5-2011

An Analysis of Financial Leverage and the 2007-2009 Financial Crisis

Larissa A. French
University of Northern Iowa

AN ANALYSIS OF FINANCIAL LEVERAGE AND THE 2007-2009 FINANCIAL CRISIS

A thesis submitted in partial fulfillment

of the requirements for the designation

University Honors with Distinction

Larissa A. French

University of Northern Iowa

May 2011

This study by: Larissa French

Entitled: An Analysis of Financial Leverage and the 2007-2009 Financial Crisis

has been approved as meeting the thesis or project requirement for the Designation: University Honors with Distinction.

2/7/11 _____

Date David Hakes, Honors Thesis Advisor, Economics

2/14/11 _____

Date Jessica Moon, Director, University Honors Program

I. Purpose of Research

This thesis will analyze the recent financial crisis, attempting to find and explain sources that caused the crisis, which includes monetary excesses, mortgage-backed securities, the August 2007 bank panic, credit default swaps, and other causes. It will link together events and activities to provide a complete picture. Additionally, this thesis will compare financial leverage with Gross Domestic Product to determine if increases in financial leverage predate financial crises. Leverage, by itself, is not enough to cause a recession, as it exists at some level all the time. However, it may be possible that excessive amounts of leverage or increasing leverage predate such crises. If this is true, it is possible that leverage can be used as a predictor for upcoming deep recessions.

II. Review of Relevant Literature

The 2007-2009 financial crisis was due to a variety of factors, each of which contributed to excessive financial leverage.

Leverage is created when the buyer of an asset uses borrowed money to supplement existing funds for investment purposes. For example, when a buyer makes a down payment of 10 percent and borrows the rest, the homeowner has a leverage ratio (value of assets divided by equity) of 10. When an asset is highly leveraged, a small increase in its price increases equity by a much greater percentage. A small decrease in the asset's price also decreases equity by a much larger percentage on assets that are highly leveraged, which makes leverage risky. If leverage increases continuously in an economy, it can create excessive demand for assets purchased with borrowed funds, pushing those assets' prices up to unsustainable levels.

When assets' prices fall, many buyers lose their equity and are forced to sell their assets or may choose to default on the loan, since there is little incentive to pay off the loan on an asset that they have no equity in. As a result, many borrowers and lenders become insolvent, meaning that the selling price of the asset simply is not high enough to make all lenders whole. This peaks when lenders become hesitant to lend money, constricting economic activity.

Many factors in the 2007-2009 financial crisis contributed to increasing leverage. The low interest rates caused monetary excesses in the economy. Standards were lowered for mortgage-backed securities (MBS), which amplified the effects of defaults on mortgages. The sharp boom and bust in the housing market subsequently affected other financial markets as falling house prices encouraged delinquencies and foreclosures. When house prices are falling, the incentive for home owners to make mortgage payments is reduced. This is particularly true if the market price of the house falls below the value of the mortgage. This led to concern over risk, as investors were not sure if they held packages that included subprime mortgages; this concern culminated in bank runs. These effects were amplified by the issuance of credit default swaps (a type of insurance on MBSs) and by questionable policy decisions on the part of the federal government. All of these factors together led to excessive financial leverage.

Monetary Excesses

According to Taylor (2009, 1), the main cause of the housing boom was government-based monetary excesses. In response to the late 1990s recession, the Federal Reserve Bank (the Fed) deviated from the Taylor rule. The Taylor rule is a policy rule where the optimal interest rate is determined in response to the GDP gap and inflation. The GDP gap is the difference between actual GDP and full-employment GDP. When actual GDP is below full-employment GDP, the Fed should reduce interest rates to stimulate the economy. If inflation is above the

target interest rate of about two percent, the Fed should increase interest rates to slow down the economy.

In the early 2000s, according to Taylor (2009, 2-3), the Fed placed interest rates well below what the Taylor rule suggests, creating the largest and longest lasting deviation in monetary policy from the rule since the 1970s. Monetary policy was too lenient with low interest rates during the 2001 to 2006 timeframe, causing excessive monetary growth. The low interest rates increased the demand for housing, encouraging the house-price boom and the subsequent bust and crisis. While there were other causes of the financial crisis, the monetary decisions of the Fed were a core cause.

The boom was primarily debt fueled. Investors drove asset prices too high, because they were able to borrow too freely due to the government-based monetary excesses, according to Whitehouse (2009, A18). There were not enough houses or other forms of tangible collateral to back the large amount of debt securities. Banks reduced the required down payment on mortgages, which allowed them to lend a larger percentage of money relative to the asset, further increasing financial leverage. From 2000 to mid-2006, down payments on riskier mortgages were lowered to less than four percent, down from the previous average of 14 percent.

This debt-fueled boom crashed. Because houses had become overpriced, housing prices fell to their fundamental values. The result was a high-level of defaults on mortgages, because when the value of the house falls below the value of the mortgage, the incentive to keep paying the mortgage is reduced. As defaults increased, lending tightened, constricting money flow for investments.

Thus, financial leverage increased because low interest rates and easier lending standards caused a larger percentage of the money relative to the asset to be borrowed. If the borrower

defaulted, however, the leverage multiplied the losses experienced by the financial institutions. This bust had a devastating effect on the economy.

Mortgage-Backed Securities

The effects of the housing bust were amplified by subprime mortgages and government programs. Subprime mortgages and government programs can be tied together through the government-sponsored enterprises (GSEs) Fannie Mae (Federal National Mortgage Association) and Freddie Mac (Federal Home Loan Mortgage Corporation). Originally, the GSEs bought only conforming loans, which are mortgages that meet certain borrower characteristics, to back mortgage-backed securities (MBSs) they issue. Conforming loans required a substantial down payment and evidence that the borrower could repay the loan. They also add on guarantees that principal and interest will be repaid to the ultimate lenders.

According to Holmes (1999), Fannie Mae announced in 1999 that it would be easing credit requirements on loans that it purchased from lenders. While Fannie and Freddie do not directly lend money, they purchase mortgages made by banks and other financial institutions on the secondary market. The reason for easing credit requirements was to encourage the direct lenders to extend credit to subprime borrowers, people who would not normally qualify for a loan. This policy change came due to increased pressure from the Clinton Administration to make it easier for low- and moderate-income borrowers to be able to own a home.

This program did not really take off until 2005. In 2003 and 2004, both Fannie and Freddie had accounting scandals. According to Calomiris (2008, 8-9), they used their commitment to affordable loans in order to avoid scrutiny and political pressure as a result of these scandals. From 2005 to 2007, Fannie and Freddie dramatically expanded their subprime

and Alt-A investments. Alt-A investments are somewhat similar to subprime loans in that they are made to people who appear to have good credit, but they have provided little to no income or asset verification. As GSEs, the MBSs they issued were perceived to have implicit government backing, and that allowed their risk taking to escape the wariness of lenders which normally acts as a market discipline. Essentially, as GSEs, there was a "privatization of the profit and the socialization of the risk" (Calomiris 2008, 2), where the shareholders of Fannie and Freddie reaped the benefits of their risk-taking, but when the system collapsed, it was the taxpayers who paid the costs.

The collapse of Fannie and Freddie was ultimately brought about by their enormous losses associated with risky housing investments. It was also, in part, facilitated by the federal government's unwillingness to better regulate Fannie and Freddie and to institute a special structure to limit taxpayers' exposure to risk. In 2005, though bills were discussed in Congress, the government did not pass bills that would have prohibited the GSEs from holding risky portfolios of mortgages and MBSs. If the bills had passed, they would have reduced the risky investment activities that took place in subsequent years.

These mortgage-backed securities issued by Fannie Mae and Freddie Mac contributed to financial leverage by bundling together mortgages. Each mortgage was supported by a small down payment, which averaged less than four percent, and the rest was supported by borrowed money. When these mortgages are bundled together and sold, then another layer of financing is added to the original mortgage. As homeowners defaulted on their mortgages, the practice of bundling mortgages into MBSs amplified the losses in the financial system.

In August 2008, Fannie and Freddie held or had guaranteed more than $1.011 trillion in unpaid principal balance on junk mortgages—subprime mortgages and Alt-A investments. The

losses they had realized on these poor investments were responsible for their collapse, forcing a government takeover of the two GSEs.

August 2007 Bank Panic

In August 2007, when money market interest rates skyrocketed, the crisis really became severe. This was measured through the Overnight Index Swap (OIS). The OIS is a measure of what markets expect the federal funds rate to be over a three-month period, as compared to the three-month London Inter-Bank Offered Rate (Libor). According to Taylor (2009, 15-16), Libor-OIS controls for interest rate expectations, and thus, the spread measures factors such as expected risk and liquidity. On August 9 and 10, the Libor-OIS spread jumped to unusually high levels. As the spread is essentially a measure of financial stress, it affects the transmission mechanism of monetary policy to the economy; when the spread is high, it has a constricting effect.

Thus, it was necessary to find the reason for the increased spread. At the time, the reason was misdiagnosed as a liquidity issue. The federal government instituted policies that allowed the crisis to continue, instead of addressing the real cause of the spread: fears regarding counterparty risk. At the time, these fears were a fundamental problem in the financial sector. Counterparty risk is the concern over dealing with another individual or institution because the first institution does not know what bad assets, risky investments, etc. the second has. This crisis arose due to concerns from investors and firms about the riskiness of banks' balance sheets.

The reason the crisis was misdiagnosed was because the crisis was only noticeable to the main players: banks, firms, and institutional investors. According to Gorton (2010, 12), the August 9, 2007 crisis came in the form of a bank run by firms and institutional investors, as it

involved the repurchase agreements market, also called the repo market. Though the subprime mortgages played a role in the bank panic, they were not directly responsible for the panic, as the outstanding amount of subprime bonds was not large enough to cause a global financial crisis by itself. Instead, securitization that included subprime loans was primarily responsible for this bank run.

Securitization is the selling of portfolios of loans by a bank to another party, primarily firms and institutional investors. The buyers are interested in purchasing in the repo market because they also have a demand for checking accounts, much like the average consumer. However, bank deposits are only insured up to a certain amount. In order to protect their deposits, they purchased asset-backed securities in the repo market.

Although the repo market has existed for about 30 years, the size of the market is unknown. The Fed only measures repo by the 19 primary bank dealers that it trades with; however, the market was estimated to be about $12 trillion. Regulators did not measure or understand the development of the market, meaning that the crisis was the result of structural issues and could very well happen again.

Therefore, the August 9, 2007 panic arose because investors were concerned about the quality and transparency of banks' financial statements, especially because there was an increasing trend in mortgage defaults. Even though the subprime mortgages were not, by themselves, responsible for the panic, the uncertainty regarding the distribution of risk partially came from the subprime mortgages; investors did not know where the subprime bonds were, in which firms, and for how much money.

People who purchased MBSs, which may have included subprime mortgages, faced three risks: interest rate risk, prepayment risk, and default risk. When interest rates change, the value

of the asset-backed security changes in the opposite direction; so if interest rates go up, the value of the MBS goes down. Mortgages can be prepaid with no penalty, which introduces prepayment risk, where the lenders do not know when their bond will be repaid. If the bond is prepaid, they will miss out on interest payments.

Finally, there was a concern over default risk, though Fannie and Freddie guaranteed against such risk, not all MBSs had those guarantees. Because investors did not know whether the MBSs they held contained subprime mortgages, they were extremely worried about the default risk.

Due to the concerns regarding unknown risk, on August 9 and 10, 2007, firms and institutional investors essentially did a run on banks in the form of "haircuts." According to Gorton (2010, 12-13), a haircut is where the depositor wants more in asset-backed securities than it pays for them, requiring the bank to raise money. For example, the bond might be worth $500 million, but the purchaser is only willing to pay $400 million, requiring the bank to come up with the $100 million difference. Before the bank run, there were no haircuts in the repo market. On August 9, 2007, several investors and firms demanded haircuts, which are essentially withdrawals, forcing banks to sell assets to make up the difference.

"Haircuts" are just another term to express financial leverage. Investors and firms wanted to pay only a percentage of the bond's worth, forcing the bank to leverage the rest of the bond. As more haircuts were demanded, losses were amplified for banks due to the fire sales. Banks held fire sales and were willing to accept losses since they needed the cash more than they needed the assets. To minimize losses in these sales, firms sold bonds that were not likely drop in price very much, that were non-securitized, and that were highly rated. However, because many

firms were trying to sell the same assets in order to meet the withdrawal demand, money was lost in the fire sales.

These losses, combined with losses from MBSs and subprime mortgages, led to a credit crunch, or a sharp decrease in bank lending. When commercial banks fail or fear that they will fail, they reduce or stop lending. According to Mankiw (2011, 539), a credit crunch decreases investment and consumption, reducing aggregate demand and, in the short-run, reducing output. In this way, a credit crunch can cause a crisis to become a recession. In the 2007-2009 financial crisis, this is precisely what happened as multiple factors—MBSs, subprime mortgages, the bank run, and fears of counterparty risk—led to the credit crunch.

By the time the real cause of the high Libor-OIS spread, which was a bank panic rather than a liquidity crunch, was noticed, the delay in addressing the fear of counterparty risk had already caused its damage on the economy.

Questionable Policy Decisions

During the delay in determining the real cause of the Libor-OIS spread, the government instead focused on policies to increase liquidity. Three such policies that failed to address risk, and thus, allowed the financial crisis to continue, include the Term Auction Facility (TAF), temporary cash infusions, and initial cuts in interest rates. According to Taylor (2009, 19-21), TAF increased the flow of credit and lowered interest rates by making it easier for banks to borrow from the Fed; however, while the Libor-OIS spread reduced slightly after TAF's introduction, it then increased, and overall, TAF had no noticeable effect on reducing the spread.

Temporary cash infusions came from the Stimulus Act of 2008, and consisted of sending rebate checks totaling more than $100 billion to people around the United States. According to

Taylor (2009, 19-21), the idea was that if people had more to spend they would spend more, and an increase in consumer spending would have a positive effect on the economy. In reality, people spent very little of the rebate, and there was no significant increase in consumption expenditures as a result of it.

According to Taylor (2009, 19-21), in the early 2000s when interest rates were reduced, the Taylor rule had suggested there be a slight reduction in interest rates. However, the drop was much larger than it should have been, which inflated the money supply, caused oil prices to rise, and prolonged the crisis.

The crisis worsened in October 2008, prolonging the crisis for more than a year. It became more than just concern over the housing market, and it became a serious credit crunch. The main question at the time was whether the Fed should have prevented the financial institution Lehman Brothers from declaring bankruptcy on September 13 and 14. While the Lehman Brothers' bankruptcy did not directly worsen the crisis, it did raise concerns.

The week of Lehman Brothers' bankruptcy, the Fed announced it was going to implement a large rescue package, the Troubled Asset Relief Program (TARP). The testimony regarding TARP included no restrictions or oversight on its use. When Lehman Brothers was allowed to go bankrupt, people began realizing that there was a lack of predictability regarding Fed policy, and they realized the harm that such unpredictability could do. As more people began realizing that Fed policy had not been thought through and that the crisis was worse than they had been led to believe, risk increased and markets were driven down.

Market non-transparency played a role in the Lehman Brothers' and other firms' bankruptcies. A market is non-transparent when the contract is not traded on a centralized market that records all transactions. Therefore, in a non-transparent market, no one knows exactly how

much of this security another party owns, so they cannot judge each other's risk exposure. This is termed counterparty risk.

Credit Default Swaps

Credit default swaps (CDS) also played a role in firms' bankruptcies and magnified the financial crisis. According to Cherny (2009, 1), the CDS assumes and removes credit or default risk from a portfolio of assets. That is, a CDS is insurance against the possibility that a security defaults. The Lehman Brothers' bankruptcy meant CDS sellers would be forced to pay out billions of dollars to the holders of "insured" securities. Because the CDS is not regulated as insurance, a CDS can be bought by someone who does not own the underlying asset. In addition, because CDSs were not regulated as insurance, the insurer was not required to hold reserves in case the security defaulted. As a result, when Lehman Brothers went bankrupt, it was not clear which sellers were responsible for paying the CDSs or if they would even be able to pay, given the financial environment.

The Lehman Brothers' bankruptcy also fueled the demand for additional haircuts on asset-backed securities, prompting more fire sales and losses on the side of banks. The falling asset prices and demand for rising margins reinforced each other, prompting banks to become reluctant to lend. According to Whitehouse (2009, A18), when banks are unwilling to lend, they can stifle the economy. Thus, the Lehman Brothers' collapse really highlighted the danger of opaque, unregulated markets to investors, banks, and the economy.

It also highlighted the problem of excessive financial leverage. Because investors could purchase a CDS on an asset they did not own, the total value of CDSs exceeded the cost of outstanding debt being insured. The MBSs bundled mortgages together, which were all based on

tangible assets—houses or other real estate—but CDSs were issued in greater value than the tangible assets. Therefore, when subprime mortgages, which were hidden in MBSs, defaulted, many firms and investors lost money.

The issue with investors buying CDSs on assets they did not own can be highlighted with a comparative example to regular insurance markets. It was as if it were legal to buy ten insurance policies on your house. In addition, others can buy or sell insurance on another person's house, betting on whether or not it will burn down, even though they have no insurable interest in that house. And the sellers of the insurance have held no cash reserves to pay out in case the house actually burns down!

By 2007, it was estimated that $60 trillion in CDSs (insurance) were sold to insure $5 trillion in mortgage-backed securities. This magnified financial leverage another twelve-fold. Yet, this counterparty risk went unrecognized because of the lack of transparency in the CDS market.

By this time, the general agreement was that counterparty risk was actually the cause for the Libor-OIS spread back in August 2007. If this had been realized sooner, actions to remove bad assets or inject equity to fix banks' balance sheets could have begun sooner, and the crisis may not have continued as long or gotten as severe as it did.

This realization can especially be amplified by looking at other countries. According to Davis (2009, 1), in 2009, governments were cutting interest rates and pumping money into the economy in order to spur a recovery. This caused an increase in asset prices, such as gold and copper, and raised concerns over an asset price bubble in equity markets around the world. As U.S. investors looked for higher yields by investing into countries that were growing more rapidly, this encouraged property and equity booms in other countries. Perhaps learning from the

U.S.'s mistakes, other countries like Singapore and South Korea turned to regulation to tighten mortgage requirements to prevent excessive growth in the housing and real estate markets.

Currently, economists are looking to fix models that have served as major policy tools at the world's central banks. One of the reasons that the housing price boom did not initially raise concerns was because existing models were not able to raise red flags. Current models looked at interest rates, not the amount of money being borrowed or the percentage of money being borrowed relative to the value of the underlying asset, or leverage. Thus, economists are looking at information they can glean from this crisis to better manage business cycles.

III. Hypothesis to be Tested

I hypothesize that excessive financial leverage precedes financial crises, which can be shown by a decrease in GDP following significant increases in financial leverage. When leverage increases, it means that the same amount of collateral is supporting greater amounts of debt. Because leverage both has the potential to amplify losses and gains, when leverage increases in the economy, both risk and financial industry profits are also increased. Thus, I will use financial industry profits as a percentage of total corporate profits as a proxy for aggregate financial leverage. Because essentially all profits tend to be pro-cyclical, they tend to increase when an economy booms, and profits tend to fall when the economy goes into a recession. However, while that is true for small movements in profit and output, when financial profits rise by an enormous amount, financial leverage has increased so much that it creates a financial crisis and a very deep recession. Thus, I argue that excessive increases in financial industry profits as a proportion of total corporate profits should precede a financial crisis and a major recession.

I expect to find that increases in financial industry profits will act as a predictor to some recessions and financial crises. Although it likely will not be useful in all cases, perhaps, in the future, economic analysts can reference financial leverage ratios as one way to watch the economy and gauge the relative health of the economy.

IV. Methodology

The process for testing this hypothesis is rather straightforward. I searched for information regarding financial industry profits from the U.S. Department of Commerce website, and we gathered data going back about 60 years. An aggregate measure—the financial industry profits as a proportion of total corporate profits—was used because other measures are industry specific (e.g. housing or banking industries). Industry specific measures miss the bigger picture. There also is really no other alternative measure because there have been so many redundant and non-transparent transactions that one cannot get direct data on aggregate financial leverage; the data simply does not exist. Therefore, financial industry profits as a proportion of total corporate profits will be used as a proxy.

I graphed the financial industry profits against the GDP data using a graph with GDP and financial industry profits on vertical axes and time on the horizontal axis. Therefore, I graphed GDP and financial industry profits as a percent of total corporate profits over time, so we can observe the relationship. I expect to find that when financial industry profits rise over some threshold – the threshold which will come out once the data is graphed – GDP will fall significantly. I also marked all recessions during the observation time period to search for additional relationships.

V. Results

The data were gathered from two sources: the Bureau of Economic Analysis of the U.S. Department of Commerce, and the National Bureau of Economic Research.

The Bureau of Economic Analysis provides annual and quarterly data on the financial and nonfinancial sectors' corporate profits. The real GDP data was also gathered from this source, and those data points were converted into growth rates by taking the first difference of the natural log of the real GDP levels. The information dates from 1948 to 2009 for the annual data and from 1948 to the first two quarters of 2010 for the quarterly data. The raw data for this information can be found in Table 1 for annual data and Table 2 for the quarterly data, with the numbers measured in billions.

Financial leverage was proxied by dividing financial industry profits by total corporate profits (financial plus nonfinancial corporate profits). Financial leverage was also proxied by dividing financial industry profits by nonfinancial corporate profits, as these ratios should be slightly more reactive to significant changes in financial industry profits.

The National Bureau of Economic Research is the source of the data on the recessions. On the graphs, this information was highlighted with gray bars, with the total width of the bar encompassing the beginning and end of the recession. This was done to provide additional information on the relationship between financial leverage and real GDP growth. The data for this can be found in Table 3.

Table 1

Year	Financial	Nonfinancial	Real GDP
1948	2.50	27.10	14.67
1949	3.10	24.50	14.60
1950	3.10	31.30	15.87
1951	3.40	35.60	17.10
1952	4.10	32.80	17.75
1953	4.60	32.80	18.57
1954	4.80	31.60	18.46
1955	5.10	41.60	19.78
1956	5.40	39.80	20.18
1957	5.70	38.80	20.58
1958	6.10	33.80	20.40
1959	7.30	43.80	21.86
1960	8.20	41.70	22.40
1961	8.20	42.70	22.92
1962	8.50	50.10	24.31
1963	8.10	56.10	25.37
1964	8.70	62.40	26.84
1965	9.20	72.70	28.57
1966	10.50	77.50	30.43
1967	11.00	74.40	31.20
1968	12.70	78.90	32.71
1969	13.50	74.40	33.72
1970	15.20	60.20	33.79
1971	17.40	70.80	34.92
1972	19.10	82.80	36.78
1973	20.70	88.90	38.91
1974	20.20	77.50	38.69
1975	19.70	98.90	38.61
1976	24.10	121.00	40.68
1977	30.90	141.90	42.55
1978	38.80	156.80	44.92
1979	39.00	151.80	46.33
1980	31.20	134.70	46.20
1981	26.80	166.80	47.37
1982	22.90	150.20	46.45
1983	33.60	191.20	48.55
1984	32.20	249.80	52.04
1985	44.80	249.60	54.19
1986	55.20	219.50	56.07
1987	59.90	259.90	57.87
1988	65.40	304.30	60.24
1989	74.90	283.50	62.40
1990	81.60	276.70	63.57
1991	109.50	271.30	63.42
1992	127.10	296.10	65.57
1993	119.30	347.50	67.44
1994	116.80	433.50	70.19
1995	152.70	470.60	71.95
1996	162.10	537.40	74.65
1997	191.10	586.20	77.97
1998	165.90	543.70	81.37
1999	201.30	533.50	85.30
2000	206.10	467.50	88.83
2001	244.40	370.10	89.78
2002	287.10	427.20	91.41
2003	325.90	486.10	93.69
2004	364.40	677.50	97.04
2005	419.00	797.60	100.00
2006	427.60	923.90	102.67
2007	323.80	835.90	104.67
2008	128.00	723.50	104.67
2009	242.40	663.30	101.92

Numbers measured in billions.

Source: Data from Bureau of Economic Analysis 2010, table 6.16D.

Table 2

Year	Qtr	Financial	Nonfinancial	Real GDP
1948	1	2.20	26.00	14.43
1948	2	2.40	27.50	14.69
1948	3	2.60	26.80	14.77
1948	4	2.80	28.10	14.79
1949	1	3.00	26.50	14.59
1949	2	3.10	24.10	14.54
1949	3	3.10	25.30	14.70
1949	4	3.10	22.10	14.56
1950	1	3.00	25.60	15.15
1950	2	3.00	29.30	15.61
1950	3	3.00	33.60	16.22
1950	4	3.10	36.70	16.51
1951	1	3.20	35.60	16.72
1951	2	3.30	35.20	16.99
1951	3	3.50	35.50	17.33
1951	4	3.90	36.20	17.36
1952	1	3.70	33.90	17.54
1952	2	4.00	31.50	17.55
1952	3	4.20	30.90	17.67
1952	4	4.50	35.00	18.26
1953	1	4.40	35.70	18.60
1953	2	4.50	34.90	18.74
1953	3	4.70	33.80	18.62
1953	4	4.70	26.70	18.33
1954	1	4.70	28.90	18.24
1954	2	4.80	30.10	18.27
1954	3	4.80	32.00	18.47
1954	4	4.90	35.20	18.84
1955	1	5.00	40.20	19.38
1955	2	5.10	41.40	19.70
1955	3	5.10	41.90	19.97
1955	4	5.10	42.80	20.08
1956	1	5.10	40.50	19.99
1956	2	5.30	40.10	20.14
1956	3	5.50	39.00	20.12
1956	4	5.60	39.50	20.45
1957	1	5.70	41.00	20.57
1957	2	5.60	39.70	20.52
1957	3	5.80	39.00	20.72
1957	4	5.80	35.60	20.50
1958	1	6.00	29.80	19.95
1958	2	6.10	30.60	20.07
1958	3	6.00	34.70	20.54
1958	4	6.40	40.10	21.02
1959	1	6.70	43.40	21.45
1959	2	7.00	48.10	21.99
1959	3	7.60	42.00	21.96
1959	4	7.90	41.80	22.04
1960	1	8.20	45.80	22.53
1960	2	8.30	41.70	22.43
1960	3	8.20	41.00	22.46
1960	4	8.20	38.50	22.18
1961	1	8.40	37.10	22.31
1961	2	8.10	41.90	22.72
1961	3	8.10	44.00	23.09
1961	4	8.10	47.80	23.56
1962	1	8.30	50.00	23.98
1962	2	8.60	48.80	24.25
1962	3	8.60	49.90	24.47
1962	4	8.40	51.70	24.53
1963	1	8.30	52.30	24.85
1963	2	8.10	56.10	25.17
1963	3	8.10	57.40	25.64
1963	4	8.10	58.70	25.83
1964	1	8.60	62.10	26.41
1964	2	8.70	62.10	26.72
1964	3	8.70	63.10	27.08
1964	4	8.70	62.30	27.16
1965	1	8.50	70.00	27.82
1965	2	8.70	71.70	28.20
1965	3	9.20	72.90	28.77
1965	4	10.20	76.00	29.47
1966	1	10.60	79.00	30.19
1966	2	10.40	77.90	30.29

Year	Qtr	Financial	Nonfinancial	Real GDP
1966	3	10.60	75.90	30.49
1966	4	10.50	77.10	30.74
1967	1	10.70	74.20	31.01
1967	2	10.90	73.10	31.01
1967	3	11.00	73.60	31.26
1967	4	11.40	76.60	31.50
1968	1	12.30	76.40	32.15
1968	2	12.80	79.40	32.69
1968	3	12.90	79.30	32.92
1968	4	12.70	80.60	33.06
1969	1	13.60	79.60	33.58
1969	2	13.30	76.70	33.68
1969	3	13.30	73.60	33.89
1969	4	13.90	67.70	33.73
1970	1	14.00	59.40	33.68
1970	2	14.20	62.80	33.74
1970	3	15.70	61.60	34.04
1970	4	16.90	57.00	33.68
1971	1	16.40	68.80	34.61
1971	2	16.90	69.70	34.81
1971	3	18.20	70.80	35.08
1971	4	18.10	73.90	35.18
1972	1	18.90	78.50	35.81
1972	2	19.30	79.50	36.66
1972	3	18.70	83.40	37.01
1972	4	19.40	89.80	37.62
1973	1	20.30	93.20	38.58
1973	2	20.90	87.90	39.03
1973	3	20.60	86.20	38.82
1973	4	20.90	88.40	39.19
1974	1	20.10	79.50	38.85
1974	2	20.00	79.20	38.95
1974	3	20.80	76.30	38.56
1974	4	19.90	74.90	38.41
1975	1	20.10	77.80	37.94
1975	2	19.30	91.80	38.23
1975	3	19.00	111.50	38.88
1975	4	20.60	114.70	39.38
1976	1	22.50	126.40	40.28
1976	2	23.40	120.40	40.58
1976	3	24.60	119.90	40.78
1976	4	25.90	117.20	41.08
1977	1	27.90	123.20	41.55
1977	2	30.10	142.20	42.38
1977	3	31.80	154.60	43.14
1977	4	33.70	147.40	43.13
1978	1	35.30	134.80	43.28
1978	2	38.30	162.20	44.98
1978	3	40.40	162.30	45.42
1978	4	41.10	167.90	46.02
1979	1	39.90	158.40	46.10
1979	2	40.30	154.90	46.14
1979	3	38.60	148.70	46.47
1979	4	37.10	145.10	46.60
1980	1	34.00	142.20	46.75
1980	2	30.80	118.70	45.79
1980	3	28.70	129.00	45.71
1980	4	31.30	149.10	46.55
1981	1	29.90	160.90	47.52
1981	2	27.40	162.30	47.14
1981	3	25.70	182.20	47.71
1981	4	24.10	161.90	47.12
1982	1	18.30	147.40	46.35
1982	2	21.20	156.80	46.60
1982	3	23.50	155.40	46.42
1982	4	28.70	141.30	46.45
1983	1	33.00	159.30	47.03
1983	2	35.80	186.00	48.09
1983	3	33.00	205.40	49.04
1983	4	32.60	214.10	50.05
1984	1	32.60	244.30	51.02
1984	2	32.00	254.70	51.90
1984	3	30.30	248.40	52.41
1984	4	33.80	251.90	52.83
1985	1	41.00	249.00	53.33
1985	2	43.60	243.80	53.78

Year	Qtr	Financial	Nonfinancial	Real GDP
1985	3	46.30	263.90	54.62
1985	4	48.30	241.80	55.04
1986	1	55.10	227.50	55.57
1986	2	57.80	218.90	55.79
1986	3	54.60	213.60	56.33
1986	4	53.40	217.90	56.60
1987	1	51.50	230.60	56.91
1987	2	60.00	254.60	57.52
1987	3	64.50	277.40	58.02
1987	4	63.70	277.00	59.01
1988	1	58.00	294.40	59.32
1988	2	65.40	298.20	60.08
1988	3	69.60	301.50	60.39
1988	4	68.40	323.00	61.20
1989	1	74.90	292.60	61.77
1989	2	75.10	284.80	62.23
1989	3	76.90	285.10	62.73
1989	4	72.70	271.80	62.86
1990	1	77.60	276.20	63.52
1990	2	82.90	294.30	63.77
1990	3	84.20	271.80	63.77
1990	4	81.80	264.50	63.21
1991	1	103.00	275.20	62.91
1991	2	108.10	273.00	63.33
1991	3	112.80	270.40	63.60
1991	4	114.10	266.50	63.85
1992	1	130.80	281.70	64.55
1992	2	128.30	294.70	65.23
1992	3	124.60	284.60	65.91
1992	4	124.40	323.30	66.60
1993	1	114.00	312.50	66.72
1993	2	118.10	342.60	67.15
1993	3	117.00	346.30	67.50
1993	4	127.90	388.60	68.39
1994	1	114.70	400.70	69.06
1994	2	108.20	424.50	70.00
1994	3	122.50	441.50	70.45
1994	4	121.80	467.20	71.24
1995	1	138.00	448.10	71.41
1995	2	153.40	452.00	71.57
1995	3	163.30	487.50	72.17
1995	4	156.00	494.70	72.67
1996	1	163.10	519.50	73.17
1996	2	165.40	532.60	74.43
1996	3	163.50	540.00	75.08
1996	4	156.50	557.70	75.90
1997	1	182.50	569.80	76.48
1997	2	190.00	575.70	77.62
1997	3	194.30	608.20	78.59
1997	4	197.60	591.00	79.19
1998	1	170.80	538.30	79.94
1998	2	162.60	542.90	80.66
1998	3	162.60	561.40	81.73
1998	4	167.60	532.40	83.14
1999	1	191.20	554.60	83.88
1999	2	190.90	551.90	84.54
1999	3	209.60	520.20	85.61
1999	4	213.40	507.10	87.15
2000	1	210.90	498.50	87.38
2000	2	200.00	493.20	89.08
2000	3	206.00	464.20	89.16
2000	4	207.40	414.20	89.68
2001	1	232.90	389.80	89.39
2001	2	243.40	397.80	89.97
2001	3	244.70	373.70	89.73
2001	4	256.60	318.80	90.04
2002	1	281.90	389.70	90.82
2002	2	287.40	418.60	91.30
2002	3	285.10	428.10	91.76
2002	4	294.10	472.30	91.78
2003	1	314.20	454.20	92.15
2003	2	319.80	471.40	92.88
2003	3	332.60	497.00	94.44
2003	4	337.10	522.00	95.29
2004	1	352.90	621.20	95.96
2004	2	355.00	674.60	96.64

Year	Qtr	Financial	Nonfinancial	Real GDP
2004	3	364.40	712.60	97.35
2004	4	385.10	701.80	98.20
2005	1	425.50	748.50	99.18
2005	2	390.20	805.50	99.60
2005	3	440.60	761.10	100.35
2005	4	419.70	875.40	100.87
2006	1	442.00	902.00	102.20
2006	2	447.50	894.90	102.56
2006	3	416.50	987.60	102.59
2006	4	404.40	911.10	103.34
2007	1	345.10	882.40	103.57
2007	2	358.90	893.90	104.40
2007	3	343.80	783.30	104.99
2007	4	247.50	784.20	105.74
2008	1	242.60	703.60	105.55
2008	2	230.60	686.20	105.70
2008	3	103.90	802.70	104.63
2008	4	-65.20	701.60	102.81
2009	1	123.60	665.40	101.54
2009	2	227.40	617.40	101.36
2009	3	286.10	647.10	101.76
2009	4	332.40	723.20	103.01
2010	1	337.60	840.40	103.96
2010	2	334.20	888.60	104.40

Numbers measured in billions.
Source: Data from the Bureau of Economic Analysis 2010, table 6.16D.

Table 3

Peak	Trough	Length of Recession (Months)
November 1948	October 1949	11
July 1953	May 1954	10
August 1957	April 1958	8
April 1960	February 1961	10
December 1969	November 1970	11
November 1973	March 1975	16
January 1980	July 1980	6
July 1981	November 1982	16
July 1990	March 1991	8
March 2001	November 2001	8
December 2007	June 2009	18

Source: National Bureau of Economic Research 2011.

The data from the above three tables was used to create six figures. Figures 1 and 2 show the ratio of financial industry profits to total corporate profits graphed against time and overlaid with a graph of real GDP growth, which is also graphed against time. This information is split into two periods, pre- and post-1980, because 1980 marks a shift in government regulation of financial industries. According to McKenzie (1994, 193),

FIGURE 1
Financial/Total & Real GDP Growth (1948-1980)

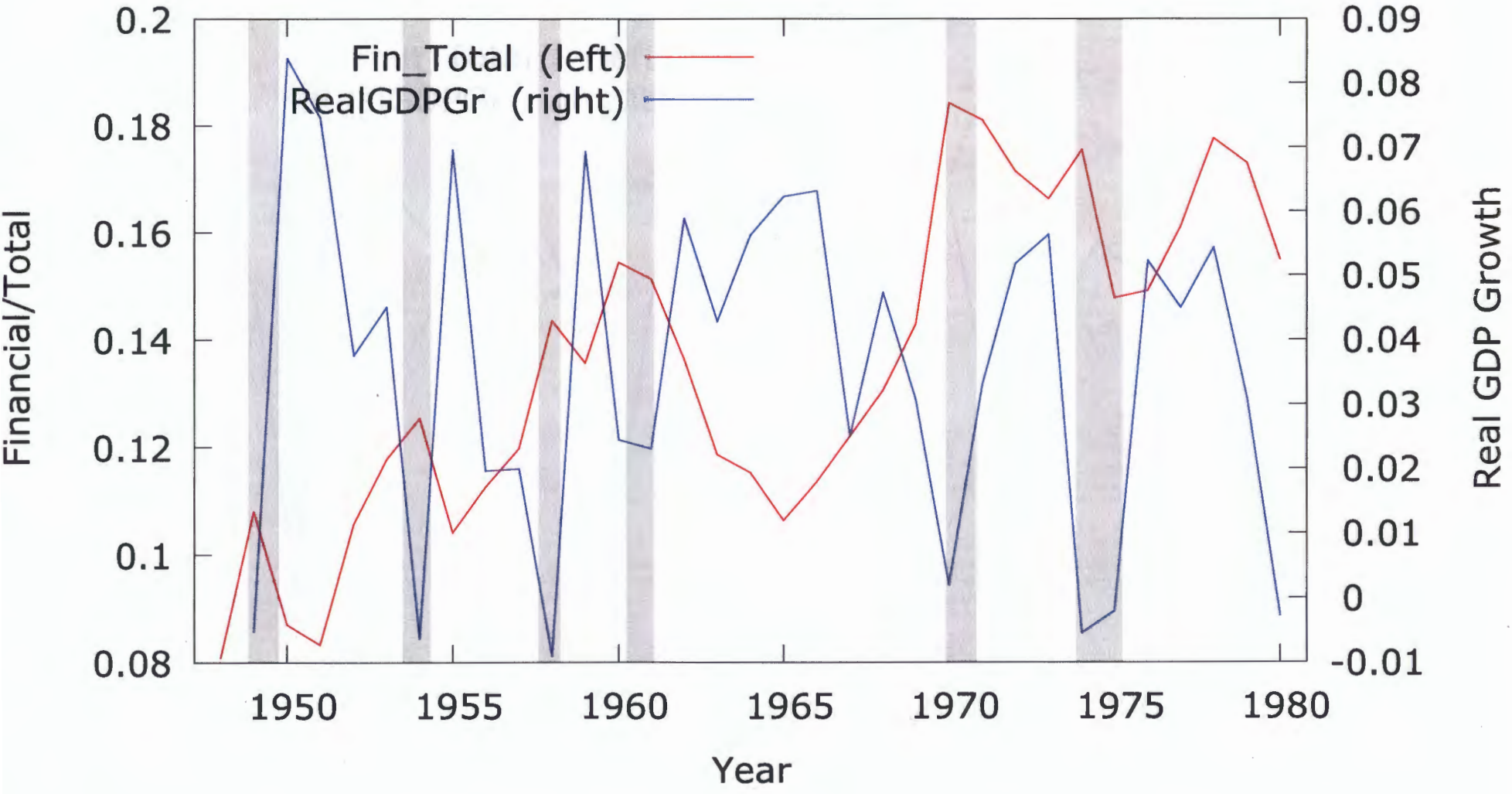
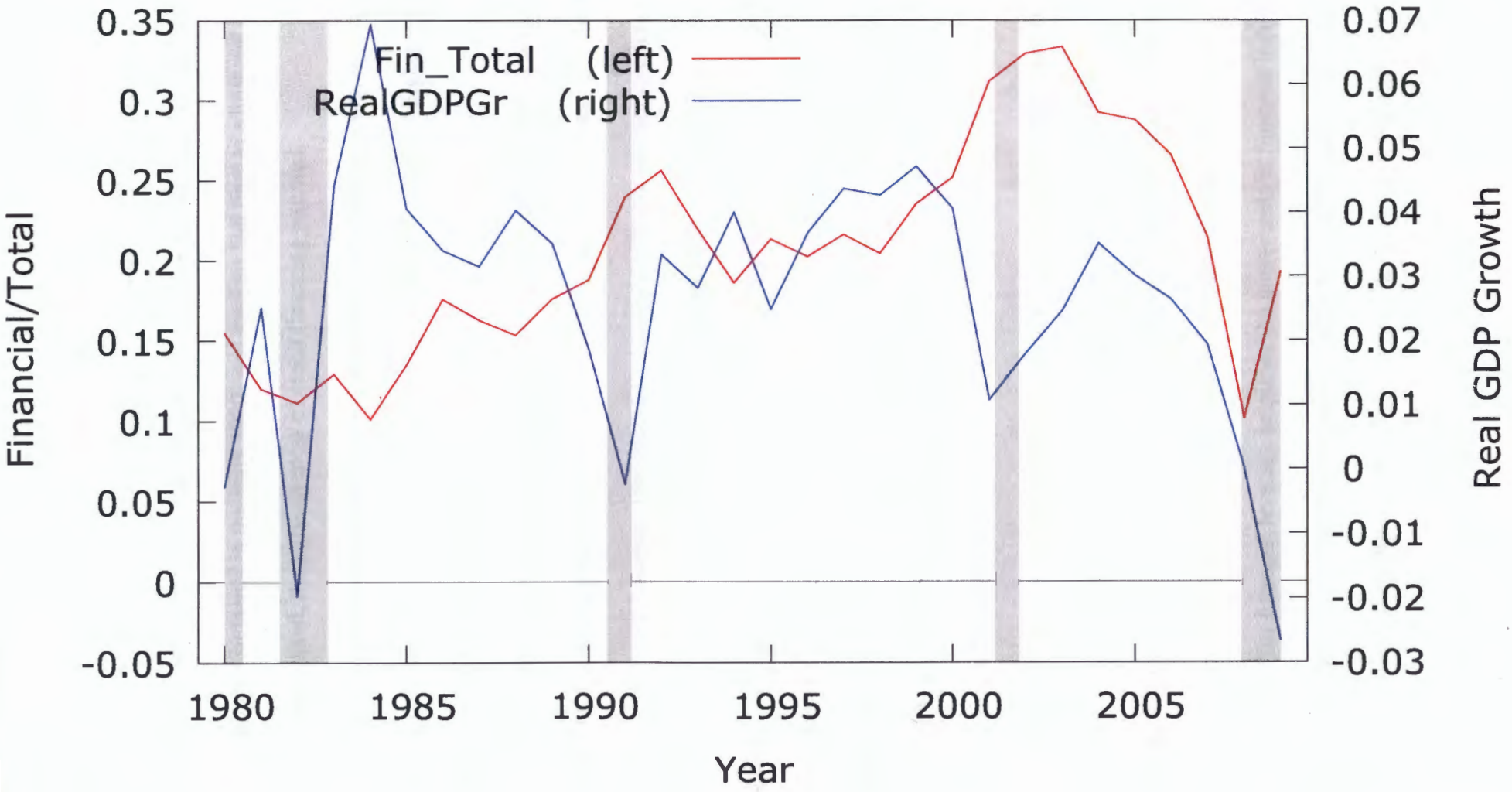


FIGURE 2
Financial/Total & Real GDP Growth (1980-2009)



> [E]vents of the 1970s forced Americans and American corporations to accept lower levels of leverage than they probably would have accepted otherwise. After inflation stopped suddenly in the early 1980s and markets had time to adjust and credit controls were relaxed, the attractiveness of credit financing returned.

Changes in government regulation is reflected in the graph through a slightly higher ratio of financial industry profits, going up to nearly 0.35 after 1980, while the highest peak of financial industry profits before 1980 is just above 0.18 (see Figure 2).

The figures show a surprising relationship. Initially, the expectation was that financial industry profits would peak slightly before a recession, rather than peaking at the same time GDP is falling. It appears, however, that financial industry profits are counter-cyclical to real GDP. That is, when real GDP is climbing, financial industry profits are declining, and when real GDP is falling, financial industry profits are climbing. This general relationship seems to hold true, even outside of recessions. The recessions, however, seem to highlight this relationship in particular. For example, the July 1953 to May 1954 recession, highlighted as the second gray bar on Figure 1, shows a sharp peak in financial industry profits at almost the exact same time that GDP has reached a low point.

The next two sets of figures, Figure 3 and Figure 4, highlight this same relationship. The difference between Figures 1 and 2 from Figures 3 and 4, however, is the proxy for financial leverage. Figures 3 and 4 proxy financial leverage by dividing financial industry profits by nonfinancial corporate profits. Real GDP growth remains the same in all figures. This slightly different proxy for financial leverage amplifies the movements in financial industry profits over time. As a result, this calculation more easily highlights changes in financial industry profits, relative to nonfinancial corporate profits. Whereas Figures 1 and 2 show financial industry

FIGURE 3
Financial/Nonfinancial & Real GDP Growth (1948-1980)

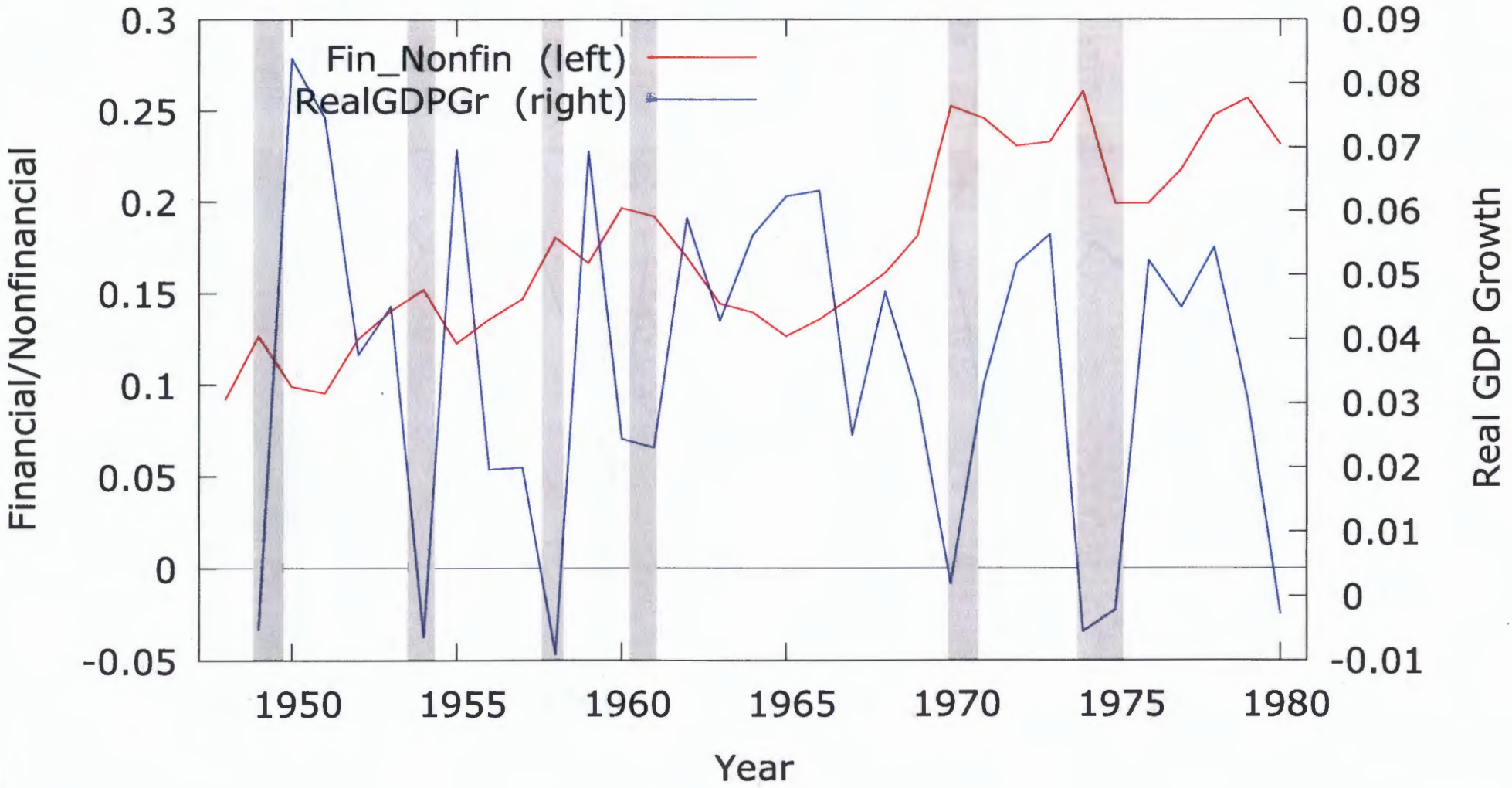
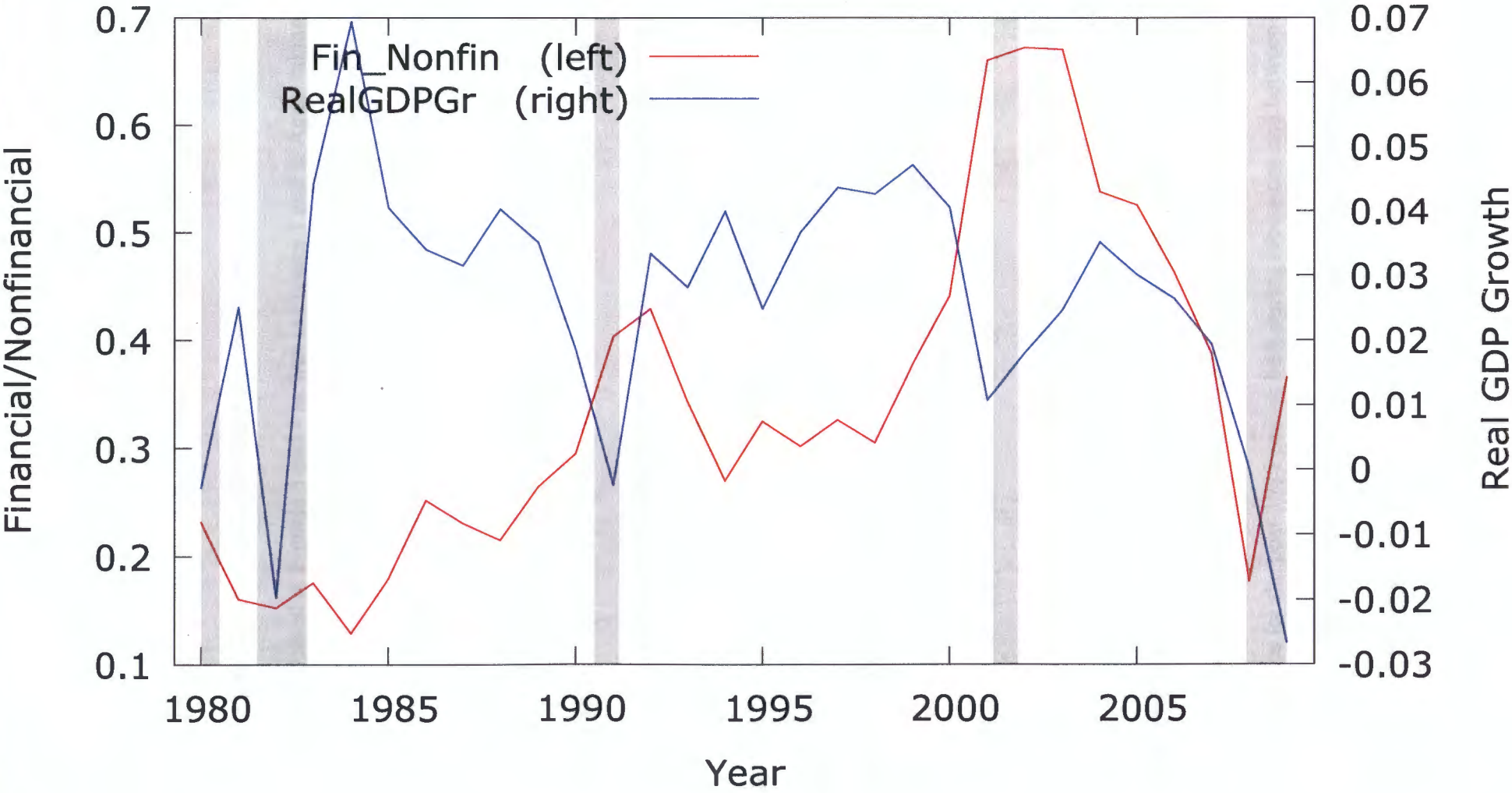


FIGURE 4
Financial/Nonfinancial & Real GDP Growth



profits as a percentage of total corporate profits peaking at around 0.35, Figures 3 and 4 show financial industry profits as a percent of non-financial corporate profits peaking at just below 0.7.

The same counter-cyclical relationship between financial industry profits and GDP growth is highlighted in Figures 3 and 4 as was in Figures 1 and 2. Again taking the example of the July 1953 to May 1954 recession, highlighted as the second gray bar on Figure 3, financial industry profits reaches a sharp peak around 0.15, while real GDP growth hits a low point, around -0.01.

The last two figures plot the same data, but instead of looking at annual fluctuations, Figures 5 and 6 employ quarterly data. This allows for more fluctuations in real GDP and financial industry profits to be observed in the graphs. Again, though, the same counter-cyclical relationship seems to exist. The peak in the July 1953 to May 1954 recession occurred at the same time real GDP growth hits a low point. This relationship can also be highlighted by looking at a period where there was no recession, such as between the end of the 1961 recession and the beginning of the 1969 recession, marked as the empty white space between the fourth and fifth gray bars on Figure 5. Here, financial industry profits are generally in a state of decline with small peaks, but no sharp increases. Real GDP growth, meanwhile, is mostly positive, with a few sharp fluctuations. Looking at a time when no recession is occurring can also demonstrate the counter-cyclical relationship between financial leverage and real GDP growth, as financial industry profits are in decline while real GDP growth is generally climbing during this time period. Note the strong negative relationship between financial industry profits and real GDP growth continues for the post-1980 period, both during recessions and between recessions.

Finally, with regard to the most recent financial crisis and recession, the data more closely follows the original prediction. That is, the expectation was that increases in financial

FIGURE 5
Financial/Total & RealGDP Growth (1948-1980 Quarterly)

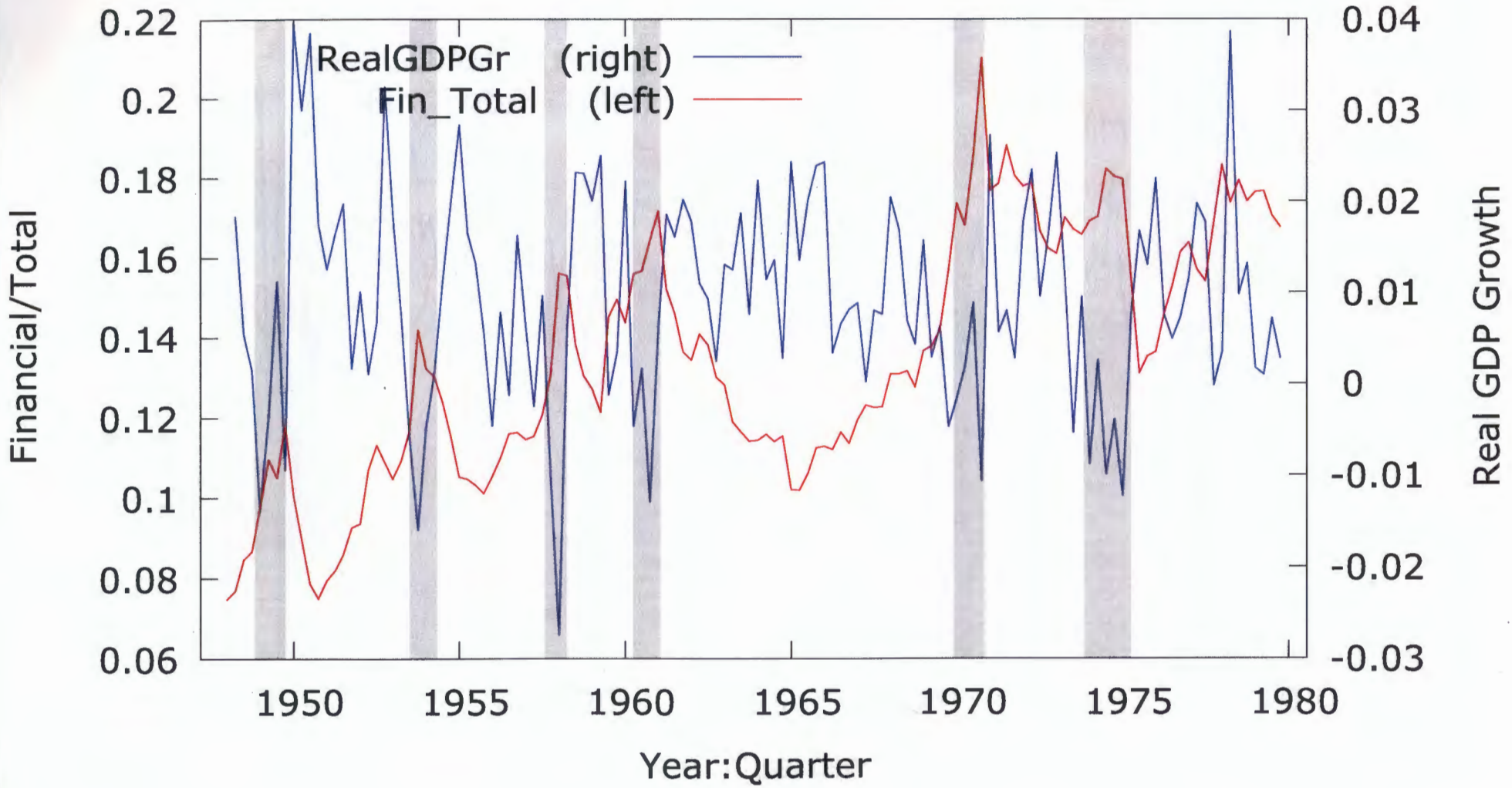
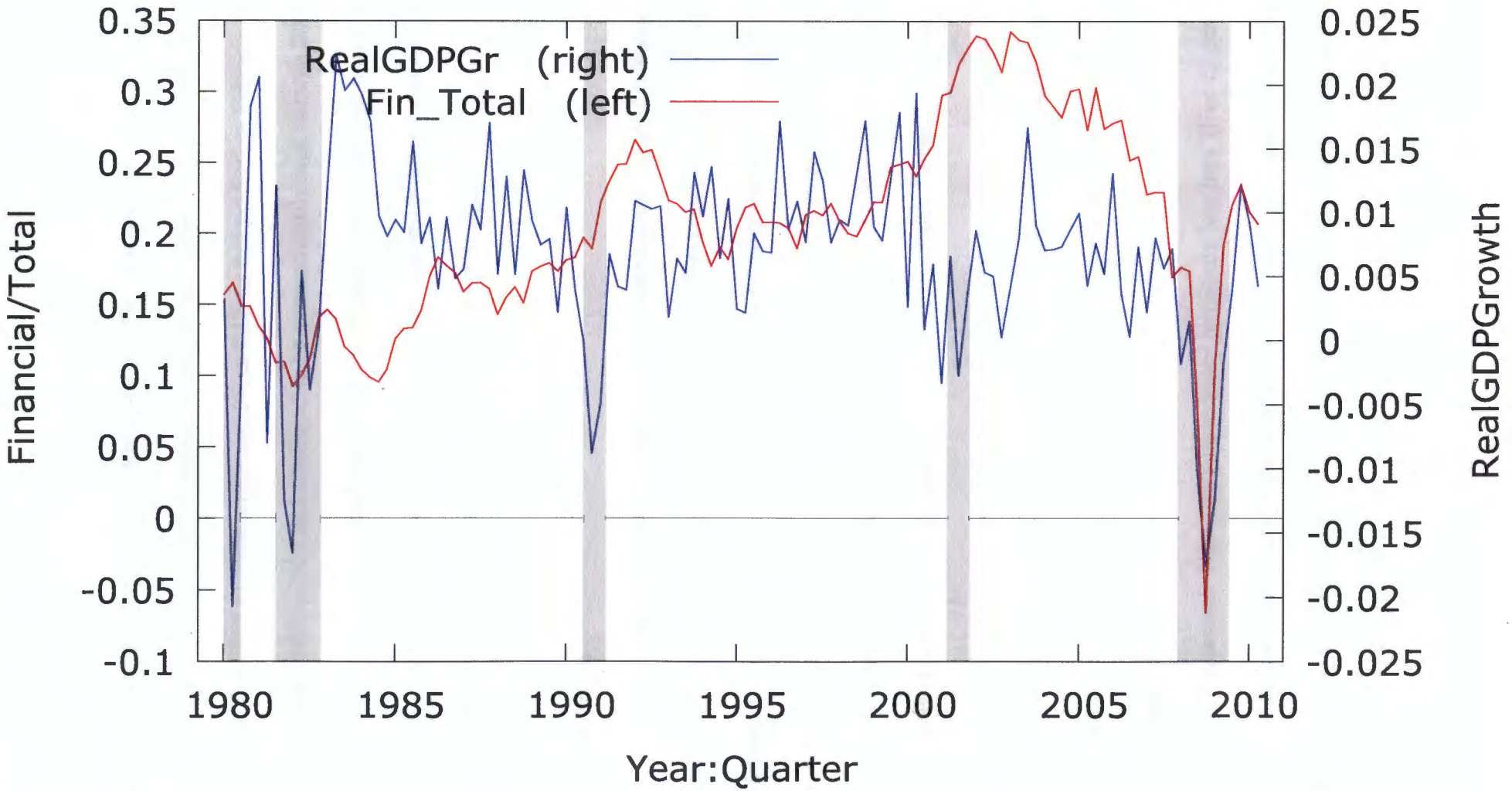


FIGURE 6
Financial/Total & Real GDP Growth (1980-2010 Quarterly)



industry profits would precede a contraction in GDP. But since all profit levels should fall in a prolonged financial crisis and recession, we might fail to find a relationship well into a long recession. The 2007 financial crisis somewhat follows this prediction. Financial industry profits climbed from 2000 to 2003 and continued to be extraordinarily high through 2007, prior to the crisis. Then, as the economy and financial sector faltered, both GDP and financial industry profits fell as expected. During the recession, as government programs came to the aid of the financial industry, financial industry profits began to grow again.

VI. Conclusion

Overall, this data shows a negative correlation between financial industry profits and real GDP growth. Rising financial industry profits are clearly associated with declining real GDP, and inversely, declining financial industry profits are associated with rising real GDP.

It is interesting to note that the negative correlation between financial industry profits and GDP growth seems to hold equally well in the pre- and post-1980 periods. That is, every recession is associated with a rise in financial industry profits. To the extent that a rise in financial industry profits represents an increase in financial leverage, these results are consistent with the view that excessive financial leverage is associated with economic contractions.

Finally, it is interesting to speculate on the threshold at which financial industry profits are associated with a reduction in GDP growth. It appears in Figure 1 that in the pre-1980 period, there are no recessions when financial industry profits are less than 10 or 12 percent. In the post-1980 period, this tends to rise to the 15 to 20 percent range. That same increase can be seen in Figures 3 through 6. This result may suggest that the deregulation in the financial industry over the period of 1980 to 1986 raised the general level of financial industry profits as a percent of

total corporate profits, thus raising the threshold for a negative impact of financial industry profits on GDP growth.

Overall, these results are consistent with the view that excessive financial leverage is associated with economic contractions. Because aggregate financial leverage is difficult to measure in non-transparent markets, it may be reasonable for policy makers to track financial industry profits as an indicator of excess leverage and economic contractions.

VII. Literature Cited

Bureau of Economic Analysis, "National Income and Product Accounts Table: Table 6.16D. Corporate Profits by Industry," U.S. Department of Commerce, http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=239&Freq=Qtr&FirstYear=2008&LastYear=2010 (accessed January 13, 2011).

Calmoriris, Charles and Peter Wallison. 2008. The Last Trillion-Dollar Commitment: The Destruction of Fannie Mae and Freddie Mac. *American Enterprise Institute for Public Policy Research* (September): 1-10.

Cherny, Kent and Ben Craig. 2009. Credit Default Swaps and Their Market Function. *Economic Commentary* (July): 1-4.

Davis, Bob and Alex Frangos. 2009. Fears of a New Bubble as Cash Pours In. *Wall Street Journal* (November 4): 1 and A4.

Gorton, Gary. 2010. Questions and Answers about the Financial Crisis. *U.S. Financial Crisis Inquiry Commission* (February 20): 1-16.

Holmes, Steven. 1999. Fannie Mae Eases Credit to Aid Mortgage Lending. *New York Times.* (September 30). http://www.nytimes.com/1999/09/30/business/fannie-mae-eases-credit-to-aid-mortgage-lending.html (accessed September 6, 2010).

Mankiw, Gregory and Laurence Ball. 2011. *Macroeconomics and the Financial System.* New York: Worth Publishers.

McKenzie, Richard. 1994. *What Went Right in the 1980s.* San Francisco: Pacific Research Institute for Public Policy.

Mishkin, Frederic. 2010. *The Economics of Money, Banking and Financial Markets.* Boston: Addison-Wesley.

National Bureau of Economic Research, "US Business Cycle Expansions and Contractions," National Bureau of Economic Research, http://www.nber.org/cycles/cyclesmain.html (accessed January 13, 2011).

Rosen, Richard. 2007. The Role of Securitization in Mortgage Lending. *Chicago Fed Letter*, (November): 1-4.

Taylor, John. 1998. *Principles of Macroeconomics.* Boston: Houghton Mifflin Company.

Taylor, John. 2009. *Getting Off Track: How Government Actions and Interventions, Caused, Prolonged, and Worsened the Financial Crisis.* Stanford: Hoover Institution Press.

Whitehouse, Mark. 2009. Crisis Compels Economists to Reach for New Paradigm. *Wall Street Journal* (November 3): 1 and A18.