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2008

11th Annual High School Mathematical Contest in Modeling (HiMCM) Summary Sheet
(Please attach a copy of this page to each copy of your Solution Paper.)

Team Control Number: 1903
Problem Chosen: A

Please type a summary of your results on this page. Please remember not to include the name of your school, advisor, or team members on this page.

Summary:

When modeling the national debt over the course of time, we found several important characteristics of the federal deficit that allowed us to understand debt and make effective forecasts on how to minimize its effect on the nation. First, because federal deficit is reduced by having a federal income greater than federal expenditures, it is necessary to either increase revenue, decrease expenses, or do both in order to decrease debt. Second, we found that income and spending trends employed by past administrations had not effectively managed the debt according to both our model and available data, showing that a new approach was needed. Lastly, we found that the current national debt was far too large to eliminate in the next eight years with a politically feasible course of action, but creating a budget surplus is possible.

After determining that no prior policy had been effective at decreasing federal deficit, we sought out the largest contributor to national debt and found that it was the rampant increase of entitlement and discretionary spending. By capping the rates of increase in these areas and eventually returning them to reasonable values, we were able to propose two plans which would generate a net reduction of the national debt by the end of the year 2017 according to the models we used when analyzing previous budget trends. The implementations of these plans would be both fiscally possible and politically feasible—essential factors to keep in mind when dealing with economic policy.

We believe that with financial responsibility, dedication to budget maintenance, and careful safeguards to prevent the ballooning of discretionary and entitlement spending as detailed by our proposed policies, the national debt may once again return to acceptable levels.

Restatement of Problem:

Our objective was to find a politically feasible model to understand and project the national debt at the end of the year 2017. We needed to use different federal income and spending strategies for the years 2009-2017 that implemented policies we believed would minimize national debt during that period. In order to arrive at the best conclusion possible, we also needed to analyze the change in government expenditures and revenues over the past 40 years. After we successfully modeled the projected deficit in different situations, we then used our models to suggest the best policies for taxation and spending, including suggestions for how to change each policy to minimize the national debt.

Assumptions:

1. *The President will always want to decrease the yearly budget deficit and thereby decrease the national debt*
   This assumption allowed us to initialize our model by finding the value (budget deficit or surplus) that would need to be critically analyzed in order to determine which plans were the most effective.
2. *No major foreign or domestic catastrophes*
   We assumed that there would be no major catastrophes such as natural disaster, domestic conflict, or war with a foreign country. A major catastrophe would have a huge impact on the ability to adjust spending by the federal government, and therefore would render models useless.
3. *Interest trends are similar in future*
   We assumed that interest trends would be similar among all plans for the future and therefore does not have any importance when comparing the trends generated by each scenario.
4. *There will be no significant change in current tax rates within a scenario.*
   Death tax, sales tax, estate tax, payroll tax, capital gains tax, income tax, business tax, and dividend tax will remain constant within each prediction.
5. *Inflation rates will remain constant*
   Within the proposed time period, the rate of inflation will remain constant for all scenarios. Therefore inflation does not have any importance when comparing the trends generated by each scenario.
6. *Revenue gained or lost from imported and exported goods will be negligible*
   By removing the debt or surplus generated by the import and export of goods, we were able to more accurately determine the effects of the administration's policies of taxation and spending.

Model:

To determine the change in the federal debt, we considered two factors: the trends in total federal income and the trends in total federal spending. This straightforward method allows us to represent total yearly change in federal deficit as a function of federal income and federal spending.

Equation 1:

$$dD = I - S$$

Where:
dD represents the continual change in federal debt
I represents the trend in total federal income
S represents the trend in total federal spending

Once we developed this equation, it became clear that a method to determine the trend for federal incomes and federal expenditures for a presidential policy would be necessary. In order to find these trends, we used existing data to plot the incomes and expenditures of each presidency of the past 40 years and found the linear regression equations for each policy. However, Equation 1 was inadequate for the purpose of analyzing different taxing and spending policies. In order to effectively apply our model to the changes implemented by each presidential administration, we integrated Equation 1 with respect to time. We were then able to model the overall change in deficit with the following equation.

Equation 2:

$$\Delta D = -\int_{y_i}^{y_f} (I - S)\, dy$$

Where:
D represents the total deficit accrued by a presidential term in billions of dollars
y_i represents the beginning of the first year of a presidential term
y_f represents the end of the final year of a presidential term
I represents the trend in total federal income
S represents the trend in total federal spending
dy represents a small increment of time the presidential policy is in effect

Now, we would be able to use the proposed trends for federal income and federal spending to determine which policies would be the most effective at reducing the federal deficit, thereby decreasing the ratio of federal deficit to gross domestic product by the end of the year 2017. Only one final equation was necessary to complete the model to predict which presidential policy would be the most successful.

Equation 3:

$$D_{2017} = D_{2008} - \int_{0.5}^{8.5} (I - S)dy$$

Where:
D_{2017} represents the total federal debt at the end of the year 2017 in billions of dollars
D_{2008} represents the total federal debt at the end of the year 2008 in billions of dollars
I represents the trend in total federal income
S represents the trend in total federal spending
dy represents a small increment of time that the proposed policy is in effect

**The reasoning behind using 0.5 and 8.5 as the parameters for the integral is discussed in detail in Appendix B.*

This final equation allowed us to accurately determine what value of federal deficit each presidential policy would result in by the end of the year 2017 by taking the current national debt and adding to it the deficit accumulated in the eight years between 2009 and 2017. The lower the value ofD_{2017}, the more effective the proposed policy was at lowering the federal debt.

Model Testing:

In order to test the soundness of our model, we calculated the total change in the federal deficit as represented by the area between the linear regression equations for federal income and spending, respectively. In order to simplify the calculations, we subtracted existing debt from both sides of Equation 3, which left us with the total change in federal deficit as a function of spending and income. Using this method, we were able to observe how closely the integral of the linear regression equations of a policy's taxation and spending correlated with the actual change in federal deficit, a value readily supplied by available statistics. Not surprisingly, there was a strong correlation between the values supplied by Equation 4 and the actual change, proving that our model could accurately predict the effects of government policies toward spending and taxation upon the federal deficit.

Equation 2:

$$\Delta D = -\int_{y_i}^{y_f} (I - S)dy$$

Where:
ΔD represents the total change in federal deficit at the end of a policy's implementation in billions of dollars
y_i represents the beginning of the first year of a presidential term
y_f represents the end of the final year of a presidential term
I represents the trend in total federal income
S represents the trend in total federal spending

dy represents a small increment of time that the proposed policy is in effect

The calculations, as well as the difference between actual and predicted deficit values, can be found in Appendix B.

Model Analysis and Conclusions:

Given the accuracy of our model, we can confidently say that it predicts correct deficits. The percentage of error generated by our model's calculations for past data was so small that they became negligible. Therefore, the predictions made for the years 2009-2017 can be assumed to be entirely accurate for each presidential policy. This means that President Clinton's taxing policy was by far the most successful model, as it was the only policy capable of generating a period of a budget surplus, even though his two terms still resulted in a higher federal debt.

Even though President Clinton had the most successful tax policy according to our regression models, President Bush's tax policy has also achieved high tax revenues. The next president will choose to either maintain the Bush tax policy or return to the Clinton tax levels of the 1990s. Returning to the Clinton levels would stand as an increase in taxes or a return to the tax levels pre-2003.

Single

Tax Year 2002		Tax Year 2003[1]	
Income level	**Tax rate**	**Income level**	**Tax rate**
up to $6,000	10%	up to $7,000	10%
$6,000 - $27,950	15%	$7,000 - $28,400	15%
$27,950 - $67,700	27%	$28,400 - $68,800	25%
$67,700 - $141,250	30%	$68,800 - $143,500	28%
$141,250 - $307,050	35%	$143,500 - $311,950	33%

over $307,050	38.6%	over $311,950	35%

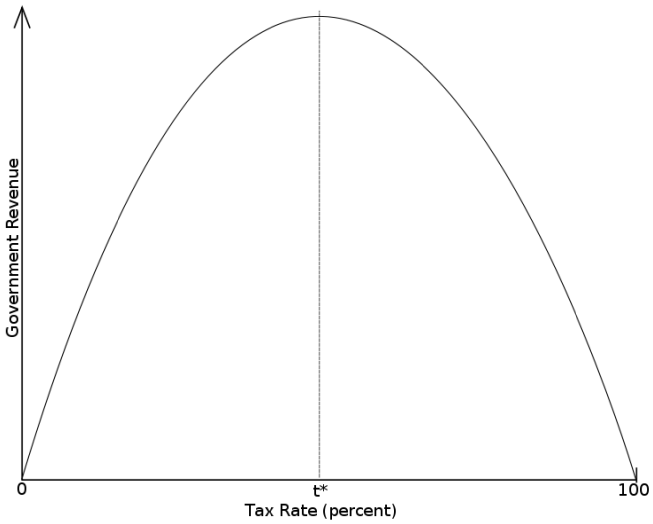
Married filing jointly or Qualifying widow(er)

Tax Year 2002		Tax Year 2003	
Income level	**Tax rate**	**Income level**	**Tax rate**
up to $12,000	10%	up to $14,000	10%
$12,000 - $46,700	15%	$14,000 - $56,800	15%
$46,700 - $112,850	27%	$56,800 - $114,650	25%
$112,850 - $171,950	30%	$114,650 - $174,700	28%
$171,950 - $307,050	35%	$174,700 - $311,950	33%
over $307,050	38.6%	over $311,950	35%

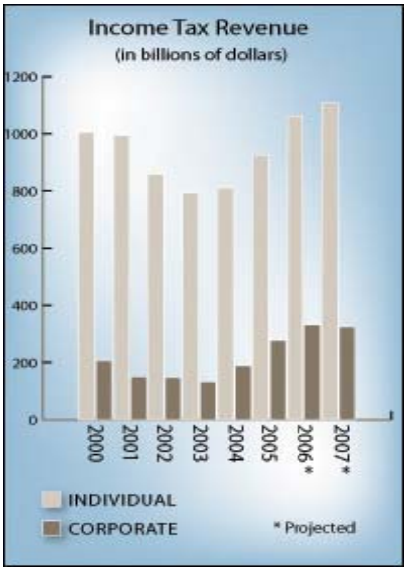
IRS.gov 75. United States Internal Revenue Service

According to our debt regression analysis (not including the Social Security reform cost per year) in conjunction with our suggested plans in spending, the tax levels under Clinton and Bush would both achieve a surplus over time. The next president would basically determine whether to follow the supply-side tax policy of President Bush or revert back to the traditional Keynesian macroeconomics of President Clinton.

Supply-side economics is a school of macroeconomic thought that argues that economic growth can be most effectively created using incentives for people to produce (supply) goods and services, such as adjusting income tax and capital gains tax rates. Cutting taxes creates more revenue.



Cutting taxes that lie on any point on the right portion of the Laffer curve (above) increases government receipts.



Source: IRS

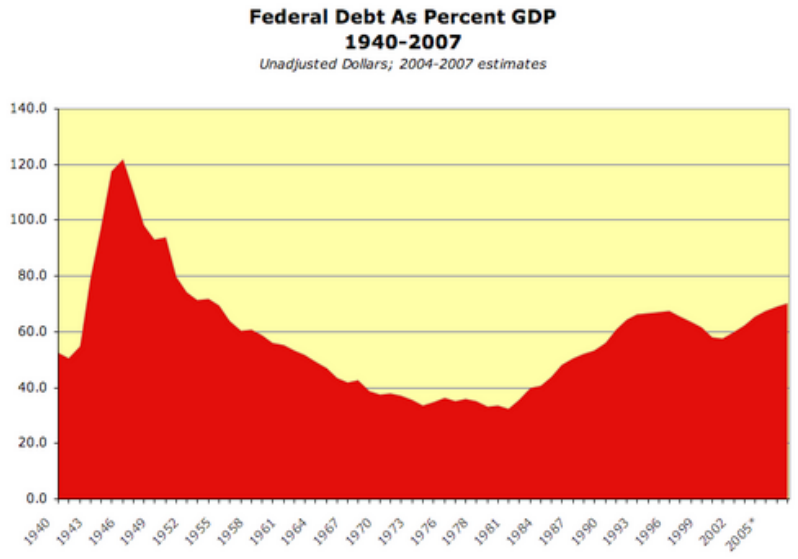
(Above) President Bush would argue lower taxes spurred economic growth, which in turn created higher tax revenues. Opponents would argue that the Bush tax cuts have little effect or relation to the tax revenues and have actually harmed the economy by increasing long term deficits.

Keynesian macroeconomics contends that tax cuts should be used to increase demand, not supply, and thus should be targeted at cash-strapped, lower-income households, who are more likely to spend additional income, whereby government achieves the most revenue by taxing more. Government pro-actively increases aggregate demand to stimulate economy.

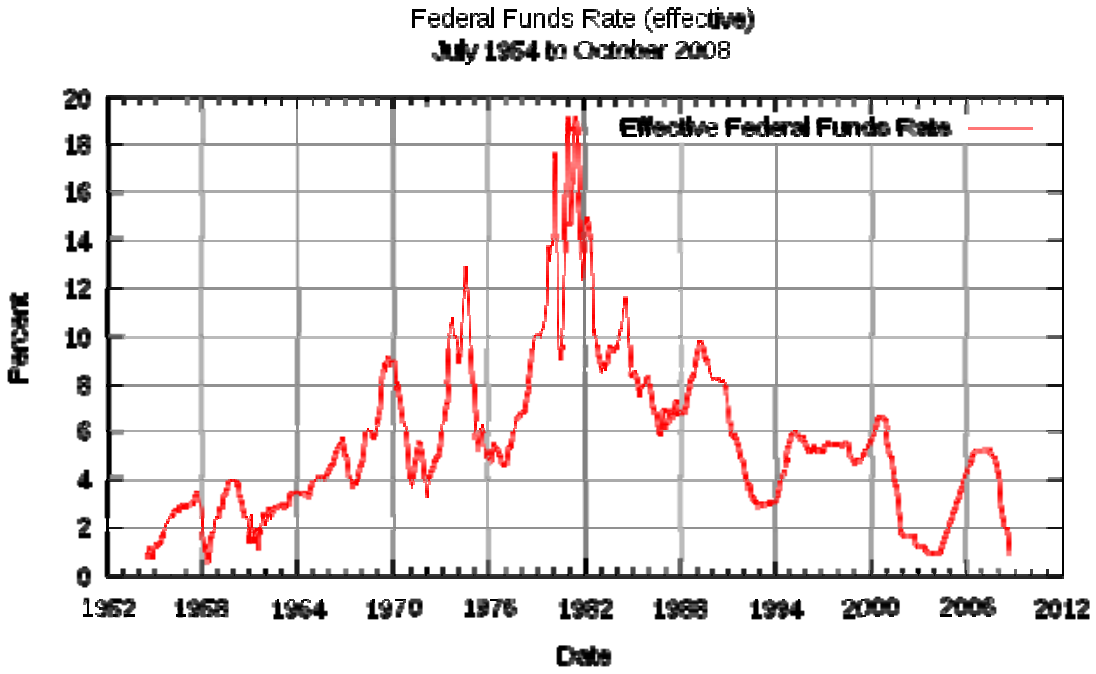
Therefore, the decision whether to maintain the Bush rates or return to Clinton rates clearly depends upon the economic philosophy of the new president.

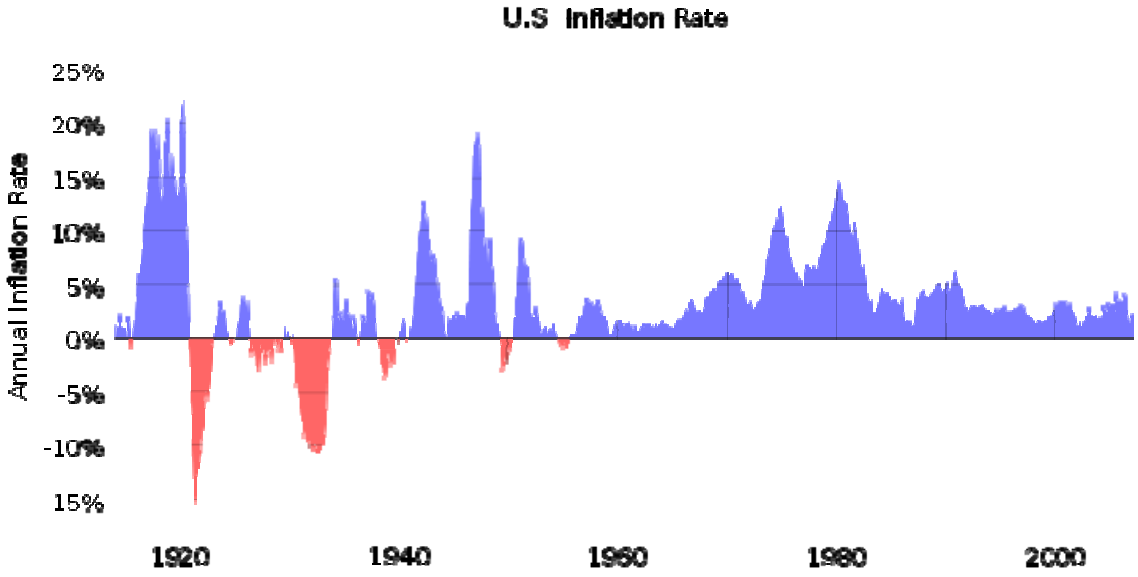
This choice for the next president reveals the inherent strengths and weaknesses of our model. Although our model allows anyone to witness general trends and understand how revenues and spending affects the budget deficit and in the turn the debt, it is limited in its capacity as a linear regression based model to determine the exact effect of a tax rate or tax hike. There are certainly trends that can be identified. However, specific revenues can be directly contributed to either a tax hike or tax cut. By using regression models for all presidents since 1968, we can see how revenues generally relate to a change in tax policy and how this relates to level of the deficit. Thus, neither supply-side nor Keynesian economics can be validated explicitly—validation arises only from implicit evidence and interpretation. No regression model can perfectly predict the economic repercussions of a particular change in taxes. {Too many variables: inflation rates, rate of income growth, condition of economy (GDP growth or contraction)}

Either way, these progressively accrued deficits are unacceptable if the objective of the new president is to eventually eliminate the yearly budget deficits and in turn create yearly surpluses that will lower the overall national debt aggregate. For the most part, each respective president achieved considerable success in the regard to revenue generation. Therefore, we can logically deduce that the problem lies not in the revenue but rather lies in the flawed spending policies of the past. By analyzing the spending policies, we discovered that the unchecked increase in discretionary spending and the rapidly increasing cost of entitlement programs such as Social Security and Medicare are to blame for the burgeoning of the federal debt. Another indicator that shows the need to control overall spending is the rising Debt to GDP ratio, as illustrated by the following chart.



The up creep in this ratio as indicated by the preceding chart evinces the growing instability in the overall American money market. This higher ratio leads to more instability in the form of higher interest rates offered on American debt securities. The interest offered on the loans occurs at a higher rate because the buyer must bear the burden and risk of less stable treasury securities. Debt over time gradually creates more debt because the seller of the debt must now cover the increased interest being offered. Therefore, when the national debt increases, the allocation of funds in the budget spent to cover interest increases in proportion. High debt, in turn, creates the risk of higher inflation in the long term because of the eventual need of the seller country to fulfill the value of the initial security. Inflation leads to a weakening money supply and soft currency. Deflationary measures such as the raising of the core Fed Fund's rate attempts to combat the debt-driven increase in inflation, but ultimately makes loaning harder and contracts overall potential liquidity, leading to higher interest rates offered on a loan to attract buyers. This leads to a potential contraction in economic activity, which in turn threatens tax revenues. Therefore, it is vital that a country balances both the inflationary and deflationary pressures so that an optimal amount of liquidity may enter a market and allow for outcomes beneficial for society.





For example, in the 1970s higher interest rates were instituted to curb off the rampant inflation present in the economy. This rampant inflation in conjunction with the deflationary actions of the Fed led to a period of stagflation whereby the economy suffered from increasing inflation and increasing unemployment, which was exacerbated by the deflationary measures of increasing interest rates. By increasing interest rates in a high inflationary market, a government risks contracting the liquidity market (making loans harder to obtain), leading to economic stagnation.

On the other hand, interests rates that remain too low for an extended period of time leads to an influx of liquidity into the market, which will lead to major instabilities if the liquidity is not backed by any hard money. The low interest rates of the early 2000s led to the creeping specter of inflation as more liquidity created a gradual depreciation in the value of the US dollar. The current financial crisis stems from the low-interest rate generated securities of the early decade, which now threatens to freeze the livelihood of our economy—loans.

These are the intricacies of inflation and how the national debt can in the long run begin to anchor down vital functions of our money market system.

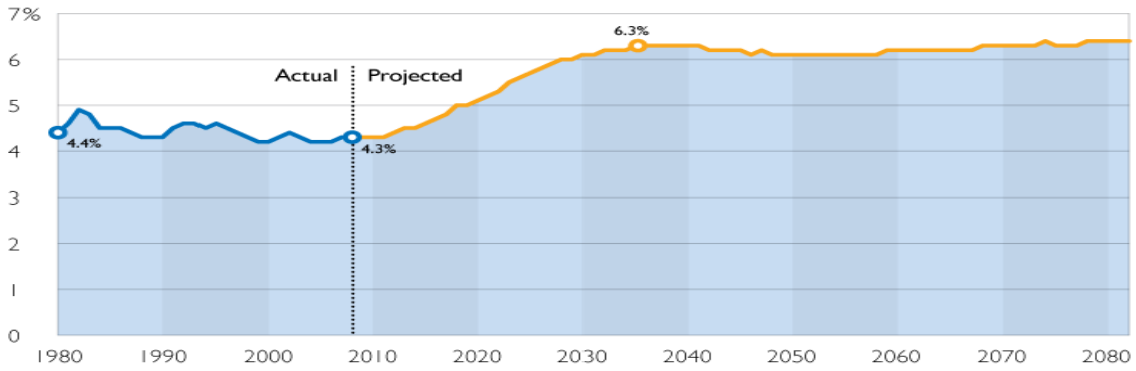
Using these principles, we created two new courses of action in which federal spending would be reevaluated in order to generate budget surplus in the years 2009-2017. These plans would in turn reduce the debt to GDP ratio to provide stability in our economic markets. *The budget will be balanced.*

Both plans aim to cut discretionary spending by a third over the entire 2009-2017 period. This would be accomplished with strict fiscal discipline, cuts in pork barrel projects, and spending freezes on non-essential allocations. These are politically feasible goals if the next president is serious about reducing deficit spending. Discretionary spending is also easy to control because

expenditures should only increase each year by the rate of inflation. According to results from the CBO, discretionary spending will jump three fold from 1990 to 2018 if nothing is done to contain the deliberative congressional rate of spending increase. This drastic jump far exceeds the increase in inflation and shows that cutting discretionary spending is a matter of will, and does not pose as much of a problem as reforms or cuts in entitlement programs.

Both plans would also cut Medicare spending by twenty percent. This would be accomplished with necessary benefits cuts, age readjustments, shifting of resources to state control, and major restructuring of outdated programs, such as cutting the plans that do not work or are bleeding the system dry.

Social Security Cost as Percentage of GDP without Any Reform

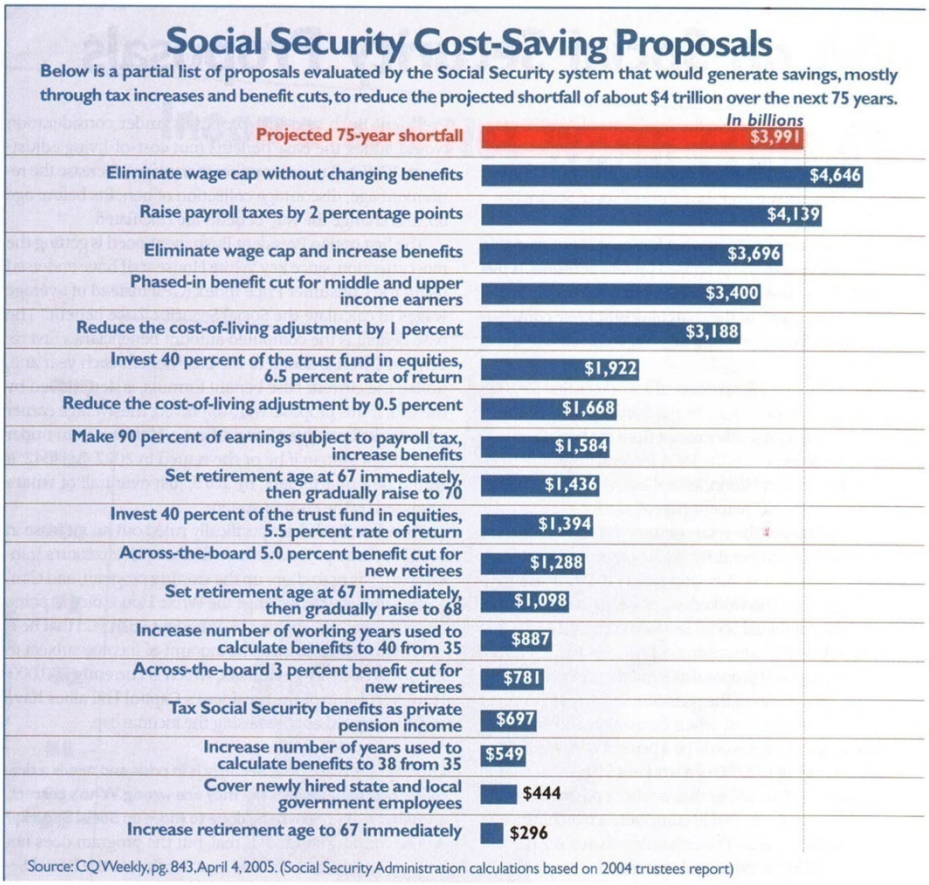


The most crucial aspect our spending plans is a complete restructuring and reform of the Social Security System. In 75 years, the System faces a shortfall of 4 trillion dollars. The system needs to make up 4 trillion dollars over a seventy-five year period to achieve solvency whereby the revenue received will always exceed or equal the program's outlays. If it does not, the system will go bankrupt as the system gradually begins to give out more money than it takes in during the early 2010s.

The plans will be executed as follows with the major difference being bolded.

Plan A	Plan B
1. Reduce the cost of living adjustment by 1%	Reduce the cost of living adjustment by 1%
2. Raise Payroll Tax by 2%	Raise Payroll Tax by 2%
3. Retirement Age immediately raised to 67 and gradually raised to 70	Retirement Age immediately raised to 67 and gradually raised to 70
4. Phase in Benefit Cut for Middle and Upper Income Earners	Phase in Benefit Cut for Middle and Upper Income Earners
5. Eliminate the Wage Cap	

The estimated savings and revenue accrued over 75 years as a result of these reforms were calculated based on the estimates from the chart below and then used to determine the savings per year and ultimately for the period 2009-2017.



Although Plan A provides the government with a greater surplus, we created Plan B as a suitable alternative. Plan A's reform to eliminate the wage cap remains a controversial reform since everyone making above the $100,000 cap would now be open to additional taxes on their earned wage. This potential action may be perceived as politically infeasible due to the raising of taxes on the middle, upper-middle, and small business class of America. Plan B, although providing a smaller budget surplus, still saves the system while maintaining the cap. Both plans would also provide greater fairness in the system by phasing in a benefit cut for Middle and Upper Income earners—the socioeconomic classes that depend the least upon Social Security due to their other financial resources. Therefore, these plans achieve solvency for the system, preserve fairness, protect the economic well-being of those who need Social Security (the lower-middle class, working poor), and create increased revenues that will permanently outweigh any outlays.

Appendix A: Model Testing Results

Equation 4:

$$\Delta D = -\int_{y_i}^{y_f} (I - S)dy$$

Where:
ΔD represents the total change in federal deficit at the end of a policy's implementation in billions of dollars
y_i represents the beginning of the first year of a presidential term
y_f represents the end of the final year of a presidential term
I represents the trend in total federal income
S represents the trend in total federal spending
dy represents a small increment of time that the proposed policy is in effect

To better calculate the change in deficit from an initial year to a final year, we adjusted the initial year to 0.5 instead of 0 and the final year to 4.5 in the case of a single term of active policy and 8.5 in the case of a dual term of active policy. This change in time span for the integral took into account the fact that the regression equations we generated were most valid for the midpoints of each set of income and spending data. By adjusting the integral's parameters to the middle of the first and last years of a policy's implementation, we found that our data's percent error dropped by roughly 3 orders of magnitude, from $\sim 15 - 20\%$ to nearly negligible amounts. Such a drastic improvement in the accuracy of our model was a clear indication that using (.5) and (4.5) or (8.5) as parameters was a superior method for modeling the change in deficit.

President Nixon's Term: Actual:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{8.5} \big((17.401x + 152.36) - (26.113x + 137.4\big)dy = 193.95$$

Actual Change in Deficit: 194.0 billion dollars
Percent Error: $\sim 0\%$

President Carter's Term:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{4.5} \big((54.82x + 296.85) - (59.04x + 343.1)\big)dy = 227.2$$

Actual Change in Deficit: 227.2 billion dollars
Percent Error: $\sim 0\%$

President Reagan's Term:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{8.5} \big((46.743x + 508.56) - (55.198x + 637.81)\big)dy = 1338.38$$

Actual Change in Deficit: 1338.4 billion dollars
Percent Error: ~0%

President Bush Sr.'s Term:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{4.5} \big((32.33x + 961) - (78.46x + 1079.6)\big)dy = 935.7$$

Actual Change in Deficit: 933.1 billion dollars
Percent Error: 0.270%

President Clinton's Term:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{8.5} \big((121.17x + 1001.4) - (51.304 + 1355.8)\big)dy = 320.024$$

Actual Change in Deficit: 320.3 billion dollars
Percent Error: 0.086%

President Bush Jr.'s Term:

Predicted Change in Deficit:

$$\Delta D = -\int_{0.5}^{8.5} \big((112.25x + 1639.6) - (151.53x + 1707.5)\big)dy = 1957.28$$

Actual Change in Deficit: 1957.0 billion dollars
Percent Error: 0.014%

All values for actual change in deficit were taken from http://www.treasurydirect.gov and double-checked with values supplied by http://www.cbo.gov/budget/data/historical.pdf to ensure accuracy

Appendix B: Projected Future Deficits without Adjustments for Increasing Entitlement Spending

The future deficit accrued by following a presidential policy similar to those of previous presidents over the period between 2009 and 2017 can be described by the general equation:

Equation 3:

$$D_{2017} = D_{2008} - \int_{0.5}^{9.5} (I - S)dy$$

Where:
D_{2017} represents the total federal debt at the end of the year 2017 in billions of dollars
D_{2008} represents the total federal debt at the end of the year 2008 in billions of dollars
I represents the trend in total federal income
S represents the trend in total federal spending
dy represents a small increment of time that the proposed policy is in effect

By inserting the necessary linear regression equations for I and S and substituting the current deficit for D_{2008}, we were able to obtain the following estimates of the federal deficit in 2017 for each presidential policy.

President Nixon's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((17.401x) - (176.875x)\big)dy = \sim 17836.33$$

President Carter's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((54.82x) - (176.875x)\big)dy = \sim 16152.475$$

President Reagan's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((46.743x) - (176.875x)\big)dy = \sim 16515.94$$

President Bush Sr.'s Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((32.33x) - (176.875x)\big)dy = \sim 17164.525$$

President Clinton's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((121.17x) - (176.875x)\big)dy = \sim 13166.725$$

President Bush Jr.'s Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((112.25x) - (176.875x)\big)dy = \sim 13568.125$$

Appendix C: Projected Future Deficits with Adjustments for Increasing Entitlement Spending

The future deficit accrued by following a presidential policy similar to those of previous presidents over the period between 2009 and 2017 can be described by the general equation:

Equation 3:

$$D_{2017} = D_{2008} - \int_{0.5}^{9.5} (I - S)dy$$

Where:
D_{2017} represents the total federal debt at the end of the year 2017 in billions of dollars
D_{2008} represents the total federal debt at the end of the year 2008 in billions of dollars
I represents the trend in total federal income
S represents the trend in total federal spending
dy represents a small increment of time that the proposed policy is in effect

By inserting the necessary linear regression equations for I and S and substituting the current deficit for D_{2008}, we were able to obtain the following estimates of the federal deficit in 2017 for each presidential policy.

President Nixon's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{8.5} \big((17.401x) - (109.48x)\big)dy = \sim 14803.555$$

President Carter's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((54.82x) - (109.48x)\big)dy = \sim 13119.7$$

President Reagan's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((46.743x) - (109.48x)\big)dy = \sim 13483.165$$

President Bush Sr.'s Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((32.33x) - (109.48x)\big)dy = \sim 14131.75$$

President Clinton's Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((121.17x) - (109.48x)\big)dy = \sim 10133.95$$

President Bush Jr.'s Policy:

$$D_{2017} = \sim 10{,}660 - \int_{0.5}^{9.5} \big((112.25x) - (109.48x)\big)dy = \sim 10535.35$$

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November 21st,2008

Dear Mr. President,

We are writing in response to your request for suggestions concerning our nation's financial policy. As we both know, the United States is rife with debt due to federal spending that outstrips federal revenues. In our proposal, we wish to present you with suggestions on how to control the nation's deficit by adjusting the nation's budget.

Upon further research, the more evident it became that our current spending policies are increasing much faster than our rate of revenue income can compensate for. The issue does not lie with the normal rate of revenue income, but rather with the exponential increase of spending on entitlements and discretionary items in the federal budget. Furthermore, our spending policies are open to reform, but our taxation policies are much more resistant to change due to the public interest in keeping taxes as low as possible. For this reason, we would like to outline methods through which you can decrease federal spending in such a way that an effective tax policy can offset costs and thereby decrease the federal deficit on the order of about 11.7 billion dollars per year.

Of course, there is always the alternative of becoming a bystander and keeping the current taxation and spending policies. We have included calculations for this scenario in order to illustrate the dire need for reforms in the spending policies of the nation. As our figures suggest, leaving the budget unchanged will result in massive debt accumulation of about 15 trillion dollars. We trust that you will adjust the budget accordingly to avoid such a devastating economic blow.

Our models take into account the revenue (or debt) accrued by the past six presidents to determine the most effective taxation policies. These policies are proven to be effective and politically feasible, so implementing them should be fairly straightforward and offer little resistance from the public. We determined that President Bill Clinton had the greatest revenue over his eight year term, and that President George W. Bush's policy also had comparable benefits. Both President Clinton and President Bush had effective and reasonable tax policies that allowed them to achieve optimum revenue, and we believe that you too can achieve a positive yearly bottom-line total if you emulate either of their tax policies.

The first choice that needs to be made is whether or not to repeal President Bush's tax policies. If you believe in side-supply economics, then the answer is continuing the current polices. If you believe in Keynesian economics, then you should repeal President Bush's tax policies and revert back President Clinton's policies. President Clinton's tax policies did produce larger revenues, but both plans are effective depending on your economic philosophy of governance.

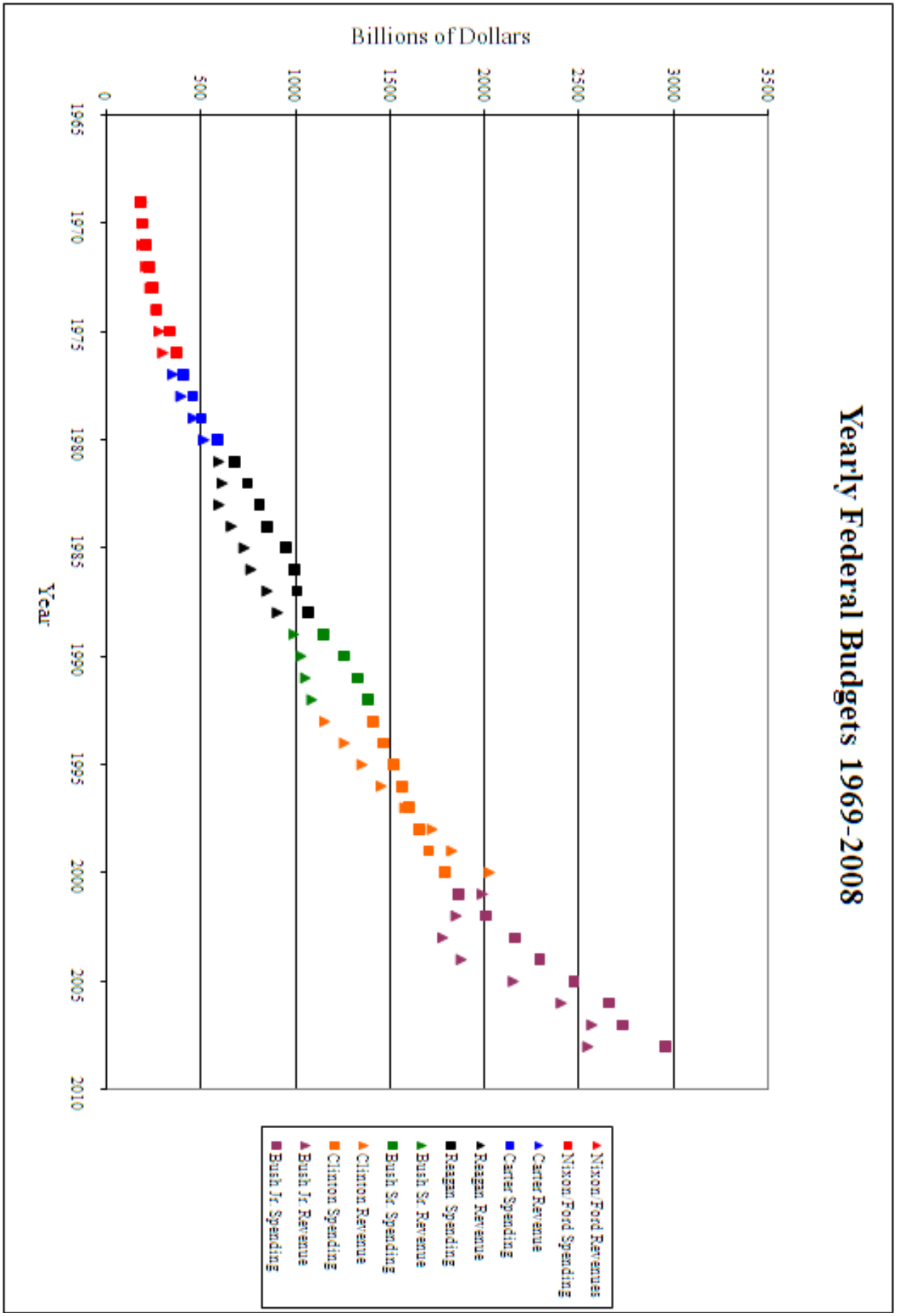
In order to decrease federal spending to the point that it is more readily managed by federal income, we need to lower expenditure, particularly expenditures for discretionary appropriations and entitlements. In order to achieve a realistic positive revenue, it is necessary to cut discretionary spending by one-third, saving about 3.8 trillion dollars over the next nine years. Discretionary spending is an easily adjustable and manageable portion of the federal budget.

Eliminating pork-barrel projects, non-functioning programs, and enacting non-essentials spending freeze will certainly allow you to adequately reduce the total discretionary spending of the nation by the specified amount. Second, we need to cut back on entitlement spending. A twenty percent reduction of the already inflated Medicare budget will save the government about 1.1 trillion dollars over the next two terms. When combined with the figures from a decrease in discretionary spending, a savings of 4.4 trillion dollars is realized. The last and most important aspect of spending that needs to be reformed is Social Security policy. We suggest that you reduce the cost of living adjustment by one percent, increase the payroll tax by two percent, raise the retirement age to 67 with a gradual increase to 70 over nine years, and phase in benefit cuts for middle and upper income earners. The benefits of these reforms upon Social Security are beyond the capability of calculation on such a short timeline, but we have shown that they will prevent Social Security from becoming a money pit for the federal government. This is especially important because current projections show that Social Security will distribute more money than it takes in by the middle of the next decade—becoming a liability to the annual budget.

The only factor that differs from our two proposed policies is whether or not to repeal the federal wage cap on Social Security taxes. By also repealing the wage cap you would generate a total of 1.5 trillion dollars over nine years by placing an additional increment of tax upon those making above $100,000. However the public is highly resistant to tax increase, so it may not be as politically feasible as our second proposal. This second proposal, which implements all of the aforementioned reforms with the exception of the repeal of the wage cap, would still generate total revenues of approximately 1 trillion dollars over nine years, but they would be slightly lesser than those produced by our first proposal. Once again, the decision is yours as to which policy would better suit the nation given how the public would receive each alternative.

Sincerely,

Concerned Economic Analysts

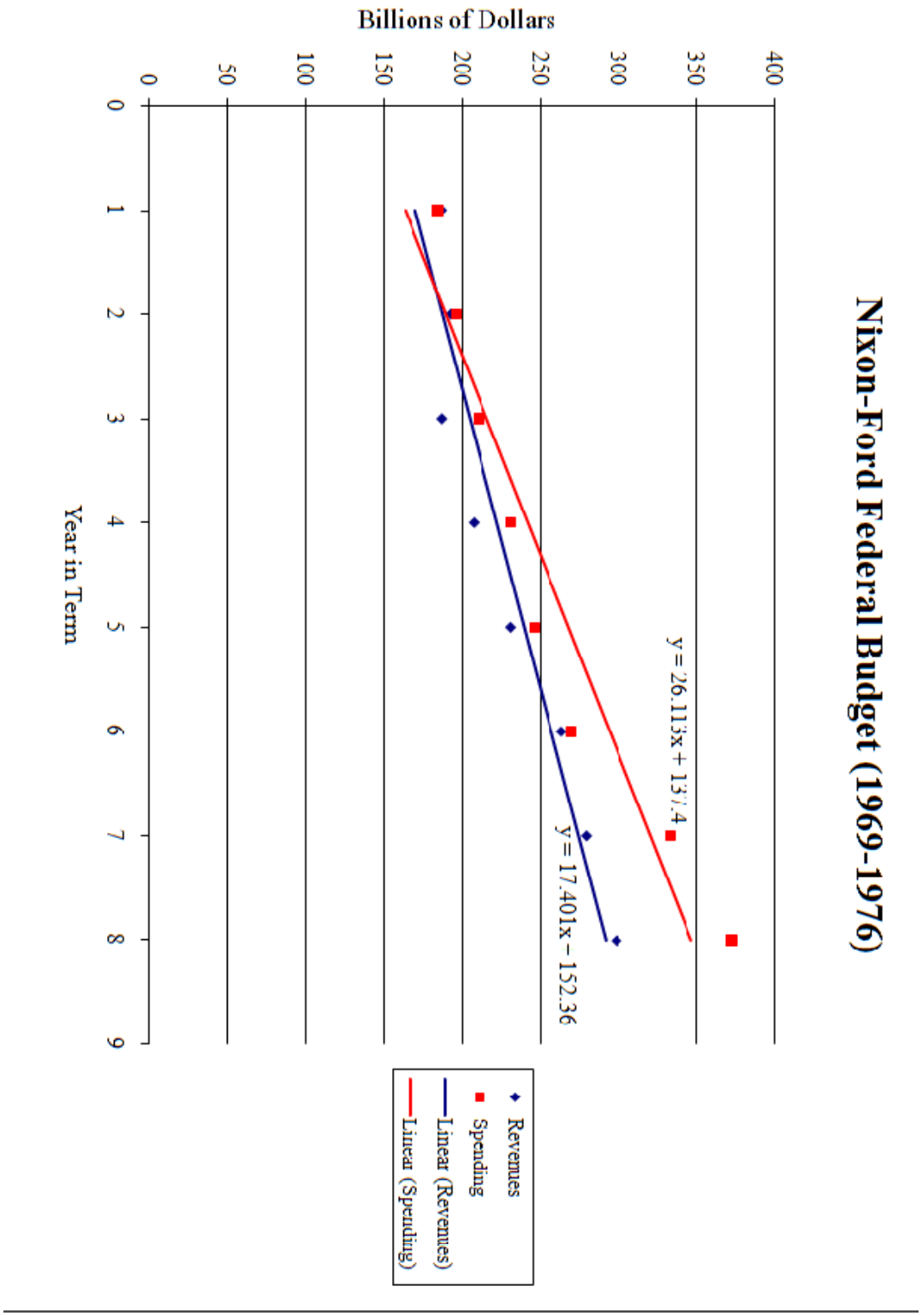

Yearly Federal Budgets 1969-2008
Billions of Dollars
0
500
1000
1500
2000
2500
3000
3500
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
Nixon Ford Revenues
Nixon Ford Spending
Carter Revenue
Carter Spending
Reagan Revenue
Reagan Spending
Bush Sr Revenue
Bush Sr Spending
Clinton Revenue
Clinton Spending
Bush Jr Revenue
Bush Jr Spending

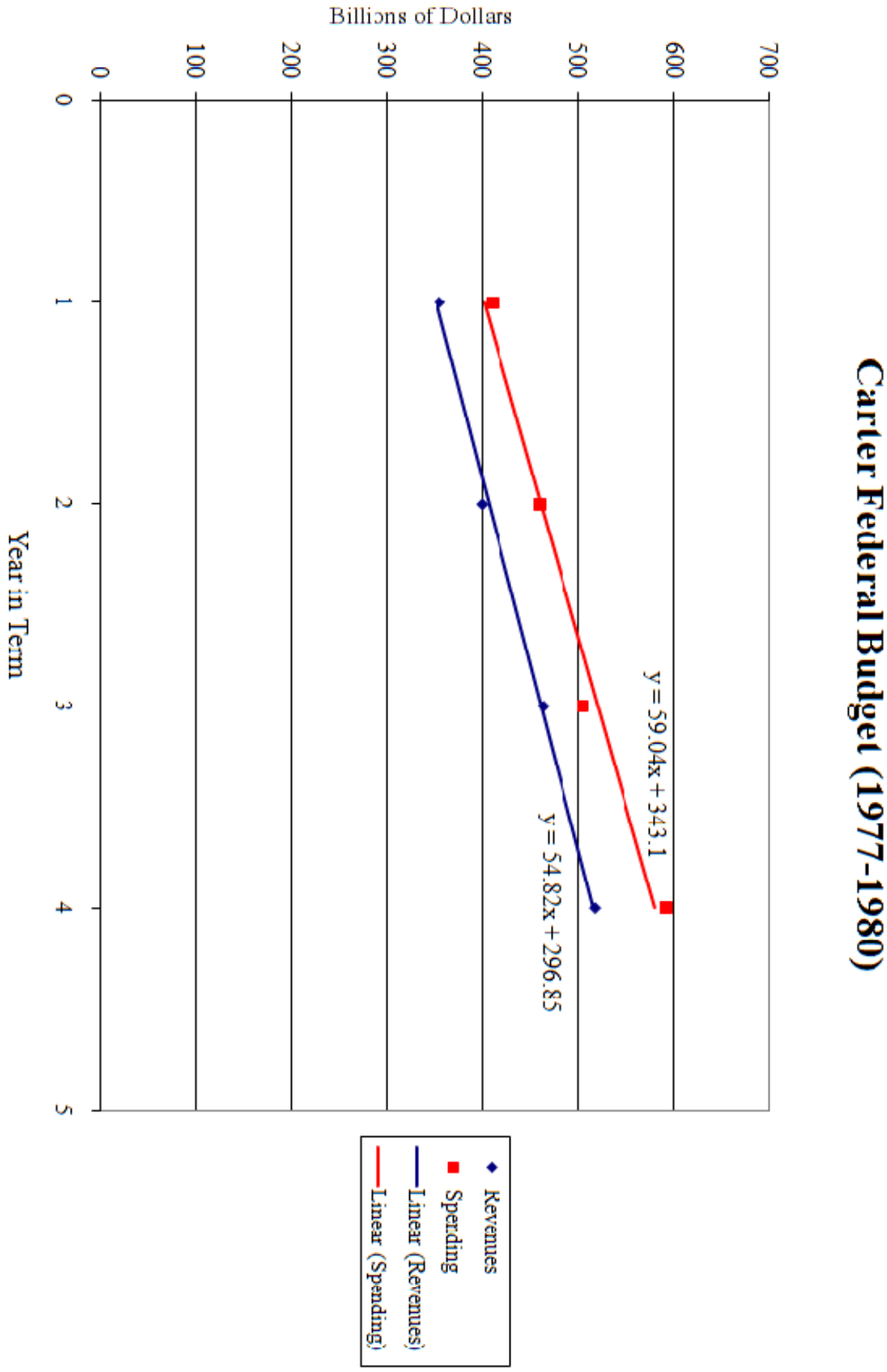
Presidential Revenues and Spending Regressions

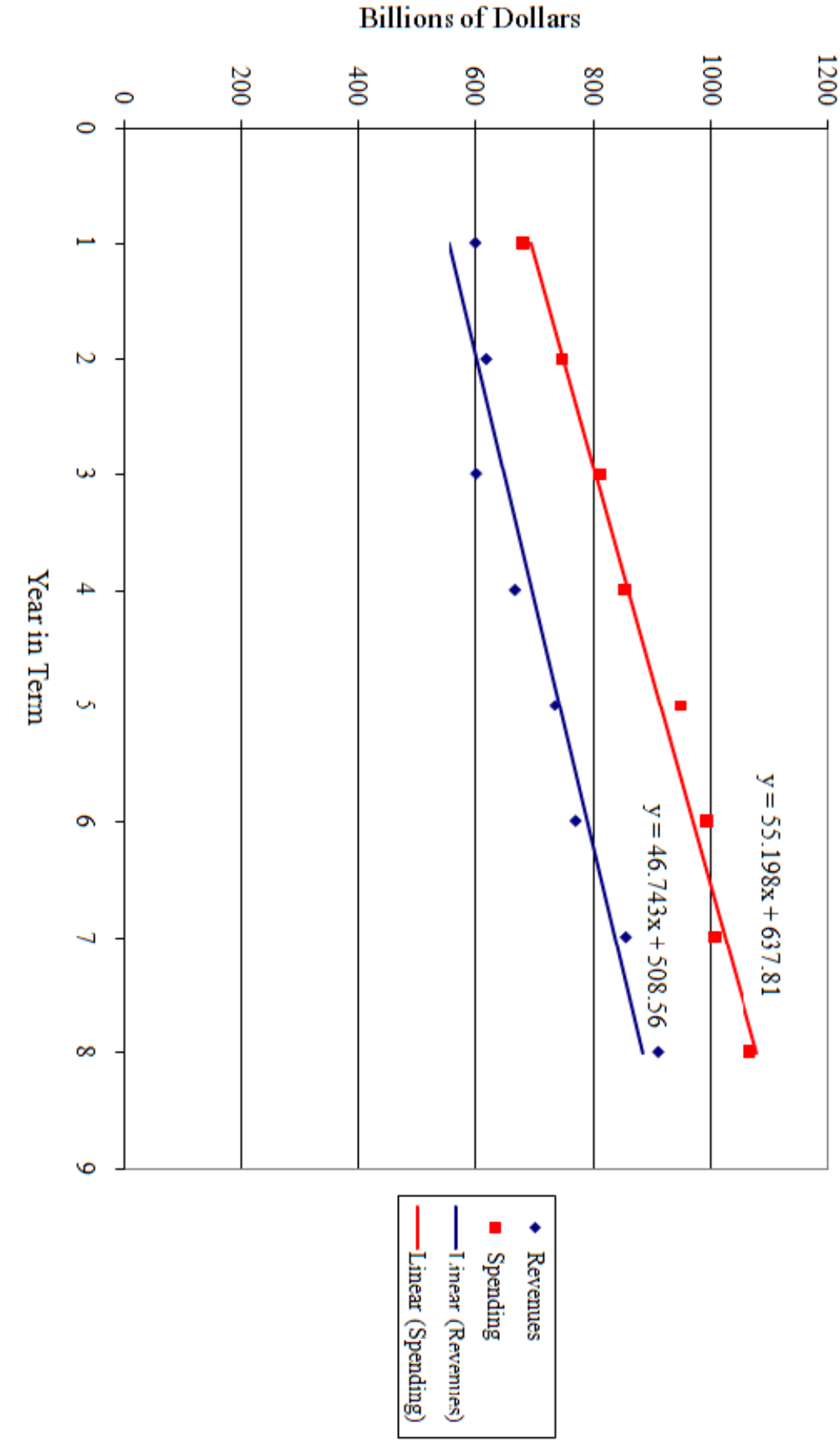
	Federal Revenues	Federal Outlays	Total Surplus	Linear Regressions	Model Predicted Total Debt Accumulated	Actual Total Debt Accumulated	Percent Error
Nixon/Ford					193.95	194	~0%
1969	186.9	183.6	3.3				
1970	192.8	195.6	-2.8				
1971	187.1	210.2	-23.1				
1972	207.3	230.7	-23.4				
1973	230.8	245.7	-14.9				
1974	263.2	269.4	-6.2				
1975	279.1	332.3	-53.2				
1976	298.1	371.8	-73.7				
	Linear Regression of Revenues:			y = 17.401x + 152.36			
	Linear Regression of Spending:			y = 26.113x + 137.4			
Carter					227.2	227.2	~0%
1977	355.6	409.2	-53.6				
1978	399.6	458.7	-59.1				
1979	463.3	504	-40.7				
1980	517.1	590.9	-73.8				
	Linear Regression of Revenues:			y = 54.82x + 296.85			
	Linear Regression of Spending:			y = 59.04x + 343.1			
Reagan					1338.38	1338.4	~0%
1981	599.3	678.2	-78.9				
1982	617.8	745.7	-127.9				
1983	600.6	808.4	-207.8				
1984	666.5	851.9	-185.4				

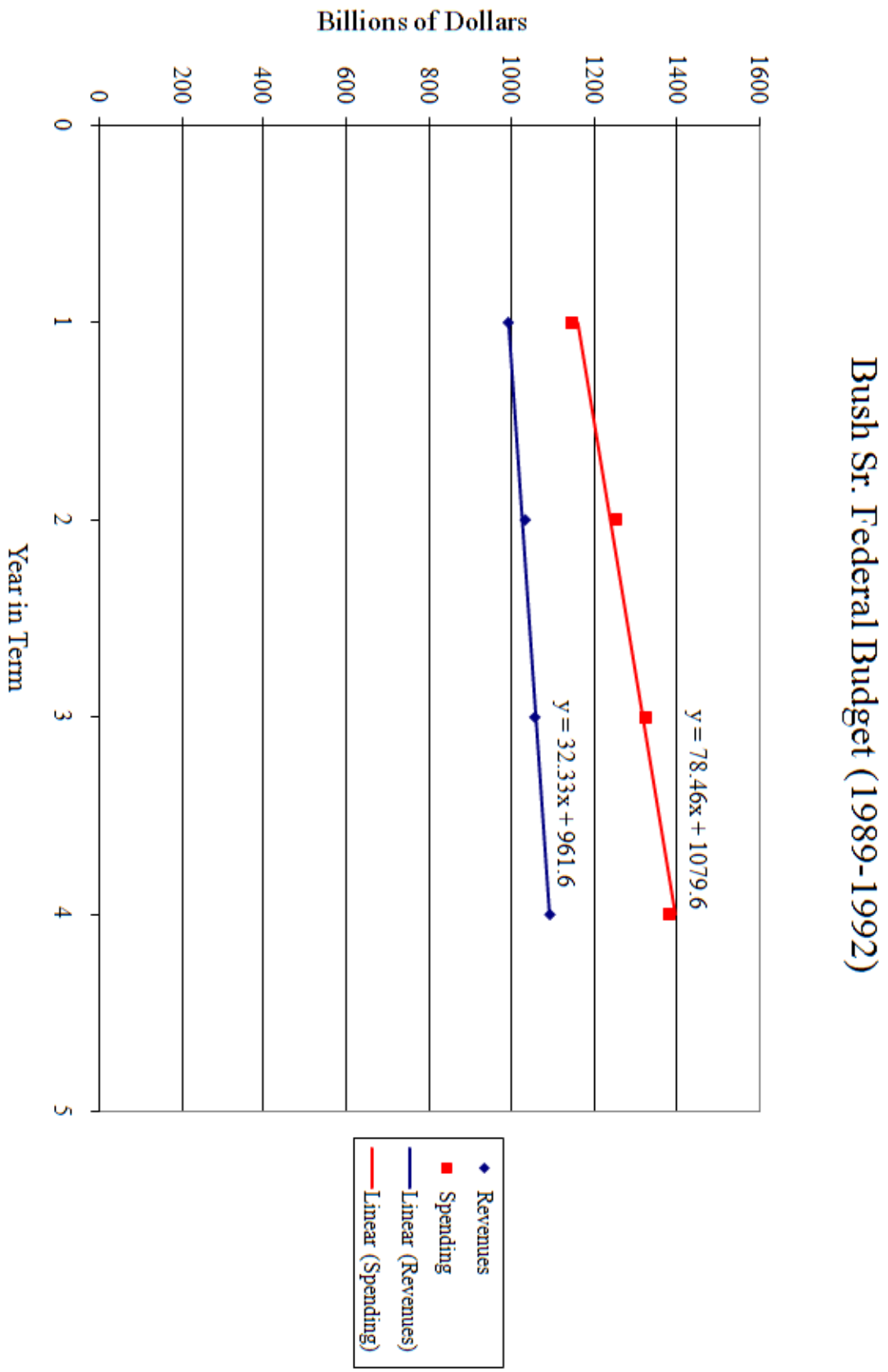
Presidential Revenues and Spending Regressions

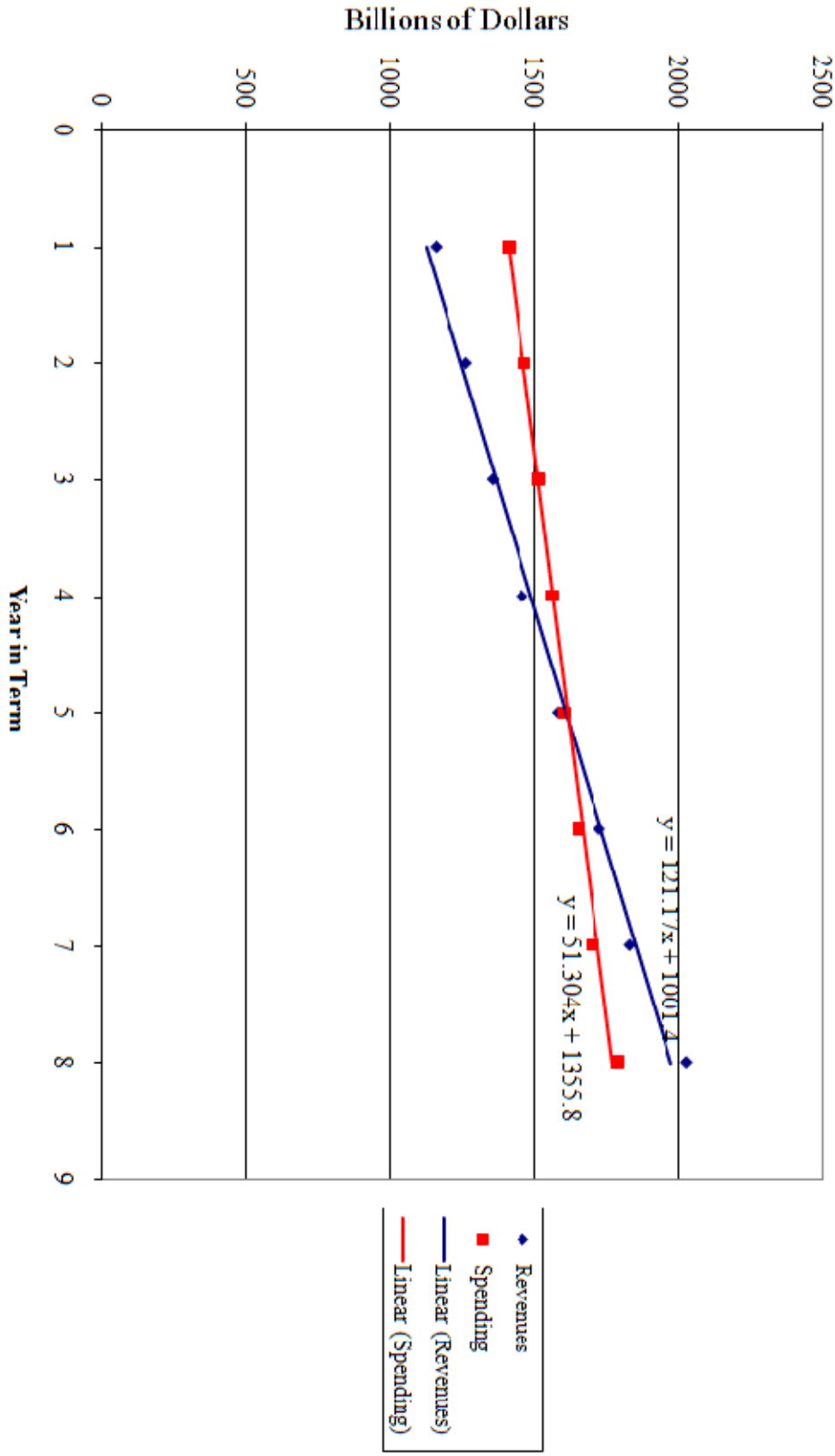
	1985	734.1	946.4	-212.3		
	1986	769.2	990.4	-221.2		
	1987	854.4	1004.1	-149.7		
	1988	909.3	1064.5	-155.2		
	Linear Regression of Revenues:			y = 46.743x + 508.56		
	Linear Regression of Spending:			y = 55.198x + 637.81		
Bush Sr					935.7	933.1	0.27%
	1989	991.2	1143.8	-152.6		
	1990	1032.1	1253.1	-221		
	1991	1055.1	1324.3	-269.2		
	1992	1091.3	1381.6	-290.3		
	Linear Regression of Revenues:			y = 32.33x + 961.6		
	Linear Regression of Spending:			y = 78.46x + 1079.6		
Clinton					320.024	320.3	0.09%
	1993	1154.5	1409.5	-255		
	1994	1258.7	1461.9	-203.2		
	1995	1351.9	1515.9	-164		
	1996	1453.2	1560.6	-107.4		
	1997	1579.4	1601.3	-21.9		
	1998	1722	1652.7	69.3		
	1999	1827.6	1702	125.6		
	2000	2025.5	1789.2	236.3		
	Linear Regression of Revenues:			y = 121.17x + 1001.4		
	Linear Regression of Spending:			y = 51.304x + 1355.8		


Nixon-Ford Federal Budget (1969-1976)
Billions of Dollars
Year in Term
y = 26.113x + 137.4
y = 17.401x - 152.36
Revenues
Spending
Linear (Revenues)
Linear (Spending)
400
350
300
250
200
150
100
50
0
0 1 2 3 4 5 6 7 8 9

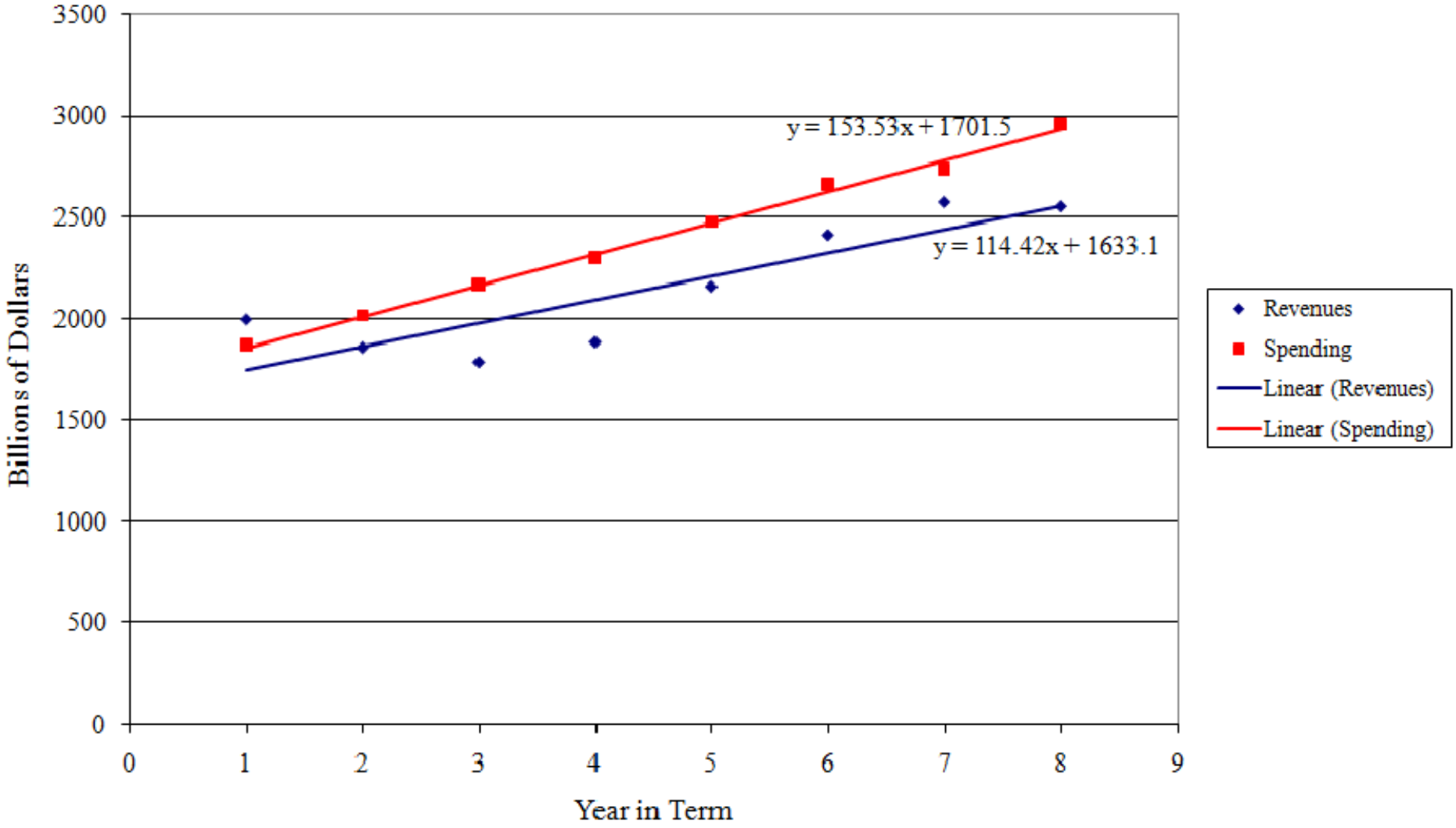

Carter Federal Budget (1977-1980)
Billions of Dollars
Year in Term
y = 59.04x + 343.1
y = 54.82x + 296.85
Revenues
Sperding
Linear (Revenues)
Linear (Spending)
0
100
200
300
400
500
600
700
0
1
2
3
4
5

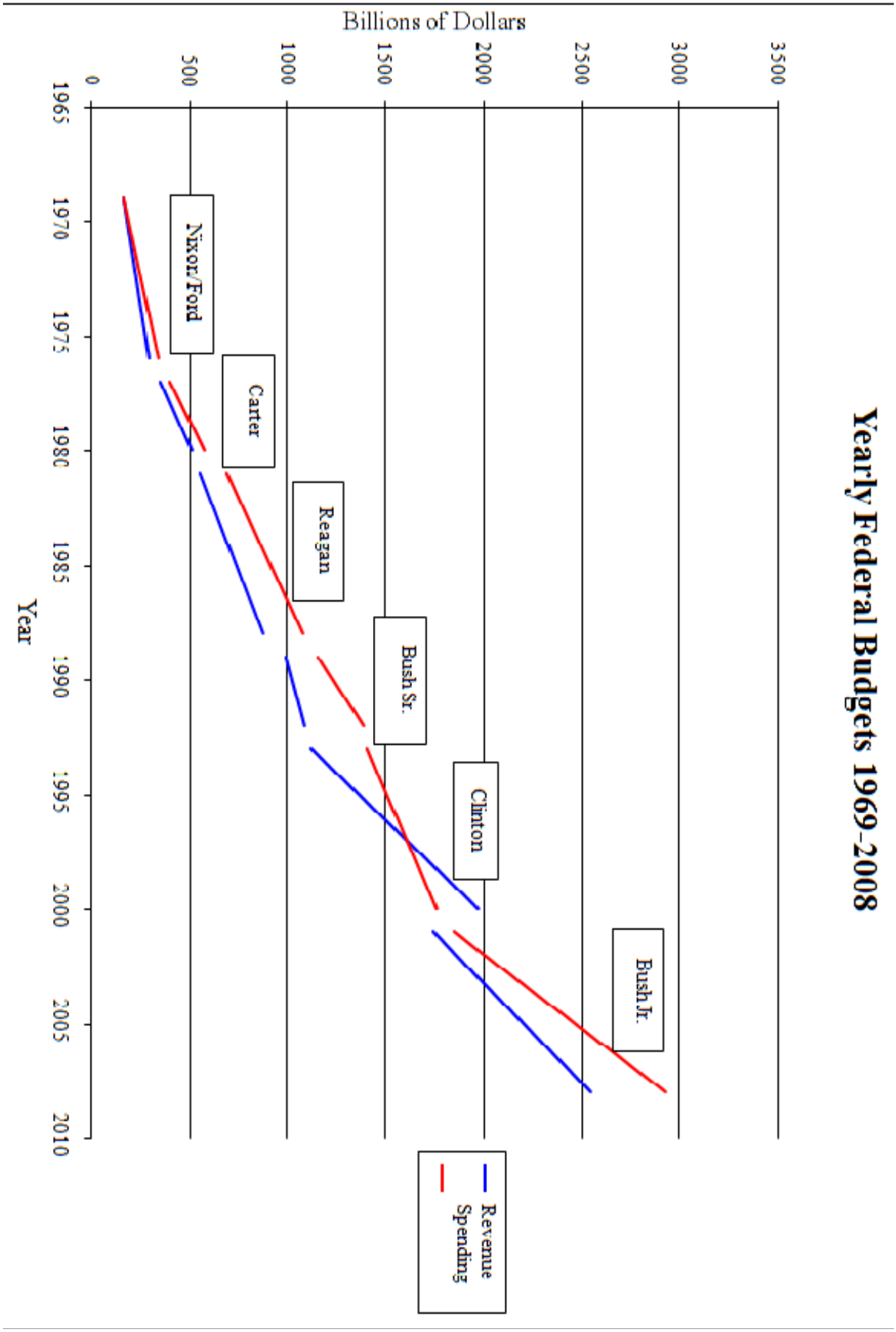

Reagan Federal Budget (1981-1988)
Billions of Dollars
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
7
8
9
Year in Term
y = 55.198x + 637.81
y = 46.743x + 508.56
Revenues
Spending
Linear (Revenues)
Linear (Spending)


Bush Sr. Federal Budget (1989-1992)
Billions of Dollars
1600
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
Year in Term
y = 78.46x + 1079.6
y = 32.33x + 961.6
Revenues
Spending
Linear (Revenues)
Linear (Spending)


Clinton Federal Budget(1993-2000)
Billions of Dollars
2500
2000
1500
1000
500
0
0 1 2 3 4 5 6 7 8 9
Year in Term
y = 121.17x + 1001.4
y = 51.304x + 1355.8
Revenues
Spending
Linear (Revenues)
Linear (Spending)

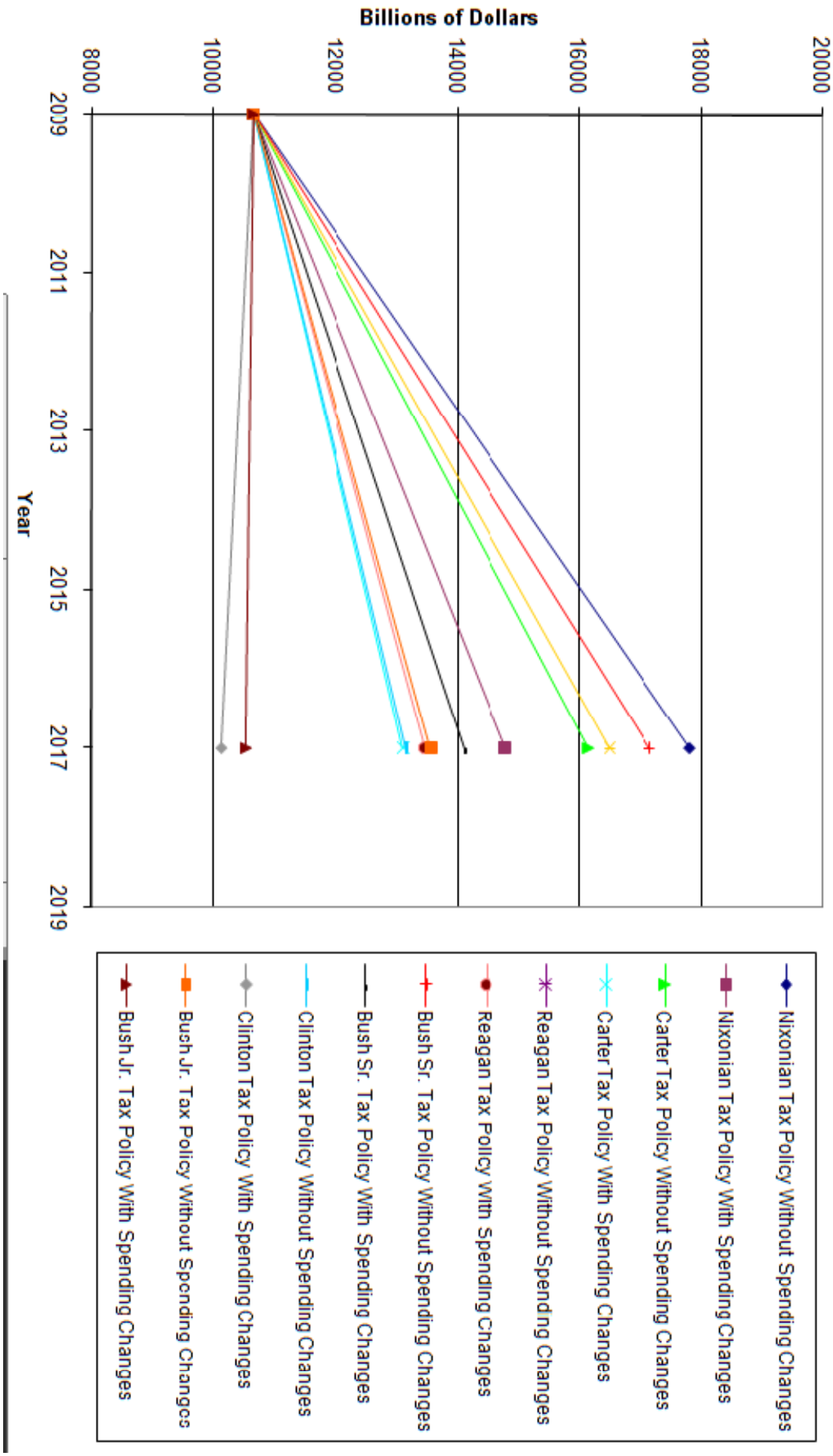
Bush Jr. Federal Budget (2001-2008)




Yearly Federal Budgets 1969-2008
Billions of Dollars
3500
3000
2500
2000
1500
1000
500
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
Nixon/Ford
Carter
Reagan
Bush Sr.
Clinton
Bush Jr.
Revenue
Spending

Projected National Debt

	Current National Debt	Rate of Revenue Increase as a Function of Year	Rate of Spending Increase with No Changes	Rate of Spending Increase with Changes	Projected National Debt 2017 Without Changes	Change in National Debt after 2017 Without Changes
Nixon/Ford	10660	y = 17.401x	y = 176.875x	y = 109.48x	17836.33	7176.33
Carter	10660	y = 54.82x	y = 176.875x	y = 109.48x	16152.475	5492.475
Reagan	10660	y = 46.743x	y = 176.875x	y = 109.48x	16515.94	5855.94
Bush Sr.	10660	y = 32.33x	y = 176.875x	y = 109.48x	17164.525	6504.525
Clinton	10660	y = 121.17x	y = 176.875x	y = 109.48x	13166.725	2506.725
Bush Jr.	10660	y = 112.25x	y = 176.875x	y = 109.48x	13568.125	2908.125
Trend Displayed by Heritage Foundation/CBO	10660	y = 143.875x	y = 176.875x		15892	5232


Future National Debt 2009-2017
Social Security Costs Not Included
Billions of Dollars
20000
18000
16000
14000
12000
10000
8000
2009
2011
2013
2015
2017
2019
Year
Nixonian Tax Policy Without Spending Changes
Nixonian Tax Policy With Spending Changes
Carter Tax Policy Without Spending Changes
Carter Tax Policy With Spending Changes
Reagan Tax Policy Without Spending Changes
Reagan Tax Policy with Spending Changes
Bush Sr. Tax Policy Without Spending Changes
Bush Sr. Tax Policy With Spending Changes
Clinton Tax Policy Without Spending Changes
Clinton Tax Policy With Spending Changes
Bush Jr. Tax Policy Without Spending Changes
Bush Jr. Tax Policy With Spending Changes

Distribution of Federal Spending

	Total Federal Spending	Discretionary Spending	Discretionary Spending as a Percentage of Total Spending	Entitlement Spending	Entitlement Spending as a Percentage of Total Spending	Entitlement Spending Without Social Security	Future Federal Spending without Social Security Reform
Nixon							
1969	183.6	117.3	0.6389	53.6	0.2919		
1970	195.6	120.3	0.6150	61	0.3119		
1971	210.2	122.5	0.5828	72.8	0.3463		
1972	230.7	128.5	0.5570	86.7	0.3758		
1973	245.7	130.4	0.5307	98	0.3989		
1974	269.4	138.2	0.5130	109.7	0.4072		
1975	332.3	158	0.4755	151.1	0.4547		
1976	371.8	175.6	0.4723	169.5	0.4559		
Carter							
1977	409.2	197.1	0.4817	182.2	0.4453		
1978	458.7	218.7	0.4768	204.6	0.4460		
1979	504	240	0.4762	221.4	0.4393		
1980	590.9	275.3	0.4676	262	0.4434		
Reagan							
1981	678.2	307.9	0.4540	301.5	0.4446		
1982	745.7	326	0.4372	334.8	0.4490		
1983	808.4	353.3	0.4370	365.3	0.4519		
1984	851.9	379.4	0.4454	361.4	0.4242		
1985	946.4	415.8	0.4393	401.1	0.4238		
1986	990.4	438.5	0.4428	415.9	0.4199		
1987	1004.1	444.2	0.4424	421.3	0.4196		
1988	1064.5	464.4	0.4363	448.3	0.4211		

Distribution of Federal Spending

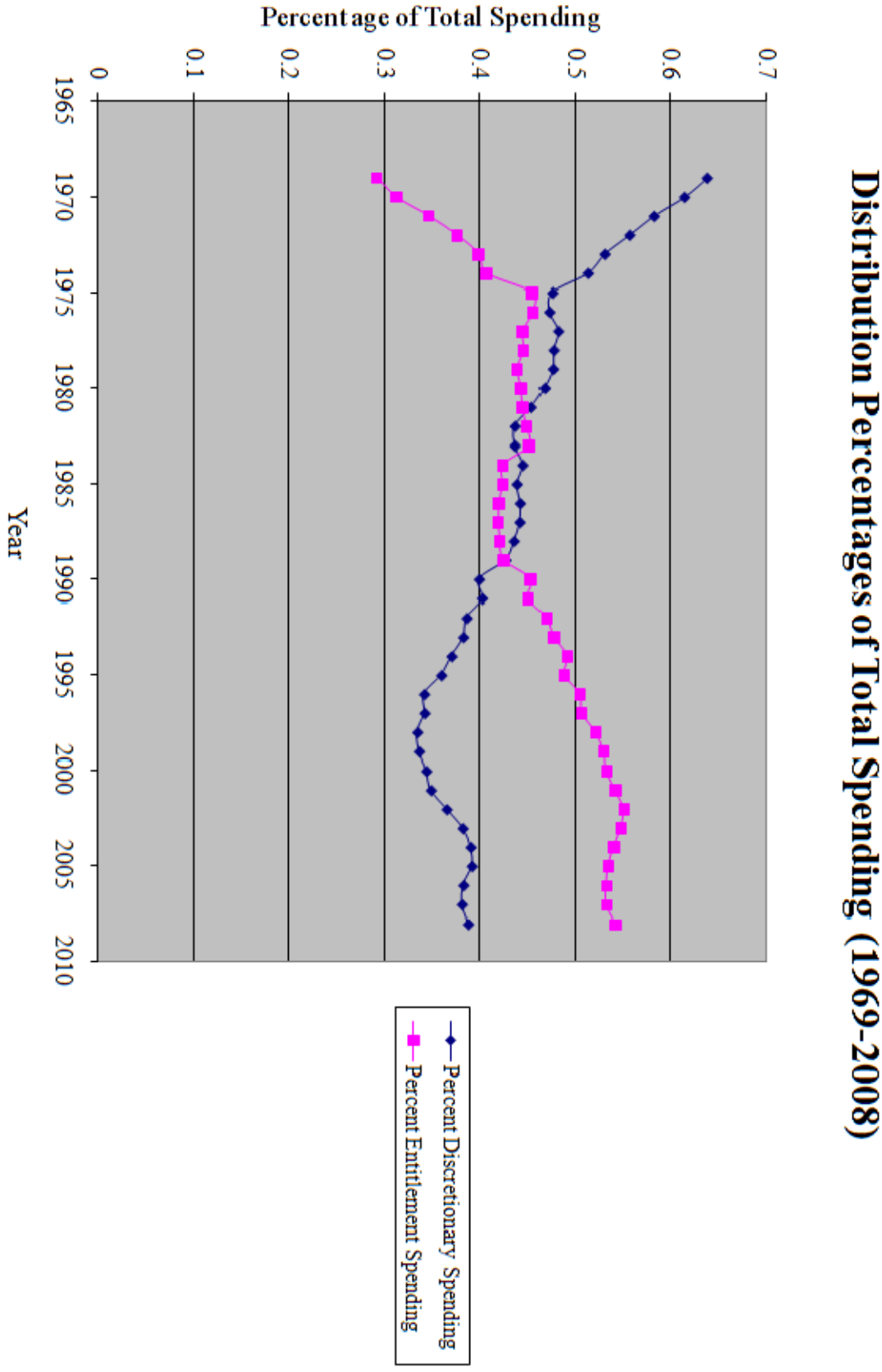
Bush Sr						
1989	1143.8	488.8	0.4273	486	0.4249	
1990	1253.1	500.6	0.3995	568.2	0.4534	
1991	1324.3	533.3	0.4027	596.6	0.4505	
1992	1381.6	533.8	0.3864	648.4	0.4693	
Clinton						
1993	1409.5	539.4	0.3827	671.4	0.4763	
1994	1461.9	541.4	0.3703	717.6	0.4909	
1995	1515.9	544.9	0.3595	738.9	0.4874	
1996	1560.6	532.7	0.3413	786.9	0.5042	
1997	1601.3	547.2	0.3417	810.1	0.5059	
1998	1652.7	552.1	0.3341	859.5	0.5201	
1999	1702	572	0.3361	900.3	0.5290	
2000	1789.2	614.8	0.3436	951.4	0.5317	
Bush						
2001	1863.2	649.3	0.3485	1007.7	0.5408	
2002	2011.2	734.3	0.3651	1105.9	0.5499	
2003	2160.1	825.4	0.3821	1181.6	0.5470	
2004	2293	895.5	0.3905	1237.6	0.5397	
2005	2472.2	968.5	0.3918	1319.8	0.5339	
2006	2655.4	1016.7	0.3829	1412.1	0.5318	
2007	2728.9	1040.6	0.3813	1451.1	0.5318	
2008	2931	1137	0.3879	1586	0.5411	
Projected by the Heritage Foundation and CBO Without Changes						
2009	3143	1166	0.3710	1729	0.5501	3143
2010	3253	1186	0.3646	1789	0.5500	3253

Distribution of Federal Spending

2011	3406	1203	0.3532	1897	0.5570	3406
2012	3484	1224	0.3513	1931	0.5542	3484
2013	3686	1259	0.3416	2073	0.5624	3686
2014	3878	1297	0.3345	2201	0.5676	3878
2015	4085	1340	0.3280	2336	0.5718	4085
2016	4349	1390	0.3196	2518	0.5790	4349
2017	4558	1442	0.3164	2642	0.5796	4558
Total		11507		19116		

Our Projection with 33% Cut in Discretionary Spending and 20% Cut in Medicare

2009	777.2556	1629.8	2655.0556
2010	790.5876	1684.6	2753.1876
2011	801.9198	1783.2	2891.1198
2012	815.9184	1817	2961.9184
2013	839.2494	1946.2	3139.4494
2014	864.5802	2064	3308.5802
2015	893.244	2188.6	3490.844
2016	926.574	2353.6	3721.174
2017	961.2372	2471	3906.2372
	7670.5662	17938	


Distribution Percentages of Total Spending (1969-2008)
Percentage of Total Spending
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year
Percent Discretionary Spending
Percent Entitlement Spending