Is the Federal Debt Raising Corporate Profits and Reducing Labor's Share of National Income?

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Abstract

The federal debt-to-GDP ratio has accelerated in recent years to levels unseen in the U.S. since the post- World War II decline. At the same time, the profit share of national income is at post-war highs and the employee compensation share of national income is at 40-year lows. The empirical evidence in this paper suggests that these facts are related. The paper provides evidence that government debt has crowded out business investment, which has led to a rising profit share and declining employee compensation share of income. This result suggests that the federal debt is contributing to income inequality. On the other hand, to the extent that the rise in profit share can be traced to economic fundamentals, it is likely to be more persistent than the rise in the mid-2000s, which was boosted by illusory profits in the financial sector.

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I. Introduction

At the end of calendar year 2011 the U.S. gross federal debt was 15.6 trillion dollars, which at 102 percent of annualized U.S. GDP is the highest since 1947.[1] Corporate profits in the final quarter of 2011 were $1.99 trillion dollars, which at 14.6 percent of national income is the largest profit share since the Department of Commerce started compiling quarterly data on the U.S. economy in 1947.[2] Meanwhile, the labor share of income is at post-war lows (Jacobson and Occhino, 2012).[3] Is it a coincidence that the profit share of national income and the debt were both at 60-year highs while the labor share of income was at post-war lows? This paper suggests not. Although the rise in profit share can be partly attributed to growth in the overseas operations of U.S. corporations (Hodge, 2011), this paper presents evidence that the federal debt may be another contributing factor.

Many researchers have analyzed the economic effects of government debt and deficits. Elmendorf and Mankiw (1999), Gale and Orszag (2003) and Engen and Hubbard (2005) are among the more recent articles that summarize this extensive research. Much of the empirical research has focused on whether government deficits affect interest rates. Although early research yielded mixed results, subsequent research has found a more consistent relationship between deficit forecasts and expectations of future long-term interest rates (Laubach, 2003).

[1] This calculation is based on GDP in the fourth quarter of 2011. The CBO forecasts the debt will continue to rise, and Kliesen and Thornton (2012) suggest that the CBO forecasts may understate future debt levels.

[2] This calculation of profit share uses data from BEA NIPA Table 1.12, from the July 2012 issue of the Survey of Current Business. The remainder of the paper calculates domestic profits as a share of domestic income (BEA NIPA Table 1.10). Domestic profits are lower because they exclude profits earned by U.S. corporations from operations in other countries.

[3] The record low labor share in Jacobson and Occhino (2012) is based on BLS data. The remainder of this paper uses employee compensation from BEA NIPA accounts as a proxy for labor share. This alternative measure has also fallen over the past three decades, but is not at record lows.

Interest rates, however, are not the only issue. To the extent that deficits reduce savings and national wealth, they will restrain future economic growth. Ball and Mankiw (1995) discuss these potential long-term consequences, noting that ongoing deficits would reduce the capital stock, which would lead to higher rates of profit and put downward pressure on wages. The empirical evidence below supports these predictions by Ball and Mankiw.

Separate from the study of government debt, researchers have been trying to understand why labor's share of income has declined and the profit share of income has risen over the last three decades. Jacobson and Occhino (2012) and Ellis and Smith (2007) discuss three potential reasons. First, researchers have suggested that wage growth has slowed because the bargaining power of unions has declined as employment in unionized sectors of the economy has declined. Second, globalization may have reduced the bargaining power of labor as low-skilled workers from China and Eastern Europe have entered the global economy. Third, researchers have suggested that technological change may play a role in changing labor and profit shares, either by increasing the productivity of capital, or by increasing the rate of worker's obsolescence and thereby reducing their bargaining power. In a cross-country analysis Ellis and Smith (2007) conclude that technology is more important than the decline of unions or globalization. Guscina (2006), however, finds a role for both technology and globalization in cross-country data. Offering an alternative explanation, the 2005 IMF World Economic Outlook finds that the labor share of income has not declined as much in countries with greater labor market flexibility. To summarize this extensive area of research, it is safe to say that researchers have not yet reached a consensus as to why labor share is low and profit share is high.

The current paper establishes a link between the two distinct areas of research, government debt and income shares. Instead of looking at interest rates for evidence of crowding out, the paper looks at business investment, corporate profits, and employee compensation.

Government debt can affect the economy by crowding out private investment and thereby restraining growth in the capital stock (Friedman, 1983). The resources available for investment are the sum of domestic savings and capital inflows from abroad. Government deficits subtract from domestic savings, and unless rising deficits are accompanied by either higher private savings or higher capital inflows, the deficits will reduce investment.[4] And as reduced business investment restrains growth in the capital stock, further macroeconomic consequences can occur.

A change in the capital stock has implications for both wages and business profitability. Looking first at wages, microeconomic theory says that a profit maximizing firm pays workers the marginal product of labor. And if the capital stock falls, wages follow the marginal product of labor downward. That is, when business investment is low workers are less productive and wages are lower. Of course, the U.S. capital stock has generally trended upwards, but to the extent that the capital stock is lower than it would be in the absence of deficits, government debt restrains wage growth. The National Income and Product Accounts (NIPA) confirm this

[4] See Olivei (2000) and Ball and Mankiw (1995) for further discussion on the relationship among savings, investment, and international capital flows.

relationship, the employee compensation (wages plus benefits) share of domestic income is low when the debt-to-GDP ratio is high.[5]

The capital stock also affects business profitability. In a competitive market, microeconomic theory says that the return-to-capital will be the same as its marginal product, and that the marginal product moves inversely with the capital stock. Stated another way, when businesses have less to invest they choose only the most profitable opportunities. Thus, if the capital stock is lower because investment is crowded out by the deficits, businesses will be more profitable than they would have been without the deficits. The NIPA data confirm this relationship, the profit share of domestic income is positively correlated with the debt-to-GDP ratio.[6]

Changes in the employee compensation and profit shares of income over the last few decades have been economically significant. For example, the compensation share of domestic income was 68.4 percent during the business cycle that began in 1980, but fell to 64.3 percent in the cycle that began in 2001.[7] This 4.1 percent difference corresponds to over $539 billion dollars annually at current levels of domestic income, which is less than the $518 billion growth in employee compensation from the trough of the recession in 2009:Q2 to the end of 2011.[8]

[5] In the context of an aggregate production function, a lower income share for the more abundant input requires the elasticity of substitution to be less than unity (Romer, 2012). This is consistent with estimates by Antràs (2004), but there is no consensus regarding the value of this economic parameter. Economists often model production with a Cobb-Douglas function, which has unity elasticity of substitution and constant labor and capital shares. As additional evidence that income shares vary, Bentolilla and Saint-Paul (2003) present cross-country evidence that labor shares decline as capital/output ratios fall.

[6] Again, in the context of an aggregate production function, this requires the elasticity of substitution to be less than unity.

[7] According to the June 2012 NIPA data release, the employee compensation share of gross domestic income fell to 62.6 percent in 2011:Q4.

[8] This calculation is based on the preliminary NIPA data release (Table 1.10) for 2011:Q4 on January 27, 2012. Employee Compensation was $7818 billion in 2009:Q2 and $8336 billion in 2011:Q4.

The remainder of the paper is organized as follows. Section 2 presents empirical evidence on how the federal debt affects the macroeconomy. Section 3 discusses implications of the empirical results and relates the results to previous research.

II. Debt and the Macroeconomy

To explore the crowding out effect of the federal debt, this section looks at the relationship between the debt and three other economic variables; business investment, corporate profits, and employee compensation.[9] Business investment as measured by the BEA is close in concept to investment as defined in the context an economic growth model. Finding measures of wages and business profits is more problematic. NIPA accounts include measures of employee compensation and corporate profits, but the proprietor's income category, into which many small businesses fall, contains an uncertain mix of compensation and profits.[10] This paper sidesteps the problem of dividing proprietor's income, and takes the NIPA corporate profit category as a proxy for business profits, and the NIPA employee compensation category as a proxy for wages and benefits.

Two of the macroeconomic relationships discussed in this paper differ from those that occur within the business cycle. First, both corporate profits and business investment are pro-cyclical, they rise during expansions and fall during recessions (Zarnowitz, 1992). But NIPA data reveal an inverse relationship between these variables over longer time horizons. As a second example, corporate profits and tax revenues typically fall during recessions, and lower tax

[9] The label for business investment in the NIPA tables is "Nonresidential Investment."
[10] See Gomme and Rupert (2004) for a discussion of some of the problems dividing NIPA accounts into labor and profit share. One strategy is to divide proprietor's income between capital and labor in the same proportions as their share of total income.

revenues cause the debt to rise. That is, business cycle effects suggest an inverse relationship between debt and profits over the short-run. In contrast, the paper shows a positive relationship between these variables over longer time horizons.

To separate the long-term economic relationships from those that occur during the business cycle, this paper calculates the averages of economic variables over the ten post-war business cycles. The business cycle peaks and troughs are taken from the National Bureau of Economic Research (NBER) Business Cycle Dating Committee (Table 1). Table 2 shows the business cycle averages of business investment, the federal debt, corporate profits, and employee compensation. The calculations use normalized variables, investment and debt are shown as a fraction of GDP, and profits and employee compensation are shown as a fraction of domestic income. Time plots of these variables from 1947 through 2011 are shown in Chart 1 and Chart 2.

The first link in the chain between debt and income shares is the crowding out of business investment. This effect is not controversial, and is arguably more about accounting than economics. That is, since domestic investment is the sum of domestic savings plus capital inflows, and the federal deficit subtracts directly from domestic savings, any increase in the deficit that is not accompanied by an increase in capital inflows or private savings will reduce investment. A paper by Feldstein and Horioka (1980) provides early indirect evidence, showing a correlation between savings and investment in cross-country data. If capital was mobile enough to compensate for shortfalls in domestic savings, investment would be independent of savings. In a more recent CBO paper, Russek (2005) offers a consensus estimate that capital inflows compensate for about 40 percent of the savings lost to the federal deficit.

Chart 3 looks at crowding out using the data from Table 2. The scatter plot shows business cycle averages of business investment versus the federal debt, both as a fraction of GDP. The negative slope of the trendline indicates a negative relationship between business investment and the federal debt.[11]

The next link in the chain between federal debt and income shares is the relationship between business investment and profits. If higher business investment implies a lower marginal product of capital, profits and business investment should be inversely related. This issue has not received as much attention as crowding out, but Anderson, Klau, and Yndgaard (1999) show a negative relationship between the level of capital and the return-to-capital in cross-country data.[12] Chart 4 illustrates this correlation using the calculations from Table 2. The scatter-chart of business cycle averages shows a negative relationship between business investment and profits.

Having shown that high federal debt levels have been associated with low business investment, and that low investment has been associated with high profitability, the paper next looks directly at the relationship between debt and income shares. Chart 5 shows the relationship between profits and the federal debt, and Chart 6 shows the relationship between employee compensation and the federal debt. These results are consistent with the crowding out hypothesis. If the federal debt reduces the capital stock, this should raise the marginal

[11] A more appropriate measure of crowding out would be a comparison of the capital stock to the federal debt. This relationship is not as strong, possibly because estimates of the capital stock depend strongly on assumptions about depreciation. When the BEA changed depreciation assumptions in 1996, estimates of the capital stock for both private and government structures rose by almost 50 percent (Browne and Hellerstein, p. 32). To the extent that some of the capital stock depreciates rapidly, business investment over the course of a business cycle may be a reasonable proxy for the capital stock.

[12] See Graph 3 on page 13 of Anderson, Klau, and Yndgaard (1999).

product of capital and lower the marginal product of labor. The charts confirm that high levels of debt are accompanied by high profit shares and low employee compensation shares.

To further illustrate the relationship between income shares and the federal debt, Table 3 presents regression results. The dependent variables are the profit and compensation shares of income. The independent variables are the debt to GDP ratio, business investment to GDP ratio, GDP growth, and energy prices. These latter two variables are added because they have been found to be significant in previous research on the effects of debt and deficits.[13] The regressions also include a lag of the dependent variable, because the regression residuals are highly serially correlated when the lag is excluded. The regressions confirm the effects identified in the previous charts. The coefficient on debt is positive and significant at 0.5% in the profit share regression, and is negative and significant at 0.1% in the compensation share regression. [14]

III. **Concluding Discussion**

The relationship between the federal debt and the distribution of national income discussed in this paper has two interesting implications. The first implication concerns income inequality. Income inequality has been rising since the 1980s,[15] and many economists view this as an important economic problem (Yellen, 2006). Wages are the largest component of income, and most of the rise in income inequality can be traced to greater dispersion of wages (Piketty and

[13] See Laubach (2003) and Engen and Hubbard (2005) for further discussion about regression variables in debt and deficit analyses.

[14] In comments on an earlier version of this paper Andrew Filardo noted a potential endogeneity problem with the regression in Table 3. Because tax rates are lower on capital than labor, shifting income from labor to capital could reduce federal revenues and thereby raise the deficit. In this case, shifting income shares could cause deficits rather than vice versa. Regressions, however, do not support this relationship between income shares and deficits, only between income shares and debt, which is consistent with the hypothesis discussed in this paper.

[15] A recent article by Gordon and Dew-Becker (2007) provides many references to this extensive literature.

Saez, 2003). Nevertheless, because capital income is skewed towards the upper end of the income distribution (Díaz-Giménez, Glover, and Ríos-Rull, 2011), a shift in the distribution of income from labor to capital will exacerbate income inequality. Thus, if the federal debt is crowding out private investment and reducing labor's share of national income, the federal debt is contributing to income inequality.

A second implication of the link between the federal debt and the distribution of national income concerns the sustainability of current levels of corporate profitability. The labor and profit shares of national income have been relatively stable over time, implying that departures from the long-run averages of these variables have been mean-reverting. Furthermore, profit shares that were high in early releases of GDP data have sometimes been revised downwards in subsequent data releases. For example, when the July 2008 NIPA data release showed the 4-quarter average of the profit share rose to over 13 percent in 2006 and 2007 for the first time in more than 50 years, some of these profits were later found to be illusory. Subsequent data releases subtracted over 40 billion dollars from the initial profit estimates for the third quarter of 2007 (mostly in the financial sector), and the profit share fell from 13.5 percent to 12.1 percent.[16] To the extent that recent rises in the profit share can be traced to macroeconomic fundamentals, this economic variable is less likely to revert to its long-run mean or be revised downwards in subsequent data releases.

The link shown in this paper between the federal debt and changes in the distribution of national income is a significant departure from earlier research on income shares. Thus, this

[16] BEA tables present annualized data and show a revision of 167 billion dollars for 3Q:2007 over the next two July releases.

preliminary result demands further scrutiny.[17] One direction for future research would be to extend the analysis to other countries. Declining labor shares, rising profit shares, and rising debt have also been observed throughout the developed world (Rodriguez and Jaydev, 2010; Ellis and Smith, 2007). Consistent with the above analysis, Bentolila and Saint-Paul (2003) present evidence that labor share depends on the capital/output ratio in OECD countries. Cross-country comparisons may be complicated, however, by dissimilarities among the developed economies. For example, Ellis and Smith show that profit shares in Australia and Norway were among the highest in the developed world in 2005, but the debt levels in these countries were not unusually high. At 16 percent of GDP, Australia's gross debt was among the lowest in the developed world (OECD, 2011). A possible explanation for these outliers is the large role for natural resources in the economies of both Australia and Norway.

In another relevant study of international data, Poterba (1998) calculates the correlation across G-7 countries of the profitability of business capital. He calculates that correlations of profitability across countries is generally low, which suggests that idiosyncratic factors are more important than common factors in explaining changes in profitability. As discussed in the introduction above, analyses of changing income shares often consider technological explanations, but technology varies less than fiscal policy across countries. Thus, Poterba's conclusion that idiosyncratic factors are more important than common factors favors a fiscal policy explanation over a technology explanation of inter-country variations in profitability.

[17] One avenue for testing the robustness of the result in this paper would be to consider alternative measures of labor share. A labor share estimate calculated by the Bureau of Labor Statistics does not show the same rise through the 1950s and 1960s that is shown in Chart 2 of employee compensation (Jacobson and Occhino, 2012). The results in this paper are unlikely to be robust to this alternative measure of labor share.

Lübker (2007) presents a final piece of cross-country evidence that is consistent with the hypothesis in this paper. He notes that labor shares of income are generally lower in developing than industrialized economies. Of course, investment and the capital stock are also lower in developing economies. Thus, this positive relationship between low labor shares and low levels of investment parallels the relationship shown above in U.S. data.

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Table 1 – NBER Business Cycles

Cycle begins	Trough	Recession Length	Expansion Length	Cycle Length
1948:Q4	1949:Q4	1.0 yr.	3.5 yr.	4.5 yr.
1953:Q2	1954:Q2	1.0	3.25	4.25
1957:Q3	1958:Q2	0.75	2.0	2.75
1960:Q2	1961:Q1	0.75	8.75	9.5
1969:Q4	1970:Q4	1.0	3.0	4.0
1973:Q4	1975:Q1	1.25	5.0	6.25
1980:Q1	1980:Q3	0.5	1.0	1.5
1981:Q3	1982:Q4	1.25	7.75	9.0
1990:Q3	1991:Q1	0.5	10.0	10.5
2001:Q1	2001:Q4	0.75	6.0	6.75
2007:Q4	2009:Q2	1.5		

Table 2 – Macroeconomic variables averaged over the business cycle[18]

Cycle Begins	Bus. Invest./ GDP	Debt/GDP	Corp. Prof./ Dom. Income	Compensation/ Domestic Income
1948:Q4	0.0930	0.694	0.1229	0.602
1953:Q2	0.0961	0.545	0.1245	0.621
1957:Q3	0.0938	0.473	0.1058	0.627
1960:Q2	0.0983	0.374	0.1141	0.630
1969:Q4	0.1050	0.264	0.0882	0.662
1973:Q4	0.1148	0.252	0.0879	0.667
1980:Q1	0.1303	0.251	0.0701	0.684
1981:Q3	0.1189	0.354	0.0751	0.664
1990:Q3	0.1106	0.451	0.0869	0.649
2001:Q1	0.1090	0.350	0.0921	0.643
All cycles	0.1071	0.400	0.0955	0.645

Data Sources: FRED, Federal Reserve Bank of St. Louis (investment, debt, and GDP); BEA NIPA Table 1.10 (profits, compensation, and domestic income)

[18] The averages are calculated from the peak of the cycle through the quarter preceding the peak of the next cycle. Thus, the first cycle runs from 1948:Q4 to 1953:Q1.

Table 3 – Regression results for profit and employee compensation shares of income (1947:Q2-2011:Q3)

	Dependent variable Profits/income	Dependent variable Compensation/income
Lagged dependent variable	0.859 (0.016)***	0.887 (0.015)***
Debt/GDP	0.0063 (0.0022)**	-0.011 (.0023)***
Nonresidential investment/GDP	-0.158 (0.028)***	0.096 (0.024)***
GDP growth	0.317 (0.026)***	-0.223 (0.021)***
Energy prices	0.0035 (0.0014)*	-0.0038 (0.0011)**
Adjusted R-squared	0.96	258
DW statistic	1.88	1.86
N	258	258

Notes: Standard errors in parentheses. GDP growth is calculated as the log difference of real GDP in 2005 dollars. Energy prices are calculated as the ratio of the energy price deflator to total consumption deflator in the NIPA accounts. * Coefficient significant at 5%, ** Coefficient significant at 0.5%, *** Coefficient estimate significant at 0.1%.

Chart 1 – Profits as a share of domestic income and business investment as a share of GDP

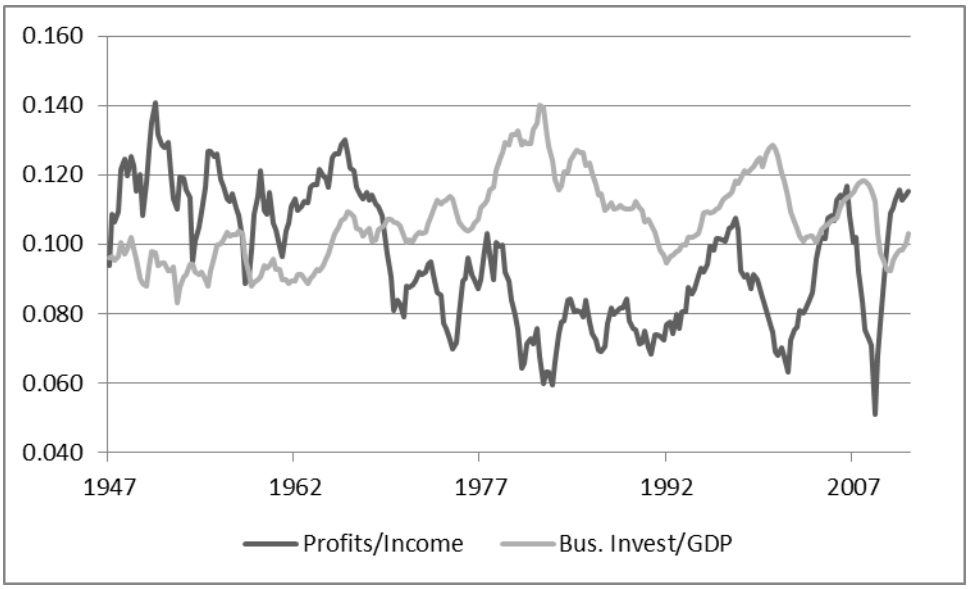


Chart 2 – Debt/GDP and employee compensation/domestic income

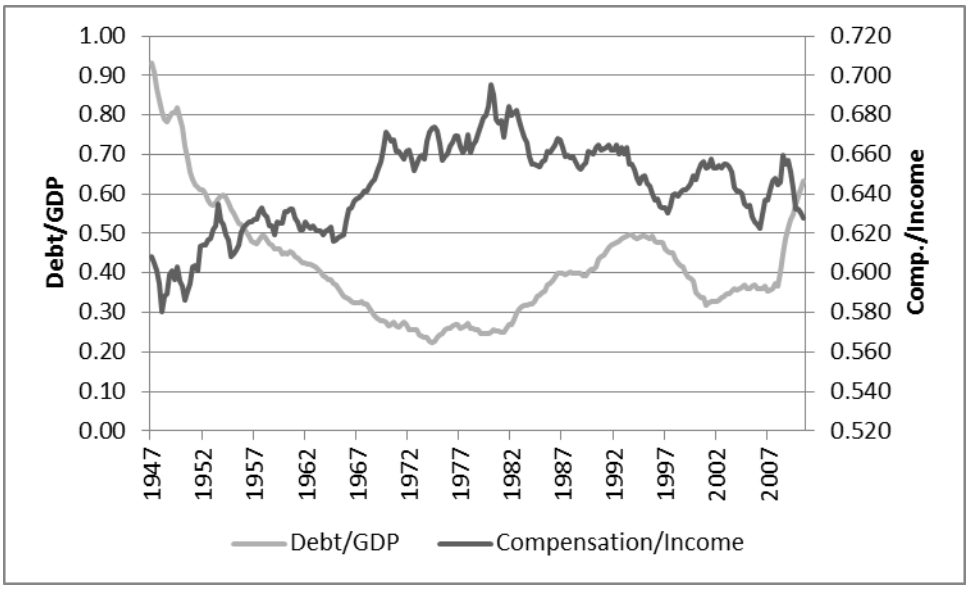


Chart 3 – Business investment/GDP and public debt/GDP, cycle averages

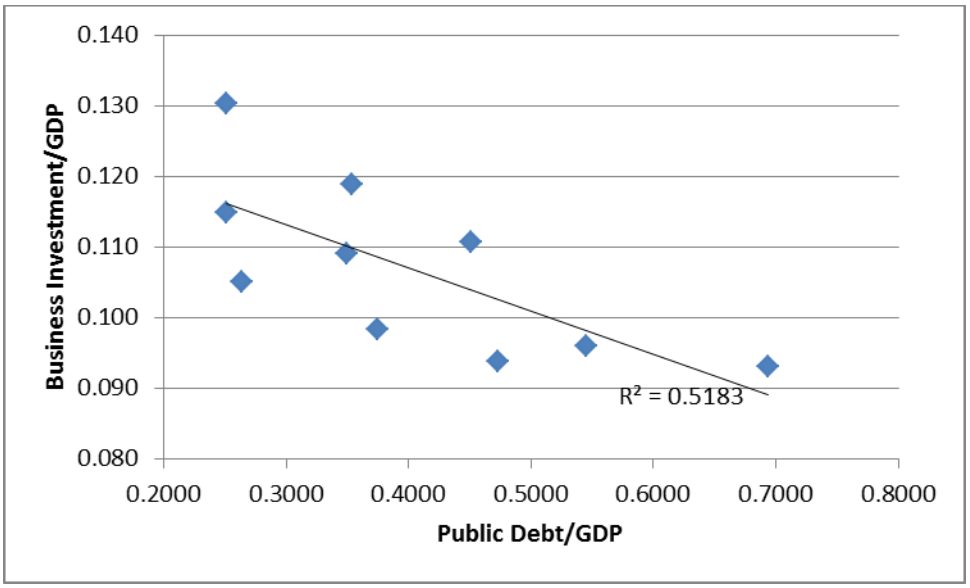
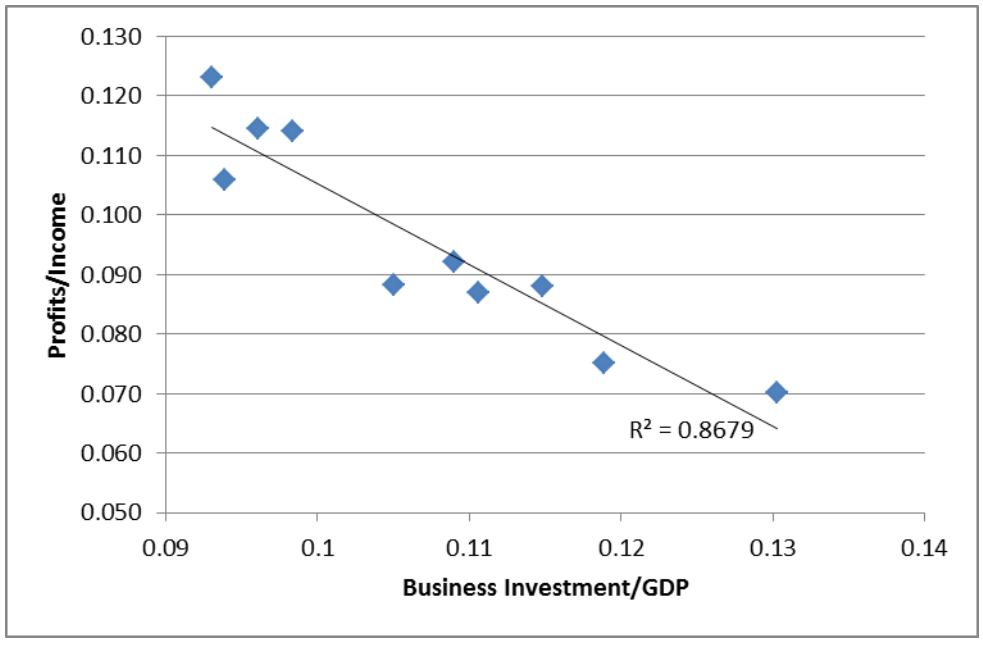


Chart 4 – Profits/domestic income and business investment/GDP, cycle averages



Note: The coefficients of determination, R^2, measure how well the data fit the trendlines. Because the variables are serially correlated between business cycles, these coefficients cannot be interpreted as a measure of statistical significance.

Chart 5 – Profits/domestic income vs. debt/GDP, cycle averages

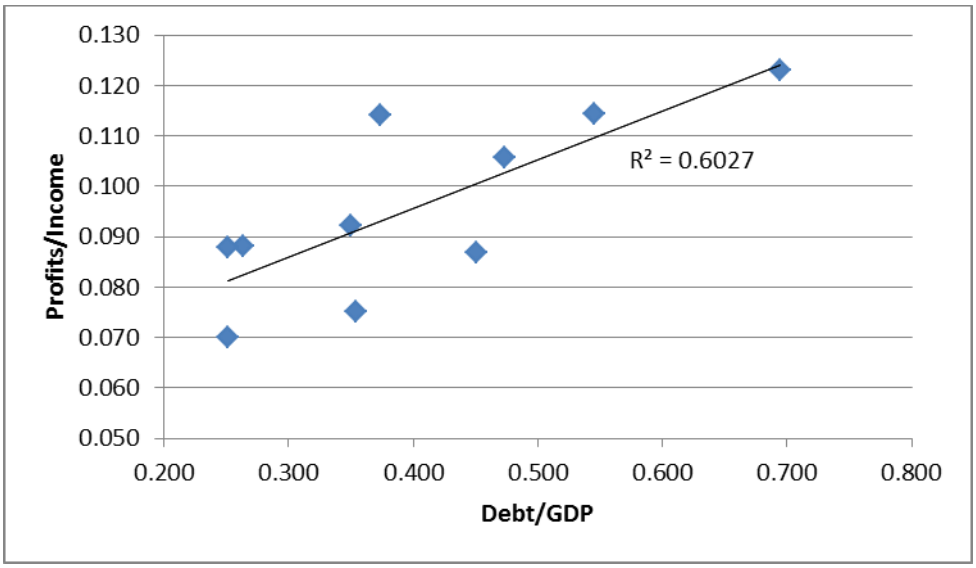
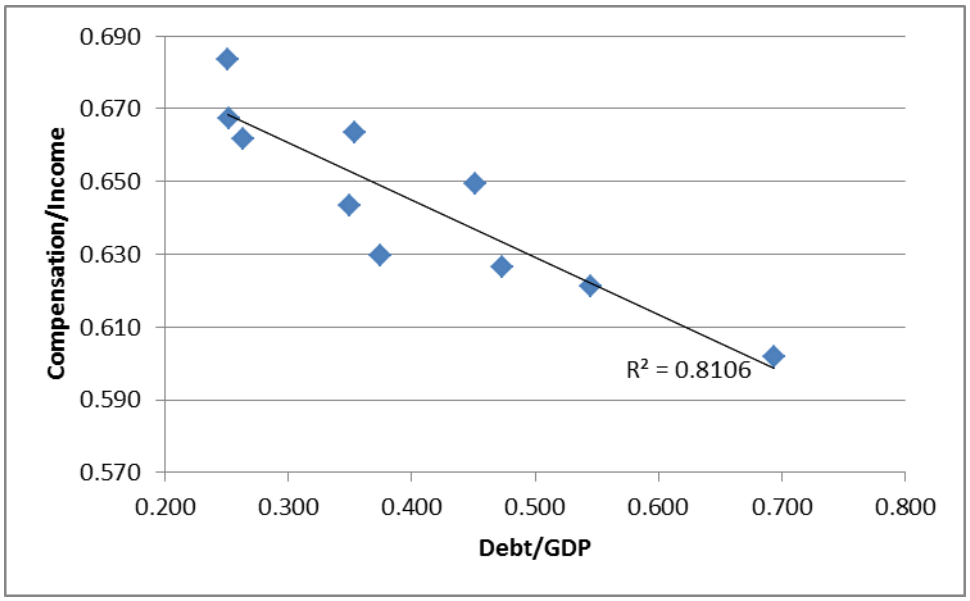


Chart 6 – Employee compensation/domestic income vs. debt/GDP, cycle averages



Note: The coefficients of determination, R^2, measure how well the data fit the trendlines. Because these variables are serially correlated between business cycles, the coefficients cannot be interpreted as a measure of statistical significance.