers on central bank independence and in order to conform with the regulations of the European System of Central Banks. In the final few years of the sample, the European Central Bank conducts monetary policy for countries in the Eurozone. The changes in independence that occur during the time period should provide good contrast between banks with and without independence.

RESULTS

Yearly Data

Since all seventeen of the independent variables are attempting to measure the same thing, namely independence, it is not surprising that the full regression exhibits high multicolinearity. Table 1 shows the Variance Inflation Factor (VIF) scores and tolerances for each variable.

Table 1. – Variance Inflation Factors and Tolerances

Variable	VIF	Tolerance
bapbk	17.70	0.056488
pstgt	12.23	0.081733
ltime	10.75	0.092995
bapmx	10.41	0.096063
pstbk	7.53	0.132776
pprov	7.31	0.136787
lmand	7.09	0.141093
pfmid	6.28	0.159148
bterm	5.68	0.175938
gapmx	5.63	0.177657
lsize	5.12	0.195198
gdiss	4.58	0.218501
gterm	3.62	0.276438
lrate	3.20	0.312059
pfmnv	2.97	0.336844
gapbk	2.08	0.48006
gturn	1.29	0.778116
Mean VIF	6.68	

Eleven out of seventeen independent variables have VIF scores over 5, which is sufficient to indicate that colinearity among those variables will make it difficult to properly estimate their coefficients. Perhaps this problem with multicolinearity is why previous researchers chose to aggregate the aspects into an index.

However, simply because there is multicolinearity between the independent variables does not mean that their effects cannot be properly estimated. While each variable can be

predicted by the sum of the others, each variable is not well explained by any single variable. Table 2 summarizes the Pearson product moment correlation coefficients for each pair of independent variables. For the complete table, see the appendix.

Table 2. – Correlation Coefficients of Independent Variables

Absolute Value	Number
0.00-0.09	40
0.10-0.19	43
0.20-0.29	29
0.30-0.39	12
0.40-0.49	5
0.50-0.59	5
0.60-0.69	2

Clearly, most variables are uncorrelated with each other. Even among variables that are more significantly correlated, the absolute value of the correlation is less than the guideline value for multicolinearity of 0.8. This is most likely because a country that wishes to have an independent central bank will give it many aspects of independence. Thus, each aspect of independence is likely to be accompanied by several others. However, because there are many ways in which a government can make a central bank independent, each individual aspect is not particularly correlated with any other.

I expect that the sources of multicolinearity come from three main groups. First, some aspects of independence are measured by two variables (price stability, governor and board appointments, and policy formation). I originally planned to have one variable to measure each of these aspects. But, after examining several central bank charters, I found organizational structures that I thought might have a significant effect, but not quite the same as structures that qualified under the stronger variable.

Since there are two variables measuring each of these aspects, they can be combined into one without significantly affecting the regression. The following new variables represent combinations of two variables listed in the model section.

Price stability as a written goal of the central bank (PSTAB): PSTAB measures whether or not price stability is a written goal for the central bank, regardless of who defines price stability. It is 1 when either PSTBK or PSTGT is 1.

Policy formed with government as a non voting member (PFNV2): PFNV2 measures whether a government representative has a vote in the regular policy meeting or not, regardless of whether or not he has a seat. It is 1 when either PFMID or PFMNV
is 1.

For appointment procedures, I think the relevant measure is whether or not the government is involved in any way with the appointment, which is already measured by GAPBK and BABPK. They are both 1 when the government is not involved at all. Thus, GAPMX and BAPMX are simply dropped from alternate regressions.

Second, the variables for the governor and the board are both meant to measure the effect of each bank's top management. Assuming that the most significant effect comes from the governor alone, board variables can be dropped with little effect.

Third, the remaining instrument independence variables are in three subgroups – governor tenure (GTERM and GTURN), policy formation (GDISS, PFNV2, and PPROV), and government financing (LMAND, LRATE, LTIME and LSIZE). One variable from each subgroup might be sufficient to capture the effects of each group. Assuming that LMAND and LRATE do not contribute as significantly to the government financing group, there are twelve possible combinations of the one variable from each of the three subgroups.

Thus, there are four types of regressions that might explain how the aspects of central bank independence relate to inflation, gross domestic product, and unemployment. Type 1 is the regression with all variables included. Type 2 is the regression with the double variables combined. Type 3 is the regression with the double variables combined and the board variables dropped. Type 4 regressions are those with one variable to represent charter goals, governor appointments, governor tenure, policy formation, and government financing.

Table 3 summarizes the VIF scores for each of the four types of regressions. Among the twelve Type 4 regressions, there was little difference in their VIF scores and estimated coefficients. I have included the regression that includes the variables I feel to be most important in these regressions – PSTAB, GAPBK, GTURN, PFVN2 and LSIZE.

Table 3. – Multicolinearity Among the Yearly Regressions

Type 1		Type 2		Type 3		Type 4	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
bapbk	17.70	ltime	6.83	ltime	4.32	pfnv2	1.91
pstgt	12.23	pfnv2	5.36	lmand	3.34	lsize	1.78
ltime	10.75	pstab	5.23	pstab	3.20	pstab	1.54
bapmx	10.41	bapbk	4.17	pfnv2	2.61	gturn	1.06
pstbk	7.53	lsize	3.42	pprov	2.57	gapbk	1.02
pprov	7.31	lmand	3.35	lrate	2.52		
lmand	7.09	bterm	3.30	lsize	2.38		
pfmid	6.28	lrate	3.15	gdiss	1.99		
bterm	5.68	gdiss	3.12	gterm	1.42		
gapmx	5.63	pprov	2.58	gturn	1.18		
lsize	5.12	gterm	2.19	gapbk	1.17		
gdiss	4.58	gapbk	1.42				
gterm	3.62	gturn	1.25				
lrate	3.20						
pfmnv	2.97						
gapbk	2.08						
gturn	1.29						
Mean VIF	6.68	Mean VIF	3.49	Mean VIF	2.43	Mean VIF	1.46
# VIF >5	11	# VIF >5	3	# VIF >5	0	# VIF >5	0

Type 2 regressions show less multicolinearity than Type 1, but a few variables still have high VIF scores. Type 3 and 4 regressions have no multicolinearity. However, Type 4

regressions have very low R^2 values, indicating that too many independence variables are missing to accurately explain the real macroeconomic effects. For complete regressions results, refer to the appendix.

Thus, the Type 3 regressions appear to offer the best explanation for how central bank independence affects inflation, gross domestic product, and unemployment. As a whole, they explain about one-third of the changes in the macroeconomic variables. Several estimated coefficients are highly significant and most are in the hypothesized direction. The results from the Type 3 regression are summarized in Table 4.

Table 4. – Type 3 Regressions with Yearly Data

	Inflation Rate	Inflation Variance			Real GDP Growth	Unemployment Rate
		Average	0.02	0.00		
pstab	-0.0113*	0.0274***	0.0016*	0.0012	-0.0042	-0.0045
gapbk	-0.0050	-0.0039	-0.0007	-0.0009	0.0058	0.0055
gterm	-0.0016*	-0.0041***	-0.0005***	-0.0006***	0.0006	0.0026***
gturn	-0.0010*	-0.0003	-0.0001	-0.0001	0.0002	-0.0011**
gdiss	0.0144**	0.0178***	0.0028**	0.0034***	-0.0069**	-0.0532***
pfnv2	-0.0314***	-0.0383***	-0.0058***	-0.0070***	0.0034	-0.0152**
pprov	-0.0030	0.0021	-0.0007	-0.0008	0.0030	0.0193***
lmand	-0.0205***	0.0018	-0.0021**	-0.0029***	-0.0041	0.0085
lrate	-0.0084	-0.0081**	-0.0005	-0.0009	0.0046	-0.0112**
ltime	-0.0173*	-0.0594***	-0.0063***	-0.0070***	0.0108**	-0.0140
lsize	0.0119	0.0382***	0.0042**	0.0046***	-0.0269***	0.0514***
constant	0.0960***	0.0468***	0.0100***	0.0134***	0.0414***	0.0795***
n	436	436	436	436	436	410
R^2	0.3409	0.4991	0.3352	0.3463	0.1543	0.2993
Adj. R^2	0.3238	0.4861	0.3180	0.3294	0.1323	0.2800
F	14.17	34.97	14.93	15.29	7.52	15.93
P(F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: A coefficient of 0.01 implies a 1% change from time *t* to time *t*+1. F and P(F) list the observed F statistic and probability of measuring that F statistic associated with the hypothesis that all of the estimated coefficients are equal.

The most important results from these regressions are the Wald test values for the hypothesis $H_0 : \beta_1 = \beta_2 = \cdots = \beta_{11}$. The p-values for these F scores are all 0 carried out to four decimal places, strongly indicating that the effects of each aspect of independence are not the

same. In fact, this result holds for all regressions using yearly data, not just Type 3. This means that an index that assumes that each aspect contributes equally to independence will distort the true independence of central banks.

Listing price stability as an explicit goal is estimated to reduce the overall inflation rate by about 1%. Given that the constant rate of inflation, before the effects of independence are taken into account, is estimated here to be 9%, this is a significant finding. Listing price stability as a goal also significantly increases the variance of the inflation rate around its average, indicating that the policy of a central bank with that objective will conflict with its government's fiscal policy more often than that of a bank without it. The remaining estimated coefficients for goal independence variables are not significant.

In addition to the goal independence variables, a few instrument independence variables have a significant effect on the inflation rate. However, the governor's statutory term length and effective term length, while statistically significant, are not far enough from zero to be economically significant. Those that are significant, government involvement in policy-making, non-mandatory loans to the government, and limits on the length of government loans, most directly affect the government's ability to influence monetary policy in the short run.

As for the inflation variance regressions, increasing the governor's term length, forming policy without the government as a voting participant, and putting limits on the length of loans to the government are estimated to have significant effects in the hypothesized direction. Table 5 summarizes the estimated coefficients of variance converted to standard deviations. To put these coefficients in perspective, their presence reduces the average difference from the average inflation rate by 6%, 19% and 24%, respectively. However, I think these estimates seem large because the average inflation rate will be skewed upward by the few instances of high inflation,

so that the years in which inflation is low will be farther from the average. The estimated constant standard deviation is 21% in the average variance regression, over twice the constant in the other two regressions. Thus, I assume an inflation target of 2% or 0% is a more reliable measure of the true variance. In these cases, the estimated coefficients imply a standard deviation in the inflation rate of 2%, 8%, and 8%, respectively.

Table 5. – Inflation Variance Coefficients in Standard Deviations

	inflv	infl2	infl0
pstab	0.1655	0.0405	0.0345
gapbk	-0.0624	-0.0269	-0.0304
gterm	-0.0637	-0.0222	-0.0236
gturn	-0.0162	-0.0100	-0.0119
gdiss	0.1335	0.0527	0.0579
pfnv2	-0.1958	-0.0761	-0.0839
pprov	0.0457	-0.0264	-0.0286
lmand	0.0426	-0.0458	-0.0540
lrate	-0.0900	-0.0232	-0.0295
ltime	-0.2437	-0.0795	-0.0837
lsize	0.1954	0.0645	0.0681
constant	0.2163	0.0999	0.1158

The estimated effect of protecting the governor from dismissal is significant and in the opposite direction in all six of the regressions. Perhaps this can be explained by the fact that I did not include a variable for whether or not a governor could be reappointed. In cases where a government does not seek to exercise control over the governor by threatening to dismiss him, it could decide to achieve the same result by making the governor's reappointment contingent upon his performance.

For the most part, independence does not have a significant effect on real GDP growth. Aside from governor dismissal, the only aspects of independence that have a significant effect are the limits on the time and size of loans to the government, of which only the size limit is in the expected direction.

As for unemployment, governor term length, policy approval, and limits on loan size are significant and in the expected direction. However, governor dismissal, government participation in policy-making, and limits on loan rates are significant in the opposite direction. Of these three, by far the biggest belongs to governor dismissal, which I have already explained suffers from a missing variable bias. It is likely that this bias is skewing the results from the unemployment regression.

Average Data

For the data set, I also calculated the average inflation rate, GDP growth rate, and unemployment for each bank. I used the average data set to measure the effects of independence over the long run. Just as with the yearly data, the average regressions also show signs of multicolinearity. Table 6 summarizes the VIF scores for Type 1-4 regressions using the average dataset. Just as with the yearly data, the Type 3 regressions are the most robust without exhibiting multicolinearity. Table 8 summarizes the results of the Type 3 regressions using averages data.

Table 6. – Multicolinearity Among the Regressions with Average Data

Type 1		Type 2		Type 3		Type 4	
Variable	VIF	Variable	VIF	Variable	VIF	Variable	VIF
bapmx	119.52	pstab	6.66	pfnv2	3.62	pfnv2	1.82
pstgt	81.76	pfnv2	6.49	ltime	3.31	lsize	1.61
ltime	45.02	bapbk	5.63	pstab	3.25	pstab	1.48
pstbk	33.08	gdiss	5.48	lmand	3.23	gturn	1.24
gturn	27.13	gterm	4.79	lrate	2.80	gapbk	1.07
bapbk	22.81	lrate	4.62	lsize	2.19		
pfmid	22.71	lmand	4.07	gdiss	2.16		
gapmx	16.78	ltime	3.90	pprov	2.15		
pfmnv	15.51	gturn	3.80	gturn	1.81		
pprov	11.44	bterm	3.70	gterm	1.74		
gterm	6.62	pprov	3.28	gapbk	1.39		
bterm	6.39	lsize	2.83				
lmand	6.05	gapbk	2.36				
gapbk	5.92						
gdiss	5.77						
lrate	4.06						
lsize	3.66						
Mean VIF	25.54	Mean VIF	4.43	Mean VIF	2.51	Mean VIF	1.44
# VIF > 5	15	# VIF > 5	4	# VIF > 5	0	# VIF > 5	0

It turns out that with using the averages data, almost none of the estimated coefficients are significant. Not surprisingly, the p-values associated with the f scores from the test $H_0 : \beta_1 = \beta_2 = \cdots = \beta_{11}$ are much higher. It appears that as far as the long run is concerned, measuring independence with an index is just as good as analyzing the aspects separately; however, that result is trivial since independence would have no effect on macroeconomic variables either way.

The reader should note that the estimated coefficients are in the expected direction, just not significant. These regressions still leave open the possibility that independence might be correlated with macroeconomic variables in the long run; however, they do not allow us draw any significant conclusions.

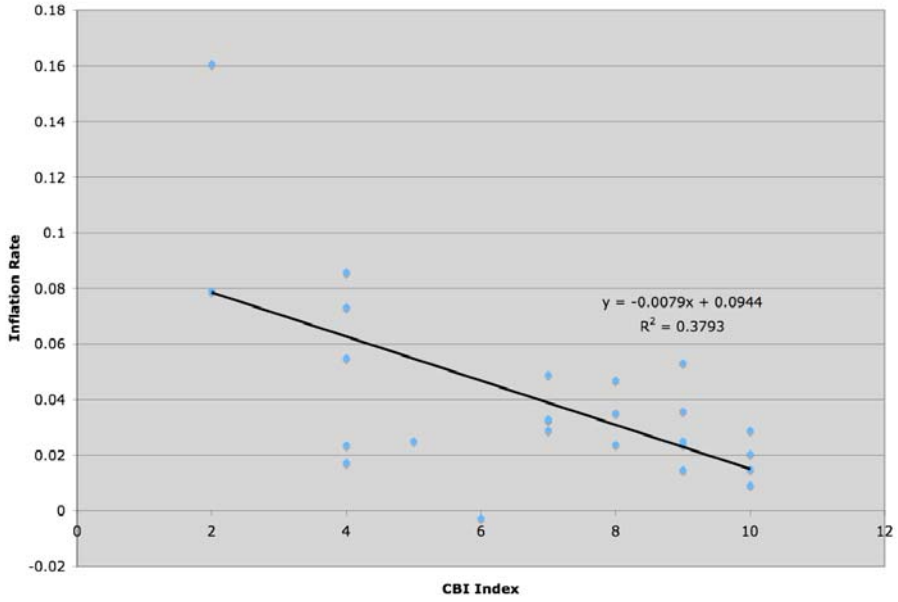
Table 8. – Type 3 Regressions with Average Data

	Inflation Rate	Inflation Variance			Real GDP Growth	Unemployment Rate
		Average	0.02	0.00		
pstab	-0.0353	-0.0097	-0.0034	-0.0049	0.0039	0.0209
gapbk	0.0071	-0.0073	-0.0004	-0.0001	0.0117	0.0341
gterm	-0.0022	-0.0062*	-0.0007	-0.0008	0.0008	0.0063
gturn	-0.0026	-0.0028	-0.0005	-0.0006	0.0009	0.0008
gdiss	0.0207	0.0349*	0.0045	0.0054	-0.0084	-0.0934**
pfnv2	-0.0147	-0.0067	-0.0020	-0.0026	-0.0017	-0.0411
pprov	-0.0037	-0.0152	-0.0026	-0.0028	0.0101	0.0518*
lmand	-0.0282	-0.0063	-0.0034	-0.0045	-0.0057	0.0111
lrate	-0.0121	-0.0191	-0.0014	-0.0019	0.0058	-0.0073
ltime	0.0060	-0.0229	-0.0003	-0.0001	-0.0041	-0.0364
lsize	0.0056	0.0350	0.0039	0.0041	-0.0308**	0.0370
constant	0.1032**	0.0613*	0.0110*	0.0147**	0.0447***	0.0890
n	24	24	24	24	24	23
R^2	0.6152	0.6530	0.6310	0.6266	0.5426	0.5648
Adj. R^2	0.2624	0.3350	0.2927	0.2843	0.1232	0.1295
F	1.20	1.57	1.15	1.14	1.38	1.40
P(F)	0.3795	0.2264	0.4014	0.4115	0.2932	0.2951
# VIF >5	0	0	0	0	0	0
Avg. VIF	2.510	2.510	2.510	2.510	2.510	2.480

Note: A coefficient of 0.01 implies a 1% change from time *t* to time *t*+1. F and P(F) list the observed F statistic and probability of measuring that F statistic associated with the hypothesis that all of the estimated coefficients are equal.

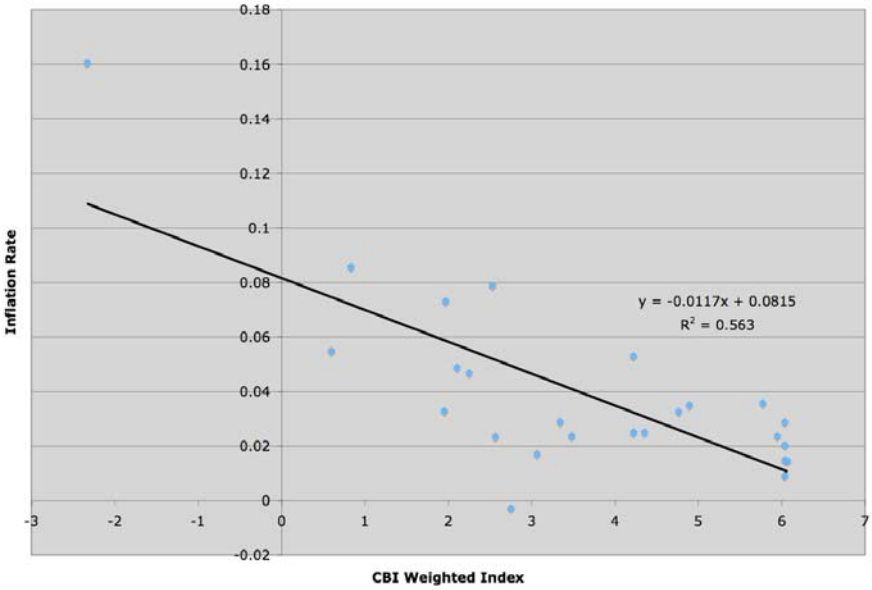
Taking the regression results as a whole, the most significant finding of this paper is that there is a difference in how the aspects of central bank independence affect macroeconomic variables. This means that measuring independence by an index, which assumes that all aspects carry equal weight distorts the true value of independence. To illustrate this point, I have constructed an index using the averages data, a common measure of independence in previous research. For details on how the index is constructed, refer to the appendix. Chart 1 displays the correlation between the simple CBI index and the average inflation rate.

Chart 1. – CBI Index and Inflation Rate



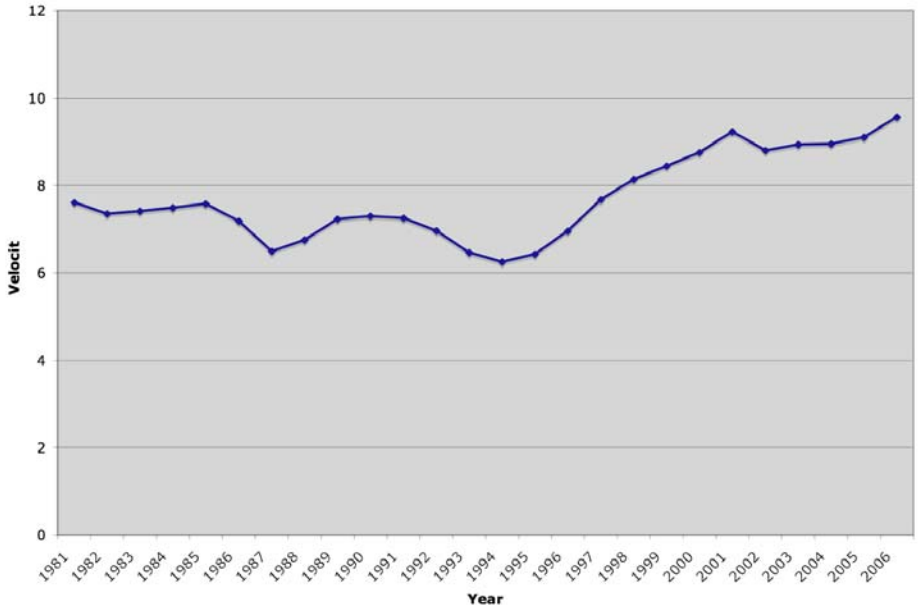
The chart does show a negative correlation between the total independence and the inflation rate, a result consistent with previous research. However, the R^2 value is only 0.3793, indicating only a decent fit. When the index is weighted according to the estimated coefficients from the regressions, the fit improves to 0.5630. Chart 2 displays the correlation between the weighted CBI index and the inflation rate. Not only does the fit improve when using the weighted index, the estimated effect of independence increases as well, from -0.0079 to -0.0117.

Chart 2. – Weighted CBI Index and Inflation Rate



From these results, it appears that independence is effective in the short run, but its effect, if there is one, decreases in the long run. This might be for two reasons. First, if the labor market is self-correcting, as assumed, then monetary policy can only affect it in the short run, when wages are fixed. Thus, independence will have no effect on GDP growth and unemployment in the long run. Second, during the time period used in the study, the M1 velocity of money in the United States, as measured by nominal GDP over M1, varied between 6 and 10 (see Chart 3). The increase in velocity after the mid-nineties is most likely due to the rise of personal computers and the Internet, as well as an increased use of credit and debit cards, which allows business and consumers to manage their accounts and conduct transactions more easily. This change in technology was a global phenomenon, so countries other than the U.S. most likely had similar changes in velocity. Changes in velocity from year to year would disrupt a central bank's ability to control the price level. Thus, over the short run, when the velocity is fixed, the central bank has a strong influence on the price level. In the long run, when velocity fluctuates, the central bank has less of an influence on the price level.

Chart 3. – United States M1 Velocity, 1981-2006



The weighted index indicates that there might be a correlation between independence and inflation in the long run, while the regressions indicate that each individual aspect of independence is not correlated with inflation. Thus, I believe further study is needed in this area.

CONCLUSIONS

Future papers on this topic should seek to have larger samples than the one in this paper. Unfortunately, the time constraints of this project placed limits on the size of the sample I could take. The small sample increased the likelihood of mulitcoliniarity between the independent variables, which makes it more difficult to measure the effect of one aspect while holding the others constant. The larger the sample, the more likely it will be to find a significant result, especially with data for country averages.

The countries in this sample were mostly developed countries in Europe and the Western world. I attempted to include more developing countries in the sample, but hyperinflation in those countries during the sample time period caused them to be extreme outliers. The effects of

independence might be different in developed and developing countries. A future paper with a broader sample should analyze independence in developed and developing countries, both together and in separate groups.

The variables and data can be adjusted more to fit the peculiarities of each central bank. This initial attempt took a lot of simplifying assumptions about the data and made a modest, but ultimately negligible attempt to measure how the actual values of each central bank changed from year to year. Forming monetary policy is ultimately part of a political process, which depends on those involved in the process – central bank officials, government officials, and the voting public – as well as the institutional structures of the central banks and governments involved. This political process will fluctuate from year to year and should ultimately change the levels of a central bank's independence.

In this paper, I had hoped to be able to conclude which aspects of independence had the greatest effects on inflation, gross domestic product, and unemployment. Due to the problems with my data outlined above, I feel that making any such claim at this point would be premature. However, I do believe that my method of analyzing the aspects independence separately is correct. Hypothesis tests show without a doubt what is a very intuitive point: not all aspects of independence have the same effect on macroeconomic variables. Future papers with more robust data sets and models should be able to draw more precise conclusions about exactly how different these effects are.

Appendix Table 1. - Pearson Product Moment Correlation Coefficients

	PSTBK	PSTGT	GAPBK	GAPMX	BAPBK	BAPMX	GTERM	BTERM	GTURN	GDISS	PFMID	PFMNV	PPROV	LMAND	LRATE	LTIME	LSIZE
PSTBK		-0.40	-0.22	-0.02	-0.22	-0.02	0.11	0.09	-0.40	0.10	0.27	-0.08	0.37	0.00	0.04	0.25	-0.30
PSTGT	-0.40		0.56	0.26	-0.05	0.39	-0.11	-0.11	0.28	-0.09	0.30	-0.18	-0.50	0.12	0.04	0.18	0.12
GAPBK	-0.22	0.56		-0.13	0.11	-0.02	-0.10	-0.19	0.17	0.10	0.17	-0.10	-0.28	0.19	0.15	0.10	0.07
GAPMX	-0.02	0.26	-0.13		0.15	0.65	0.00	0.05	0.15	0.15	-0.02	0.20	-0.06	-0.08	-0.23	-0.20	0.24
BAPBK	-0.22	-0.05	0.11	0.15		-0.27	0.19	0.35	0.02	0.23	-0.04	0.15	-0.09	-0.31	-0.20	-0.59	-0.20
BAPMX	-0.02	0.39	-0.02	0.65	-0.27		0.00	0.06	0.32	-0.08	0.02	0.29	-0.15	-0.06	-0.03	-0.09	0.21
GTERM	0.11	-0.11	-0.10	0.00	0.19	0.00		0.51	-0.16	0.29	0.26	-0.04	0.05	-0.16	0.07	-0.42	-0.26
BTERM	0.09	-0.11	-0.19	0.05	0.35	0.06	0.51		0.45	0.36	0.25	0.07	0.35	0.04	0.25	-0.13	-0.24
GTURN	-0.40	0.28	0.17	0.15	0.02	0.32	-0.16	0.45		0.10	0.13	0.09	0.21	0.08	0.10	0.15	0.31
GDISS	0.10	-0.09	0.10	0.15	0.23	-0.08	0.29	0.36	0.10		0.10	0.03	0.19	0.38	0.33	-0.03	0.09
PFMID	0.27	0.30	0.17	-0.02	-0.04	0.02	0.26	0.25	0.13	0.10		-0.43	0.21	-0.14	0.04	0.08	0.17
PFMNV	-0.08	-0.18	-0.10	0.20	0.15	0.29	-0.04	0.07	0.09	0.03	-0.43		0.13	0.00	0.06	-0.15	0.18
PPROV	0.37	-0.50	-0.28	-0.06	-0.09	-0.15	0.05	0.35	0.21	0.19	0.21	0.13		0.10	0.27	0.27	0.25
LMAND	0.00	0.12	0.19	-0.08	-0.31	-0.06	-0.16	0.04	0.08	0.38	-0.14	0.00	0.10		0.66	0.52	0.12
LRATE	0.04	0.04	0.15	-0.23	-0.20	-0.03	0.07	0.25	0.10	0.33	0.04	0.06	0.27	0.66		0.29	0.19
LTIME	0.25	0.18	0.10	-0.20	-0.59	-0.09	-0.42	-0.13	0.15	-0.03	0.08	-0.15	0.27	0.52	0.29		0.10
LSIZE	-0.30	0.12	0.07	0.24	-0.20	0.21	-0.26	-0.24	0.31	0.09	0.17	0.18	0.25	0.12	0.19	0.10	

Appendix Table 2 - Type 1 Regressions, Yearly Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstbk	-0.027342***	0.025529***	0.000347	-0.000747
	[0.0082]	[0.0046]	[0.0012]	[0.0015]
pstgt	-0.031492**	-0.011898	-0.005630**	-0.006890**
	[0.0159]	[0.0089]	[0.0023]	[0.0029]
gapbk	-0.022923	-0.054380***	-0.005932***	-0.006849**
	[0.0151]	[0.0084]	[0.0022]	[0.0027]
gapmx	0.012249*	-0.023210***	-0.00135	-0.00086
	[0.0070]	[0.0039]	[0.0010]	[0.0012]
bapbk	0.092845***	0.148922***	0.020909***	0.024623***
	[0.0211]	[0.0119]	[0.0031]	[0.0038]
bapmx	0.016322	0.053772***	0.006645***	0.007298***
	[0.0108]	[0.0060]	[0.0016]	[0.0019]
gterm	0.002319*	0.001218*	0.000344*	0.000436*
	[0.0012]	[0.0007]	[0.0001]	[0.0002]
bterm	-0.003927***	-0.006901***	-0.000941***	-0.001098***
	[0.0013]	[0.0007]	[0.0002]	[0.0002]
gturn	-0.000870*	-0.000177	-0.000074	-0.000109
	[0.0005]	[0.0002]	[0.0000]	[0.0000]
gdiss	-0.010648	-0.022201***	-0.002945**	-0.003371**
	[0.0082]	[0.0046]	[0.0012]	[0.0015]
pfmid	-0.017023**	-0.006506	-0.001796	-0.002477*
	[0.0075]	[0.0042]	[0.0011]	[0.0013]
pfmnv	-0.038742***	-0.065317***	-0.008500***	-0.010050***
	[0.0069]	[0.0038]	[0.0010]	[0.0012]
pprov	0.004802	0.003379	-0.001299	-0.001107
	[0.0082]	[0.0046]	[0.0012]	[0.0015]
lmand	-0.020120**	0.029660***	0.000672	-0.000133
	[0.0079]	[0.0044]	[0.0011]	[0.0014]
lrate	0.007508	-0.000331	0.001272	0.001572
	[0.0054]	[0.0030]	[0.0008]	[0.0010]
ltime	0.029652**	-0.008458	0.003327*	0.004513*
	[0.0131]	[0.0073]	[0.0019]	[0.0024]
lsize	-0.017087	0.029134***	0.002375	0.001692
	[0.0110]	[0.0062]	[0.0016]	[0.0020]
Constant	0.067697***	0.000019	0.001848	0.004156
	[0.0157]	[0.0088]	[0.0023]	[0.0028]
n	436	436	436	436
R^2	0.4642	0.6824	0.446	0.4625
Adj. R^2	0.4424	0.6695	0.4235	0.4407
F	17.86	50.39	16.97	17.96
P(F)	0.0000	0.0000	0.0000	0.0000
# VIF >5	11	11	11	11
Avg. VIF	6.68	6.68	6.68	6.68

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix Table 2 (continued) - Type 1 Regressions, Yearly Data

	Real GDP Growth	Unemployment Rate
pstbk	-0.015017***	-0.023483***
	[0.0051]	[0.0083]
pstgt	-0.017881*	-0.047180***
	[0.0099]	[0.0164]
gapbk	0.014841	0.0184
	[0.0094]	[0.0157]
gapmx	0.009791**	0.008254
	[0.0044]	[0.0075]
bapbk	-0.000956	0.043549**
	[0.0132]	[0.0216]
bapmx	0.002631	0.039490***
	[0.0067]	[0.0112]
gterm	0.000462	0.004062***
	[0.0007]	[0.0012]
bterm	-0.000231	-0.002359
	[0.0008]	[0.0014]
gturn	0.000123	-0.001683***
	[0.0003]	[0.0005]
gdiss	-0.007393	-0.060761***
	[0.0051]	[0.0087]
pfmid	0.008258*	-0.005981
	[0.0047]	[0.0078]
pfmnv	0.001174	-0.033114***
	[0.0043]	[0.0070]
pprov	0.002974	0.023457***
	[0.0051]	[0.0086]
lmand	-0.006032	0.015998*
	[0.0049]	[0.0086]
lrate	0.007075**	-0.011872**
	[0.0034]	[0.0059]
ltime	0.015207*	0.010655
	[0.0082]	[0.0139]
lsize	-0.039290***	0.031075**
	[0.0069]	[0.0126]
Constant	0.050856***	0.076265***
	[0.0098]	[0.0167]
n	436	410
R^2	0.1875	0.4092
Adj. R^2	0.1545	0.3836
F	5.94	16.09
P(F)	0.0000	0.0000
# VIF >5	11	10
Avg. VIF	6.68	6.49

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix Table 3 - Type 2 Regressions, Yearly Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstab	0.000448	0.043983***	0.003639***	0.003657***
	[0.0075]	[0.0046]	[0.0011]	[0.0013]
gapbk	-0.020706	-0.00641	-0.002353	-0.003181
	[0.0131]	[0.0081]	[0.0019]	[0.0024]
bapbk	0.066975***	0.042960***	0.008659***	0.011338***
	[0.0108]	[0.0066]	[0.0016]	[0.0019]
gterm	0.002330**	-0.001338**	0.000026	0.00012
	[0.0010]	[0.0006]	[0.0001]	[0.0001]
bterm	-0.000327	0.001785***	0.000064	0.000051
	[0.0011]	[0.0006]	[0.0001]	[0.0002]
gturn	-0.00059	-0.000143	-0.000053	-0.000076
	[0.0005]	[0.0003]	[0.0000]	[0.0000]
gdiss	-0.012513*	-0.004325	-0.000966	-0.001466
	[0.0071]	[0.0044]	[0.0010]	[0.0013]
pfnv2	-0.042106***	-0.056252***	-0.007755***	-0.009440***
	[0.0080]	[0.0049]	[0.0012]	[0.0014]
pprov	-0.002448	0.002884	-0.000605	-0.000702
	[0.0051]	[0.0031]	[0.0007]	[0.0009]
lmand	-0.019730***	0.002428	-0.001999**	-0.002788***
	[0.0057]	[0.0035]	[0.0008]	[0.0010]
lrate	0.007144	0.001548	0.001453*	0.001739*
	[0.0057]	[0.0035]	[0.0008]	[0.0010]
ltime	0.006442	-0.052157***	-0.003679**	-0.003421*
	[0.0110]	[0.0068]	[0.0016]	[0.0020]
lsize	0.018152*	0.052193***	0.005500***	0.006227***
	[0.0095]	[0.0058]	[0.0014]	[0.0017]
Constant	0.048159***	0.007478	0.003323*	0.004849**
	[0.0121]	[0.0075]	[0.0018]	[0.0022]
n	436	436	436	436
R^2	0.4016	0.57	0.3861	0.4018
Adj. R^2	0.3832	0.5568	0.3671	0.3834
F	17.8	40.16	16.86	17.86
P(F)	0.0000	0.0000	0.0000	0.0000
# VIF >5	3	3	3	3
Avg. VIF	3.49	3.49	3.49	3.49

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 3 (continued) - Type 2 Regressions, Yearly Data

	Real GDP Growth	Unemployment Rate
pstab	-0.002715	0.000355
	[0.0045]	[0.0079]
gapbk	0.006396	0.013636
	[0.0079]	[0.0138]
bapbk	0.001672	-0.011173
	[0.0065]	[0.0118]
gterm	0.000734	0.002034*
	[0.0006]	[0.0011]
bterm	0.000243	0.001541
	[0.0006]	[0.0011]
gturn	0.000193	-0.001300**
	[0.0003]	[0.0005]
gdiss	-0.008163*	-0.052072***
	[0.0043]	[0.0082]
pfnv2	0.001732	-0.021600**
	[0.0048]	[0.0085]
pprov	0.003045	0.019558***
	[0.0031]	[0.0054]
lmand	-0.004104	0.008747
	[0.0034]	[0.0062]
lrate	0.004954	-0.014119**
	[0.0034]	[0.0063]
ltime	0.010429	-0.024070**
	[0.0066]	[0.0118]
lsize	-0.025494***	0.058588***
	[0.0057]	[0.0115]
Constant	0.039143***	0.080245***
	[0.0073]	[0.0135]
n	436	410
R^2	0.1549	0.3029
Adj. R^2	0.1288	0.2800
F	6.34	13.05
P(F)	0.0000	0.0000
# VIF >5	3	2
Avg. VIF	3.49	3.32

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 4 - Type 3 Regressions, Yearly Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstab	-0.011279*	0.027394***	0.001641*	0.00119
	[0.0062]	[0.0039]	[0.0009]	[0.0011]
gapbk	-0.004985	-0.003897	-0.000722	-0.000922
	[0.0124]	[0.0079]	[0.0018]	[0.0022]
gterm	-0.001618*	-0.004060***	-0.000494***	-0.000559***
	[0.0008]	[0.0005]	[0.0001]	[0.0001]
gturn	-0.001018*	-0.000261	-0.0001	-0.000141
	[0.0005]	[0.000337]	[0.0000]	[0.0000]
gdiss	0.014427**	0.017830***	0.002776***	0.003353***
	[0.0059]	[0.0038]	[0.0008]	[0.0010]
pfnv2	-0.031434***	-0.038345***	-0.005788***	-0.007045***
	[0.0058]	[0.0037]	[0.0008]	[0.0010]
pprov	-0.002975	0.002092	-0.000697	-0.000816
	[0.0053]	[0.0034]	[0.0008]	[0.0009]
lmand	-0.020453***	0.001811	-0.002101**	-0.002919***
	[0.0060]	[0.0038]	[0.0008]	[0.0010]
lrate	-0.008361	-0.008106**	-0.000536	-0.000871
	[0.0053]	[0.0034]	[0.0007]	[0.0009]
ltime	-0.017259*	-0.059394***	-0.006320***	-0.007010***
	[0.0091]	[0.0058]	[0.0013]	[0.0016]
lsize	0.011878	0.038199***	0.004160***	0.004635***
	[0.0083]	[0.0052]	[0.0012]	[0.0015]
Constant	0.096043***	0.046804***	0.009971***	0.013413***
	[0.0099]	[0.0063]	[0.0014]	[0.0018]
n	436	436	436	436
R^2	0.3409	0.4991	0.3352	0.3463
Adj. R^2	0.3238	0.4861	0.3180	0.3294
F	14.17	34.97	14.93	15.29
P(F)	0.0000	0.0000	0.0000	0.0000
# VIF >5	0	0	0	0
Avg. VIF	2.43	2.43	2.43	2.43

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 4 (continued) - Type 3 Regressions, Yearly Data

	Real GDP Growth	Unemployment Rate
pstab	-0.004149	-0.004455
	[0.0035]	[0.0062]
gapbk	0.005835	0.005449
	[0.0071]	[0.0125]
gterm	0.000612	0.002567***
	[0.0004]	[0.0008]
gturn	0.000202	-0.001109**
	[0.0003]	[0.0005]
gdiss	-0.006877**	-0.053170***
	[0.0034]	[0.0062]
pfnv2	0.003391	-0.015223**
	[0.0033]	[0.0059]
pprov	0.002975	0.019279***
	[0.0030]	[0.0054]
lmand	-0.004142	0.008534
	[0.0034]	[0.0062]
lrate	0.004604	-0.011156**
	[0.0030]	[0.0055]
ltime	0.010840**	-0.014013
	[0.0052]	[0.0093]
lsize	-0.026905***	0.051420***
	[0.0047]	[0.0103]
Constant	0.041422***	0.079512***
	[0.0057]	[0.0119]
n	436	410
R^2	0.1543	0.2993
Adj. R^2	0.1323	0.2800
F	7.52	15.93
P(F)	0.0000	0.0000
# VIF >5	0	0
Avg. VIF	2.43	2.25

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 5 - Type 4 Regressions, Yearly Data

	Inflation Rate	Inflation Variance			Real GDP Growth	Unemployment Rate
		Average	0.02	0.00		
pstab	-0.025859***	-0.005511	-0.002444***	-0.003478***	0.001981	-0.015323***
	[0.0046]	[0.0035]	[0.0007]	[0.0008]	[0.0025]	[0.0047]
gapbk	-0.010521	0.000732	-0.000284	-0.000705	0.001398	-0.018698
	[0.0126]	[0.0095]	[0.0019]	[0.0023]	[0.0068]	[0.0128]
gturn	-0.000866	-0.000546	-0.000118	-0.000152	0.000263	-0.001344**
	[0.0005]	[0.0004]	[0.0000]	[0.0001]	[0.0002]	[0.0005]
pfnv2	-0.022583***	-0.025290***	-0.003788***	-0.004692***	0.001485	-0.006508
	[0.0054]	[0.0041]	[0.0008]	[0.0010]	[0.0029]	[0.0055]
lsize	-0.003701	0.024841***	0.001638	0.00149	-0.022920***	0.052886***
	[0.0078]	[0.0059]	[0.0012]	[0.0014]	[0.0042]	[0.0101]
Constant	0.082291***	0.00884	0.005590***	0.008482***	0.044789***	0.048705***
	[0.0074]	[0.0056]	[0.0011]	[0.0014]	[0.0040]	[0.0099]
n	436	436	436	436	436	410
R^2	0.2083	0.1522	0.1436	0.1630	0.1065	0.1385
Adj. R^2	0.1991	0.1424	0.1337	0.1532	0.0961	0.1278
F	23.97	17.34	15.35	17.77	12.62	15.08
P(F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
# VIF >5	0	0	0	0	0	0
Avg. VIF	1.46	1.46	1.46	1.46	1.46	1.30

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 6 - Type 1 Regressions, Average Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstbk	-0.000719	0.027254	-0.000651	-0.00068
	[0.0320]	[0.0160]	[0.0031]	[0.0042]
pstgt	0.042984	0.025319	-0.005017	-0.003298
	[0.0751]	[0.0375]	[0.0074]	[0.0100]
gapbk	-0.047648	-0.050420**	-0.005849	-0.007755
	[0.0334]	[0.0167]	[0.0033]	[0.0044]
gapmx	-0.007998	-0.011305	-0.00389	-0.00421
	[0.0238]	[0.0119]	[0.0023]	[0.0032]
bapbk	0.174912**	0.183399***	0.032834***	0.039831***
	[0.0567]	[0.0283]	[0.0056]	[0.0075]
bapmx	0.029487	0.041616	0.013827*	0.015006
	[0.0666]	[0.0333]	[0.0066]	[0.0089]
gterm	0.008000**	0.004376**	0.000965**	0.001285**
	[0.0029]	[0.0014]	[0.0002]	[0.0004]
bterm	-0.003439	-0.004622**	-0.000961**	-0.001099**
	[0.0030]	[0.0015]	[0.0003]	[0.0004]
gturn	-0.001067	-0.000482	-0.000657	-0.0007
	[0.0049]	[0.0024]	[0.0004]	[0.0006]
gdiss	-0.028082	-0.021696**	-0.003676*	-0.004799*
	[0.0162]	[0.0081]	[0.0016]	[0.0021]
pfmid	-0.040907	-0.025043	-0.002283	-0.003919
	[0.0265]	[0.0132]	[0.0026]	[0.0035]
pfmnv	-0.057714*	-0.056260***	-0.011979***	-0.014287**
	[0.0290]	[0.0145]	[0.0028]	[0.0038]
pprov	0.054638**	0.024522**	0.002935	0.005121*
	[0.0192]	[0.0095]	[0.0019]	[0.0025]
lmand	-0.024121	0.006081	-0.001098	-0.002063
	[0.0135]	[0.0067]	[0.0013]	[0.0018]
lrate	0.026532*	0.018119**	0.004010**	0.005072**
	[0.0112]	[0.0056]	[0.00111	[0.0015]
ltime	-0.002756	-0.017494	0.005811	0.005701
	[0.0495]	[0.0247]	[0.0049]	[0.0066]
lsize	-0.050432**	-0.004557	-0.002409	-0.004426
	[0.0190]	[0.0095]	[0.0018]	[0.0025]
Constant	0.055863*	-0.002751	0.001281	0.003116
	[0.0267]	[0.0133]	[0.0026]	[0.0035]
n	24	24	24	24
R^2	0.9568	0.9868	0.9784	0.9755
Adj. R^2	0.8345	0.9495	0.917	0.9061
F	6.75	24.53	13.19	11.64
P(F)	0.0132	0.0004	0.0022	0.0031
# VIF >5	15	15	15	15
Avg. VIF	25.54	25.54	25.54	25.54

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix Table 6 (continued) - Type 1 Regressions, Average Data

	Real GDP Growth	Unemployment Rate
pstbk	0.008893	0.110574
	[0.0275]	[0.1403]
pstgt	0.037335	0.220169
	[0.0644]	[0.3243]
gapbk	-0.000622	-0.070443
	[0.0287]	[0.1414]
gapmx	0.00079	-0.031764
	[0.0205]	[0.1006]
bapbk	0.002541	0.110679
	[0.0486]	[0.2408]
bapmx	-0.011019	-0.055402
	[0.0572]	[0.2828]
gterm	0.001191	0.014751
	[0.0025]	[0.0133]
bterm	0.000875	0.0004
	[0.0026]	[0.0129]
gturn	0.001011	0.008617
	[0.0042]	[0.0212]
gdiss	-0.010547	-0.137637
	[0.0139]	[0.0769]
pfmid	-0.007331	-0.09634
	[0.0228]	[0.1160]
pfmnv	-0.004553	-0.05514
	[0.0249]	[0.1220]
pprov	0.023319	0.117537
	[0.0164]	[0.0837]
lmand	-0.007722	0.019812
	[0.0116]	[0.0590]
lrate	0.009737	0.013151
	[0.0096]	[0.0546]
ltime	-0.020141	-0.128414
	[0.0424]	[0.2110]
lsize	-0.041481**	-0.000079
	[0.0163]	[0.1054]
Constant	0.051916*	0.047882
	[0.0229]	[0.1163]
n	24	23
R^2	0.7013	0.676
Adj. R^2	-0.1452	-0.4255
F	0.87	0.63
P(F)	0.6235	0.7786
# VIF >5	15	16
Avg. VIF	25.54	26.02

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix Table 7 - Type 2 Regressions, Average Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstab	0.023233	0.047198**	0.005334*	0.006264
	[0.0247]	[0.0168]	[0.0028]	[0.003770]
gapbk	-0.027595	-0.046231*	-0.006507	-0.00761
	[0.0334]	[0.0228]	[0.0039]	[0.005105]
bapbk	0.145497***	0.146271***	0.022643***	0.028462***
	[0.0446]	[0.0304]	[0.0052]	[0.006808]
gterm	0.008462*	0.004456	0.000966*	0.001304*
	[0.0040]	[0.0027]	[0.0004]	[0.000614]
bterm	-0.001966	-0.002843	-0.000453	-0.000532
	[0.0036]	[0.0025]	[0.0004]	[0.000560]
gturn	0.003551	0.00361	0.000495	0.000638
	[0.0029]	[0.0020]	[0.0003]	[0.000448]
gdiss	-0.045073	-0.030022	-0.005476*	-0.007279*
	[0.0250]	[0.01710	[0.0029]	[0.003829]
pfnv2	-0.052694*	-0.041238**	-0.007264**	-0.009372**
	[0.0243]	[0.0166]	[0.0028]	[0.003722]
pprov	0.026996	0.015789	0.002195	0.003275
	[0.0162]	[0.0110]	[0.0019]	[0.002483]
lmand	-0.014322	0.009072	-0.000994	-0.001567
	[0.0175]	[0.0119]	[0.0020]	[0.002678]
lrate	0.028082	0.020469	0.004685*	0.005808*
	[0.0189]	[0.0129]	[0.0022]	[0.002896]
ltime	-0.022141	-0.049793**	-0.004488	-0.005374
	[0.0230]	[0.0157]	[0.0027]	[0.003519]
lsize	-0.022346	0.005069	-0.000791	-0.001685
	[0.0264]	[0.0180]	[0.0031]	[0.004043]
Constant	0.027638	-0.012125	-0.00035	0.000355
	[0.0360]	[0.0245]	[0.0042]	[0.005499]
n	24	24	24	24
R^2	0.8198	0.8976	0.8742	0.8672
Adj. R^2	0.5855	0.7645	0.7107	0.6945
F	2.92	6.08	4.24	4
P(F)	0.0498	0.0038	0.0145	0.0178
# VIF >5	4	4	4	4
Avg. VIF	4.430	4.430	4.430	4.430

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 7 (continued) - Type 2 Regressions, Average Data

	Real GDP Growth	Unemployment Rate
pstab	0.006758	0.054966
	[0.0125]	[0.0673]
gapbk	0.016951	0.042165
	[0.0169]	[0.0755]
bapbk	0.000724	0.055637
	[0.0226]	[0.1160]
gterm	0.001012	0.011449
	[0.0020]	[0.0109]
bterm	0.001145	0.002959
	[0.0018]	[0.0084]
gturn	0.000693	0.002725
	[0.0014]	[0.0070]
gdiss	-0.01039	-0.130118
	[0.0127]	[0.0726]
pfnv2	-0.006695	-0.076086
	[0.0123]	[0.0675]
pprov	0.01008	0.065237
	[0.0082]	[0.0402]
lmand	-0.00753	0.00398
	[0.0089]	[0.0419]
lrate	0.007076	0.018486
	[0.0096]	[0.0555]
ltime	-0.006031	-0.053883
	[0.0117]	[0.0548]
lsize	-0.028473*	0.012137
	[0.0134]	[0.0835]
Constant	0.040892**	0.070063
	[0.0182]	[0.0815]
n	24	23
R^2	0.5631	0.5850
Adj. R^2	-0.0049	-0.0145
F	1.06	1.02
P(F)	0.4726	0.4968
# VIF >5	4	6
Avg. VIF	4.430	5.690

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 8 - Type 3 Regressions, Average Data

	Inflation Rate	Inflation Variance		
		Average	0.02	0.00
pstab	-0.035277	-0.009675	-0.003441	-0.004852
	[0.0230]	[0.0197]	[0.0031]	[0.0040]
gapbk	0.007054	-0.007349	-0.000428	-0.000145
	[0.0341]	[0.0293]	[0.0046]	[0.0059]
gterm	-0.00223	-0.006206**	-0.000683	-0.000773
	[0.0032]	[0.0027]	[0.0004]	[0.0005]
gturn	-0.002639	-0.00276	-0.000493	-0.000598
	[0.0027]	[0.0023]	[0.0003]	[0.0004]
gdiss	0.020707	0.034864*	0.00455	0.005378
	[0.0210]	[0.0180]	[0.0028]	[0.0036]
pfnv2	-0.014695	-0.006679	-0.001968	-0.002556
	[0.0243]	[0.0208]	[0.0033]	[0.0042]
pprov	-0.003717	-0.015191	-0.002602	-0.002751
	[0.0175]	[0.0151]	[0.0024]	[0.0030]
lmand	-0.028227	-0.006336	-0.0034	-0.004529
	[0.0208]	[0.0179]	[0.0028]	[0.0036]
lrate	-0.012112	-0.019116	-0.00143	-0.001915
	[0.0196]	[0.0169]	[0.0027]	[0.0034]
ltime	0.005983	-0.022854	-0.000338	-0.000099
	[0.02835	[0.0243]	[0.0038]	[0.0049]
lsize	0.005609	0.035013	0.003872	0.004096
	[0.0310]	[0.0266]	[0.0042]	[0.0054]
Constant	0.103216**	0.061281*	0.010975*	0.014703**
	[0.0371]	[0.0318]	[0.0050]	[0.0065]
n	24	24	24	24
R^2	0.6152	0.6530	0.6310	0.6266
Adj. R^2	0.2624	0.3350	0.2927	0.2843
F	1.20	1.57	1.15	1.14
P(F)	0.3795	0.2264	0.4014	0.4115
# VIF >5	0	0	0	0
Avg. VIF	2.510	2.510	2.510	2.510

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 8 (continued) - Type 3 Regressions, Average Data

	Real GDP Growth	Unemployment Rate
pstab	0.003874	0.020933
	[0.0081]	[0.0362]
gapbk	0.011734	0.034065
	[0.0121]	[0.0536]
gterm	0.000843	0.006308
	[0.0011]	[0.0051]
gturn	0.000859	0.000789
	[0.0009]	[0.0042]
gdiss	-0.008408	-0.093421**
	[0.0074]	[0.0344]
pfnv2	-0.001659	-0.041079
	[0.0086]	[0.0387]
pprov	0.010066	0.051891*
	[0.0062]	[0.0275]
lmand	-0.005699	0.011092
	[0.0074]	[0.0343]
lrate	0.005782	-0.007269
	[0.0070]	[0.0329]
ltime	-0.004115	-0.036369
	[0.0100]	[0.0441]
lsize	-0.030784**	0.037035
	[0.0110]	[0.0619]
Constant	0.044694***	0.089027
	[0.0132]	[0.0684]
n	24	23
R^2	0.5426	0.5648
Adj. R^2	0.1232	0.1295
F	1.38	1.40
P(F)	0.2932	0.2951
# VIF >5	0	0
Avg. VIF	2.510	2.480

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

Appendix Table 9 - Type 4 Regressions, Average Data

	Inflation Rate	Inflation Variance			Real GDP Growth	Unemployment Rate
		Average	0.02	0.00		
pstab	-0.036774**	-0.011208	-0.003641	-0.005112*	0.001483	-0.013943
	[0.0148]	[0.0151]	[0.0021]	[0.0027]	[0.0050]	[0.0257]
gapbk	-0.00351	0.007509	0.000895	0.000754	0.000818	-0.026951
	[0.0301]	[0.0307]	[0.0043]	[0.0054]	[0.0103]	[0.0520]
gturn	-0.002109	-0.002694	-0.000431	-0.000515	0.000559	-0.000794
	[0.0022]	[0.0022]	[0.0003]	[0.0004]	[0.0007]	[0.0038]
pfnv2	-0.013276	-0.019197	-0.002867	-0.003399	0.003664	-0.002422
	[0.0171]	[0.0174]	[0.0024]	[0.0031]	[0.0058]	[0.0296]
lsize	-0.004231	0.027431	0.002228	0.002058	-0.024700**	0.060832
	[0.0267]	[0.0271]	[0.0038]	[0.0048]	[0.0091]	[0.0577]
Constant	0.093603***	0.022922	0.007738*	0.011082**	0.041369***	0.043869
	[0.0277]	[0.0282]	[0.0040]	[0.0050]	[0.0094]	[0.0598]
n	24	24	24	24	24	23
R^2	0.4136	0.2242	0.3575	0.3741	0.3406	0.1177
Adj. R^2	0.2593	0.0200	0.1885	0.2094	0.1671	-0.1273
F	2.52	.84	1.68	1.87	2.45	.06
P(F)	0.0752	0.5180	0.1956	0.1564	0.0817	0.6700
# VIF >5	0	0	0	0	0	0
Avg. VIF	1.440	1.440	1.440	1.440	1.440	1.330

Standard errors in brackets, truncated at four decimal places
* significant at 10%; ** significant at 5%; *** significant at 1%
A coefficient of 0.01 means a 1% increase

BIBLIOGRAPHY

Alesina, Alberto and Lawrence H. Summers. 1993. Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence. *Journal of Money, Credit and Banking* 25 (2): 151–162.

Aufricht, Hans, ed. 1961. *Central Banking Legislation*. Washington, D.C.: International Monetary Fund.

_____. 1967. *Central Banking Legislation, Volume II: Europe*. Washington, D.C.: International Monetary Fund.

Bank for International Settlements. 1963. Eight European Central Banks: A Descriptive Study. New York: Praeger, Frederick A

Blinder, Alan S. 1997. Is Government Too Political? *Foreign Affairs*, November/December.

Cukierman, Alex. 1992. *Central Bank Strategy, Credibility and Independence*. Cambridge: MIT Press.

Debelle, Guy, and Stanley Fischer. 1994. Goals, Guidelines and Constraints Facing Monetary Policymakers; Proceedings of a Conference Held at North Falmouth, Massachusetts, June 1994. 195–221.

Eggertson, Gauti, and Eric Le Borgne. 2004. A Political Agency Theory of Central Bank Independence. IMF Working Paper. http://www.imf.org/external/pubs/ft/staffp/2004/00-00/eggert.pdf (Accessed May 14, 2007)

Eijfinger, Sylvester C. W. and Eric Schaling. 1993. Central Bank Independence in Twelve Industrial Countries. *Banca Nazionale del Lavoro Quarterly Review* 184: 49-89.

Eijffinger, Sylvester C. W. and Jakob De Haan. 1996. *The Political Economy of Central Bank Independence*. Princeton: International Finance Section, Department of Economics, Princeton University.

Elgie, Robert and Helen Thompson. 1998. *The Politics of Central Banks.* New York: Routledge.

Faust, Jon. 1996. Whom Can We Trust to Run the Fed? Theoretical Support for the Founders' Views. *Journal of Monetary Economics* 37 (2): 267–283.

Fischer, Stanley. 1995. Central-Bank Independence Revisited. *The American Economic Review* 85 (2): 201–206.

Fuhrer, Jeffrey C. 1997. Central Bank Independence and Inflation Targeting: Monetary Policy Paradigms for the Next Millenium? *New England Economic Review* January/February: 19–36.

Goodman, John B. 1992. *Monetary Soverignty: The Politics of Central Banking in Western Europe*. Ithaca, NY: Cornell University Press.

Grilli, Vittorio, Donato Masciandaro, and Guido Tabellini. 1991. Political and Monetary Institutions and Public Financial Policies in the Industrial Countries. *Economic Policy* 6 (13): 341–392.

Mangano, Gabriel. 1998. Measuring Central Bank Independence: A Tale of Subjectivity and of Its Consequences. *Oxford Economic Papers* 50 (3): 468–492.

McCallum, Bennett T. 1995. Two Fallacies Concerning Central-Bank Independence. *The American Economic Review* 85 (2): 207–211.

_____. 1997. Crucial Issues Concerning Central Bank Independence. *Journal of Monetary Economics* 39 (1): 99–112.

Posen, Adam S. 1993. Why Central Bank Independence Does Not Cause Low Inflation: There Is No Institutional Fix For Politics. In *Finance and the International Economy*, ed. R. O'Brien, 40-65. Oxford: Oxford University Press.

_____. 1995. Declarations Are Not Enough: Financial Sector Sources of Central Bank Independence. *NBER Macroeconomics Annual* 10: 253–274.

Rogoff, Kenneth. 1985. The Optimal Degree of Commitment to an Intermediate Monetary Target. *The Quarterly Journal of Economics* 100 (4): 1169–1189.

Walsh, Carl E. 1995. Optimal Contracts for Central Bankers. *The American Economic Review* 85 (1): 150–167.