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# Financial Solvency of the American Government.

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FINANCIAL SOLVENCY OF THE AMERICAN GOVERNMENT

Thesis submitted in partial fulfillment of Honors

By

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### Abstract

The main topic of this paper is the financial solvency, or “the ability to pay all debts,” of the United States government (“solvency,” n.d.). The questions posed and analyzed are 1) is the American government solvent, 2) did Standard and Poor’s accurately downgrade the American debt, and 3) how does the national debt affect the solvency of the American government. To determine the solvency and effects of debt, analysis of financial information for America and nine other countries, grouped according to their credit rating is used. Solvency is determined by credit rating for this analysis; a country with a high credit rating of AAA will be considered extremely solvent, with each downgrade showing a more at risk country. The appropriate credit rating for the United States will be determined by comparing the information and noting where the United States stands in relation to the other countries for four key economic indicators. Also, analysis of standard lending rules applied to America’s financial information shows whether or not the amount of debt America holds is safe compared to what requirements are expected of individuals. Appendices show more detailed solvency analyses for the ten countries, at present and over the past thirty years.

The results of the study show that solvency could be a future problem for the American government. It has only adequate capacity to repay its debt and should not have received a AA+ rating from Standard and Poor’s. A BBB+ rating would have been more appropriate. Also, applying standard lending rules to the American debt shows that it exceeds the 40% debt-to-income standard, making the likelihood of debt repayment, or solvency, low based on standards used in the financial lending sphere.

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### I. Introduction and Thesis Statement

With the recent financial crisis of 2008 and the downgrade of the American government from AAA to AA+ by Standard and Poor's, many American citizens are concerned about the financial solvency of the American government ("S&P ratings sovereign," 2012). Another point of concern is the high amount of national debt. While the United States has become a major player in the global economy, some now doubt whether the country will be able to continue its current debt policy.

Many financial writers have discussed the ideas of solvency and the national debt. First, John Steele Gordon has written about the general definition of the national debt and what should be included. Second, Andrew Abel and Barry M. Ferguson have detailed the implications of how the government runs the Social Security Trust Fund. Third, David Weliver has explained standard lending rules that apply to individuals.

While these articles offer great insight individually, bringing these ideas all together can give an idea of whether the solvency of the American government might be an issue. Comparing these articles to current financial data for the United States shows whether the debt makes the government at risk of default as so many researchers suspect it might be. Analyzing the data and comparing the United States to other countries and applying Gordon, Abel, Ferguson, and Weliver's articles to the data can show how well the government can maintain its current debt load, what credit rating is most appropriate, and whether the amount of the United States national debt is too high relative to standard lending rules. The American government is on a path that might be unsustainable, should not have received such a high rating from Standard and Poor's, and has a debt-to-income so high it is at risk of default.

## II. Literature Review

To discuss the national debt, there must be a definition of what is included in the term. In “A Short Primer on the National Debt,” John Steele Gordon (2011) states that “the total national debt of the United States is the sum of all federal bills, notes and bonds that have been issued by the Treasury and not yet redeemed.” This total debt includes Treasury securities held by individuals, governments, and financial institutions. Gordon also discusses intra-governmental debt, Treasury bonds that are held by the government itself to fund different sections of the government, and asks if these securities should be included in the amount of national debt. According to his previous definition of the total national debt, these securities should be included. This definition of the national debt, including the intra-governmental debt, will be used for this paper. The largest majority of these intra-governmental securities are found in the Social Security Trust Fund. Gordon offers three solutions, “cut spending elsewhere, raise taxes, or borrow the money in the bond market, thus converting intra-governmental debt into publicly held debt.”

In conjunction with Gordon’s concerns about the Social Security Trust Fund, Andrew Abel (1992) wrote an article entitled “Can the Government Roll Over Its Debt Forever,” in which he details the idea that the United States government is running a Ponzi scheme to keep making its Social Security payments. Abel discusses how the government rolls over its debt by issuing new Treasury securities to pay for ones that are coming due. Instead of using regular income to make these payments, the government is using new debt to pay existing debt. In the business world, this is known as a Ponzi scheme and is illegal. According to Abel’s calculations, if the government continues to roll over its debt to pay Social Security, it will no longer be able to do so in the future. Eventually, this process must stop. What Abel does not do is determine

when that might happen. In the conclusion of his paper, Abel has two suggestions to reduce the debt: 1) the government must employ “an increase in tax revenues and / or 2) a cut in government expenditure” but states that “neither . . . will be universally popular.”

Barry M. Ferguson (2011) also discusses the Social Security Fund in his article “US Debt Default Will Punish Pensions.” Ferguson states that the government itself holds one third of the total Treasury debt and that this money does, in fact, help fund the Social Security program. He also discusses how a ruling by the Supreme Court in 1960 takes away the right of citizens to their Social Security benefits, even if they paid some into the system, but Congress keeps running up the debt by using Treasuries to further the Social Security Trust Fund.

To determine the level of debt the American government should hold, standard lending rules can be used. David Weliver (2010) states the common lending rule that the sum of total debts for an individual should not exceed forty percent of gross income. Also, Weliver states that a mortgage payment should not exceed twenty-eight percent of gross income. These rules will be applied to the amount of income and debt the American government holds to determine whether or not the United States meets these rules.



### III. Global Comparison of Solvency

With the recent economical collapse and recession, many people have been concerned with their country's ability to repay debt, and rightfully so. With Greece's economy spiraling downward, the question to be answered now is which countries are to follow. The downgrade of American bonds by Standard and Poor's has made all these fears even worse, to the point that Americans no longer have faith in their government to repay their debt. Compared to other countries, how does America really rank, though? Is the United States one of the countries that is about to fall apart? If so, how long will it be before a plummet occurs?

To answer these questions, a process of comparison and contrast is used. Economic ratios and figures can be calculated and analyzed for the United States and other countries to determine where the United States is in relation to nations across the globe. Four key calculations provide the basis for analysis between countries. These calculations include average percentage change in GDP, average net lending and borrowing, and average gross debt for ten countries from the time period 2009 to 2016. Looking at the actual data from 2009 to 2011 and projected data from 2012 to 2016 gives a perspective of where each country is currently and where it expects to go in the near future, allowing for a comparison showing if the United States is likely to have a solvency issue in the near future. Average percent change in GDP shows the growth in the amount of production each country has per year. If the country's GDP is expected to grow, the economy is growing also, and there will be more opportunity for government revenue from taxation. Thus, a rise in GDP can be seen as a rise in the amount of money the government has to pay its debt. Average net lending and borrowing determines whether the country is taking on more debt and causing the nation to have more debt to repay in the future. Average gross debt as a percent of GDP is the most important figure in the analysis and shows

the amount of debt the country has in relation to how much it produces. If this figure is too high, the country might have a solvency issue because the entire nation would literally be producing less per year on whole than the amount only the government holds in debt.

For comparison purposes, nine countries are divided into three groups based on their credit rating from Standard and Poor's. These groups are segregated as below. Moody's ratings are also given for comparison.

Country Group	Country	S&P Rating	Capacity to Meet Financial Commitment on Any Given Obligation	Moody's Rating
1	Germany	AAA	Extremely Strong	AAA
1	Switzerland	AAA	Extremely Strong	AAA
1	United Kingdom	AAA	Extremely Strong	AAA
1	France	AA+	Very Strong	AAA
2	Spain	A	Strong	A1
2	Ireland	BBB+	Adequate	BA1
2	Italy	BBB+	Adequate	A2
3	Portugal	BB	Possibly Inadequate	BA2
3	Greece	SD	Selectively Defaulted	CAA1

("S&P ratings sovereign," 2012)

(*Standard & poor's*, 2011)

(Damodaran, 2012)

Ideally, the United States would be an extremely solvent, AAA-rated country, but Standard and Poor's has rated it at AA+ after changing its credit policy ("S&P ratings sovereign," 2012).

Because Moody's and Fitch did not downgrade as well, the Standard and Poor's ratings will be the only ones used in this analysis of if the downgrade was accurate. Analysis and comparison of public data from the International Monetary Fund for each country shows where exactly the United States falls and what would be the appropriate credit rating. An analysis of the averages for the countries for key economic indicators follows. For more detailed solvency analysis of

individual countries for this time period, see Appendix 2. For detailed solvency analysis for the countries over the past thirty years based on more criteria, see Appendix 3.

### *Analysis of Economic Indicators*

Figure 1: Average Percentage Change in Gross Domestic Product (GDP), 2009-2011 (actual) and 2012-2016 (projected)

<u>Country</u>	<u>Subject Descriptor</u>	<u>Units</u>	<u>Scale</u>	<u>Average</u>
France	Gross domestic product, constant prices	Percent change		1.239
Germany	Gross domestic product, constant prices	Percent change		1.009
Greece	Gross domestic product, constant prices	Percent change		-0.450
Ireland	Gross domestic product, constant prices	Percent change		0.758
Italy	Gross domestic product, constant prices	Percent change		0.095
Portugal	Gross domestic product, constant prices	Percent change		0.336
Spain	Gross domestic product, constant prices	Percent change		0.681
Switzerland	Gross domestic product, constant prices	Percent change		1.450
United Kingdom	Gross domestic product, constant prices	Percent change		1.194
United States	Gross domestic product, constant prices	Percent change		1.911

According to Figure 1, the country with the highest average percent change in GDP for the time period is the United States, at 1.91%, with Greece having the lowest at -.45%. The only countries who have experienced average growth of higher than 1% are France, Germany, Switzerland, and the United Kingdom, the last three of which have AAA ratings. A higher percent of growth in GDP, *ceteris paribus*<sup>1</sup>, will result in more money being available to pay off debt and thus a higher solvency and credit rating. Even though the United States is rated the same as France at AA+, its growth surpasses that of the AAA-rated countries, suggesting that its credit rating might be understated.

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<sup>1</sup> *Ceteris paribus* is Latin for “all other things being equal”

Figure 2: Average Difference Between General Government Revenue and General Government Total Expenditures, or Net Lending/Borrowing, as a Percentage of GDP, 2009-2011 (actual) and 2012-2016 (projected)

Country	Units	General Government Revenue Average	General Government Total Expenditure Average	Difference
France	Percent of GDP	50.595	55.085	-4.490
Germany	Percent of GDP	43.984	45.150	-1.166
Greece	Percent of GDP	39.673	46.465	-6.792
Ireland	Percent of GDP	34.874	45.398	-10.524
Italy	Percent of GDP	47.180	49.767	-2.587
Portugal	Percent of GDP	41.844	46.666	-4.822
Spain	Percent of GDP	36.536	42.571	-6.035
Switzerland	Percent of GDP	34.990	34.319	0.671
United Kingdom	Percent of GDP	37.280	43.348	-6.068
United States	Percent of GDP	33.249	41.250	-8.001

In Figure 2, the United States falls on the low end of general government revenue as a percent of GDP. *Ceteris paribus*, as revenue goes up, solvency should go up as well because the nation should have more funds available to repay debt. When adding in government expenditures, however, the difference between the two is what represents solvency. Ideally, a country would have a positive difference between revenue and expenditures. A negative difference represents debt and the need for more debt each year to make each year's expenditures. In Figure 2, the only country with a positive amount is Switzerland. Germany has the next highest amount of difference, even though this number is negative. The United States falls behind even Greece, though, for this figure. The only country that is worse off by this criterion than the United States is Ireland, which is rated BBB+. Based on Figure 2, the United States deserved an even lower credit rating than AA+.

Figure 3: Average General Government Gross Debt as a Percentage of GDP, 2009-2011 (actual) and 2012-2016 (projected)

<u>Country</u>	<u>Subject Descriptor</u>	<u>Units</u>	<u>Scale</u>	<u>Average</u>
France	General government gross debt	Percent of GDP		87.042
Germany	General government gross debt	Percent of GDP		79.353
Greece	General government gross debt	Percent of GDP		164.867
Ireland	General government gross debt	Percent of GDP		106.410
Italy	General government gross debt	Percent of GDP		118.303
Portugal	General government gross debt	Percent of GDP		105.789
Spain	General government gross debt	Percent of GDP		69.021
Switzerland	General government gross debt	Percent of GDP		50.771
United Kingdom	General government gross debt	Percent of GDP		80.480
United States	General government gross debt	Percent of GDP		104.195

The most important figure when discussing solvency for a country is the amount of gross debt relative to a country's GDP. If the country does not produce more on a whole than its amount of governmental debt each year, it has a high chance of not being able to repay its debts. This figure is what ultimately sent Greece into default, and if other nations reach such high amounts as Greece did, they could possibly default also. From Figure 3, based on credit ratings, for AAA countries, this amount on average should be between 50% and 81%. Germany, Switzerland, and the United Kingdom all fall within this range. France, the other AA+ country, has general government gross debt on average of 87%. Spain, rated A, has an average of 69%, and the BBB+ countries, Ireland and Italy, are 106% and 118%, respectively. Based on this information, the United States was rated too high. With an average of 104%, the United States falls much closer to the BBB+ ratings than AA+. In reality, the United States probably should have been rated at BBB+ based on this criterion.

While this comparison is country-wide, comparing the United States as a business for this criterion would change its amount since governmental entities hold part of the American debt. Using this figure to compare the United States as a business would mean that its ratio here would

drastically decrease, falling behind Germany. For this analysis, though, the figure is assumed to remain as quoted from the International Monetary Fund, and the countries are compared based on their national average as a sovereign entity instead of as a business.

*Detailed Solvency Analysis of the United States, 2009 through 2016 (actual and projected)*

Analysis of Economic Indicators

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-3.486	3.03	1.527	1.782	2.538	3.077	3.425	3.394
Gross domestic product per capita, constant prices	National currency	Units	41,327.94	42,219.64	42,468.16	42,816.25	43,487.86	44,401.90	45,488.34	46,587.57
Gross national savings	Percent of GDP		11.459	12.532	12.782	14.121	15.172	15.901	16.268	16.316
Unemployment rate	Percent of total labor force		9.275	9.633	9.09	9.04	8.544	7.81	6.952	6.071
Employment	Persons	Millions	139.886	139.069	139.882	141.876	n/a	n/a	n/a	n/a
Population	Persons	Millions	307.374	309.997	312.891	315.878	318.894	321.939	325.013	328.116
General government revenue	National currency	Billions	4,351.99	4,494.68	4,760.67	5,058.91	5,416.56	5,792.53	6,131.60	6,500.14
General government revenue	Percent of GDP		31.222	30.941	31.601	32.648	33.873	34.846	35.242	35.616
General government total expenditure	National currency	Billions	6,140.72	5,995.49	6,213.68	6,286.80	6,407.42	6,701.04	7,112.64	7,591.75
General government total expenditure	Percent of GDP		44.054	41.273	41.246	40.572	40.069	40.311	40.881	41.597
General government net lending/borrowing	Percent of GDP		-12.833	-10.332	-9.645	-7.924	-6.196	-5.465	-5.639	-5.981
General government primary net lending/borrowing	Percent of GDP		-10.913	-8.368	-7.973	-6.313	-4.607	-3.531	-3.102	-2.822
General government net debt	Percent of GDP		60.633	68.341	72.609	78.378	82.162	84.645	86.675	88.724
General government gross debt	Percent of GDP		85.245	94.356	100.046	105.031	108.93	111.363	113.195	115.394

(“World economic outlook,” 2012)

While a negative 3.5% change in GDP in 2009 might seem like a drastic decrease, compared to all the countries, the United States experienced a decline in GDP after the financial crisis that was not necessarily high. In 2010, the country even made up for the amount of GDP lost, and from 2011 on the rates are projected to increase at a healthy rate. Per capita, the GDP is higher than that of eight of the other nine countries; only Switzerland has a higher GDP per capita than the United States.

Gross national savings, or the amount of GDP left over after consumption expenditures have been made each year, is on the lower end of the spectrum for the United States (“Gross domestic savings,” 2011). While some of the other countries have savings at 20% or more of

GDP through some years, the United States only starts at 11.5% and increases to 16.3% in 2016. The amount of savings represented by these figures is not a large amount and shows that the United States is not as solvent as the AAA-rated countries. While this seems to be of some concern, long term investments are not included in this figure, causing it to be smaller than the actual savings are.

One of the most common concerns to the average U.S. citizen in today's economy is the unemployment rate. With an unemployment rate a high 9.3% in 2009 following the financial crisis, there was little room for error when the rate rose again to 9.6% in 2010. Although the rate dropped in 2011 and is projected to keep falling, it is expected to only get as low as 6.0% by 2016.

The United States shows the highest amount of government revenue by far. With figures starting at \$4.4 in 2009 and rising to \$6.5 trillion in 2016, the American government looks extremely profitable. However, there is no room to believe that America can grow based on its amount of revenue as soon as government total expenditure comes into play. At a shocking \$1.8 trillion difference between America's government expenditures and revenues, the amount of debt the country has makes sense. While government revenues are rising and are expected to continue to rise, so are government expenditures. In 2012, the difference between the two should be \$1.2 trillion, and by 2016 the difference is projected to be \$1.1 trillion. This lack of improvement puts the United States in danger of taking on even more debt, which is accurately reflected by its projected general gross debt.

The amount of borrowing the American government has taken on is also high. With the bailout plan in 2008, the country needed to borrow 12.8% of its GDP in 2009. This number is projected to decrease, but not by much. In 2013 it should amount to about half of the 2009

figure, and it is not expected to decrease much past that. With a higher net borrowing balance than other countries, the United States is beginning to look similar to Greece. Although the United States does not start at a gross debt level 100% or higher of its GDP, it does surpass 100% in 2011 and is only expected to continue to rise after that. Comparing the United States to Greece, it might not be too much longer that the country can sustain these levels of debt. Greece started at a ratio of 127% debt to GDP in 2009; the United States is expected to hit 115% by 2016. Of course, such high amounts of debt that are only expected to grow put the United States at even higher risk for default.

Although some aspects of the data indicate that the United States is not in terrible shape, others provide great concern. Based on the difference between government expenditure and revenue and the amount of general government gross debt as a percentage of GDP, the United States should not have a AAA rating.

Figure 4: U.S. Gross Public Debt as a Percentage of GDP, 1930 to projected 2017

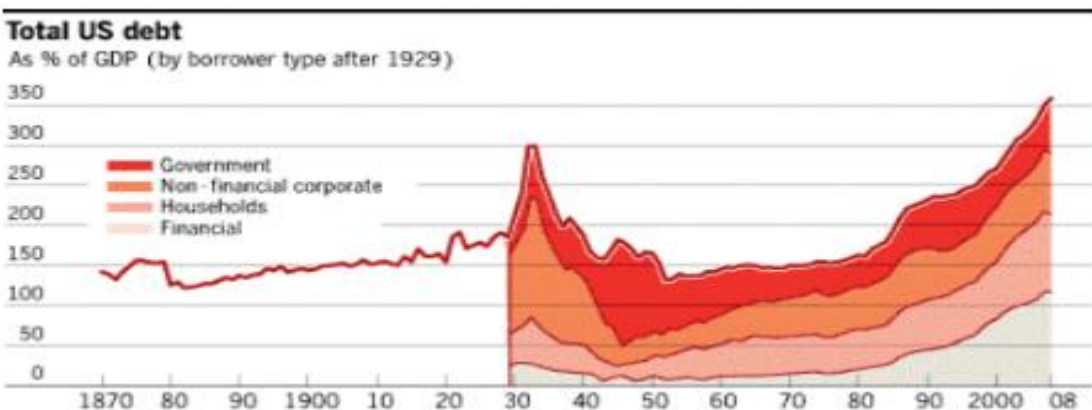


(Chantrill, 2012)



Even at the beginning of the Great Depression, America's Gross Public Debt as a percentage of GDP was well below 50%. While this number rose to over 100% in the 1940s, debt as a percentage of GDP continued to decline until 1980, when it started to rise again. According to Figure 4, over the past thirty years (see Appendix 3.4), the United States has consistently raised its debt as a percentage of GDP. Although it started under 50% in 1980, it has grown to exceed 100% in 2011, mostly increasing after the 2008 financial crisis, suggesting that the United States credit rating should not have taken so long to drop from AAA to AA+. According to Appendix 3.4, the United States increased past the AAA range between 2005 and 2010, around 2008.

Figure 5: Total US Debt as a Percentage of GDP, 1870-2008, Based on Borrower Type



(Aridas)

According to Figure 5, the total United States government debt has equaled that of non-financial corporate debt, and household debt on a steady basis. These figures have all continued to rise, however, resulting in a total debt of 350% of GDP in 2008, when the financial crisis hit. Based on this graph, the United States is borrowing at the same levels as its citizens and businesses, respectively, combined. With such a high percentage of GDP coming from the

governmental entity alone, the amount of debt the United States holds as a country might pose a serious issue for repayment.

### *Summary of Analysis*

Although the United States is the leader of GDP growth from 2009 to 2016, its other figures do not indicate that it is a very solvent nation. Based on net lending and borrowing, the United States also does not deserve a AA+ rating. The best determinant, though, gross debt as a percent of GDP, shows that the United States should have been rated at a BBB+. Based on the analysis, the United States does not have a strong capacity to repay its debt and should not have received a AA+ rating from Standard and Poor's.

If the United States were to experience more growth in GDP than debt, it could possibly achieve a AAA credit rating again in the future. For a AAA rating, based on the data and ratings for the other countries, the United States must have a debt-to-GDP ratio around 80% or below. Based on a growth of 140.35%<sup>2</sup> in debt from 2000 to 2010, the amount of growth needed by GDP for the ratio to get down to 80% is determined. In 2011, GDP was \$15.04 trillion ("CIA - the,"). Based on the 100% ratio in 2011, debt is concluded to be the same amount. The following calculation shows the amount of growth in GDP needed to achieve an 80% debt-to-GDP ratio by 2021, given the 140.35% growth debt is currently experiencing.

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<sup>2</sup> In 2000, debt was \$5628.7 billion. In 2010, debt was \$13528.82 billion. ("Government spending chart,")

$$.80 = \frac{15.04(1+x)}{15.04(1+1.4035)}$$

$$.80 = \frac{15.04(1+x)}{36.1486}$$

$$.80(36.1486) = 15.04(1+x)$$

$$28.9189 = 15.04(1+x)$$

$$1.9228 = 1+x$$

$$.9228 = x$$

Thus, GDP needs to grow by 92.28% over the ten years for the United States to obtain an 80% debt-to-GDP ratio and a AAA rating by 2021. Considering that GDP only grew 47.22%<sup>3</sup> from 2000 to 2010, it is unlikely that the United States will achieve this goal.

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<sup>3</sup> In 2000, GDP was \$9884.17 billion. In 2010, GDP was \$14551.8 billion. ("US gross domestic," )

#### IV. United States Debt Analyzed by Standard Lending Rules

One of the most prominent discussion topics in the nation recently has been the amount of debt the United States government holds. As Abel said, if citizens, financial institutions, and other countries decide to stop purchasing Treasury securities, some government programs might no longer be able to function (Abel, 1992). In this case, the United States would be forced to change either its budgeting processes or its basic governmental structure, as Greece has recently experienced. If the government were any other institution, debtors would approve it for these loans based on specified ratios. These standard lending rules can be applied to the government's current financial data to determine eligibility for a safe loan that a debtor can expect to be repaid. When making these calculations, tax receipts will be considered the country's income. In basic business and political jargon, the terms "surplus" and "deficit" represent the total amount extra that a company brought in or the total amount a company lost during the year, respectively. The surplus and deficit can thus be considered as a "net operating income," the income from normal business operations that the company has left over after all expenditures have been made at the end of the year. This use of surplus and deficit as net operating income occurs in the following analysis. All data used in these calculations comes from the United States Office of Management and Budget's historical tables, Table 1.3, Summary of Receipts, Outlays, and Surpluses or Deficits (-) in Current Dollars, Constant (FY 2005) Dollars, and as Percentages of GDP: 1940-2017.

The most basic business rule is the break-even rule, where companies attempt to bring in more than they spend. For a government to break even, it must have a zero balance or a surplus, where tax receipts are equal to or greater than government expenditures. A deficit would mean that the government did not break even. Since 1940, the American government has only had a

surplus 12 times. In 2002, the difference went from a \$128.2 billion surplus to a \$157.8 billion deficit, and the deficits have almost consistently increased since then. According to this rule, the United States is not functioning as a sustainable economic entity. Comparing the United States government to a business, however, poses a few issues. Because governments wield the power to tax, they are the ones issuing currency and determining which currency will be used to repay their debts. Also, some governments, including the United States, can print money to repay their debts instead of repaying debt out of income. Governments can also create and enforce legal contracts. These three differences between governments and businesses could make a difference in analyzing the United States according to business-related rules.

To determine whether a bank will lend money to an individual, there are two main standard lending rules (Weliver, 2010). First, the mortgage payment must not exceed 28% of the individual's gross monthly income. Second, the total of the individual's monthly mandatory payments must not exceed 40% of gross monthly income.

For the 40% rule, the sum of debts is not the entire amount of debt a person has but the sum of his *required* payments toward debt during the year. In 2010, the United States had receipts of \$2.17 trillion. Also in 2010, the United States paid \$415 billion in interest expenses alone ("Government - interest," 2012). Thus, the interest payments on the national debt account for  $415/2170$ , or 19.12% of the country's receipts. Note that the 19.12% includes only interest payments, so it meets the 28% rule. Adding in fixed expenditures, like an individual would with his credit card debt, car payment, etc., gives the total debt used for the 40% rule. Assuming that Social Security, Medicare, and Medicaid do not need debt funding additional to what taxpayers put into the systems, fixed spending in 2010 was around \$590 billion (Amadeo, 2012). Adding this figure to the interest payment, the result is total mandatory payments of \$1.005 trillion.

Dividing this figure by the \$2.170 trillion of receipts, total debt payments are 46.31% of receipts, which does not meet the standard.

In lending, if one standard rule is broken, the lender usually will not make the deal. The American government already has obtained the loan, however. Based on this analysis, the amount of debt the American government holds is too high because it exceeds the 40% standard. A loan based on this percentage of debt to income would be considered at risk or subprime. In fact, people are starting to figure this out about the American debt. With the Federal Reserve purchasing most of the Treasury issuance last year, the amount of debt appears lower (Goodman, 2012). According to Goodman, if the Federal Reserve weans the Treasury from this “subsidized spending and borrowing,” and natural buyers begin purchasing the securities again, the deficit incurred might convince the government to attempt to reduce its high amount of debt (Goodman, 2012). If the government can reduce its amount of debt, it might get back under the 40% standard and once again be operating with debt levels that are sustainable by individuals and businesses.

### V. Summary and Conclusions

The United States is experiencing a decreased likelihood of ability to repay its debt, bringing into question its future solvency. This analysis shows that the American government might not be able to sustain its level of debt in the future. Although Standard and Poor's only downgraded the American debt to AA+, it should have been downgraded lower based on net lending/borrowing and gross debt as a percent of GDP. The United States also does not meet the standards for its debt that its individual citizens are required to meet to get a loan. If the United States were an individual, it would not be able to borrow as much money as it has.

Although this analysis shows discouraging results, the United States does have options for increasing its future ability to maintain solvency and achieving a higher credit rating. As Abel said, the government can either increase taxation or reduce expenditures (Abel, 1992). The United States also could print more money, inflating the money supply. Increasing the money supply would decrease the value of the currency and could cause a decline in the American economy, so it is not the most feasible option. Increasing taxation would provide more revenue and cash flow for the government to repay its debt. Decreasing expenditures would allow for more of the revenue the government already collects to be spent paying off the principal of its debt. To pay off this principal, the Treasury could buy back securities. These purchases would also eliminate the interest payments the government would have to make when before these securities come due.

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Appendix 1: Ideal Data Results for Current, Projected, and Historic Period Analysis

In 2009, immediately following the financial crisis of 2008, the percentage change in the gross domestic product (GDP) for many countries was negative. Given the conditions of the global economy, this negative change was to be expected; what truly matters about the analysis of GDP is what happened and is projected to happen after that initial drop. Ideally, a country's GDP as a percentage change and GDP *per capita*<sup>4</sup> will continue to rise. This incline results from a growth in production of the country overall and suggests that the economy is in an expansionary period, where there will be higher employment and inflationary pressure on prices. The government will be able to collect more revenue during this time period, allowing it more cash flow to repay its debt. To keep this expansionary period sustainable for a longer amount of time, the best growth to see in GDP is small, not drastic.

For the unemployment rate, a lower number is better. Typically, any time the percent of the total labor force that is unemployed falls below five percent, the country is said to have full employment. Again, given the recent financial crisis, these numbers should be fairly high in 2009. The unemployment rate should decline between 2009 and 2016, though. As far as the actual number of people employed, if the economy is growing, this number should be expected to rise. A low unemployment rate allows for more taxation and revenue, increasing solvency.

General government revenue should increase over time and should be above general government total expenditure. Ideally, *ceteris paribus* ("all other things equal"), these two would have an inverse relationship, with general government revenue constantly increasing and general government expenditure decreasing. When the general government total expenditure is higher than revenue, however, the government has much less of a likelihood of repaying its debt.

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<sup>4</sup> (per "head," directly translated from the Latin)

General government net lending/borrowing and general government primary net lending/borrowing should both be positive, representative of a situation in which the government is lending money to other countries, financial institutions, *et cetera*, that can repay the money with interest to provide revenue. If the lending/borrowing as a percent of GDP is positive, it should rise to show improvement. If it is negative, it should approach zero. A solvent country need not necessarily have a positive ratio for this category, but it should show improvement if the ratio is negative and be should approaching zero for the country to have high solvency.

Finally, general government net debt and general government gross debt as percentages of GDP should be low. A lower ratio in this category indicates a higher level of solvency for the given country. When the ratio exceeds 100%, the government's net or gross debt, respectively, is higher than the production of the entire country. Countries whose debt thus exceeds their GDP have a harder time repaying such debt and likely will be considered insolvent with a lower credit rating.

Appendix 2: Detailed Solvency Analysis for Current and Projected Periods

*Appendix 2.1: France*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-2.632	1.384	1.652	1.399	1.867	2.099	2.062	2.081
Gross domestic product per capita, constant prices	National currency	Units	27,943.20	28,184.48	28,519.58	28,786.79	29,190.68	29,667.56	30,141.19	30,628.33
Gross national savings	Percent of GDP		17.488	18.554	18.55	19.217	19.457	19.555	19.81	20.028
Unemployment rate	Percent of total labor force		9.5	9.787	9.518	9.178	8.976	8.599	8.288	8.187
Employment	Persons	Millions	25.573	25.569	25.736	25.947	n/a	n/a	n/a	n/a
Population	Persons	Millions	62.637	62.96	63.248	63.538	63.829	64.121	64.414	64.709
General government revenue	National currency	Billions	928.818	957.591	1,006.96	1,048.39	1,082.75	1,126.49	1,172.06	1,221.10
General government revenue	Percent of GDP		49.164	49.544	50.625	51.188	51.024	51.071	51.071	51.071
General government total expenditure	National currency	Billions	1,071.91	1,094.49	1,124.01	1,143.08	1,167.01	1,195.01	1,223.91	1,254.85
General government total expenditure	Percent of GDP		56.738	56.627	56.51	55.811	54.995	54.178	53.331	52.482
General government net lending/borrowing	Percent of GDP		-7.574	-7.083	-5.885	-4.623	-3.971	-3.107	-2.259	-1.411
General government primary net lending/borrowing	Percent of GDP		-5.349	-4.853	-3.437	-2.098	-1.398	-0.357	0.627	1.531
General government net debt	Percent of GDP		71.987	76.5	80.985	83.545	84.88	84.924	83.856	81.857
General government gross debt	Percent of GDP		79.011	82.326	86.811	89.371	90.706	90.75	89.681	87.683

("World economic outlook," 2012)

France's gross domestic product dropped in 2009 immediately following the financial crisis of 2008, as expected. After this drop, though, the country's GDP has grown each year at a rate around 1.4%. In 2012, GDP is expected to rise again at around 1.4%, and between 2013 and 2016, analysts predict that the percent change in GDP will climb to over 2%. Per capita, GDP has grown and is expected to grow slightly each year at a constant rate. In other words, France is becoming and should become more productive in the future. While France's GDP is increasing, the country is and will be saving more and/or spending less as a percentage of GDP.

Unemployment in France has been high the past three years and is projected to stay high, yet decrease, until 2016. After a jump from 9.5% to 9.8% in 2010, the country's unemployment rate has dropped and is projected to continue dropping from 2012 to 2016. The raw employment numbers themselves, however, are expected to grow by about 200 million people each year. Population is on a steady increase as well, growing by about 300,000 people per year.

The government revenue in France is growing at a safe rate as well. From about 900 billion in 2009, it has grown to 1 trillion in 2011 and is projected to reach €1.2 trillion by 2016. Government expenditure, however, is rising also, and has been well over the revenue from 2009 to 2011. Each of these years the expenditures in France have topped the revenue. The difference in the two, however, has steadily declined. From 2012 to 2016, the difference is expected to remain low, only about €100,000 greater.

As a result of the total expenditure being greater than government revenue, France has constantly had to borrow money, showing a net borrowing in 2009 of about 7.6% of GDP. This number drops to 5.9% in 2012 and is expected to keep dropping until it is a very low amount of net borrowing, at 1.411% of GDP. While the net borrowing is expected to decrease in France, the government's gross and net debts are both expected to increase. Its gross debt has shot from 79.0% of GDP to 86.8% in 2011. After this incline, gross debt is expected to continue to grow until it hits 90.7% in 2014 but then should fall to 87.7% in 2016.

Overall, France has is solvent for the current time period for GDP, employment, and revenue. The main problem with France is its growth in total expenditure, but the decline to a lower difference between expenditure and revenue, as well as the decline in net borrowing will enable the country to be even more solvent in the future. The only major concern with France is its expected rise to a general gross debt that is just over 90% of GDP.

*Appendix 2.2: Germany*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-5.078	3.562	2.725	1.273	1.502	1.499	1.295	1.293
Gross domestic product per capita, constant prices	National currency	Units	27,918.30	28,970.56	29,819.68	30,259.84	30,776.02	31,300.02	31,768.77	32,244.14
Gross national savings	Percent of GDP		22.173	23.04	24.145	24.363	24.539	24.706	24.544	24.353
Unemployment rate	Percent of total labor force		7.742	7.083	6.001	6.151	6.389	6.263	6.132	5.991
Employment	Persons	Millions	40.313	40.505	40.99	41.004	n/a	n/a	n/a	n/a
Population	Persons	Millions	81.767	81.603	81.44	81.277	81.115	80.952	80.791	80.629
General government revenue	National currency	Billions	1,066.04	1,082.09	1,133.09	1,157.70	1,179.47	1,203.28	1,227.95	1,255.08
General government revenue	Percent of GDP		44.895	43.689	44.12	44.073	43.956	43.767	43.687	43.687
General government total expenditure	National currency	Billions	1,138.71	1,163.72	1,175.90	1,186.46	1,200.55	1,204.52	1,222.20	1,243.01
General government total expenditure	Percent of GDP		47.956	46.985	45.787	45.168	44.742	43.812	43.482	43.266
General government net lending/borrowing	Percent of GDP		-3.06	-3.296	-1.667	-1.095	-0.786	-0.045	0.205	0.42
General government primary net lending/borrowing	Percent of GDP		-0.755	-1.153	0.388	0.847	1.23	1.921	2.067	2.138
General government net debt	Percent of GDP		56.375	57.555	57.174	56.995	56.58	55.266	55.266	55.266
General government gross debt	Percent of GDP		74.143	83.964	82.643	81.896	80.957	79.058	77.123	75.036

("World economic outlook," 2012)

Germany's GDP dropped by 5.1% in 2009, but began growing again in 2010. While this growth is encouraging, the amount of growth slowed to the country's GDP only growing by 1.3% in 2012 and being projected to grow at rates between 1.2% and 1.5% through 2016. GDP per capita, however, is on a steady incline and is projected to remain on that path through 2016. For Germany, GDP is still projected to continually grow, just at varying rates. The growth might fluctuate, but should preferably not drop so much in 2012. Germany's gross national savings are also expected to increase slightly throughout the time span. An increase from 22.2% of GDP to 24.1% in GDP from 2009 to 2011 looks encouraging, but this amount levels off and remains around 24% throughout 2016.

Germany does not seem to be as affected as France by the financial crisis in the unemployment area. From 2009 to 2011, unemployment dropped from 7.7% to 6.0%, but this number is expected to rise again until 2014. The population in Germany is expected to drop over time, adding to the problem of the increased unemployment rate. With less people in the population, that should leave more room for jobs, so the unemployment rate should go down instead of rise.

Germany's general government revenue is expected to increase, but, again, the total expenditure is currently higher than the revenue and is expected to remain as such until 2015. Although government expenditures still are expected to increase over the time period, they are increasing at a slow rate. Germany basically is projecting to cut costs enough that it will run a budget surplus beginning in 2015. Compared to France specifically, the difference between Germany's total expenditure and revenue started at a much lower amount in 2009, leaving the possibility open that a slower incline in expenditures than that of revenue could possibly bring the two together and allow revenue to surpass income. Germany's net lending and borrowing has been a low borrowing amount, at 3.1% of GDP in 2009. This rate is expected to drop to -.04% in 2014, then turn into a net lending balance. The government's gross debt rose 10% from 74.1% to 84.0%. After this increase, the gross debt as a percent of GDP is expected to decline to 75% in 2016.

Because GDP, employment, and government revenue are expected to slowly grow over time, and the amount of debt is expected to decline, Germany is solvent according to this data.



*Appendix 2.3: Greece*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-2.339	-4.354	-5	-2	1.5	2.3	3	3.296
Gross domestic product per capita, constant prices	National currency	Units	16,103.40	15,371.99	14,588.81	14,284.17	14,486.85	14,809.68	15,244.82	15,739.42
Gross national savings	Percent of GDP		5.117	4.103	4.011	4.293	5.193	6.687	8.994	11.671
Unemployment rate	Percent of total labor force		9.375	12.458	16.484	18.488	18.987	18.486	17.987	17.237
Employment	Persons	Millions	4.511	4.389	4.143	4.036	n/a	n/a	n/a	n/a
Population	Persons	Millions	11.161	11.183	11.194	11.204	11.213	11.221	11.228	11.233
General government revenue	National currency	Billions	87.716	89.903	88.497	88.397	89.619	92.701	94.471	93.816
General government revenue	Percent of GDP		37.323	39.059	40.071	40.72	40.552	40.879	40.285	38.498
General government total expenditure	National currency	Billions	124.175	113.887	106.125	103.319	101.021	99.045	101.067	100.569
General government total expenditure	Percent of GDP		52.837	49.479	48.053	47.594	45.711	43.677	43.098	41.269
General government net lending/borrowing	Percent of GDP		-15.513	-10.42	-7.982	-6.874	-5.159	-2.798	-2.813	-2.771
General government primary net lending/borrowing	Percent of GDP		-10.268	-4.948	-1.294	0.792	3.258	5.655	5.06	4.436
General government net debt	Percent of GDP		127.1	142.757	153.083	175.432	173.565	163.64	149.773	147.472
General government gross debt	Percent of GDP		127.1	142.757	165.559	189.149	187.944	178.53	165.057	162.839

(“World economic outlook,” 2012)

Greece, the only country that has defaulted, has the worst GDP percentage changes out of any of the other countries. While every other country shows positive improvement, the only positive growth Greece shows in its GDP is in the projections for the future. The GDP per capita is also significantly lower than that of any other country. Gross national savings in single digits, along with unemployment rates in double digits, explain the current state of Greece’s economy. Projections do expect gross national savings to grow, but unemployment rates of 16.5% in 2011 and 18.5% in 2011 do not bode well for the future, no matter what the projections might be.

Gross revenue in Greece has grown only slightly but is projected to grow more in the next few years. How can analysts expect a country to do so much better when it has performed so badly in the past? With total government expenditures well above government revenue, no wonder Greece is in the shape it is in right now. Surprisingly enough, the difference in the two is not as great as in some other countries. With government net lending and borrowing at -15.5% in 2009, the best improvement the country has reached in 2011 is -8% of GDP. Although the projections are that net borrowing will decrease to 2.8% in 2016, these projections are extremely unlikely to actually occur given the situation of the difference between revenue and expenditures.

The most disturbing section of Greece's figures is the general government gross and net debts. In 2009 and 2010, these were actually the same, but gross debt surpassed net debt in 2011, and this difference is projected to keep increasing through 2016. Starting in 2009 general government gross debt being 127.1% of GDP, the country was completely set up to fail economically. Increasing gross debt at all over 100% is dangerous, but with this ratio expected to hit almost 190% in 2012, is it possible for Greece to even survive? Even with a decrease, this figure is still expected to be 162% in 2016. Such high amounts of debt compared to what the country actually produced are the most likely culprit behind Greece's current situation.

Greece is obviously the most insolvent country in the group and an example of where the United States could be if it does not start making some serious changes to its economic system.

#### *Appendix 2.4: Ireland*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-6.995	-0.43	0.363	1.484	2.181	2.845	3.302	3.311
Gross domestic product per capita, constant prices	National currency	Units	36,013.72	35,767.55	35,030.83	35,666.53	36,406.07	37,403.58	38,600.10	39,838.37
Gross national savings	Percent of GDP		11.415	11.528	11.756	11.821	11.471	11.895	12.053	12.512
Unemployment rate	Percent of total labor force		11.825	13.625	14.3	13.9	13.2	12.4	11.2	10.5
Employment	Persons	Millions	1.929	1.848	1.82	1.83	n/a	n/a	n/a	n/a
Population	Persons	Millions	4.459	4.471	4.581	4.566	4.571	4.576	4.58	4.585
General government revenue	National currency	Billions	54.028	52.999	54.433	56.719	58.969	61.647	65.082	67.965
General government revenue	Percent of GDP		33.642	33.976	34.602	35.211	35.337	35.357	35.535	35.328
General government total expenditure	National currency	Billions	76.828	102.88	70.661	70.561	70.343	69.383	72.621	75.175
General government total expenditure	Percent of GDP		47.839	65.952	44.917	43.804	42.154	39.793	39.652	39.076
General government net lending/borrowing	Percent of GDP		-14.197	-31.977	-10.315	-8.593	-6.816	-4.437	-4.117	-3.747
General government primary net lending/borrowing	Percent of GDP		-12.35	-28.855	-6.757	-4.381	-1.463	1.343	1.824	2.189
General government net debt	Percent of GDP		42.309	78.042	98.751	104.64	107.435	105.697	103.144	100.31
General government gross debt	Percent of GDP		65.245	94.924	109.273	115.433	118.303	117.662	116.132	114.305

(“World economic outlook,” 2012)

For Ireland, the drop in GDP in 2009 was harsher than that for other countries. The country rebounded, though, and brought the GDP back up in 2011. It is projected to keep rising through 2016 with the percent change getting higher each year. Gross national savings as a percent of GDP have continued to rise despite the situation. Unemployment in 2009 was at an

already high rate of 11.9%, but in 2010 and 2011 it got even worse, ending up at 14.3%.

Although this number is projected to decrease over the next few years, it still should remain at least 10%, if not well over.

Ireland's general government revenue as a percent of GDP has consistently risen between 2009 and 2011 and is expected to sustain at least the same amount of growth until 2016. In actual Euros, though, the government revenue dropped slightly from 2009 to 2010, due to the drop in GDP. Total expenditure for Ireland began at a high enough amount over revenue, but when it rose from a 3/2 ratio of total expenditure to revenue in 2009 to being double, that was too much. Apparently the government agreed, however, because it fell again in 2011 and is expected to remain level while revenues are expected to rise, allowing the government to make enough money to cover its spending. As a result of the 2010 drastic change in expenditures, government net lending and borrowing also surpassed an extremely high and dangerous amount, with a -32% net borrowing in 2010, but this amount decreased again to a normal basis and is expected to decrease even more until 2016. The general government gross debt, however, is a major concern. In 2011, the country had debt 109.3% of GDP; this number is only expected to rise. Without changing this policy, regardless of anything else, Ireland is one of the more insolvent countries in the group and is headed down the same path Greece took.

*Appendix 2.5: Italy*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-5.217	1.296	0.639	0.323	0.54	0.8	1.14	1.24
Gross domestic product per capita, constant prices	National currency	Units	20,077.20	20,237.87	20,273.58	20,251.62	20,279.51	20,366.03	20,528.06	20,718.02
Gross national savings	Percent of GDP		16.826	16.901	16.458	16.911	17.736	18.332	18.66	18.935
Unemployment rate	Percent of total labor force		7.808	8.4	8.2	8.5	8.6	8.3	8	7.8
Employment	Persons	Millions	23.02	22.903	23.045	23.061	n/a	n/a	n/a	n/a
Population	Persons	Millions	60.045	60.34	60.619	60.881	61.125	61.352	61.562	61.754
General government revenue	National currency	Billions	707.018	713.032	729.944	760.344	794.083	817.445	842.539	869.925
General government revenue	Percent of GDP		46.523	46.037	45.925	46.914	47.895	48.048	48.052	48.045
General government total expenditure	National currency	Billions	787.593	782.47	794.184	798.524	813.118	835.922	862.401	890.69
General government total expenditure	Percent of GDP		51.825	50.521	49.967	49.27	49.043	49.134	49.184	49.192
General government net lending/borrowing	Percent of GDP		-5.302	-4.483	-4.042	-2.356	-1.148	-1.086	-1.133	-1.147
General government primary net lending/borrowing	Percent of GDP		-0.978	-0.325	0.535	2.626	4.141	4.452	4.484	4.574
General government net debt	Percent of GDP		97.132	99.351	100.439	100.704	99.643	98.42	96.688	94.835
General government gross debt	Percent of GDP		116.066	118.995	121.065	121.385	120.105	118.403	116.319	114.089

(“World economic outlook,” 2012)

While Italy, like the other countries, experienced a decline in GDP in 2009, it rose in 2010 and 2011 and is projected to rise again from 2012 to 2016. The amount of growth, however, is not exactly ideal. With changing, very low percentages of increase, growth in GDP over the next few years seems to be no more than happenstance. Gross national savings also looks to be a small problem. While it is increasing as a percent of GDP, the change from year to year is minimal and cannot be expected to truly help the country. Unemployment also seems to be an issue as has grown and is expected to grow from an understandable 7.8% in 2009 to 8.6% in 2013 while most other countries show declining unemployment rates.

Italy’s general government revenue has been on the rise, growing 22 billion Euros between 2009 and 2011 and is expected to increase, finally showing a sign of encouragement. This encouragement is short-lived, however, because the amount of revenue as a percentage of GDP fluctuates over the entire eight-year time span where some countries experience growth. Again, expenditures remain higher than revenues, showing another sign of insolvency. Although the difference is expected to decrease in the future, in 2016, Italy still will have a deficit of about 20.5 billion Euros. Primary net lending and borrowing for Italy actually is better than the other

countries, though. Although Italy does run a net borrowing amount, it starts at only 5.3% in 2009 and is expected to gradually decrease over time. The gross debt, however, seems to be a great issue. Italy is ahead of Ireland on government gross debt, starting at 116.1% of GDP in 2009. This rate increased until 2012, but it is expected to slowly decrease between 2012 and 2016.

Most of these figures paint a bad picture for Italy's future. Although the numbers might look scary, there is room for improvement, and Italy does seem to be taking small steps to make its government more solvent.

#### *Appendix 2.6: Portugal*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-2.507	1.331	-2.159	-1.844	1.19	2.453	2.22	2
Gross domestic product per capita, constant prices	National currency	Units	15,052.78	15,238.12	14,880.97	14,582.54	14,735.39	15,079.06	15,399.71	15,697.59
Gross national savings	Percent of GDP		9.152	9.206	8.545	10.361	12.162	13.245	14.548	16.096
Unemployment rate	Percent of total labor force		10.633	12.042	12.215	13.352	13.397	12.372	11.139	10.173
Employment	Persons	Millions	5.014	4.937	4.864	4.814	n/a	n/a	n/a	n/a
Population	Persons	Millions	10.627	10.638	10.658	10.675	10.69	10.703	10.713	10.72
General government revenue	National currency	Billions	66.967	71.664	72.22	72.107	73.818	76.718	79.473	82.161
General government revenue	Percent of GDP		39.723	41.497	42.179	42.299	42.235	42.284	42.28	42.256
General government total expenditure	National currency	Billions	84.006	87.446	82.263	79.764	79.077	80.972	83.091	85.46
General government total expenditure	Percent of GDP		49.829	50.635	48.044	46.791	45.245	44.629	44.205	43.952
General government net lending/borrowing	Percent of GDP		-10.107	-9.138	-5.865	-4.492	-3.009	-2.345	-1.925	-1.697
General government primary net lending/borrowing	Percent of GDP		-7.363	-6.277	-1.851	0.131	1.88	2.634	3.003	3.218
General government net debt	Percent of GDP		78.79	88.698	101.809	107.572	110.708	110.378	108.319	106.272
General government gross debt	Percent of GDP		83.01	92.919	106.03	111.793	114.928	114.599	112.54	110.493

(“World economic outlook,” 2012)

For a country in the most insolvent group, Portugal experienced a smaller amount of decline of GDP in 2009 than expected, but the good fortune lasted only until 2011, when the country went from an increase in GDP to a decrease again. GDP is expected to decline even further in 2012, then rise slowly. The growth rate in GDP fluctuates more than it should over the eight-year span, showing much insolvency for the country. Gross national savings as a percent of GDP also fluctuated from 2009 to 2011, but it is projected to increase. The unemployment

rate has risen and should continue to rise through 2013, when it should start falling again.

Considering that all the rates are above ten percent, however, Portugal does not look like the ideal place to be an employee or citizen.

Portugal has experienced a small increase in general government revenue from 2009 to 2011. The amount of revenue is expected to slowly rise through 2016. Expenditures started at 17 billion Euros higher than revenue, but by 2011 were only 10 billion Euros higher. In 2016, they are projected to be a mere 3 billion Euros higher than revenue. With Portugal working on reducing expenditures relative to revenues, the country's net lending and borrowing should be expected to improve. From 2009 to 2011, Portugal cut its net borrowing almost in half to 5.9%, and projections show it reaching a borrowed amount of 1.7% of GDP in 2016. Also, although the amount of government gross debt rose drastically by 23 percentage points of GDP from 2009 to 2011, the number is expected to rise only slightly until 2014 then begin to fall.

Like Italy, Portugal seems to be in bad shape but is also taking steps that will lead it in the right direction for the future.

*Appendix 2.7: Spain*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-3.722	-0.147	0.775	1.123	1.769	1.863	1.945	1.845
Gross domestic product per capita, constant prices	National currency	Units	14,660.12	14,578.40	14,651.09	14,779.08	15,008.38	15,253.38	15,515.07	15,766.90
Gross national savings	Percent of GDP		19.251	18.435	18.051	18.212	18.719	19.238	19.411	19.545
Unemployment rate	Percent of total labor force		18.01	20.065	20.7	19.7	18.5	17.54	16.6	15.7
Employment	Persons	Millions	19.181	18.744	18.596	18.622	n/a	n/a	n/a	n/a
Population	Persons	Millions	45.828	46.018	46.144	46.258	46.357	46.462	46.567	46.669
General government revenue	National currency	Billions	365.4	379.5	400.1	411.6	427.4	442.8	460.1	478.5
General government revenue	Percent of GDP		34.671	35.715	36.792	36.886	37.048	37.032	37.039	37.107
General government total expenditure	National currency	Billions	482.7	477.7	466.9	469.2	478.1	491.4	510.7	531
General government total expenditure	Percent of GDP		45.801	44.956	42.935	42.048	41.443	41.096	41.112	41.178
General government net lending/borrowing	Percent of GDP		-11.13	-9.242	-6.143	-5.162	-4.395	-4.064	-4.073	-4.071
General government primary net lending/borrowing	Percent of GDP		-9.877	-7.849	-4.414	-3.074	-2.098	-1.43	-1.167	-0.861
General government net debt	Percent of GDP		41.901	48.749	56.048	58.707	61.337	63.375	64.658	65.947
General government gross debt	Percent of GDP		53.259	60.117	67.423	70.151	72.805	74.866	76.13	77.416

(“World economic outlook,” 2012)

For Spain, gross domestic product as a percent of GDP is a bit of a problem. Although the country started out with a smaller decrease in GDP than some, it did not recover in 2010. Through 2016, GDP is expected to rise, but the growth is neither high nor level. Gross national savings also represents a problem. Instead of increasing, in 2010, the amount of savings as a percent of GDP actually dropped. It dropped again in 2011 but is expected to slowly rise over the remainder of the time span. Unemployment in Spain reached an astronomical amount, surpassing 20% in 2010. While these rates are decreasing and are expected to continue to decrease, they should only drop to 15.7% by 2016. This problem very much decreases the solvency of Spain.

While Spain has a relatively amount of government revenue, its expenditures are even higher. The difference between expenditures and revenue for Spain in 2009 was 117 billion Euros. This extremely high amount of deficit declined to only 65.8 billion Euros in 2011 and is expected fluctuate some until it hits 53.5 billion Euros in 2016. Spain does seem to be attempting to make an effort, but its amount of effort might not be enough to help. Spain’s net borrowing was high in 2009 and has not decreased much and is not expected to decrease to the

point that other countries have. Although this information makes Spain look like an extremely insolvent country, Spain is not so bad off as to be compared with Portugal or Greece.

### Appendix 2.8: Switzerland

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-1.878	2.714	2.148	1.418	1.8	1.8	1.8	1.8
Gross domestic product per capita, constant prices	National currency	Units	62,592.50	63,907.85	64,891.04	65,418.88	66,199.23	66,988.88	67,787.95	68,596.55
Gross national savings	Percent of GDP									
Unemployment rate	Percent of total labor force		3.561	3.64	3.449	3.355	3.102	2.867	2.765	2.666
Employment	Persons	Millions	3.956	4.022	4.042	4.07	n/a	n/a	n/a	n/a
Population	Persons	Millions	7.742	7.789	7.836	7.883	7.93	7.978	8.025	8.074
General government revenue	National currency	Billions	186.991	190.524	199.164	202.845	208.795	215.445	222.173	228.434
General government revenue	Percent of GDP		34.909	34.605	35.112	34.911	34.95	35.075	35.179	35.179
General government total expenditure	National currency	Billions	184.106	188.543	194.81	199.386	205.599	210.146	216.76	222.868
General government total expenditure	Percent of GDP		34.371	34.245	34.344	34.316	34.415	34.213	34.322	34.322
General government net lending/borrowing	Percent of GDP		0.539	0.36	0.768	0.595	0.535	0.863	0.857	0.857
General government primary net lending/borrowing	Percent of GDP		1.179	0.963	1.447	1.272	1.175	1.474	1.467	1.442
General government net debt	Percent of GDP		53.058	52.805	50.765	49.559	48.404	47.525	46.223	44.956
General government gross debt	Percent of GDP		54.826	54.524	52.435	51.188	49.989	49.067	47.722	46.414

(“World economic outlook,” 2012)

Switzerland’s GDP also experienced negative growth in 2009, but the decline was not as much as the other countries experienced. In 2010, the country experienced a healthy incline in GDP. This increase did not remain, though, and the country’s GDP still increased, but at a slower rate. In the next years to come, Switzerland’s GDP is expected to increase and stay at 1.8% increase per year. Per capita, this amounts to about 700,000 francs per person.

The unemployment rate for Switzerland is the most impressive out of all ten countries. At only a 3.6% unemployment rate in 2009, Switzerland had better than full employment when most countries were experiencing extreme unemployment. The unemployment rate rose in 2010 but is expected to go down, resulting in a 2.7% unemployment rate in 2016. Employment and population figures are also continuing to rise, but only slightly.

Switzerland’s general government revenue is also rising every year, growing from 187 billion francs to 228 billion francs in the eight-year span. As a percent of GDP, though, the



increase is not as impressive. Switzerland is the only one of the ten countries to show government revenue greater than total expenditure that is positive every year making it the most solvent. It also has experienced and plans to keep a positive net lending/borrowing, making it the only country also to be a net lender each year. Its government's gross debt is also extremely low, staying in the low 50% range and the high 40% range. Also to be noted, the government's net debt and gross debt are extremely close, only a couple percentage points apart at most during any year in the time period. Overall, Switzerland is the most solvent country and enjoys the best results in almost every category out of the ten countries.

#### *Appendix 2.9: United Kingdom*

Subject Descriptor	Units	Scale	2009	2010	2011	2012	2013	2014	2015	2016
Gross domestic product, constant prices	Percent change		-4.875	1.354	1.137	1.576	2.369	2.612	2.651	2.731
Gross domestic product per capita, constant prices	National currency	Units	20,982.54	21,121.81	21,218.03	21,408.63	21,770.73	22,192.61	22,629.88	23,093.03
Gross national savings	Percent of GDP		11.768	11.836	11.341	11.996	13.211	14.471	15.54	16.332
Unemployment rate	Percent of total labor force		7.458	7.858	7.754	7.81	7.755	7.404	6.959	6.736
Employment	Persons	Millions	28.961	29.035	29.278	29.387	n/a	n/a	n/a	n/a
Population	Persons	Millions	61.798	62.222	62.644	63.065	63.486	63.906	64.332	64.763
General government revenue	National currency	Billions	513.575	532.726	568.957	599.478	635.158	669.618	704.696	738.265
General government revenue	Percent of GDP		36.816	36.604	37.134	37.406	37.655	37.668	37.61	37.35
General government total expenditure	National currency	Billions	657.208	681.279	698.77	711.851	721.304	731.429	748.173	770.91
General government total expenditure	Percent of GDP		47.112	46.811	45.607	44.418	42.762	41.145	39.93	39.001
General government net lending/borrowing	Percent of GDP		-10.296	-10.207	-8.473	-7.012	-5.107	-3.477	-2.32	-1.652
General government primary net lending/borrowing	Percent of GDP		-8.491	-7.704	-5.627	-4.131	-2.235	-0.657	0.413	1.218
General government net debt	Percent of GDP		60.887	67.678	72.852	76.887	78.05	77.216	75.169	72.498
General government gross debt	Percent of GDP		68.317	75.502	80.762	84.766	85.948	85.101	83.06	80.386

(“World economic outlook,” 2012)

Gross Domestic Product for the United Kingdom dropped significantly in 2009 by 4.9% but rose in 2010 and is expected to steadily increase until 2016. Although the initial drop seems high, it occurred immediately following the 2008 financial crisis. This drop shows that the United Kingdom was one of the countries involved in the economic fall, representative of the fact that it is a powerful player in the global economic system. Gross national savings has also

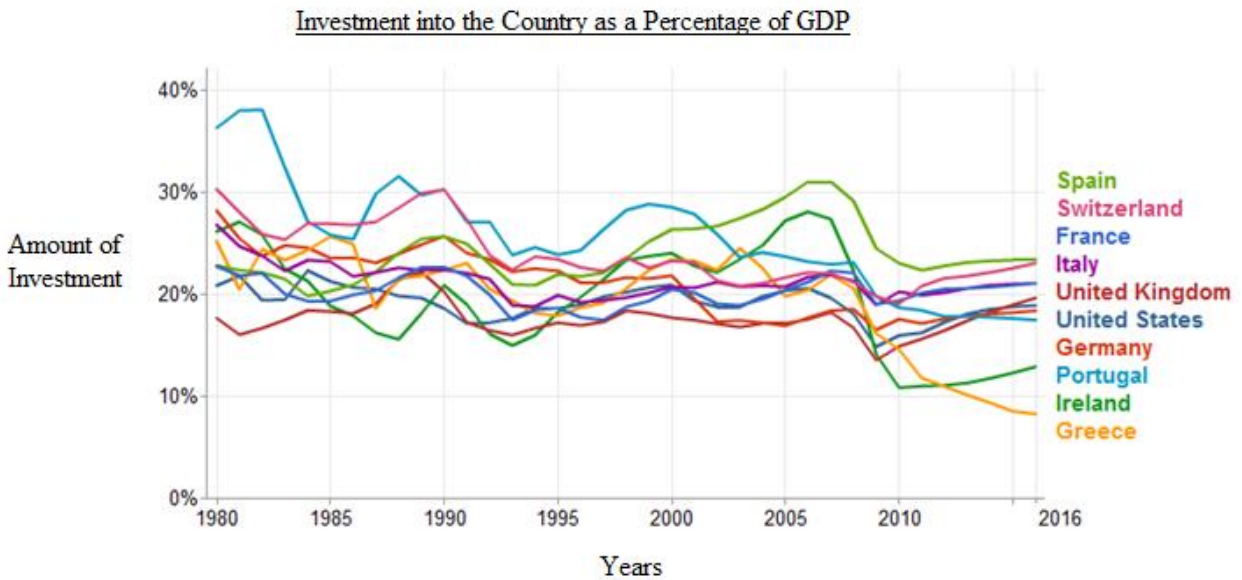
been rising, and is projected to continue to rise at a growing rate. These two areas are growing ideally for the United Kingdom, showing that it is experiencing growth in its economy.

Unemployment in the United Kingdom began in 2009 at a high 7.5% and rose again in 2010 to 7.9%, not unlike other countries that were involved in the 2008 financial crisis. While most countries show a downward trend in unemployment, the United Kingdom's projections for unemployment have the rate fluctuating from 2011 to 2016. The actual employment figures have been rising, but no projects are made for the future. Population is expected to grow, however, so unemployment being erratic presents a bit of an issue.

The United Kingdom's general government revenue is increasing, both in actual currency figures and as a percentage of GDP. While revenue is experiencing healthy growth, expenditures are also on the rise and are an entire 150 billion British pounds over the amount of revenues in 2009. This difference does not decline much until the projected figures for 2012, when it declines to 120 billion, then about 45 billion in 2015. With such a deficit, the United Kingdom does not look as solvent as before. The government had a higher net borrowing as a percent of GDP in 2009, but it fell in 2011 and is projected to decline to a balance of -1.7% of GDP in 2016, a much better rate. The government's gross debt is still not as high as some of the other countries, either. Starting at 68% in 2009, it has risen to 84.8% in 2012 and is expected to rise in 2013 slightly then fall back down. Unlike some of the countries in the following group, it is actually projected to decline. Overall, the United Kingdom is more solvent than some countries, but it is the most insolvent of those in its group.

Appendix 3: Detailed Solvency Analysis for 1980-2010

*Appendix 3.1: Investment as a Percentage of GDP*



("International Monetary Fund," 2011)

Over the past thirty years, some of the countries have somewhat reversed roles as far as total investment as a percentage of GDP. In 1980, Portugal had the highest investment percentage, but over time, it has dropped to the lower end of the spectrum. Also, Ireland and Greece plummeted from the middle of the spectrum to the very bottom.

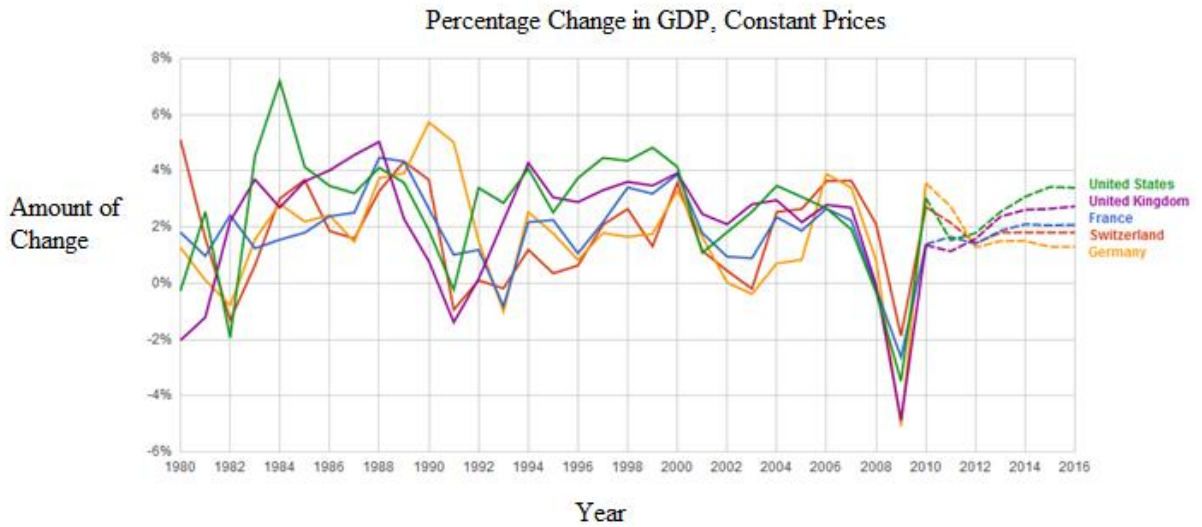
The remaining countries have sustained about the same level of total investment. The downturn of investment in Ireland and Greece suggests that lack of investment is a result of economic recessions. While the countries might perform on different levels, as the lines all combine on the same coordinate plane, the graph follows the same general shape for all the countries based on the time period. Each country dropped its amount of investment relative to GDP during the 2008 financial crisis, and they have followed roughly the same economic cycle

over the entire thirty-year time period. From this information, when a country experiences a recession, total investment as a percentage of GDP is lower.

Over the past thirty years, the United States has had enough money to reinvest it into the country at a higher proportion than some others. This excess spending could be turned around and used to repay debt, so America has remained solvent based on this criterion.

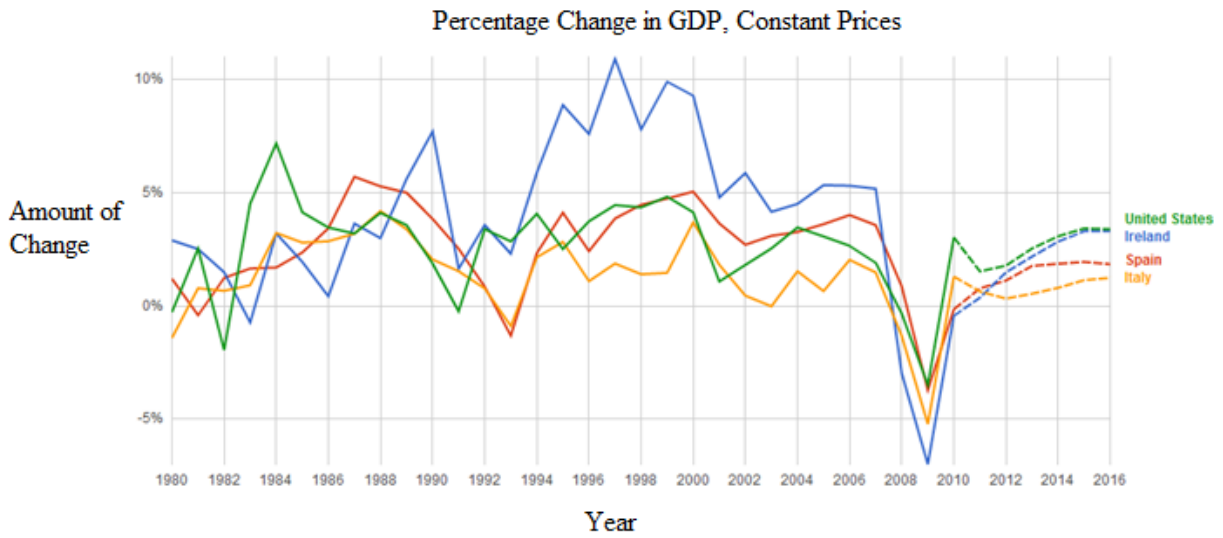
*Appendix 3.2: Percentage Change in GDP, Constant Prices*

Group 1: AAA-AA+ Ratings



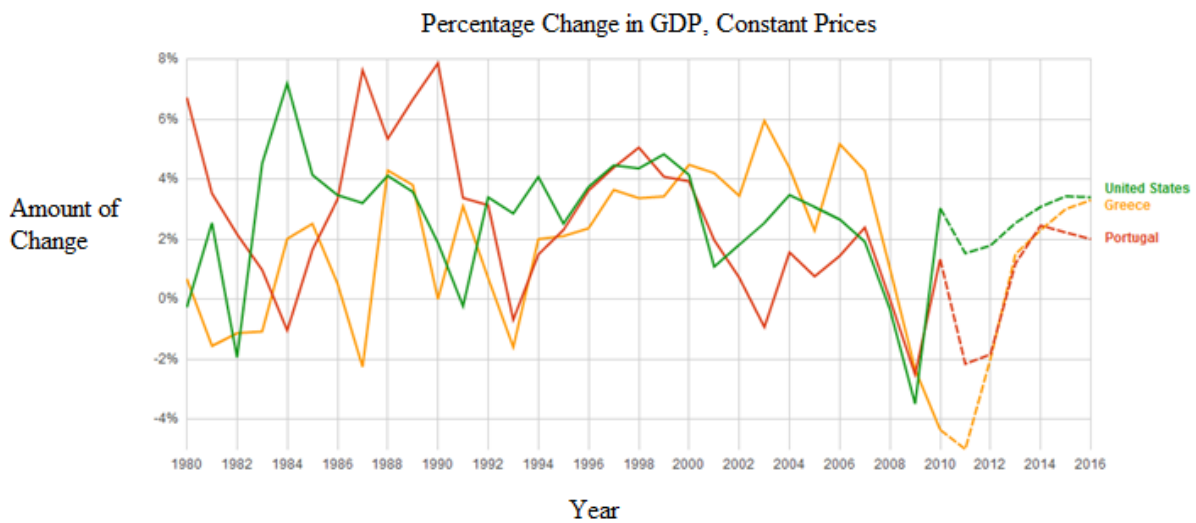
(“International Monetary Fund,” 2011)

Group 2: A-BBB+ Ratings



(“International Monetary Fund,” 2011)

Group 3: BB and Below Ratings

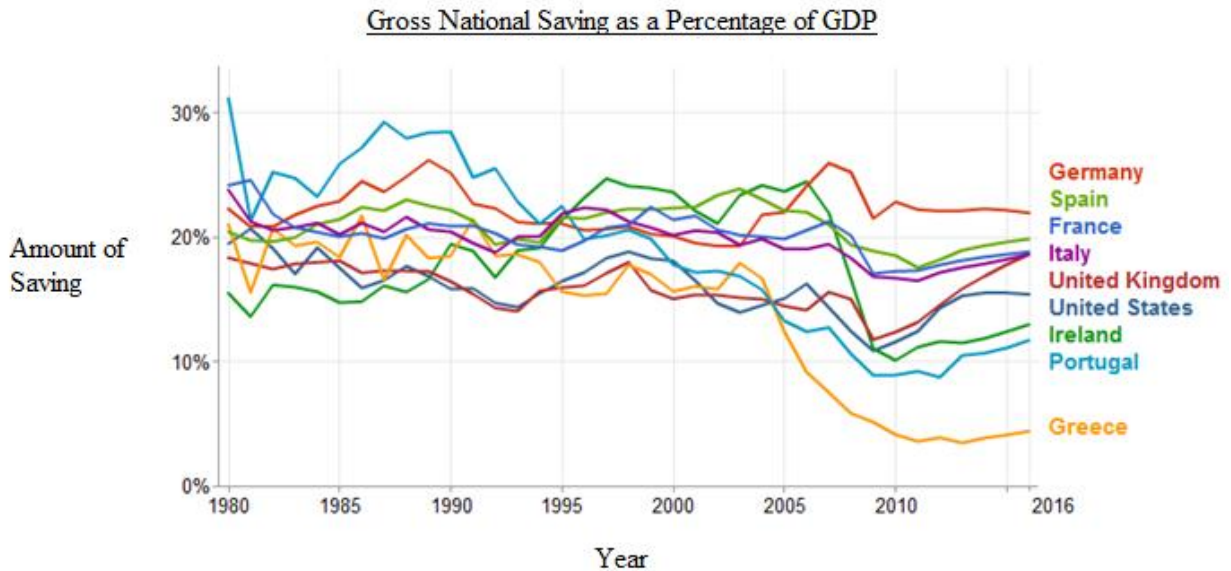


(“International Monetary Fund,” 2011)

Gross domestic product, the sum of the production for a nation, helps show the economic state in a country for a specific year. The percentage change graphs detail how quickly or slowly the economy of that country grew or declined during the year. While Ireland seemed to be performing very poorly in comparison by the investment standard, it is the only country to exceed 10% growth in GDP over the past thirty years. The United States experienced a short peak, with its GDP growth being higher than all the other nations in the early 1980s, along with Portugal and Ireland in the late 1980s. Greece has consistently struggled and only had the highest percentage growth for one year during the entire time period. Also, although Ireland did have the sharpest incline in growth of GDP, it also experienced the sharpest decline in growth during the financial crisis of 2008.

While there were differences between countries, and not all of the countries followed the norm the others set, many of the countries again followed roughly the same pattern, suggesting a global economy. When countries are constantly trading products, currency, stock, and other goods and services, a growth or decline in one country's economy can affect a trading country's economy. Also, with many companies operating globally, they contribute to their home country as well as the country in which they have an operating business.

Besides its peak in the early 1980s, the United States has basically remained about level with the other nine nations in this category. The correlation is especially higher after the 1980s peak also, indicating that the American economy stepped up to become a main player in the global economic sphere. In the category of percentage growth in GDP over time, America certainly has shown a strong possibility of solvency; each increase in production per year offers more revenue to repay debt.

*Appendix 3.3: Gross National Saving as a Percentage of GDP*

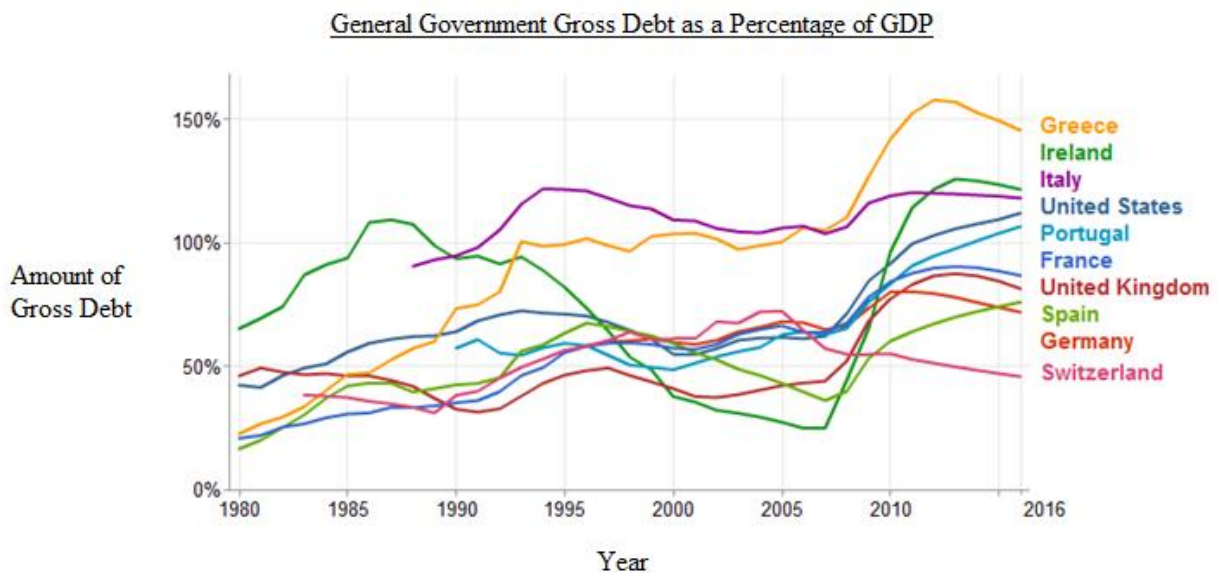
("International Monetary Fund," 2011)

The amount that a country saves gives insight to its long-term goals and the economic efficiency of the government. In this sense, gross national saving is not what the typical consumer expects savings to be but rather the amount of GDP left over after all consumption expenditures have been made ("Gross domestic savings," 2011). As a percentage of GDP, gross national saving shows how much of a country's annual production is not spent on goods and services but is instead saved to be used at a later date. Countries that have a high level of savings are more likely to be able to sustain their normal operations for a longer amount of time in the future than countries that do not save as much. These countries will also be able to use this money to repay debt. Typically with businesses and individuals, a lower amount of gross savings is indicative of a poor view of the economy because people save when they think they might not have much money in the future. Although the laws of economics would suggest that this graph would show the economic cycles that have occurred the past thirty years, the graph seems to not change much over time. According to this graph, because the ten countries

(excluding Greece, of course) stay at relatively the same level of saving as a percentage of GDP, the proportion of gross national saving does not increase when GDP falls as a result of a recession. Portugal and Greece are the only two countries who significantly dropped their proportions, suggesting that, for countries at risk, a higher level of gross national savings as a percentage of GDP makes a country less solvent.

The United States stayed in almost a horizontal line over the entire thirty-year span, with only small changes made to the percent of GDP saved. The United States has remained solvent with its amount of gross national savings as a percentage of GDP.

*Appendix 3.4: General Government Gross Debt as a Percentage of GDP*



(“International Monetary Fund,” 2011)

The gross debt as a percentage of GDP for a country is the most important calculation and graph for this study. Just like with businesses and individuals, debt can both help and hurt a government. The right amount of leverage can enable a company, individual, or government to make investments that can be profitable and sustainable in the future. The wrong amount of

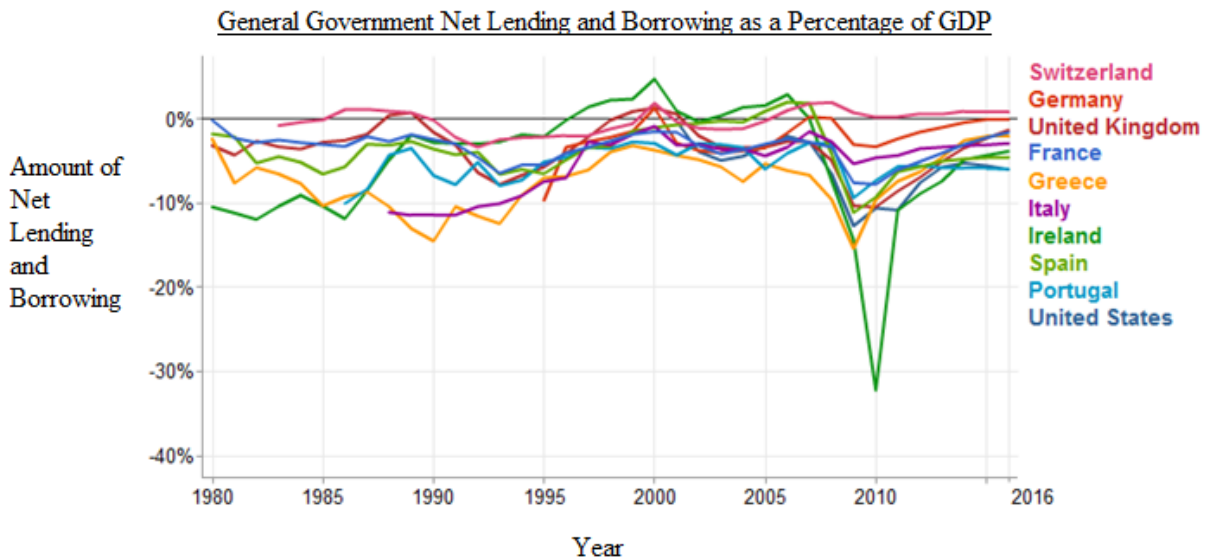


debt, however, will cause the entity trouble. Too little debt can lead to lack of appropriate and available growth, and too much debt can lead to economic failure and bankruptcy. The proper amount of debt an entity should hold varies based on its desired objectives and should be determined on an individual level.

An interesting trend in the graph is that the countries from the insolvent group have had consistently higher percentages of GDP held as debt, confirming that too much debt leads to economic downfall, especially in the case of Greece and Ireland. Switzerland, which is the country most would perceive as the most solvent, actually was in the middle to high range until 2005, when it dropped its percentage so that it now has the lowest ratio of general government gross debt to GDP.

Although the U.S. began in the middle, it has consistently raised its debt as a percentage of GDP. While this ratio decreased in 1995, it rose again after 2005. Interestingly enough, this occurrence happened before the financial crisis. After this increase, in 2008, with the bailout plan, the United States took on more debt, and the debt as a percent of GDP rose sharply. This ratio is projected to break 100% sometime during 2011 and 2012. Compared to Greece, the United States might not appear to be in danger, but it only took Greece six years to fall apart after it surpassed the 100% value. If the United States does not change its debt policy, it might be next, after Ireland and Italy.

*Appendix 3.5: General Government Net Lending and Borrowing as a Percentage of GDP*



(“International Monetary Fund,” 2011)

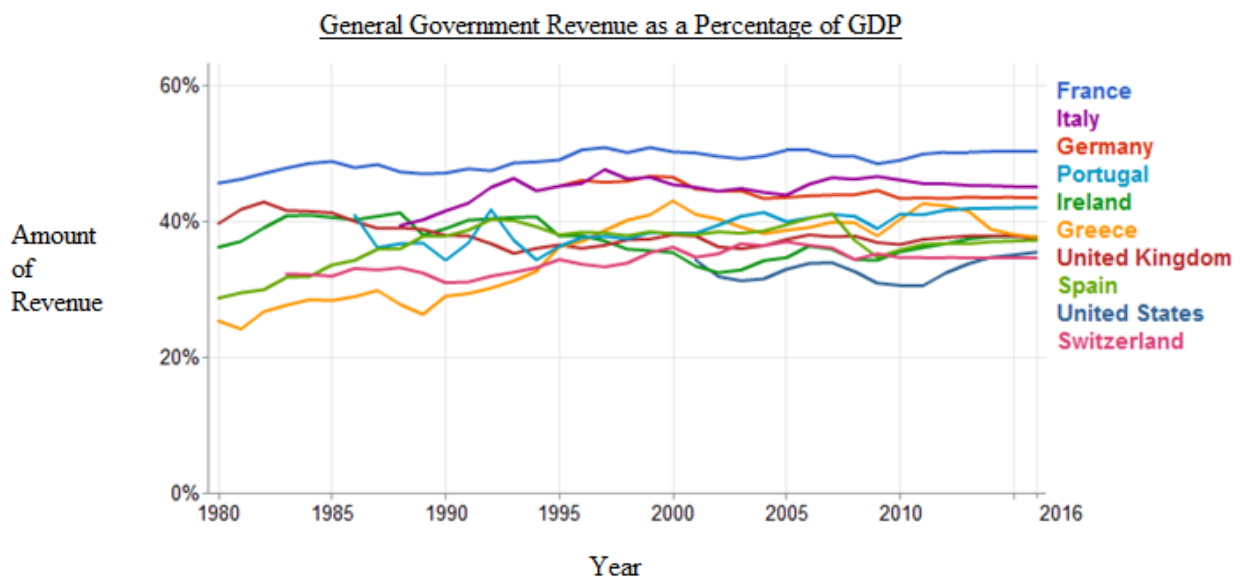
Almost every country in the world borrows money, but, as stated, borrowing too much can be extremely hazardous for a government. Government net lending and borrowing represents the amount of money that a government has lent over a time span, less the amount that the government has borrowed. A negative number for this category represents a net borrowed amount of money. Over the past thirty years, all ten countries have had a net borrowing balance as a percent of GDP, but only a few countries have had a net lending balance, and only Switzerland and Ireland have kept this ratio positive for longer than a few years. Although Ireland had net lending for about ten years, it shot way down in 2010 to an extremely high amount of net borrowing. This strong difference is discussed in the analysis of Ireland for the current time period in the next section.

Strong rises and falls in this graph would represent a problem with the government not being balanced in its use of lending and borrowing to actually help its country; an example of this is Ireland. With drastic changes in debt structure every ten years, no country could have

enough solvency for a high credit rating. The current state of Ireland's economy accurately reflects the changes Ireland made between 2000 and 2010. Switzerland, however, has remained balanced, and this small amount of change is represented by the solvency its economy has experienced over the past thirty years.

The United States has continually remained around the same level as the other countries for this section, making it difficult to determine which group to put the United States into. It has remained on the lower end, though, suggesting it has been insolvent compared to some of the other countries.

*Appendix 3.6: General Government Revenue as a Percentage of GDP*

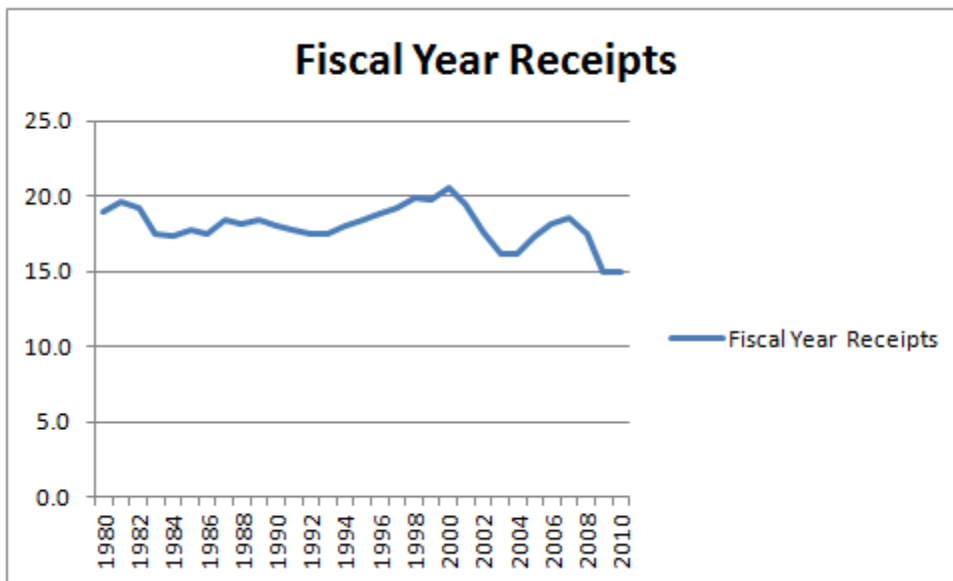


("International Monetary Fund," 2011)

The only way for a government to avoid using debt is to increase its revenue by other means, especially through the use of taxation. Also, increasing revenue for a government can help it pay down the debt it already has. According to the graph, most countries have kept their government revenue as a percent of GDP relatively level over the past thirty years. Tax culture

could have pushed to decrease tax revenue, but the governments have attempted to keep it as level as possible. Only Greece has increased their government revenue over the past thirty years, from about 20% to about 40%, which does not make sense given its current state.

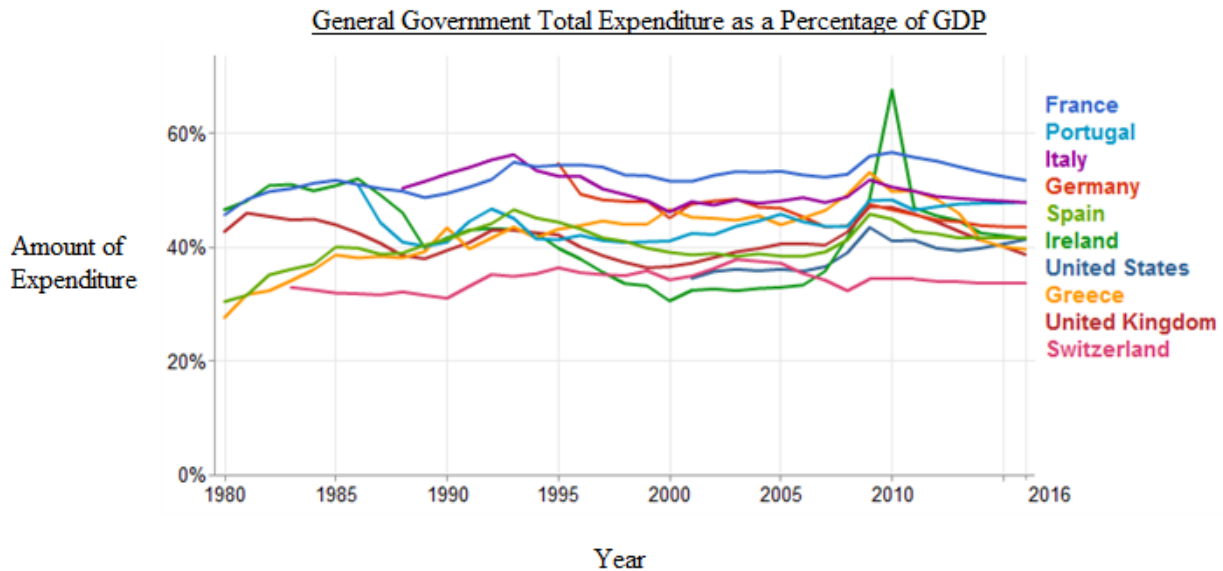
The United States data for the past thirty years is not given on this graph, but it can be obtained from the U.S. Bureau of the Public Debt. Below is a graph created from this data for 1980 through 2010 for comparison to the other nine countries.



("Historical federal receipt," 2011)

From this graph, the United States has roughly followed the same pattern as the rest of the countries. This graph only shows taxation revenue, so its revenue as a percent of GDP is lower than that of the other countries in the previous graph. The fact that the revenue has remained within a five percentage point range over the past thirty years, however, makes the United States appear to be performing pretty well.

*Appendix 3.7: General Government Total Expenditure as a Percentage of GDP*

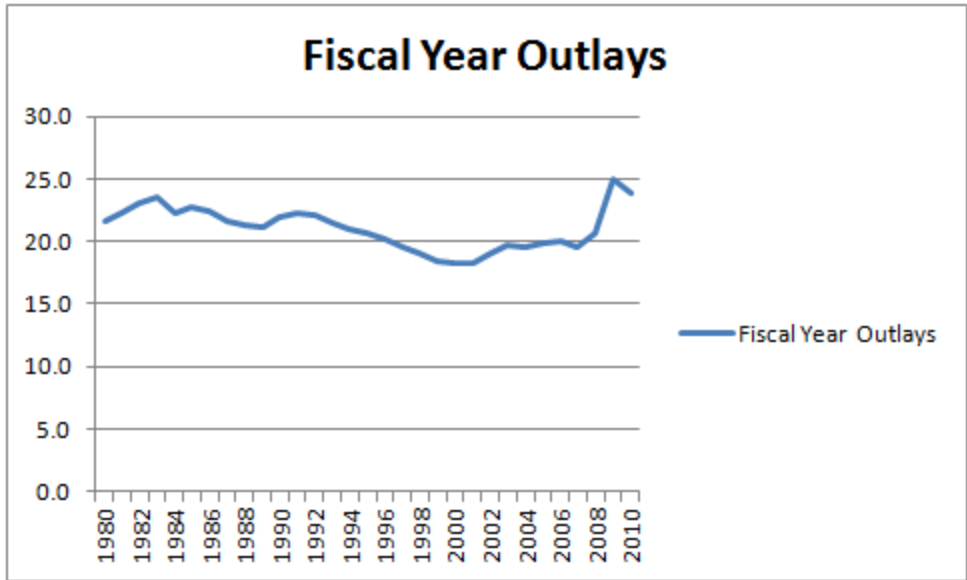


(“International Monetary Fund,” 2011)

Because raising revenue is not always the best option for a government to reduce its liabilities, reducing government expenditure is sometimes the next option. Lowering the amount of expenditure reduces the need for governmental debt and could, in the future, allow the government to have a surplus to pay off its debt.

According to the above graph, over the past thirty years, the ten countries again have followed a level pattern and kept their government expenditure at the same level of their GDP the entire time. Again, only Ireland had a sharp incline over the time span. This increase in 2010 explains the sharp increase in net borrowing that Ireland occurred in 2010 as well.

Again, the graph does not show the information for the United States, so it must be obtained from the chart from the U.S. Bureau of the Public Debt. The graph below is the U.S. outlays, or expenditures, as a percentage of GDP from 1980 through 2010.



("Historical federal receipt," 2011)

Again, the results are somewhat lower for this table than in the previous graph. With expenditures, spending as a percent of GDP ensures that the government continues to provide the standard of living that citizens expect but can take away the ability to repay debt. The fact that expenditures still remain so high above receipts shows insolvency in the United States and strongly suggests a lower credit rating.