The Effect of Non-Financial Corporate Debt on United States GDP Growth

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Abstract

This paper aims to explore the relationship between non-financial corporate debt (NFC) and the growth of the United States' real gross domestic product (GDP) between 1964-2013. The analysis will be conducted by regressing growth rates of NFC interest paid, NFC investment, NFC debt, monetary stock, and non-supervisory wages on real U.S. GDP growth. Of the five independent variables considered, three were significant: NFC debt, NFC investment, and monetary stock. Because NFC debt proved to be significant, and positively associated, it can be argued that based upon the data, an increase in NFC debt will lead to increased growth of real U.S. GDP.

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Introduction

Many financial experts and academics believe a world in which public debt continues to grow, is a troublesome trend. “When government debt grows, private investment shrinks, lowering future growth and future wages,” as Salim Furth, a contributor to The Heritage Foundation, suggests (Furth, 2013). Yet, this belief is often disputed, as others believe an accumulation of debt in the short-term leads to economic prosperity in the long-term. Much research has been conducted on the effect of public indebtedness on a nation’s economic growth; however, there has been very little done on the effect of non-financial corporate (NFC) debt on the growth of a nation’s gross domestic product (GDP). This paper intends to analyze the effect of NFC debt on the United States’ real GDP growth through ordinary least squares regression, and argues that there is a positive relationship between non-financial corporate debt (NFC) and the United States’ overall economic growth. Multiple factors will be taken into consideration when determining the causes of GDP growth, restricting the chance of a biased conclusion. If research proves the underlying assumption true, that debt results in increased real GDP growth, this knowledge will add to the economic communities understanding of debt.

Literature Review

There are varying points of view on the effect of public indebtedness on a nation's economic growth, as studies have offered different conclusions based upon the explanatory variables used. A recent study conducted by Kumar and Woo (2010), of the IMF, uses variables such as real GDP per capita, primary school enrollment, initial government consumption share, trade openness, and the relative price of investment to conclude there is a negative relationship between debt and future growth. They found that a 10-percentage point increase in the initial debt-to-GDP ratio is associated with a slowdown of real per capita GDP by 0.2 percentage points per year (Kumar & Woo, 2010).

However, a study conducted by Panizza and Presbitero in 2012 found that public debt does not have a causal effect on economic growth. The basis of this study focuses on a variable that captures the valuation effects brought about by the interaction between foreign currency debt and exchange rate volatility (Panizza & Presbitero, 2012). When this variable is linked with a country's debt, any sort of relationship between debt and economic growth disappears. The variable Panizza and Presbitero used contradicts not only Kumar and Woo's results, but also a study conducted by Reinhart and Rogoff in 2010, which found that when public debt is higher than 90% of GDP, median growth is about 1% lower than a similar country with lower debt (Reinhart & Rogoff, 2010). When Panizza and Presbitero's variable was used on the same set of data as Reinhart and Rogoff's, the point estimates concluded that debt has the same effect on a nations GDP growth when the debt-to-GDP ratio is below 50% and the debt-to-GDP ratio is above 120%, signaling no causal effect between debt and GDP growth (Panizza & Presbitero, 2012).

The effect of NFC debt on economic growth has been subjected too much less scrutiny than public debt. But there are several studies in this area of debt, most notably a study conducted by Özgür Orhangazi in 2009. Throughout the paper, Orhangazi argues that financialization, an increase in non-financial corporations' holdings of financial assets and subsidiaries, increases the potential instability and financial fragility of that sector. Orhangazi notes the increased dominance of a short-term perspective to deliver higher earnings and greater growth to the financial markets has led to greater instability within the financial system and an increase in debt levels. By the 2000's NFC debt as a percentage of NFC net worth was 46%, and it continues to grow (Orhangazi, 2009). While Orhangazi's article provides little information directly linking NFC debt and economic growth, it provides a strong background on the history and progression of corporate debt in the United States.

A study published in 2013 by Vratislav Izak compares NFC debt to real GDP growth in 17 European nations. This study follows the primary premise of what I intend to study, but focuses upon Europe, rather than the United States. Real per-capita GDP growth was used as the dependent variable, while the external variables were capital investment at current prices, the pace of job growth, the consumer price index, the borrowing of each nations' central government, the openness of the economy, and changes in prices. By utilizing these variables, Izak found a 10-percentage point increase in NFC debt is associated with a 5 basis point reduction in real per capita GDP growth (Izak, 2013).

An economic review conducted by Willem Buiter and Ebrahim Rahbari in 2012, indicates that between 1980 and 2008, NFC debt in advanced economies nearly doubled as a share of GDP, while overall GDP growth also increased, signifying a positive relationship (Buiter & Rahbari, 2012). Although Buiter and Rahbari did not control for external variables, their observations indicate a positive relationship between GDP growth and NFC debt within advanced economies. Wynne Godley (2000), a professor at Bard College, believes private debt cannot increase indefinitely, indicating Buiter and Rahbari's observation of a positive relationship between NFC debt and GDP growth can only continue for a limited time. The anti-debt perspective stems from examining the effects of a rise in borrowing by the private sector in the United States. This rise in private sector debt poses a significant risk, as an increase in asset prices or a rise in interest rates could potentially result in a severe recession, as weak positions may be exposed, generating a downward spiral of forced selling. The increase in private sector debt, along with the government's fiscal plans of increasing the budget surplus to continue economic growth, led Godley to believe a severe and prolonged recession was looming in the early 2000's (Godley, 2000).

As evident, each study that examines debt and GDP growth, whether it be public debt, private debt, or specifically NFC debt, results in slightly different conclusions based on the inclusion of different explanatory variables. They provide a starting point for my study. This was then used to generate a thesis, and my research will hopefully add value to our understanding of the economic impact of debt.

Theoretical Model

The initial hypothesis of a positive relationship between non-financial corporate debt (NFC) and the United States' real GDP growth led to the selection of the following explanatory variables: NFC Debt as a percentage of net worth, percent change in monetary base, NFC equipment and plant investment, NFC interest paid, Producer Price Index, and the federal funds rate. The aforementioned explanatory variables provide a causal model illustrating the drain debt and interest payments put on economic growth. By not simply breaking GDP growth into its constituent parts (consumption, investment, etc.), we reduce the risk of reaching a tautological conclusion - an obvious conclusion, already proven, and logically irrefutable. Not only were these variables chosen in order to prevent a tautological conclusion, they were also chosen based upon their anticipated explanatory power.

The following equation is a preliminary model that includes the expected signs of the causal variables:

Real U.S. GDP Growth = $\beta_1 + \beta_2$ *NFC debt as a % of net worth +* β_3 *Percent change in the monetary base +* β_4 *NFC equipment and plant investment -* $\beta 5$ *NFC interest paid -* $\beta 6$ *Producer Price Index (PPI) -* $\beta 7$ *Federal Funds Rate +* ϵ

Where it is assumed that $\beta_6, \beta_7 < 0$, and $\beta_2, \beta_3, \beta_4, \beta_5 > 0$, and ϵ is normally distributed.

The variable indicating NFC debt as a percentage of net worth is expected to have a positive relationship with real U.S. GDP growth. During poor economic times, in which bank lending is tightened and credit is harder to obtain, corporations still need to fund their business needs and expansion goals. Many corporations resort to borrowing from banks or issuing corporate bonds. Although issuing bonds increases a corporation's debt to net worth ratio, it is a crucial instrument for helping the business complete investment projects, resulting in future economic growth.

The change in monetary base is expected to have a positive relationship with real U.S. GDP growth, as the monetary base expands when the Federal Reserve attempts to stimulate economic growth. The expansion occurs during the process of open market operations, which involves the purchasing of securities from financial institutions. The money that financial institutions receive from the sale of securities can be used to fund loans. As more money enters into the economy, interest rates drop, resulting in easier access to loanable funds. Because loanable funds can be accessed more easily, this will in turn increase investment, resulting in a surge of economic growth.

NFC equipment and plant investment, measured as a share of U.S. GDP, is predicted to have a positive relationship with real U.S. GDP growth because increased investment within an economy will create further demand for labor, resulting in an increase of income. Subsequently, the rise in income creates additional demand for goods and services, resulting in increased GDP growth.

NFC interest paid is predicted to have a negative relationship with real U.S. GDP growth because when interest rates are lowered, money becomes cheaper to borrow. In theory, this leads to an increase in aggregate demand and economic growth. The rise in aggregate demand stems from lower interest rates stimulating consumption as the incentive to save is reduced. As borrowing money becomes cheaper, this encourages firms to take out loans, resulting in increased spending and investment. Because of this inverse relationship between interest rates and economic growth, when interest rates are high, which lead to higher interest payments, real GDP growth will be lower.

The Producer Price Index (PPI) is predicted to have a negative relationship with U.S. GDP growth. According to an article by Javier Andres and Ignacio Hernando (1997), there is a significant negative correlation between inflation and economic growth. Furthermore, when tests were run for causality, causality from inflation to growth was found to be significant and negative. Because inflation reduces the level of investment, by creating risk and uncertainty, inflation has a negative impact on a nation’s growth. This evidence suggests PPI, the measure for inflation, will have a negative impact (Andres & Hernando, 1997).

The federal funds rate, the interest rate at which a depository institution lends funds to another depository institution or government-sponsored enterprise (like Freddie Mac) overnight to maintain reserve requirements, is estimated to have a negative relationship with GDP growth. Because the Federal Reserve open-market operations affect the federal funds rate and therefore controls how expensive it is for banks to borrow money, when the Fed determines the economy needs stimulating, the rate is lowered in order to make borrowing money more attractive. When borrowing increases, investment follows suit, resulting in an increased demand for goods and services.

Data

I. Preparation

Time-series data would be utilized because the effect of NFC debt on real U.S. GDP growth will be measured over time. A 49-year period, 1964-2013, was selected based on the availability of data. From the onset, it was decided each variable would be denominated in billions of dollars, measured annually, and would not be seasonally adjusted. The decision was reached, as a preliminary scan of the variables found that the data for certain variables was only available under this format. At the expense of consistent data, these restrictions limited the model from evaluating shorter time periods, such as quarterly data.

Fortunately, obtaining data for each of the independent variables proved to be a manageable task, as the Federal Reserve Economic Data (FRED), part of the St. Louis Federal Reserve's website, provided a database in which the majority of the data could be found. FRED provided data tools in which adjustments could easily be made to a data set, with the additional option of exporting relevant results to Microsoft Excel for further alterations. Of the 7 variables comprising the model, including the dependent variable, FRED was able to provide data for 5 of the variables. Furthermore, FRED allowed for the adjustment of time periods, frequency of data (annually, monthly, or weekly) if available, and the alteration of units (percent change from a preceding period, compounded annual rate of change, etc.).

The two remaining variables, which were unavailable on FRED, NFC equipment and plant investment and NFC interest paid, were found on the Federal Reserve's website, under their quarterly release of the United States' financial accounts. The great benefit of using both the FRED and the Federal Reserve's quarterly releases was the fact that this data could be trusted as it was gathered from a reputable and respected source.

<u>II. Initial Collection</u>

For the dependent variable, real U.S. GDP growth, data was compiled on real United States GDP between 1964-2013 (Billions of Chained 2009 Dollars, Annual, Not Seasonally Adjusted). The growth rate was then calculated through an Excel formula, over the time period mentioned above.

The independent variables, NFC Debt as a percentage of net worth (Credit Market Debt as a Percentage of Net Worth (Market Value), Percent, Annual, Not Seasonally Adjusted), and the Federal Funds rate (Effective Federal Funds Rate, Percent, Annual, Not Seasonally Adjusted) were readily available on FRED as an existing data set. Although NFC equipment/plant investment as a share of GDP, and NFC interest paid were not retrieved from FRED, but rather the United States' financial accounts, the data did not require adjustments and was exported to an Excel document.

However, the percent change in the monetary base and inflation rate posed challenges, as both of these statistics could be measured in several ways. In terms of the monetary base, the Total Monetary Base or the St. Louis Adjusted Monetary Base could be used. Following research into this topic, the St. Louis Adjusted Monetary Base (Billions of Dollars, Annual, Not Seasonally Adjusted) would be the best measure for the model, as it measures the effects on a central bank's balance sheet of its open market operations, discount window lending, unsterilized foreign exchange market intervention, and changes in statutory reserve requirements (Anderson & Rasche, 1996).

As for the monetary base, there were options when it came to choosing a measure of inflation. The Consumer Price Index (CPI) or Producer Price Index (PPI) were both candidates. Furthermore, inflation could also be broken down into two separate measures, price or wage inflation. Although several options were weighed, PPI was chosen, as the primary use of this measure is to deflate revenue streams in order to measure real growth in output, the goal of the model (BLS, n.d.).

III. Growth Rates

Following deliberation with Dr. Naples, the initial data that was collected required several changes. Because the independent variables were measured nominally, this increased the possibility of biased and unreliable results. To prevent this from occurring, growth rates were calculated for each variable. Growth rates allow for the comparison of things that are not similar in size (Dallas Federal Reserve Board, n.d.). Percent change in monetary base became the growth of the monetary base as a percentage of nominal GDP. NFC equipment and plant investment became the Growth of NFC equipment and plant investment as a percentage of nominal U.S. GDP. Nominal GDP was used as the denominator for the calculation of both the monetary base and NFC investment growth rates, in order to maintain consistency with the numerator.

Interest paid by NFC was entered as growth of NFC interest paid as a percentage of NFC profits. Rather than using GDP as the denominator, NFC profits were used to perceive the amount of profit going towards interest payments on a yearly basis. Because NFC debt was already treated as a percentage of net worth, the growth rate had to be calculated. This resulted in the variable, growth of NFC debt as a percentage of net worth. The final variable, PPI, only required a growth rate calculation.

IV. Elimination of Variables

Further consultation with Dr. Naples led to the changing of certain variables altogether. PPI rises during early business-cycle expansions because of raw-material price increases, but this does not seem to interfere with GDP growth. Late in expansion, wage growth typically starts to accelerate. That is when GDP growth slows, resulting in a possible relationship between wage and GDP growth, if higher wages hurt profits and slow growth. Based upon this reasoning, the growth of non-supervisory wages was added to the equation to control for inflation and PPI was eliminated.

Additionally, the monetary base measure was changed to a measure of the money stock (M2). Because M2 is a broader measure, which encapsulates the entire stock of currency and other forms of transactions money, this would prove to be a more effective variable. Recognizing the potential two-way causation between M2 and GDP growth, M2 was lagged, as discussed below. Finally, the federal funds rate was eliminated from the model as the measure of M2 was serving the same purpose as the federal funds rate: measuring monetary policy.

V. Lags

In order to grasp the effects of a change in M2 on real GDP growth, it was vital to lag this variable. Because it may take more than one time period for an explanatory variable to impact the dependent variable, lags must be implemented. As changes in monetary policy do not impact GDP growth immediately, the growth of M2 was lagged by one period. As stated by the San Francisco Federal Reserve (1999), "the lags in monetary policy are long and variable. The major effects of a change in policy on growth in the overall production of goods and services usually are felt within three months to two years," indicating the importance of lagging M2.

VI. Truncated Model

The Great Recession, beginning in 2007, had a profound effect on all variables within the model. In order to control for this abrupt change in the data, a truncated model was utilized in order to prevent errors and unreliable results from occurring. The break would occur after 2006, ignoring the effects of the last great financial crisis. However, tests were run on both the truncated data, and also the full time period. This allowed for the visualization of how much of an impact the crisis had upon certain variables within the model.

Below, is the final model to be tested:

Real U.S. GDP Growth = β_1 *+* β_2 *Growth of NFC Debt as a % of Net Worth +* β_3 *Growth of real Money Stock as a % of Nominal U.S. GDP* $_{(n-1)}$ *+* β_4 *Growth of NFC Equipment & Plant Investment as a % of Nominal U.S. GDP -* β_5 *Growth of Interest Paid by NFC as a % of NFC profits -* β_6 *Growth of Non-supervisory Workers Wage +* ϵ

Where it is assumed that β_5, β_6 <0, and β_2, β_3, β_4, > 0, and ϵ is normally distributed.

Econometric Results & Interpretation

I. Initial Model

The initial regression on the model, without a structural break, yielded an F-value of 7.82 and a P-value of <.0000, indicating significance at the 1% level (Table 2 in Appendix). An R-Squared value of .4820 indicated the independent variables helped explain 48% of real United States GDP growth between 1964 and 2013. However, within the model, only one variable was significant, growth of NFC investment as a percentage of GDP. This was a predictable result as investment as a source of economic growth is a basic economic principle.

II. Structured Model (All variables)

Although the initial regression lead to adequate results, the truncated model, which would forgo the use of any data past 2006, was tested to determine if the truncated model was crucial in the analysis of the model. The results were significant (Table 2 in Appendix). The F-value jumped from 7.82 to 11.68, indicating increased significance. The P-value became significant at the 1% level. However, what was most striking was the R-Squared value of .6253, indicating the model from 1964 to 2006 explained 63% of real GDP growth. Furthermore, three of the five variables were now significant and had the anticipated signs, growth of investment as a percentage of GDP, growth of NFC debt as a percentage of net worth, and growth of monetary stock as a percentage of GDP.

Prior to 2006, growth of monetary stock as a percentage of GDP was significant at the 5% level with a t-value of 2.31. This signals a positive relationship between an expansion of the monetary stock and real GDP growth. Moreover, the variable Growth of NFC debt as a percentage of net worth was now significant with a t-value of 2.15, indicating a positive relationship between an increased debt to asset ratio of an NFC and GDP growth. This potentially indicates that as NFC's take on increased debt, which is used to increase investment or weather economic disturbances, average GDP growth is higher as a result. The positively significant relationship between growth of investment as a percentage of GDP remains the same as mentioned above in the original model.

However, non-supervisory wage growth and growth of interest paid by NFC's as a percent of NFC profits were not significant at the 5% level. Non-supervisory wage growth, the model's control for inflation, failed to be significant, perhaps due to inflation being a symptom of growth, rather than a cause. This reasoning also applies to the insignificance of growth of interest paid by NFC's as a percent of NFC profits, because in an economy that is experiencing growth, interest rates are typically on the rise. The rise in interest rates results in an increased percentage of interest payments in comparison to profits.

These insignificant variables were then removed from the model, to see if there were substantial changes in the results, producing the model below:

Real U.S. GDP Growth = $\beta_1 + \beta_2$ *Growth of NFC Debt as a % of Net Worth* + β_3 *Growth of Money Stock as a % of Real U.S.* $GDP_{(n-1)}$ + β_4 *Growth of NFC Equipment & Plant Investment as a % of Real U.S. GDP* + ϵ

Where it is assumed that $\beta_2, \beta_3, \beta_4 > 0$, and ϵ is normally distributed.

III. Final Model

This equation produced the following econometric result:

Real U.S. GDP Growth = 3.219 + .1197 (*Growth of NFC Debt as a % of Net Worth*) +

.2020 (*Growth of Money Stock as a % of Real U.S.* $GDP_{(n-1)}$)+ .1556 (*Growth of NFC Equipment & Plant Investment as a % of Real U.S. GDP*) + ϵ

The equation produced an F-value of 19.80, a P-value of <.0000, and an R-squared value of .6162 (Table 2 in Appendix). Although the R-squared value dropped from the previous truncated equation, the Adjusted R-Squared value rose from .5718 to .5851, indicating the elimination of the two previously mentioned variables improved the model. Each of the three variables proved to be significant at the 5% level. Additionally, all three variables, growth of NFC debt as a percentage of net worth, growth of NFC investment as a percentage of GDP, and the growth of monetary stock as a percentage of GDP were positively associated with the growth of United States GDP, as predicted.

Because growth of NFC debt as a percentage of net worth is significant, an argument can be made for increasing NFC's debt to induce real economic growth within the United States.

IV. Test for Autocorrelation

Following the initial regression of the optimal model, which included only significant variables, a test was run for autocorrelation. A Durbin-Watson test statistic was used to determine if the model suffered from autocorrelation. The model returned a statistic of 1.735 (Table 3 in Appendix). Because 1.735 >1.721 (dU), when K=4, there is no statistical evidence that the error terms are positively autocorrelated.

V. Test for Stationarity

Furthermore, tests were run to determine if the data was stationary; a time series in which the statistical properties such as the mean and variance are constant over time (Nau, n.d.). In order to test for stationary, the augmented Dickey-Fuller unit root test was used. Each variable was tested, and proved to be stationary (Table 4 in Appendix). Each variable had a test statistic that lied outside of the acceptance region, resulting in the rejection of the null hypothesis. Because the null hypothesis was rejected, it can be determined there was no unit root and the data was stationary.

VI. Test for Causality

After confirming the data was unbiased and reliable, further analysis was conducted to determine causality between the independent variables and dependent variable, using a Granger causality test. Table 5 in the Appendix identifies the results of the Granger causality tests. The independent variable and dependent variable were both tested against each other in order to explore whether two-way causation existed between the variables. When the null hypothesis was rejected, a causal relationship was identified.

The growth of NFC debt as a percentage of NFC net worth held no evident univariate causal relationship with real U.S. GDP growth, as an F-value of .210 was found and the null hypothesis was not rejected. When the variables were reversed, and real U.S. GDP growth was tested against NFC debt as a percentage of NFC net worth, an F-value of .150 was found, indicating no causal relationship.

The growth of NFC investment as a percentage of U.S. GDP held a causal relationship with the growth of real U.S. GDP at the five percent significance level with an F-value of 4.03. With the rejection of the null hypothesis indicating a causal relationship, this was significant as it helped justify the basic principles of what contributes to GDP. However, when real GDP growth was tested against the growth of NFC investment, the null hypothesis was not rejected based on an F-value of 1.990. This result signified that no two-way causation existed between the variables.

The last significant variable to be tested against GDP growth, the growth of monetary stock, resulted in two-way causation at the five percent significance level. Two-way causation exists when a predictive variable is dependent on the variable of prediction. Because of this occurrence, as shown in Table 5, a causal relationship cannot be found between the two variables. These results indicate that the only variable to have a one-way causal relationship with real U.S. GDP growth is the growth of NFC equipment and plant investment as a percentage of nominal U.S. GDP.

Conclusion

Through the use of statistical analysis, this paper has evidenced that monetary stock, NFC investment in plant and equipment, and NFC debt all positively contribute to the United States' real GDP growth. Although the three previously mentioned variables were found to be statistically significant, only one was found to have a causal relationship with U.S. GDP Growth, that variable being NFC investment in plant and equipment. The causal relationship indicates NFC investment causes GDP growth, confirming a basic economic principle. Even though there is not enough statistical evidence to determine causality between the other two variables, correlation does exist. This correlation indicates monetary stock and NFC debt do influence U.S. GDP growth, but do not hold a causal relationship as proven by the Granger-Causality tests in Table 5. However, while debt has the ability to finance growth, unpaid debt can also lead to business failure. The difference between financing growth and business failure is often a very thin line, which must be observed carefully in order for an economy to benefit from the issuance of debt.

To further expand on the research conducted, the exploration of further explanatory variables would be critical. Additionally, modifying the measure of debt might prove powerful. As the time period within this study was limited to one-year periods, using variables that allowed for analysis of quarterly data would also prove beneficial and provide a better understanding of the relationship between NFC debt and real U.S. GDP growth. Although changing the type and measures of each variable would draw exciting new research, what is vital is determining variables that have causality with GDP growth.

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Appendix

Table 1

Variable Definitions, and Data Sources [Mean; Standard Deviation]		
Variable	**Definition**	**Source**
Ggdpr	Growth of U.S. GDP (Real Gross Domestic Product, Billions of Chained 2009 Dollars, Annual, Not Seasonally Adjusted) [3.00; 2.2]	U.S. Bureau of Economic Analysis
Nfc.dnw.g	Growth of NFC Debt as a percentage of net worth (Nonfinancial Corporate Business; Credit Market Debt as a Percentage of Net Worth (Market Value), Percent, Annual, Not Seasonally Adjusted) [.70; 5]	Board of Governors of the Federal Reserve System
Nfc.igdp.g	Growth of NFC's equipment and plant investment (Billions of dollars) as a percentage of nominal U.S. GDP (Billions of Dollars, Annual, Not Seasonally Adjusted) [.58; 8.8]	NFC's equipment and plant investment: Federal Reserve Statistical Release (Financial Accounts of the United States) GDP: U.S. Bureau of Economic Analysis
Nfc.ipdp.g	Growth of Interest Paid (Nonfinancial corporate business; interest paid, Flow, Billions of Dollars, Annual, Not Seasonally Adjusted) as a percentage of Nonfinancial corporate business Profits after tax ((without IVA and CCAdj), Billions of Dollars, Annual, Not Seasonally Adjusted) [3.58; 22.9]	NFC’s interest paid: Federal Reserve Statistical Release (Financial Accounts of the United States) GDP: U.S. Bureau of Economic Analysis
Nsw.g	Growth of Average Hourly Earnings of Production and Nonsupervisory Employees (Total Private, Dollars per Hour, Annual, Not Seasonally Adjusted) [4.34; 2.0]	U.S. Bureau of Labor Statistics
L.M2gdp.g	Growth of M2 Money Stock (Billions of Dollars, Annual, Not Seasonally Adjusted) as a percentage nominal U.S. GDP (Billions of Dollars, Annual, Not Seasonally Adjusted) [.13; 3.1]	M2 Money Stock: Board of Governors of the Federal Reserve System GDP: U.S. Bureau of Economic Analysis

Table 2

Regression Results

-	Initial Regression	Regression with All Variables Before Financial Crisis	Regression Excluding Non-Significant Variables Before Financial Crisis
Explanatory Variables	Coefficients [t-statistics]	Coefficients [t-statistics]	Coefficients [t-statistics]
Nfc.dnw.g	0.0897 ^[1.71]	0.112 "[2.15]	0.1197 "[2.60]
Nfc.igdp.g	0.1775 *[5.63]	0.1566 *[5.34]	0.1556 *[5.86]
Nfc.ipdgdp.g	-0.0019 [-0.15]	-0.0014 [-.120]	
Nsw.g	0.0129 [0.10]	-0.0926 [-.760]	
L.M2gdp.g	-0.0071 [-0.08]	0.1911 "[2.31]	0.202 "[2.58]
Intercept	2.7620 *[4.49]	3.653 *[6.25]	3.22 *[15.6]
R-Squared	0.4820	0.6253	0.6162
Adj R-Squared	0.4203	0.5718	0.5851
F-Statistic	*7.8200	*11.68	*19.8
N	48.0000	41	41

Significant at:	*1% level	" 5% level	^ 10% level

Table 3

Test for Autocorrelation (Durbin Watson)

Durbin-Watson d-statistic (4,41) = 1.735412

Table 4

Tests for Stationarity

Dickey-Fuller test for unit root Number of obs=48

Stationarity test for Nfc.dnw.g

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-5.1680	-3.5940	-2.9360	-2.6020

MacKinnon approximate p-value for Z(t) = 0.0000

Dickey-Fuller test for unit root Number of obs=48

Stationarity test for Nfc.igdp.g

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-3.6530	-3.5940	-2.9360	-2.6020

MacKinnon approximate p-value for Z(t) = 0.0048

Dickey-Fuller test for unit root Number of obs=48

Stationarity test for L.M2gdp.g

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-7.9490	-3.5940	-2.9360	-2.6020

MacKinnon approximate p-value for Z(t) = 0.0000

Table 4, cont.

Dickey-Fuller test for unit root Number of obs=48

Stationarity test for Ggdpr

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.5780	-3.6000	-2.9380	-2.6040

MacKinnon approximate p-value for Z(t) = 0.0001

Table 5

Granger Causality Tests

Testing Granger Causality Between Independent and Dependent Variables Sample: 1966 to 2006 41 observations			Testing Granger Causality Between Dependent and Independent Variables Sample: 1966 to 2006 41 observations		
H0: Growth of NFC Debt/Net Worth does not Granger-cause Growth of Real US GDP			H0: Growth of Real US GDP does not Granger-cause Growth of NFC Debt/Net Worth		
F(1,38)	=	0.21	F(1,38)	=	0.15
Prob > F	=	0.6519	Prob > F	=	0.7042
H0: Growth of NFC Investment as a % of US GDP does not Granger-cause Growth of Real US GDP			H0: Growth of Real US GDP does not Granger-cause Growth of NFC Investment as a % of US GDP		
F(1,38)	=	4.03	F(1,38)	=	1.99
Prob > F	=	"0.0517	Prob > F	=	0.166
H0: Growth of M2 as a % of US GDP does not Granger-cause Growth of Real US GDP			H0: Growth of Real US GDP does not Granger-cause Growth of M2 as a % of US GDP		
F(1,38)	=	14.26	F(1,38)	=	6.05
Prob > F	=	*0.0005	Prob > F	=	*0.0185

Significant at:	*1% level	" 5% level	^ 10% level