Measuring the Effects of Monetary and Fiscal Policy Changes on the U.S. Economy (1982-2012)

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*A*bstract: This paper investigates the relationship between economic policy goals and the monetary and fiscal policy tools used to achieve them. A background is provided regarding current economic policy including an explanation of how a monetary and fiscal policy is formed and modified. A multiple regression analysis is conducted to measure the relationship between economic policy goals and the tools used to achieve them; the evidence suggests that there is a strong relationship between the two. It is further determined that it's necessary for the government and Federal Reserve to pay close attention to the policy tool variables studied, when making informed decisions regarding economic policy.

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1. Introduction

During times of economic difficulty, there are inevitably conflicting opinions regarding the policy changes that need to be made to establish stability. Over the past few years, we have seen European and American financial markets weaken, sovereign debt increase to record levels, high rates of unemployment, a deflationary Federal Funds rate and a lack of consumer spending. The United States is an important example of a country characterized by a number of these conditions.

On February 14, 2011, President Obama announced the U.S. budget for 2012. His budget included plans for higher taxes, fees for certain industries such as military and non-security discretionary spending, and reduced government spending. The US budget deficit was 1.297 trillion dollars in 2011, was forecast by the Congressional Budget Office to be 973 million in 2012, and then to decline 2.9% by 2018, with gradual economic improvement (Danis 2011). Presidential speeches, press releases, and Federal Reserve announcements are focused on methods to rescue the economy.

In order to provide relief to the nation's economic problems, the Federal Reserve and the US government's policy makers concentrate on a few specific variables. "In the United States, the Federal Reserve Act charges us with maintaining monetary and financial conditions that support maximum employment and price stability. This is referred to as the Fed's dual mandate and it has

the force of law behind it." (Evans, 2011). In accordance with this law, the Federal Reserve's sets monetary policy while the U.S. government sets fiscal policy.

There is much debate about whether monetary or fiscal policy is more effective for achieving political goals such as Gross Domestic Product (GDP) growth, a low unemployment rate, a low inflation rate, and stable prices. Historically, there were continuing economic fluctuations long before there were any recorded U.S. data (Schumpeter, 1987). The magnified contraction and expansion in and out of recession since the great depression in the 1930's has traditionally been handled through the management of interest rates. However, on October 06, 1979, the Federal Reserve announced that more attention would now be paid to bank reserves as a means of controlling monetary policy (Guffey, 1979). More recently, in 2009, the U.S. government created fiscal policy stimulus packages intended to provide a quick solution to problems of economic contraction and recession. The 2009 American Recovery and Reinvestment Act (ARRA), which included $787 billion in new spending initiatives and tax cuts to fight the recession, did not appear to be successful in generating a strong economic recovery despite an aggressive accommodative stance to maintain low interest rates (Pollin, 2012).

The purpose of this paper is to identify and analyze the strategies adopted by the Federal Reserve and the different U.S. government administrations over the period 1982-2012, in order to determine if there is an optimal choice regarding using monetary or fiscal policy when making economic decisions involving the Federal Reserve's Dual Mandate and government policy. We also explore the different methods used to adjust monetary and fiscal policy and analyze the effect each has on the economy. For example some measures are only effective for a short period, while others – such as elimination of the estate tax or expansionary fiscal policy - are phased in to address long run concerns (Muhleisen and Towe, 2004). It's apparent that both monetary and fiscal policy changes are intended to achieve political goals, but should we place our faith in one more than the other? Is it possible that the tools being used may not have a large enough effect to correct such significant problems, and should we consider concentrating on another policy instrument for change?

The objectives of this paper are to:
  (1) Identify and examine current U.S. economic policy goals.
  (2) Provide a detailed background of U.S monetary and fiscal policy.
  (3) Identify the monetary and fiscal policy tools that have been used to achieve these goals.
  (4) Determine the effect of these monetary and fiscal policy tools on economic policy goals using multiple regression analysis.
  (5) Determine whether monetary or fiscal policy or a combination of the two is more effective in achieving U.S. economic policy goals.

2. Literature Review

2.1 Policy Goals

In the US, government policies are created under the United States Constitution. The various Articles define the terms, powers, authorities, structures and limitations of the government and the Amendments or Bill of Rights seek to guarantee US citizens' various rights and freedoms.

Every political party is guided by the Constitution and by a detailed policy agenda. These policy agendas are established by laws, preferences, ideals and values of the party. The elected party must also consider the wishes of the voting citizens of the nation. The individual political parties introduce policies in keeping with their individual party priorities at the time. Since the US fell into a severe recession following the collapse of the financial markets in 2008, the focus of

economic policy makers throughout the world has been on policy interventions to counteract this crisis (Pollin, 2012)

The main objective of the US government is to protect the welfare of US citizens and their economy. To achieve this objective, there must be economic policy in place to ensure a fair distribution of wealth through subsidies and transfer payments, growth of the economy relative to the rest of the world at a sustainable rate, and sufficient consumable resources. Without these elements, the country would not be able to adhere to its own set of rules, specifically the five amendments of citizens' rights (in the US Constitution). In order to comply with these rules, the government must introduce policies that help to attain desired outcomes; this is through government intervention. For example, the government implements policies aimed at achieving low and consistent inflation, an expanding economy, and levels of interest and exchange rates that promote investment and foreign trade. Another important goal the government considers is a long term, steady state of unemployment referred to as the non-accelerating inflationary rate of unemployment or NAIRU (OECD, 2000). These goals each relate to the idea of capacity utilization, the rate at which potential output levels are being met or used. A recent example of government policy is the American Recovery and Investment Act (ARRA) signed into law in February, 2009 by the Obama Administration. This was a fiscal stimulus program that included $787 billion in new spending and tax cuts to fight the recession. Policy interventions of this type deliberately add to the deficit to boost government spending. Since its implementation, there was widespread resistance to the increases in these fiscal deficits with much debate on the need to reduce the deficit.

These economic challenges have been addressed in previous administrations. In the past ten years, while political parties had differing opinions on the macroeconomic policy needed, there was agreement that "[t]he current slowdown in the US economy would be more dramatic if both monetary and fiscal policy had not come to the rescue. A series of stimulations have indicated the plausible range of outcomes once the implosion begins, in the absence of policy intervention" (Izurieta, 2003). Some believe that "[t]o gauge the current state of American economic policymaking, one only needs to examine the inability of the United States government to deal effectively with myriad problems that led the ratings agency Standard and Poor's to downgrade U.S. debt in August 2011" (Standard & Poor's, 2011). Others believe that we must go further back and look at the bigger picture, "Starting with the 1998 passage of the Gramm-Leach-Bliley Act that deregulated the financial services industry, the American economy became increasingly "financialized" or driven more by banking than the production of tangible goods and services" (Khademain, 2009).

Political-economic problems may arise when governments are forced to face economic challenges and decisions that are in direct conflict with their political ideals and policy goals. "The Gallup poll underlines another important point about economic policy: There are economic problems and there are political problems. While the economic recession has ended, policy makers are still under political pressure to make economic policy to address the recession voters still perceived" (Pump, 2011). Reasons for differing political and economic agendas are simple; there are political incentives for political actors (Pump). There is often a grey area between political and economic goals, which may cause disagreement regarding economic variable choice. For instance, "Financial Reform is both an Obama administration priority and a square attack on the very crisis issues that brought the President and congressional majorities to their broad electoral victory in 2008" (Carpenter, 2010). However, the financial reforms of stimulus packages and bailouts of 2010 have proven to be unsuccessful in improving the US economy. "In fact other economic models predicted that the stimulus would not be very effective, and, using the same approach those now say that it has not been very effective" (Taylor, 2010). In this case, economic variables were overlooked for a more unproven and perhaps wishful belief that direct money allocations would quickly solve the problem.

2.2 Monetary and Fiscal Policy

Government intervention can be broken down into two policy categories, monetary policy and fiscal policy. Monetary policy involves monetary or "money" aggregates of the economy such as the federal funds rate, the monetary base, reserves, money supply, and foreign purchases. Fiscal policy involves imports and exports, taxes, government purchases and transfer payments. Monetary and fiscal policy both take part in influencing the economy; however, "[f]iscal policy has been a key policy tool in addressing the aggregate demand consequences of the financial crisis in the United States" (Follette and Luts, 2010).

It is important to understand that there are relationships between monetary and fiscal policy variables making the economic modeling of US policy significantly more complex. "First, with budget projections showing large federal fiscal deficits over the next decade, the recent emphasis on cutting taxes, boosting defense and security outlays, and spurring an economic recovery may come at the eventual cost of upward pressure on the interest rates, a crowding out of private investment, and an erosion of longer-term U.S. productivity growth" (Muhleisen and Towe, 2004). "The IMF uses a very large complex model called the Global Integrated Monetary and Fiscal (GIMF) Model. It shows that a one percent increase in government purchases increases GDP by a maximum of 0.7 percent and then fades out rapidly" (Taylor, 2010). Therefore, there will always be differing views regarding stronger use of monetary or fiscal policy for optimal policy choice. "The 1990's were marked by significant fiscal consolidation as the economy emerged from the 1991 recession and experienced one of the longest expansions in recent history. Since FY2000, however, the fiscal position has eroded rapidly" (Muhleisen and Towe, 2004). At the time many observers believed this to be permanent and they argued that economic prosperity would be uninterrupted, since it was based on the correct combination of productivity growth, fiscal discipline and minimal policy intervention (Izurieta, 2003). It seems that in most situations, the problem being addressed influences the choice between monetary and fiscal policy and as we continue to learn more about their timing and effects, we can make better decisions regarding policy choice.

Monetary and fiscal policy has evolved throughout the past thirty years and as policy makers continue to learn more about these policies, they become more confident adjusting the variables that they use. "On the evening of October 6th 1979, the Federal Reserve announced actions to curb money growth and dampen forces of inflation. These actions included, an increase in the discount rate, increase in reserve requirements, and a change in procedure by which monetary policy was conducted. Under the new procedure, less emphasis is being placed on interest rates and greater emphasis on the supply of bank reserves" (Guffey, 1979). This is due to the fact that "[h]igh and rising interest rates are deemed consistent with trying to curve the demand for money growth. In times of rampant inflation, however, interest rates become a very poor guide for policy and a very poor instrument for controlling money growth" (Guffey, 1979). "To be successful in conducting monetary policy, the monetary authorities must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanisms through which monetary policy affects the economy. These transmission mechanisms include interest rate effects, exchange rate effects, other asset price effects and the so-called credit channel" (Mishkin, 1995). In the past decade there has been more emphasis on using fiscal policy; however, after Obama's bailout failures and the slow pace of economic recovery, this view may once again change.

3. Introduction to Data and Method of Investigation

3.1 Target Sample

We study the U.S. economy as a whole, focussing on the time period between 1982 and 2012. During this period the U.S. experienced large fluctuations in its economy with respect to GDP and

secular growth, and used monetary and fiscal policy as the main tools to address those fluctuations. We chose to study this period, in order to incorporate the effects of changing administrations and differing views of optimal policy choice. We use quarterly data in one case and monthly data in the others between 1982 and 2012 or as available from the Reuters Research Platform. In addition, this time period includes sufficient data to allow the necessary degrees of freedom to provide us with some certainty that our regression results are reliable for statistical inference purposes.

3.2 Description of the Variables

Our method of investigation consists of first determining which economic indicators best measure and describe the economic goals of the U.S. and why. The second step involves identifying the monetary and fiscal policy changes that are made, and the tools that are used to make them, such as the U.S. federal funds rate, government purchases, taxes, and transfer payments.

The indicators that we use to measure economic policy goals are gross domestic product (GDP), unemployment rate, total retail sales, inflation measured by CPI, and the consumer confidence index. These are the y-intercept dependent variables that are dependent on the manipulation of the economic policy tools, the x-intercept or independent variables.

Gross Domestic Product is designed to measure the value of a country's goods and services; the metric is acknowledged as a critical framework to guide policy decisions that affect people's living standards (Wolverson, 2010). Unemployment rate is the second indicator that we analyze because "[a]n important challenge in setting economic policy is to identify the rate of capacity utilization that is sustainable. There are many ways of measuring capacity utilization. Looking at perhaps the most common measure, Unemployment, this idea of sustainable resource utilization has been made operational in the concept of the NAIRU" (OECD 2000). The total retail sales index (RSI), which measures the volume of retail sales on a monthly basis, is a key economic indicator and one of the earliest short-term measures of economic activity (OFNS). "The consumer price index (CPI) is a measure of the overall price level paid by consumers for the various goods and services they purchase. Monthly or annual changes in the CPI provide a good measure of consumer price inflation. Most national statistical agencies collect and report data on inflation every month. The most common reported measure is the consumer price index" (Stanford, 2008). Finally, we analyze consumer confidence. Consumer confidence identifies whether people are saving or spending their discretionary income, spending patterns, and was often cited by former Federal Reserve Chairman Alan Greenspan as a key determinant of near-term economic growth (Ludvigson, 2004).

We analyze the average Federal Funds rate as an economic policy tool. The Federal Funds rate is the Federal Reserve's principal tool for implementing monetary policy. Purchases and sales of U.S. treasury and federal agency securities are carried out through open market operations. The objective of open market operations can be to achieve a desired quantity of reserves or a desired price. We include IMF reserves and total reserves for the same reasons. Many central banks adopt the monetary targeting regime to stabilize the price level by directly controlling money supply, which is achieved by managing the quantity of central bank money (Ching, 2011). Furthermore, we include the M2 money supply. We analyze exports and imports to inquire how much the U.S is involved in foreign markets and the effect of import taxes. Finally, we include net foreign assets because they are believed to have a direct relationship on exchange rate determination, which affects retail sales and inflation (Cavallo and Ghironi, 2002). We add two dummy variables to give us further insight into the economic policy tools. The two dummy coded variables are whether the president remained in office or not during the time period measured (if president remained in office ($d_1=1$), or did not remain in office ($d_1=0$)) and whether the president was Democrat ($d_2=1$) or Republican ($d_2=0$).

3.3 The Econometric Model

A multiple regression analysis is carried out to determine the relationship between economic indicator variables (dependent variable) and monetary and fiscal policy variables (independent variables). By determining the dependent variable and its relation to the independent variables, the future value of the dependent variable can be predicted in our case with 95% confidence with the assumption that parameters remain stable over time. The regression analysis measures the relationship between the dependent and independent variables, thereby establishing the conditional expectation of the dependent variable given the independent variables.

Multiple regression is used in the analysis that follows. The results of our analysis indicate the extent to which each policy tool influences each policy goal. This information allows us to analyze which tools are the most effective when changing policy and whether monetary or fiscal changes are more desirable. The equation in our analysis is as follows:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots b_n X_n + d_1 + d_2 + e, \qquad (1)$$

where, for example,

Y = Unemployment Rate
b_0 = y- intercept
X_1 = Average Federal Funds Rate
X_2 = M2 Money Supply
X_3 = IMF Reserves
X_4 = Total Reserves
X_5 = Total Exports
X_6 = Total Imports
X_7 = Total Net Foreign Purchases
d_1 = 1 if President changed office, 0 if President remained the same
d_2 = 1 if office was seated by a Democrat, 0 if Republican
e = Error Term

4. Results of the Multiple Regression Analysis

Our regression results indicate that there are indeed strong relationships between the policy goal and policy tool variables; each is examined in the section below.

4.1 GDP (Appendix A)

The regression results for GDP indicate a strong relationship with an adjusted R-squared measure (Adj-R^2) of 0.99 (Appendix A). An Adj-R^2 of almost 100% indicates that the GDP is entirely explained by our independent policy tool variables. However, with an Adj-R^2 value close to 1.0, we have to consider the likely presence of multicollinearity. Here we test for multicollinearity using the variance inflation factor (VIF): "VIF measures the impact of multicollinearity among the X's in a regression model on the precision of estimation. It expresses the degree to which multi-collinearity amongst the predictors degrades the precision of an estimate" (Robinson and Schumacker, 2009). The VIF calculation is equal to $1/(1-R^2)$ or, in our case, 25, which is very high. A general rule is that the VIF should not exceed 10 (Belsley, Kuh and Welsch, 1980). Multi-collinearity exists in our regression and it is likely due to having independent variables that are too closely related. We in turn, remove each of our independent variables, to see which ones are highly correlated with the others. When we test for multicollinearity, we run the GDP regression against one variable, M2 Money Supply (Appendix G), and determine a new Adj-R^2 value of 0.96, and a standard error (S.E.) of $7.21E^{11}$. When we repeat the GDP regression and add IMF reserves, M2 money supply, and total net foreign purchases we obtain an Adj-R^2 value of 0.97 and a lower

standard error, $6.37E^{11}$(Appendix H). Our Adj-R^2 value increases with lower standard error as we add more independent variables, causing our VIF calculation to increase from 12.81 to 16. It's apparent that as we include more policy variables, multicollinearity increases in our model. This explains why policy makers hold certain policy variables constant when manipulating monetary or fiscal policy; they are trying to control the adverse effects multicollinearity causes when one policy tool interacts with the others and affects the outcome.

The *Significance F* for our GDP regression is at a level of $4.33E^{-83}$ <1/Billion. This indicates that there is almost no chance that the outcome of our regression occurs purely by chance and that our results are statistically significant. From Appendix A on, *** indicates the statistical significance level of *F* is <1/Billion.

When we analyze the coefficients of our independent variables, we discover that the average federal funds rate is closely related to GDP. However, there is also a large standard error indicating that we can't state this conclusively. Imports and exports have positive coefficients (38.8, 4.46) leading to the conclusion that managing importing and exporting activity directly affects annual GDP. M2 money supply has a relatively weak relationship to GDP (0.49) though still has an effect.

4.2 Unemployment (Appendix B)

The results from the unemployment regression indicate that our independent policy tool variables affect unemployment although to a much lesser extent than GDP (adjusted R^2=0.47). Thus, 47% of the variability in unemployment can be explained by our independent policy tool variables. The F-test value of our unemployment regression again suggests that this output is not purely due to chance and that our results are valid.

The independent variable regression coefficients are all very small for our unemployment regressions, which leads us to the conclusion that each policy tool variable has a relatively small effect on unemployment with the exception of the average Federal Funds rate. The Federal Funds rate has a weak but positive relationship, 0.06, indicating that when the average Federal Funds rate is low, unemployment is likely low as well. Overall our independent variables affect the unemployment rate; however, in order to make our unemployment regressions stronger we must add more independent variables. We can then test the effect of the new variable and determine if there may be a better tool to use to reach unemployment policy goals. Our regression results are significant and the US government and Federal Reserve must consider the strength of this relationship when forming unemployment policy.

4.3 Retail Sales (Appendix C)

The retail sales regression has an Adj-R^2 value of 0.99, indicating a strong relationship. This suggests that our independent variables are heavily responsible for changes in retail sales patterns. Similar to our GDP regression, there is the potential for multicollinearity which we have to realize when manipulating more than one policy tool to obtain certain retail sales results. Further tests are needed to determine exactly what variables are causing multicollinearity; however, this is beyond the scope of this paper. The regression is extremely significant, indicating that our independent variables do indeed affect retail sales.

The average Federal Funds rate estimator has the largest coefficient; however, we must be cautious with our interpretation due to the high standard error. We observe this pattern of dispersed residuals in the residual plot for the average Federal Funds rate (Appendix F). The residual plot depicts the difference between the regressions predicted value and the actual value of the output variable. When we examine the residual plot for the average Federal Funds rate in our retail sales regression, we notice that the values are widely dispersed around zero. This dispersion suggests that our model is not as accurate as the other regression models with respect to the residual plot for the

average Federal Funds rate. For example, if we compare the Federal Funds rate residual from retail sales to unemployment, we see that the residual values from unemployment are much closer to zero (Appendix F). Our dummy variables have a similar problem indicating that retail sales are not associated with whether the president changes office or remains, or whether he is Democrat or Republican. It is important to note the low p-value for total reserves ($1.43E^{-12}$) and moreso total imports ($8.22E^{-42}$), which suggests that there is a very strong relationship between the amount of goods imported and retail sales. The strength of the relationship between our independent variables and retail sales is an important consideration for the US government and Federal Reserve when they form policies involving taxes and discretionary income.

4.4 Inflation (Appendix D)

Our inflation regression has an Adj-R^2 value of 0.99, which indicates that there is a very strong relationship between inflation and our independent variables. Bernanke et al found an R^2 for consumer price index of 86.9% in their VAR and FAVAR two step principle component approach to measuring the effect of monetary shocks to the variance of common components (Bernanke et al, 2005). This further demonstrates the strong relationship between monetary policy components and their effect on inflation. The standard error of the regression is 5.88, which is low, specifically in comparison to those of our GDP and retail sales regression, which also demonstrated strong relationships between x and y variables. Our inflation regression results appear to be very reliable; however, we must also consider the problem of multicollinearity as discussed previously. The F-statistic value is extremely high again, and the null hypothesis that the nine policy variables have no statistical effect on inflation can be rejected very confidently.

We observe small coefficient values for our independent variables along with small standard error values. We found the coefficient for the Federal Funds rate (-2.60) to be negative, indicating, as expected, an inverse relationship with the rate of inflation. However, Boivin found that "unexpected exogenous changes in the Fed funds rate have been followed by a smaller response of output and inflation since the beginning of the 1980's suggesting that the federal funds rate is having a lesser effect on managing inflation." He has since found that as a result of this monetary policy has become substantially more focused on inflation stabilization (Boivan et al, 2006, 2010).

One important discovery is that net foreign purchases are negatively related to inflation, indicating to policy makers that when lowering inflation is a key objective, purchasing foreign assets may be a means of achieving this goal. There is a strong relationship (4.58) between inflation and our second dummy variable, D_2 which is whether the president in office is Democrat or Republican. This is potentially caused by different administrations having different goals regarding fiscal budgets and spending, which will directly affect inflation. Furthermore, our D_2 dummy variable has a very low p-value of $7.70E^{-05}$, demonstrating the strength of the relationship. Overall our independent variables are affecting inflation, and the US government and Federal Reserve must consider the strength of this relationship when forming policy regarding the management of inflation.

4.5 Consumer Confidence (Appendix E)

Our consumer confidence regression has an Adj-R^2 of 0.63, the second weakest relationship among all of our results. The results suggest that consumers don't base their confidence completely on our policy tool variables. This is likely due to the fact that there are many other possible mediums that can affect consumers; for instance, reports in the press, advertisements from political parties, or market speculation. We could increase the explanatory power of our regression by adding these variables and test their significance with respect to consumer confidence in an attempt to draw stronger conclusions. The significance F is extremely low, indicating that our regression is highly statistically significant.

The average federal funds rate has the strongest relationship with consumer confidence relative to the other variables, with a coefficient value of 4.98, and a small standard error (0.62) and p-value ($1.40E^{-14}$). When the Federal Reserve increases interest rates, consumer confidence is positively affected. If the Federal Funds rate rises, so does consumer confidence. Our D_2 dummy variable displays a strong relationship with consumer confidence (15.84), with a relatively low standard error (3.13). Consumers appear to base their confidence on whether the political party in power is either Democrat or Republican. IMF reserves are positively correlated with consumer confidence with a small coefficient value of $2.40E^{-9}$. When the IMF increases reserves, consumers appear to gain confidence. Overall, our independent variables appear to affect consumer confidence but not to the extent that they affect our other dependent policy variables. Therefore, the US government and Federal Reserve should consider the weakness of this relationship when forming policy to increase consumer confidence.

5. Conclusions and Recommendations for Further Study

The purpose of this paper is to identify and analyze the strategies adopted by the Federal Reserve and the different U.S. government administrations between 1982-2012, in order to determine if there is an optimal choice regarding using monetary or fiscal policy when making economic decisions involving the Federal Reserve's Dual Mandate and government policy.

We approach this question by breaking it down into five major objectives. The first objective is to identify and examine current U.S. economic policy goals. We learn that in the US, government policies are created to be in keeping with the U.S. Constitution. The main objective of the U.S. government is to protect the welfare of US citizens and their economy. To ensure this, the government implements policies aimed at low and consistent inflation, an expanding economy and desired interest and exchange rates to promote investment and foreign trade and a long term steady state of unemployment (NAIRU). We use the American Recovery and Investment Act (ARRA), signed into law in February 2009, as an example of government policy.

Our second objective is to provide a detailed background of U.S monetary and fiscal policy. Monetary policy involves the "money" aggregates of the economy such as the Federal Funds rate, the monetary base, reserves, money supply, and foreign purchases. Fiscal policy involves imports and exports, taxes, government purchases and transfer payments. We discover that the economic policy model is extremely complex. The IMF uses a very large complex model called the Global Integrated Monetary and Fiscal (GIMF) Model. Monetary and fiscal policy has evolved throughout the past thirty years and as policy makers continue to learn more about these policies, they are better able to adjust the variables that they use. In the past decade, there has been more emphasis on using fiscal policy, "Fiscal policy has been a key policy tool in addressing the aggregate demand consequences of the financial crisis in the United States" (Follette and Luts, 2010).

Our third objective is to identify the monetary and fiscal policy tools that are used to achieve policy goals. The policy tools that we identify as our independent x-variables are: average federal funds rate, M2 money supply, IMF and total reserves, total exports and imports, and net foreign purchases. We also include two dummy variables, which are whether the president remained in office during the time period or not, and whether he was a Democrat or Republican.

Our fourth objective is to determine the effect of these monetary and fiscal policy tools on economic policy goals. A multiple regression analysis is performed to determine the relationship between economic indicator variables (dependent variables) and monetary and fiscal policy variables (independent variables). Our regression analysis finds strong relationships between economic policy goals and policy tool variables.

Our fifth and final objective is to determine whether monetary or fiscal policy or a combination of the two is more effective in achieving U.S. economic policy goals. We discover that both monetary and fiscal policy are effective in achieving economic policy goals and, depending on the present situation, one may be more influential than the other when forming economic policy.

There are differing opinions as to the benefits of each type of policy. Fatas (2001) states that fiscal policies involving "positive innovations in government spending are followed by strong and persistent increases in consumption and employment." Setterfield (2007) proposes that fiscal policy is as effective as monetary policy as a tool for stabilization. Aretis (2002) suggests a new approach to monetary policy, but clarifies that there are many channels through which monetary policy is seen to operate. His analysis indicates a "rather weak" effect of interest rates on inflation. In our study, we find similar results as the coefficient between the Federal Funds rate and inflation is only -2.60. This difference may be due to the different time periods. As well, we focus our study on the US economy, while Arestis studied European markets. There may be inherently different forces at play in the North American and European economies.

One challenge that we identify during our research is the complexity of the economic model for policy. We discover that there are economic problems and there are political problems. While the economic recession has ended, policy makers are still under political pressure to develop economic policy to address the repercussions of the recession. We also run into challenges regarding possible multicollinearity when performing our multiple regressions. We attempt to analyze this by testing for multicollinearity with GDP and conclude that it is apparent in some of our results and must be investigated further.

In conclusion, we support the continued use of both monetary and fiscal policy to manage economic problems and to establish stability and depending on the present situation; one may be more influential than the other when forming economic policy. As more variables are manipulated, policy makers lose control over the outcome they desire because policy tools or independent variables begin to affect each other (multicollinearity); thus, they will hold some policy tools constant when attempting to achieve their desired economic results. Furthermore, we believe that the recovery process has begun and we can look forward to and strong prospering economic growth in the next few years.

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Appendix A - GDP Regression (118 quarterly observations)

Independent Variables	Coefficients	Standard Error	t -Stat	P-value	Lower 95%	Upper 95%
Intercept	3.03407E+12	4.16026E+11	7.292979715	5.32454E-11	2.20943E+12	3.85871E+12
Avg Fed Funds Rate	-1.27244E+11	27146136577	-4.687366504	8.12238E-06	-1.81052E+11	-73435539218
M2 Money Supply	0.494534492	0.14198168	3.483086631	0.000716889	0.213102171	0.775966814
IMF Reserves	28.36708286	10.79421294	2.627989925	0.009839457	6.971080191	49.76308553
Total Reserves	-9.604821013	3.620823465	-2.652662055	0.009189826	-16.78192127	-2.427720752
Total Exports	4.462869896	9.870844346	0.452126458	0.652084666	-15.10285602	24.02859582
Total Imports	38.8733757	6.356287578	6.115735832	1.56444E-08	26.27411101	51.47264039
Total Net Foreign Purchase	-5.065766593	2.565108096	-1.974874509	0.050834594	-10.15025584	0.018722658
D1 - President	3.29089E+11	1.27765E+11	2.575746579	0.011353827	75837651131	5.82341E+11
D2 - Republican/Democrat	2.85051E+11	1.43681E+11	1.983918776	0.049802171	250765135.3	5.69851E+11

$$\text{S.E.= 4.11295E+11} \qquad R^2\text{=0.988350} \qquad \text{Adj-}R^2\text{= 0.987380} \qquad F_{(9,108)}\text{=1018.08}^{***}$$

Appendix B - Unemployment Rate Regression (354 monthly observations)

Independent Variables	Coefficients	Standard Error	t- Stat	P-value	Lower 95%	Upper 95%
Intercept	4.201205212	0.6899334	6.089290958	3.03186E-09	2.844186222	5.558224202
Avg Fed Funds Rate	0.061586248	0.047332522	1.301140216	0.194081271	-0.031511334	0.154683831
M2 Money Supply	2.1961E-12	2.11888E-13	10.36445284	4.37525E-22	1.77934E-12	2.61286E-12
IMF Reserves	-9.48188E-11	1.76275E-11	-5.379037942	1.38668E-07	-1.2949E-10	-6.01476E-11
Total Reserves	4.73577E-12	6.35379E-12	0.745346396	0.456571291	-7.76139E-12	1.72329E-11
Total Exports	1.19377E-11	1.69637E-11	0.703721434	0.482082318	-2.14279E-11	4.53034E-11
Total Imports	-8.59376E-11	1.08762E-11	-7.901431521	3.76264E-14	-1.0733E-10	-6.45454E-11
Total Net Foreign Purchase	1.72557E-11	4.15383E-12	4.154165403	4.12318E-05	9.0856E-12	2.54258E-11
D1 - President	-1.079895489	0.215836632	-5.003300308	9.00839E-07	-1.504421116	-0.655369862
D2 - Republican/Democrat	-0.024421287	0.23912694	-0.102126875	0.918715473	-0.494756249	0.445913675

$$\text{S.E.= 1.228392} \qquad R^2\text{=0.479377} \qquad \text{Adj-}R^2\text{= 0.465756} \qquad F_{(9,344)}\text{=35.194}^{***}$$

Appendix C - Retail Sales Regression (239 monthly observations)

Independent Variables	Coefficients	Standard Error	t- Stat	P-value	Lower 95%	Upper 95%
Intercept	63968263343	4857330991	13.16942647	7.33718E-30	54397488700	73539037986
Avg Fed Funds Rate	4559596836	469492646.3	9.711753468	6.80975E-19	3634519191	5484674481
M2 Money Supply	0.024804237	0.00144781	17.13224144	6.67278E-43	0.021951504	0.02765697
IMF Reserves	1.42853364	0.093608361	15.26074842	9.5469E-37	1.244089853	1.612977427
Total Reserves	-0.308928552	0.041217706	-7.495044675	1.43799E-12	-0.390142984	-0.227714119
Total Exports	-0.725586964	0.090885261	-7.983549331	6.84768E-14	-0.904665217	-0.54650871
Total Imports	1.089093348	0.064829913	16.79924114	8.22523E-42	0.96135396	1.216832737
Total Net Foreign Purchase	0.0431589	0.022056329	1.9567581	0.05159125	-0.000300389	0.086618188
D1 - President	1533389381	1375000634	1.115191763	0.265937191	-1175880633	4242659396
D2 - Republican/Democrat	-1139093519	1518018072	-0.750382054	0.45379493	-4130161844	1851974807

S.E.= 6.194007E+9 R^2=0.992260   Adj-R^2= 0.991956   F(9,229)=3262.13[***]

Appendix D - Inflation (CPI) Regression(354 monthly observations)

Independent Variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	114.568524	3.301675448	34.70011689	2.1393E-114	108.0745112	121.0625367
Avg Fed Funds Rate	-2.601202686	0.226509729	-11.48384531	4.65034E-26	-3.046721055	-2.155684316
M2 Money Supply	-5.88783E-13	1.01399E-12	-0.580660883	0.561849223	-2.58318E-12	1.40561E-12
IMF Reserves	2.19476E-10	8.43562E-11	2.601779454	0.00967491	5.35574E-11	3.85395E-10
Total Reserves	2.17384E-12	3.0406E-11	0.071493566	0.943046492	-5.76313E-11	6.1979E-11
Total Exports	1.90896E-10	8.11798E-11	2.351524366	0.01926018	3.1225E-11	3.50567E-10
Total Imports	4.08729E-10	5.20481E-11	7.852909748	5.22765E-14	3.06356E-10	5.11101E-10
Total Net Foreign Purchase	-5.60996E-11	1.98782E-11	-2.822173258	0.005047215	-9.51977E-11	-1.70016E-11
D1 - President	5.625700265	1.032885943	5.446584209	9.79437E-08	3.594133393	7.657267137
D2 - Republican/Democrat	4.579231298	1.144341684	4.001629376	7.7069E-05	2.328443908	6.830018687

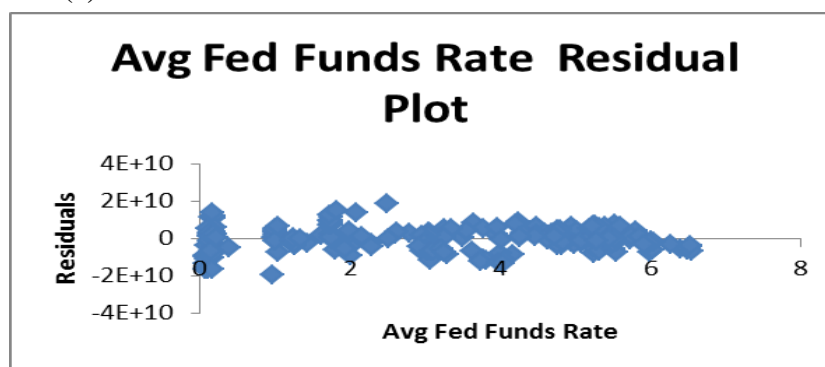**S.E.= 5.878467 R^2=0.976741   Adj-R^2= 0.976132   F(9,344)=1605.10[***]**

Appendix E - Consumer Confidence Regression(354 monthly observations)

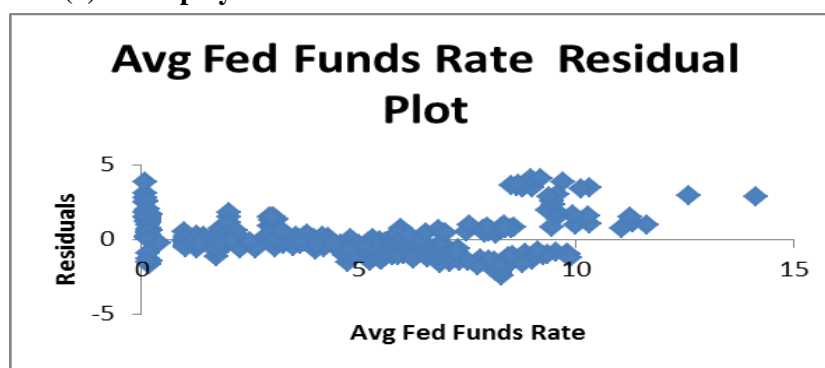| Independent Variables	Coefficients	Standard Error	t -Stat	P-value	Lower 95%	Upper 95%
Intercept	60.8067778	9.035422861	6.729820921	7.11829E-11	43.03514881	78.57840679
Avg Fed Funds Rate	4.987451393	0.619870491	8.045957121	1.40175E-14	3.768238019	6.206664767
M2 Money Supply	-1.39562E-11	2.7749E-12	-5.029459965	7.93564E-07	-1.94141E-11	-8.49834E-12
IMF Reserves	2.39996E-09	2.30851E-10	10.39615611	3.39769E-22	1.9459E-09	2.85402E-09
Total Reserves	-2.67949E-10	8.32097E-11	-3.220164968	0.001403307	-4.31613E-10	-1.04285E-10
Total Exports	-4.67289E-10	2.22158E-10	-2.103407401	0.036155942	-9.04248E-10	-3.03298E-11
Total Imports	9.27543E-10	1.42436E-10	6.512018207	2.62989E-10	6.47389E-10	1.2077E-09
Total Net Foreign Purchase	-1.53949E-10	5.43989E-11	-2.830007767	0.004928042	-2.60946E-10	-4.6953E-11
D1 - President	5.929029835	2.826613762	2.097573398	0.036672181	0.369408349	11.48865132
D2 - Republican/Democrat	15.84191524	3.131625496	5.058687656	6.88316E-07	9.682371043	22.00145943

S.E.= 16.0871 R^2=0.625311   Adj-R^2= 0.615508   F(9,344)=63.788[***]

Appendix F - Residual Plots

(1) Retail Sales

(2) Unemployment

Appendix G – Multicollinearity Test 1- GDP Regressed on M2 Money Supply ONLY
(118 quarterly observations)

Independent Variable	Coefficients	Standard Error	t -Stat	P-value	Lower 95%	Upper 95%
Intercept	5.87533E+11	1.64074E+11	3.580896775	0.000501389	2.62563E+11	9.12503E+11
M2 Money Supply	1.736443699	0.03227166	53.80707684	7.06012E-84	1.672525609	1.800361788

S.E.= 7.21674E+11 R^2=0.961477   Adj-R^2= 0.961145   F(1,116)=2895.20[***]

Appendix H – Multicollinearity Test 2 - GDP Regression NOT Including 3 X-Variables
(118 quarterly observations)

Independent Variables	Coefficients	Standard Error	t -Stat	P-value	Lower 95%	Upper 95%
Intercept	-1.35759E+11	5.06971E+11	-0.267784966	0.78936181	-1.14036E+12	8.68838E+11
Avg Fed Funds Rate	8707543028	38080908621	0.228659014	0.81955469	-66752319574	84167405630
M2 Money Supply	1.854224696	0.054986508	33.72144859	3.72425E-60	1.74526526	1.963184132
IMF Reserves	21.61034997	14.16395584	1.52572842	0.129921861	-6.456474071	49.67717402
Total Net Foreign Purchase	-17.49546494	3.58916902	-4.87451687	3.65896E-06	-24.60764296	-10.38328692
D1 - President	-2.78274E+11	1.77017E+11	-1.572015849	0.118793064	-6.29045E+11	72497574510
D2 - Republican/Democrat	2.98133E+11	1.33982E+11	2.225167386	0.028091821	32638207975	5.63629E+11

S.E.= 6.37284E+11 R^2=0.971255   Adj-R^2= 0.969701   F(6,111)=625.083[***]