BIO539_Assignment_3

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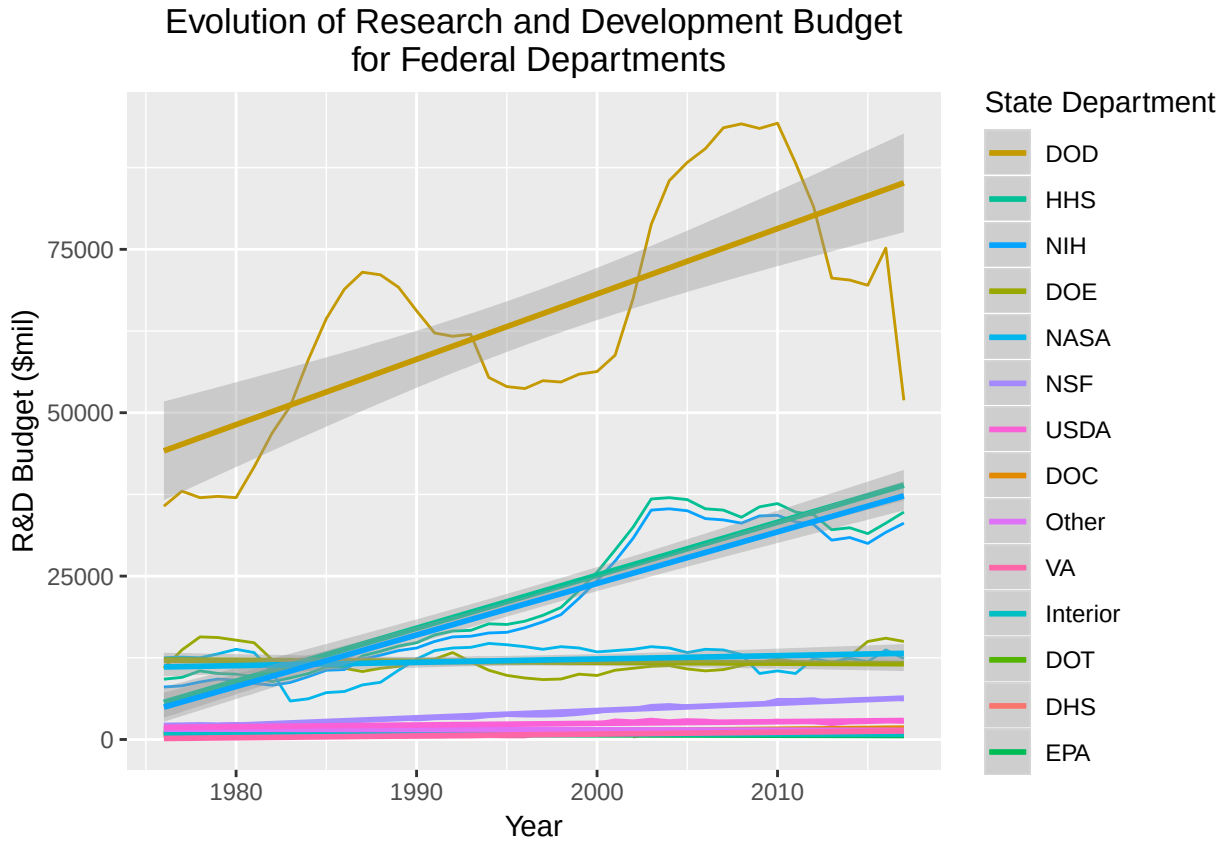
April 4th 2019

Federal Departments' Research and Development Spending

Just a few of the state agencies enjoyed an increased Research and Development budget over time, while the majority of the agencies didn't see a significant change in their budget since 1976. However, when taken together, the Federal R&D budget significantly increases over time (R square = 0.01525, p = 0.003363).

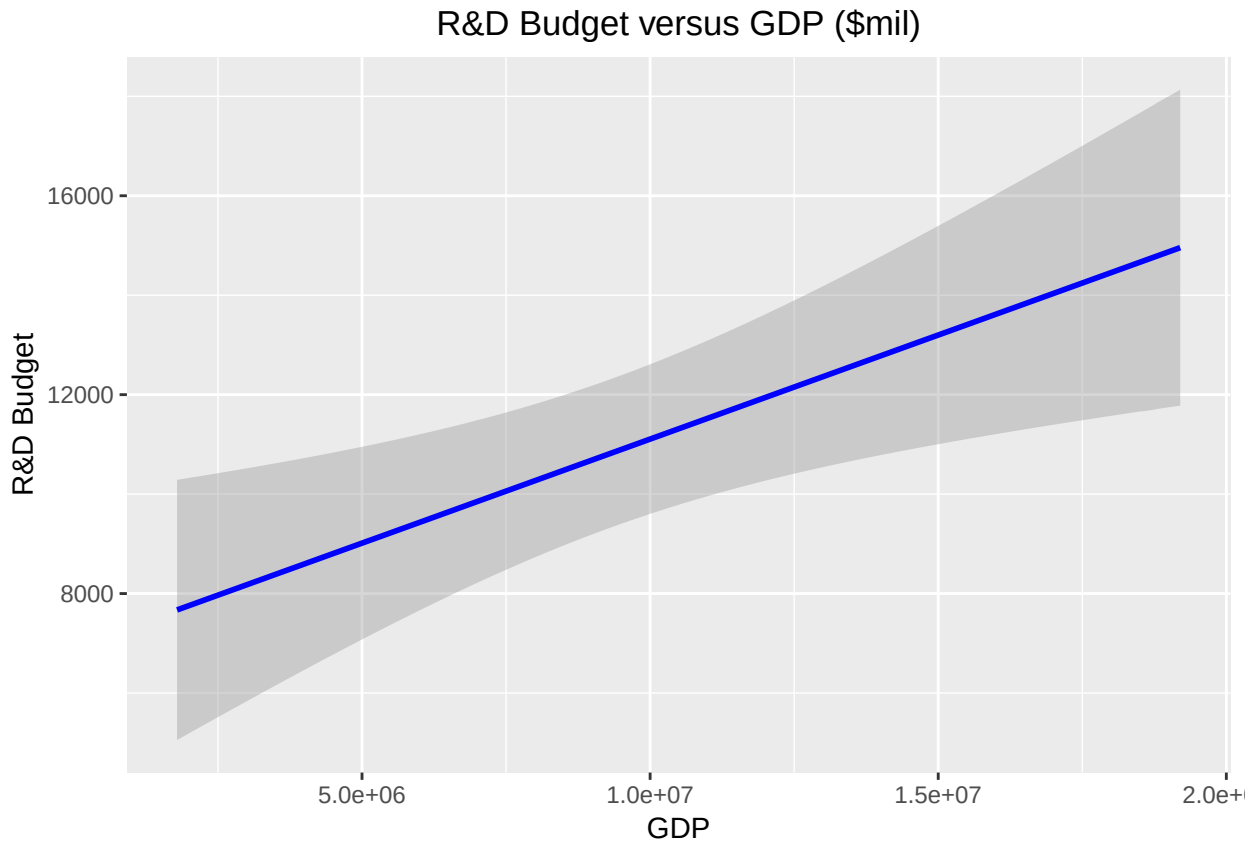
Below we can see the R&D budget trends for the state agencies from 1976 until 2017:



R&D Spending versus GDP

In the chart below we can observe a significant positive correlation between R&D budget and GPD, with an

$$R^2 = 0.01469 \; and \; p = 0.004012$$



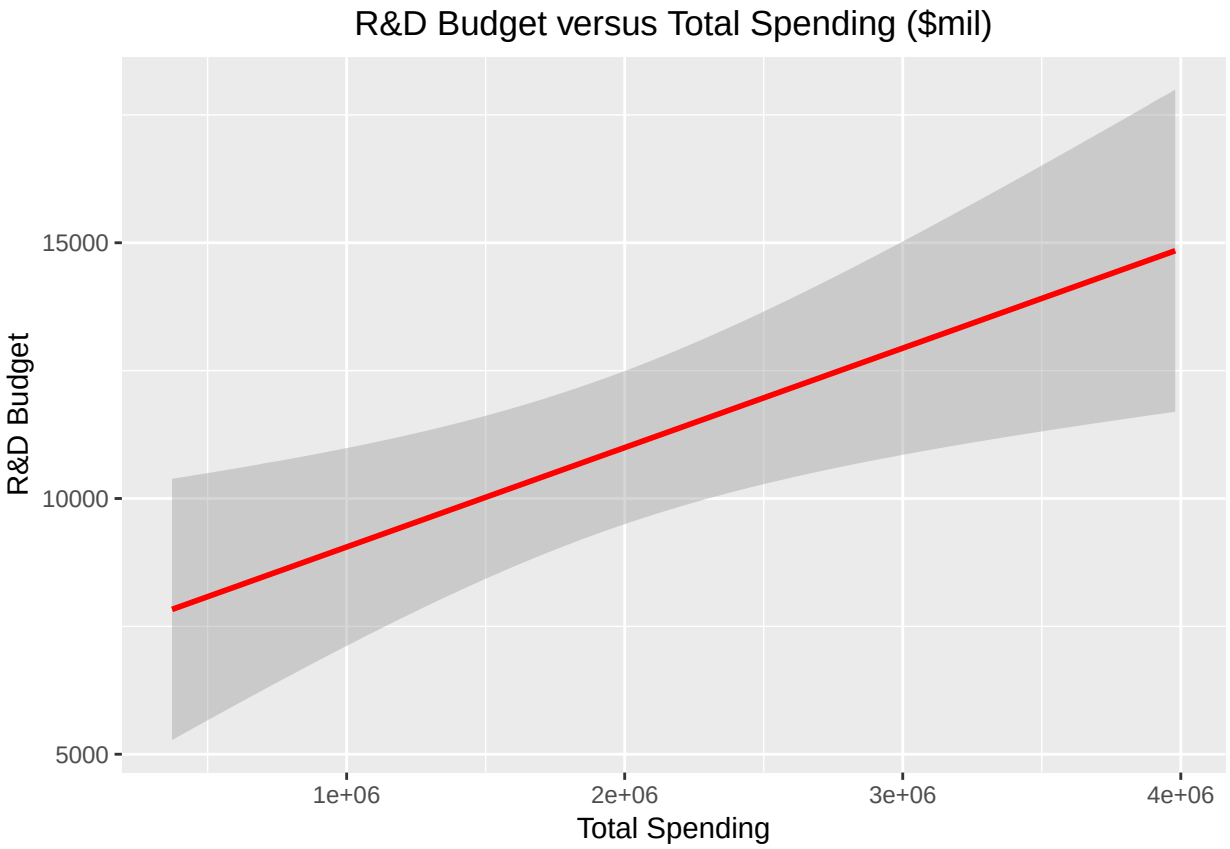
R&D Spending versus Total and Discretionary Spending

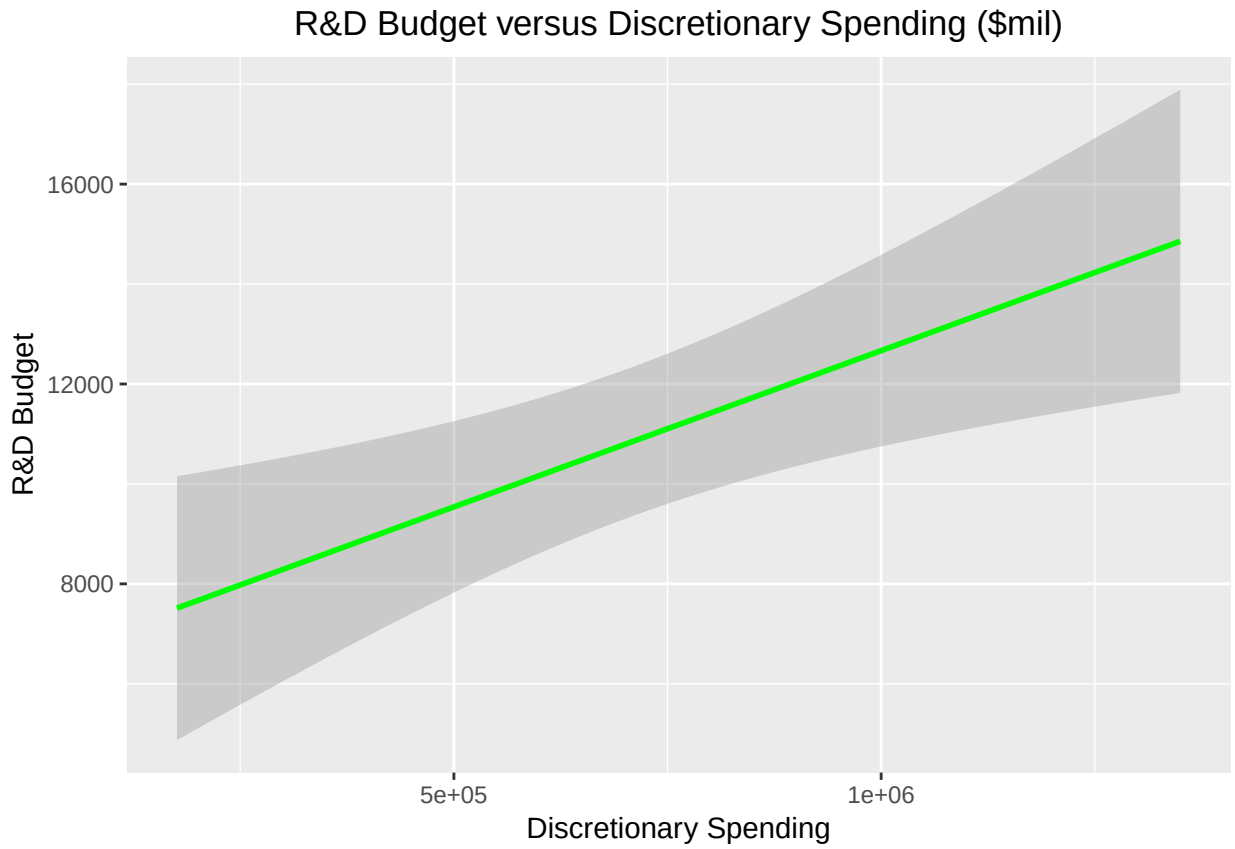
Similarly, the R&D budget is highly correlated with Total Spending

$$(R^2 = 0.01423 \ , \ p = 0.004632),$$

and with Discretionary Spending

$$(R^2 = 0.01573 \ , \ p = 0.002901).$$

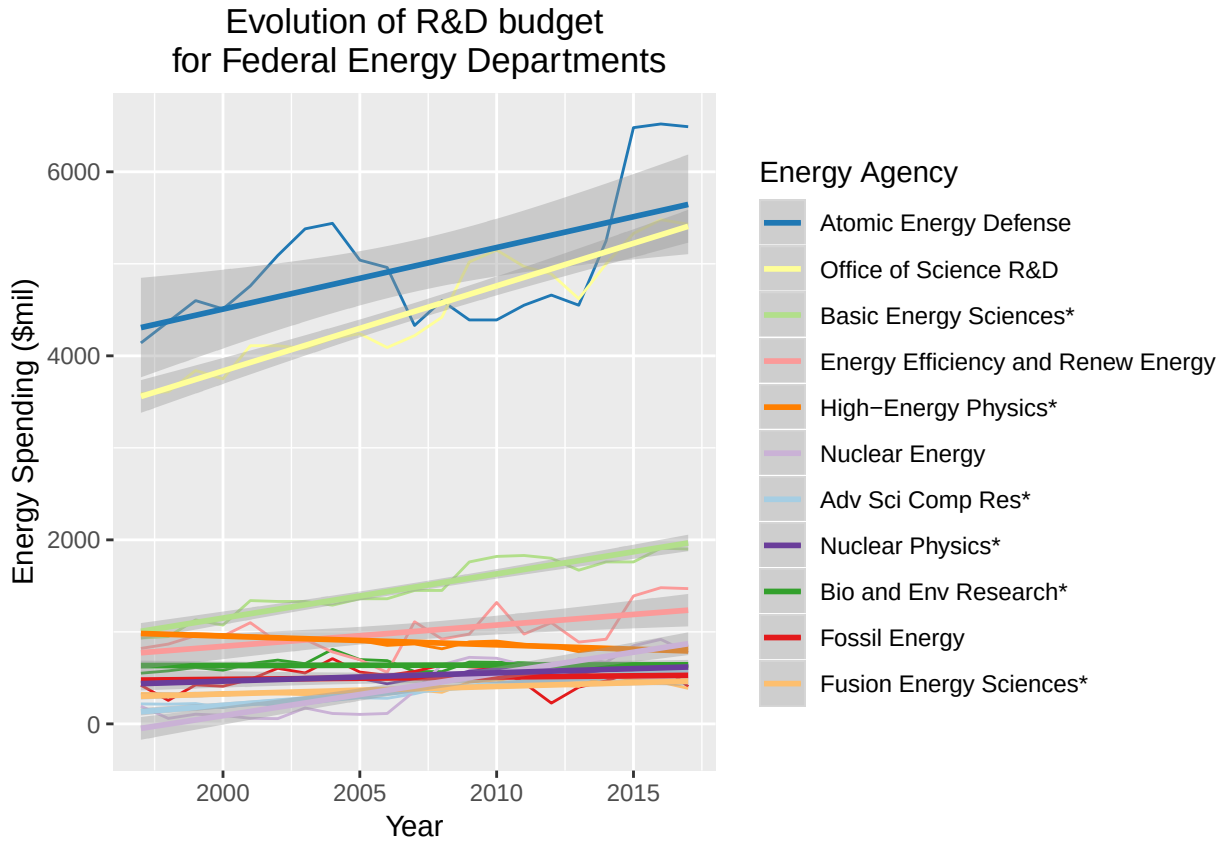

R&D Budget versus Total Spending ($mil)
R&D Budget
15000
10000
5000
1e+06
2e+06
3e+06
4e+06
Total Spending



Energy Agencies' Research and Development Spending

A second database offers insights about the R&D budget of the US Energy agencies from 1997 until 2017.

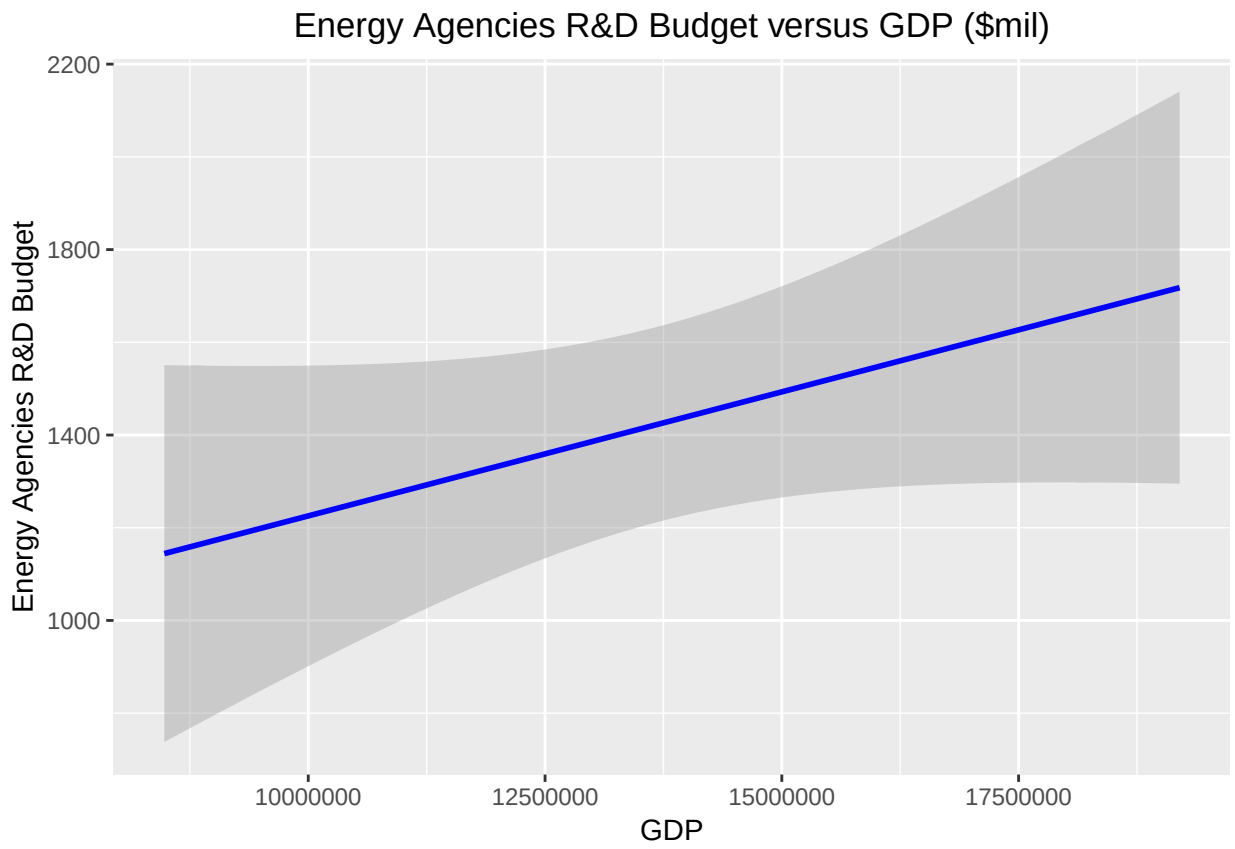
Although some agencies saw an increase in their budget over the years, several saw a reduction, and overall there is no significant correlation between the agencies' R&D budget and the year (R square = 0.011, p = 0.1118).



Energy R&D Spending compared with GDP

In the chart below we see that there is no significant correlation between R&D budget and GPD:

$$R^2 = 0.01082 \; and \; p = 0.1149$$



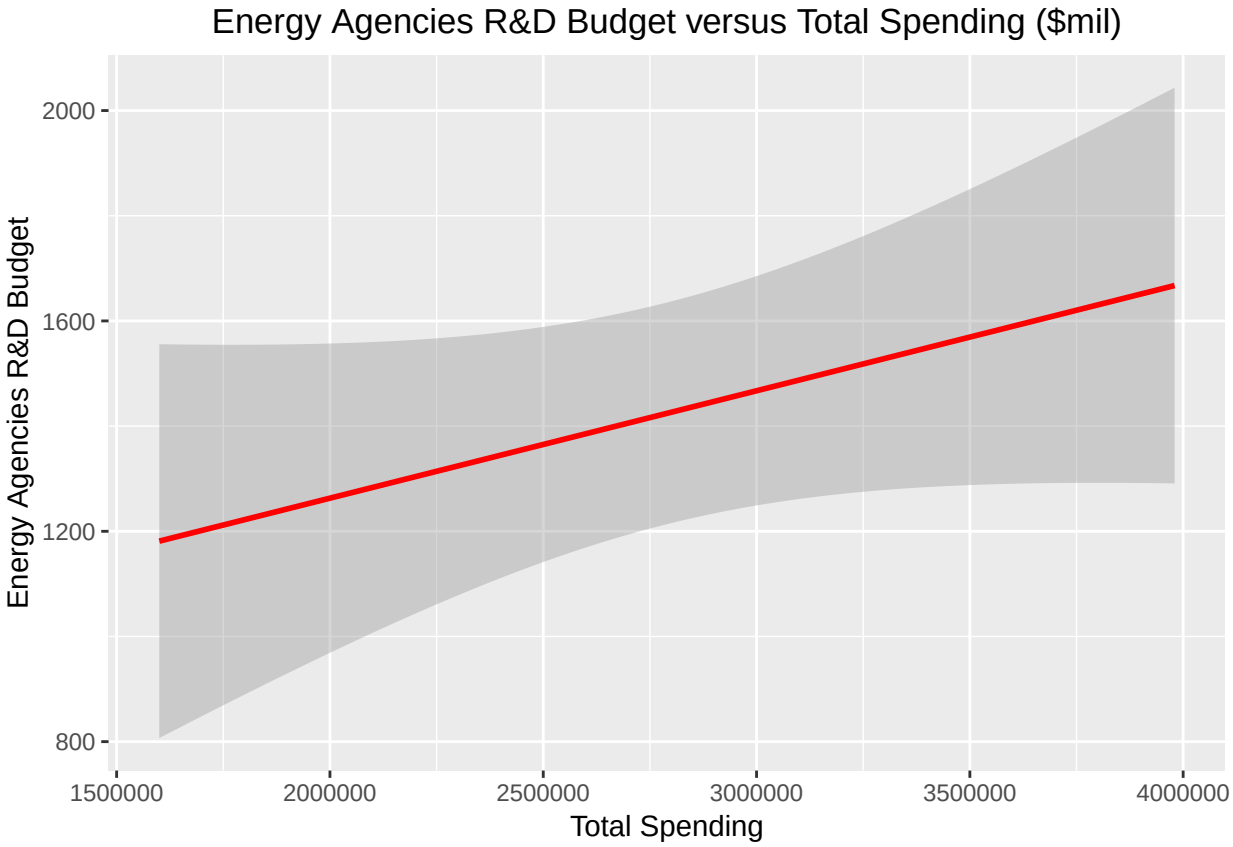
Energy R&D Spending compared with Total and Discretionary Spending

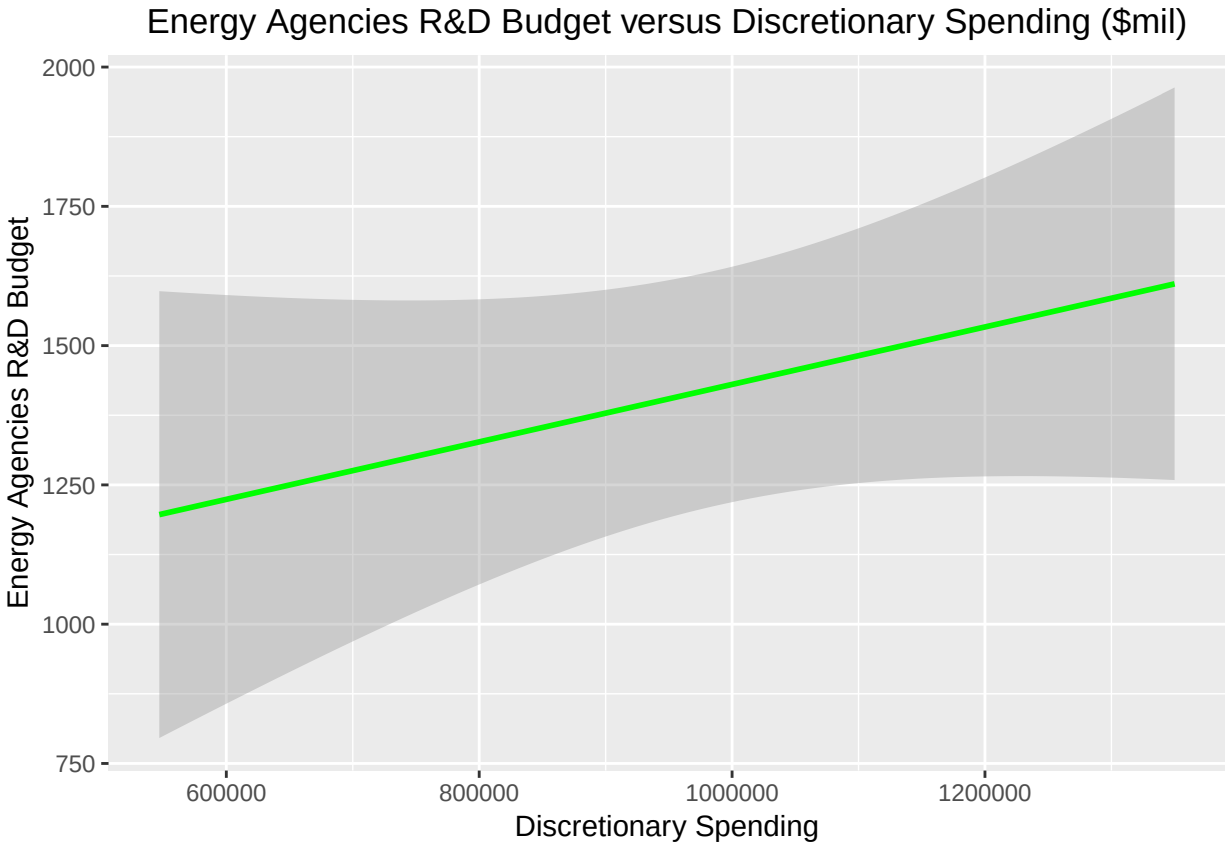
The R&D budget shows no significant correlation with Total Spending

$$(R^2 = 0.01027\ ,\ p = 0.1246),$$

or with Discretionary Spending

$$(R^2 = 0.007437\ ,\ p = 0.1916).$$

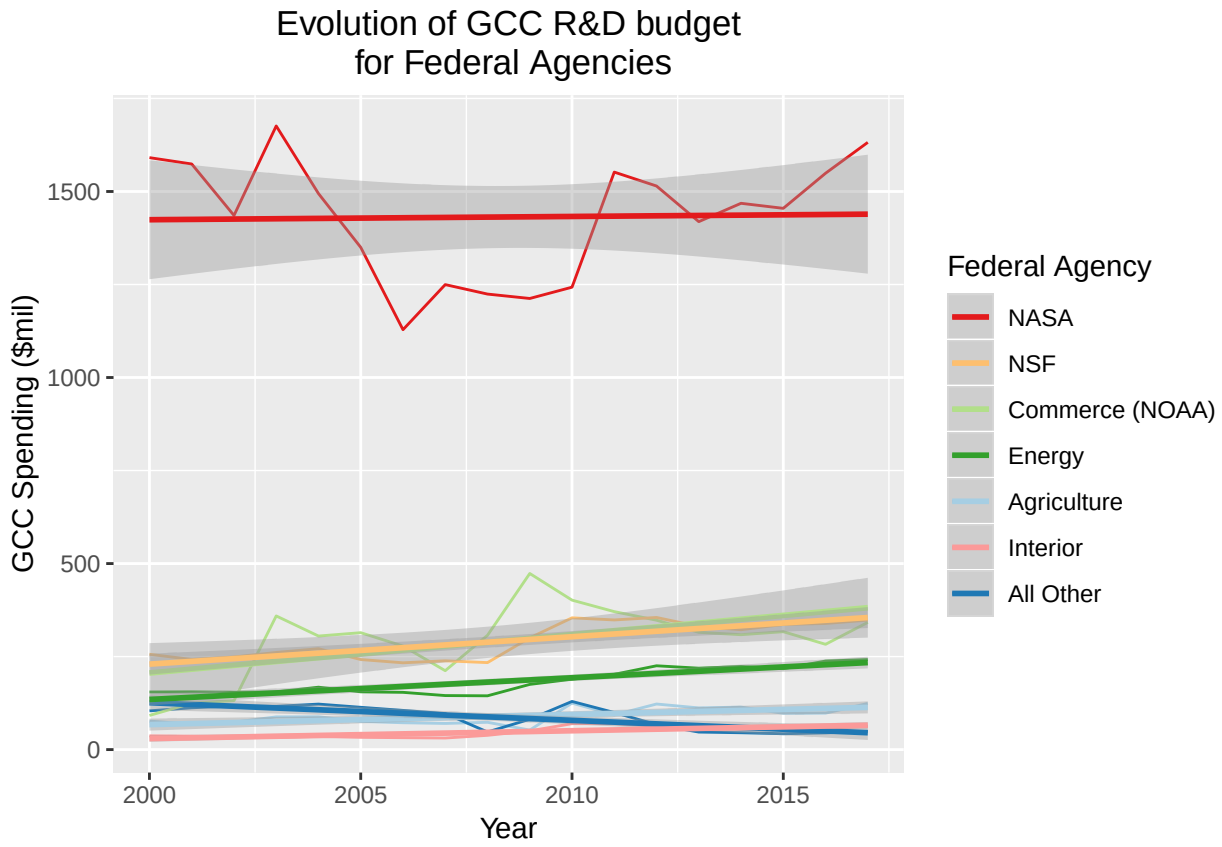

Energy Agencies R&D Budget versus Total Spending ($mil)
Energy Agencies R&D Budget
2000
1600
1200
800
1500000
2000000
2500000
3000000
3500000
4000000
Total Spending



US Agencies' Global Climate Change Research and Development Budget

The last database shines a light on the R&D budget for global climate changes of several US Agencies from 2000 until 2017.

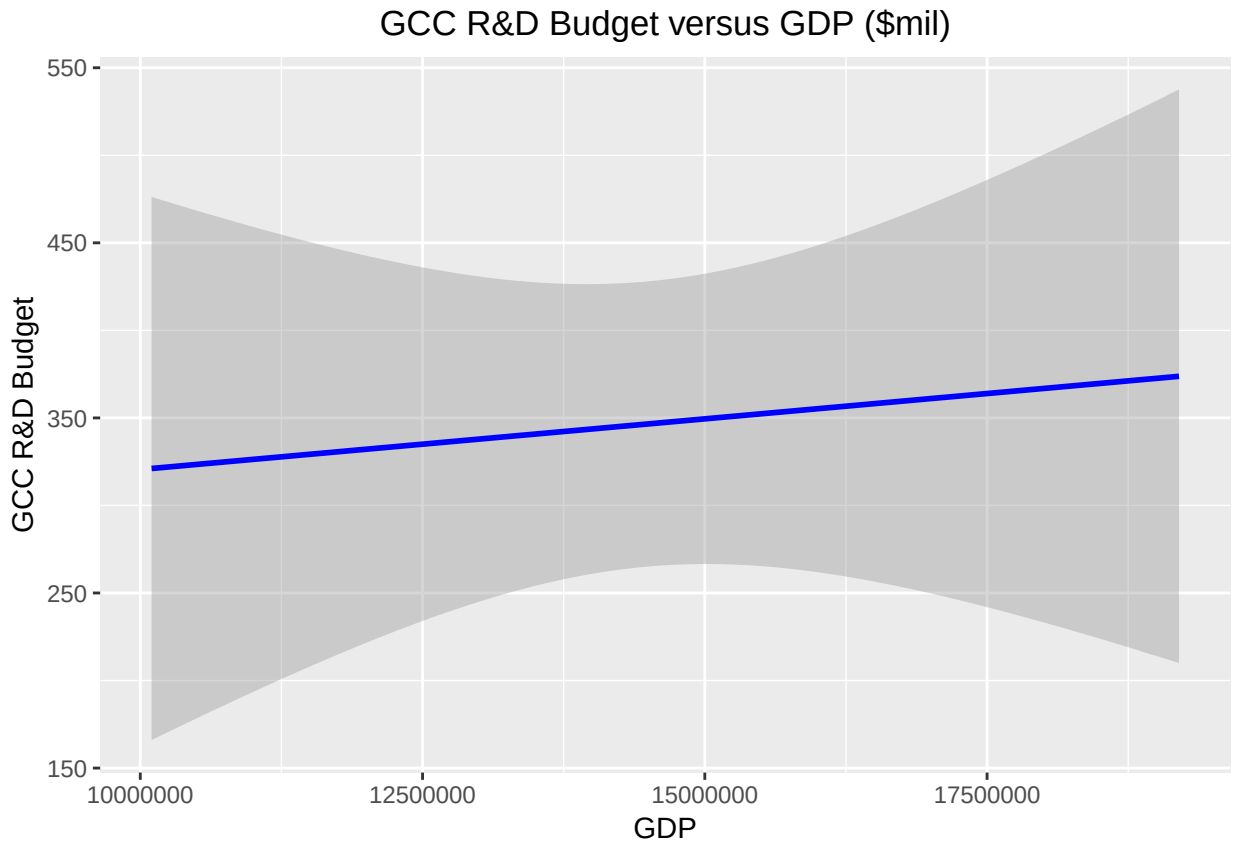
Looking at the data it is safe to state that the budget for Global Climate Change R&D remained fixed over time, and that there is no significant correlation between the Federal agencies' R&D budget and the year (R square = 0.001568, p = 0.6598).



US Agencies' GCC Research budget compared with GDP

In the chart below we see that there is no significant correlation between GCC R&D budget and GPD:

$$R^2 = 0.001165 \; and \; p = 0.7044$$



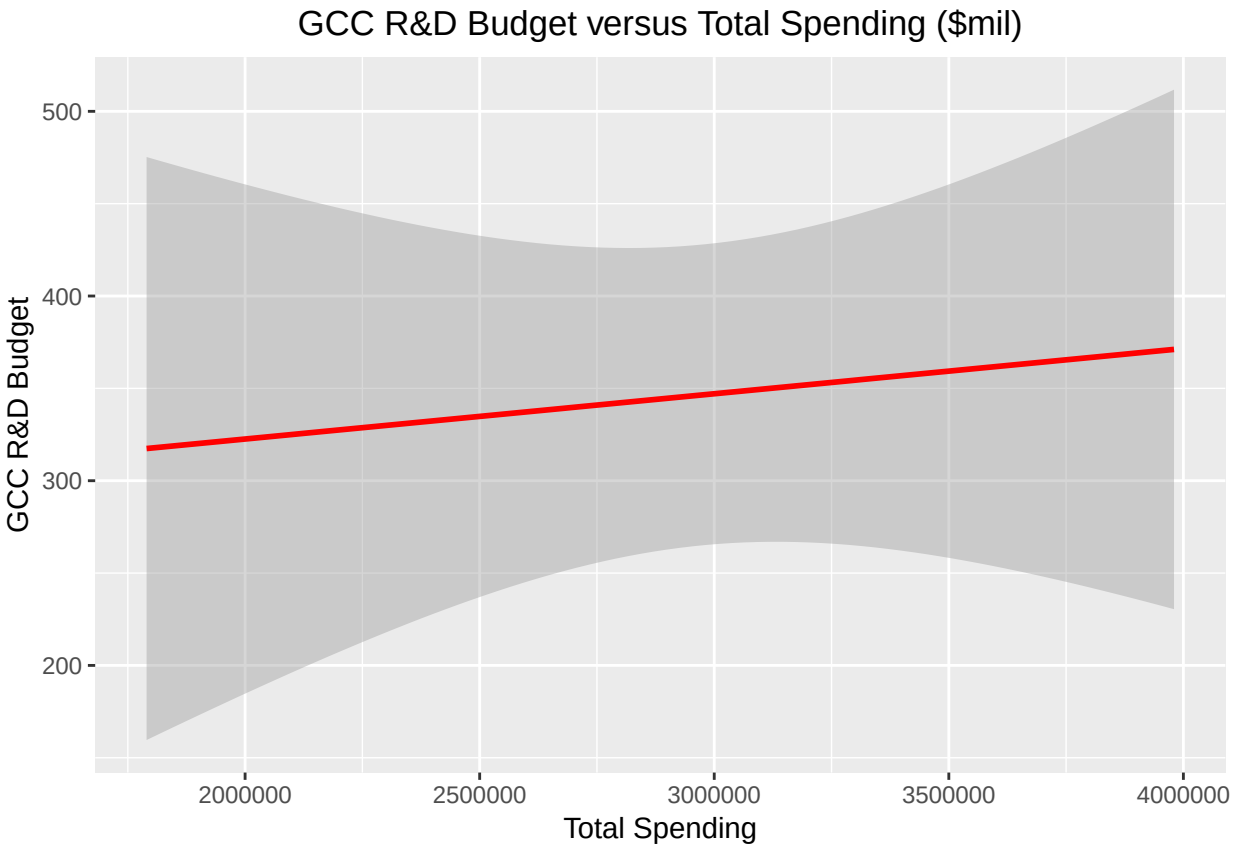
GCC R&D Spending compared with Total and Discretionary Spending

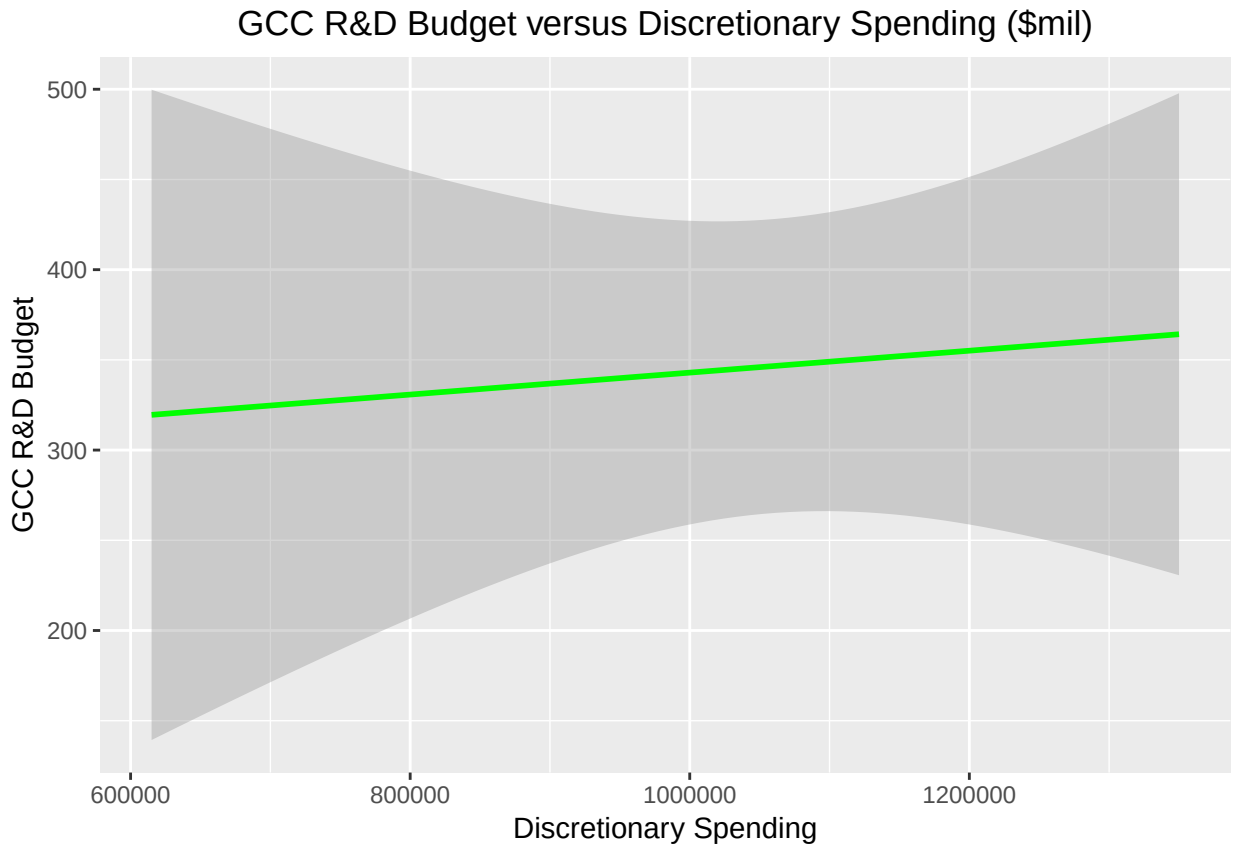
The GCC R&D budget shows no significant correlation with Total Spending

$$(R^2 = 0.001455\ ,\ p = 0.6715),$$

or with Discretionary Spending

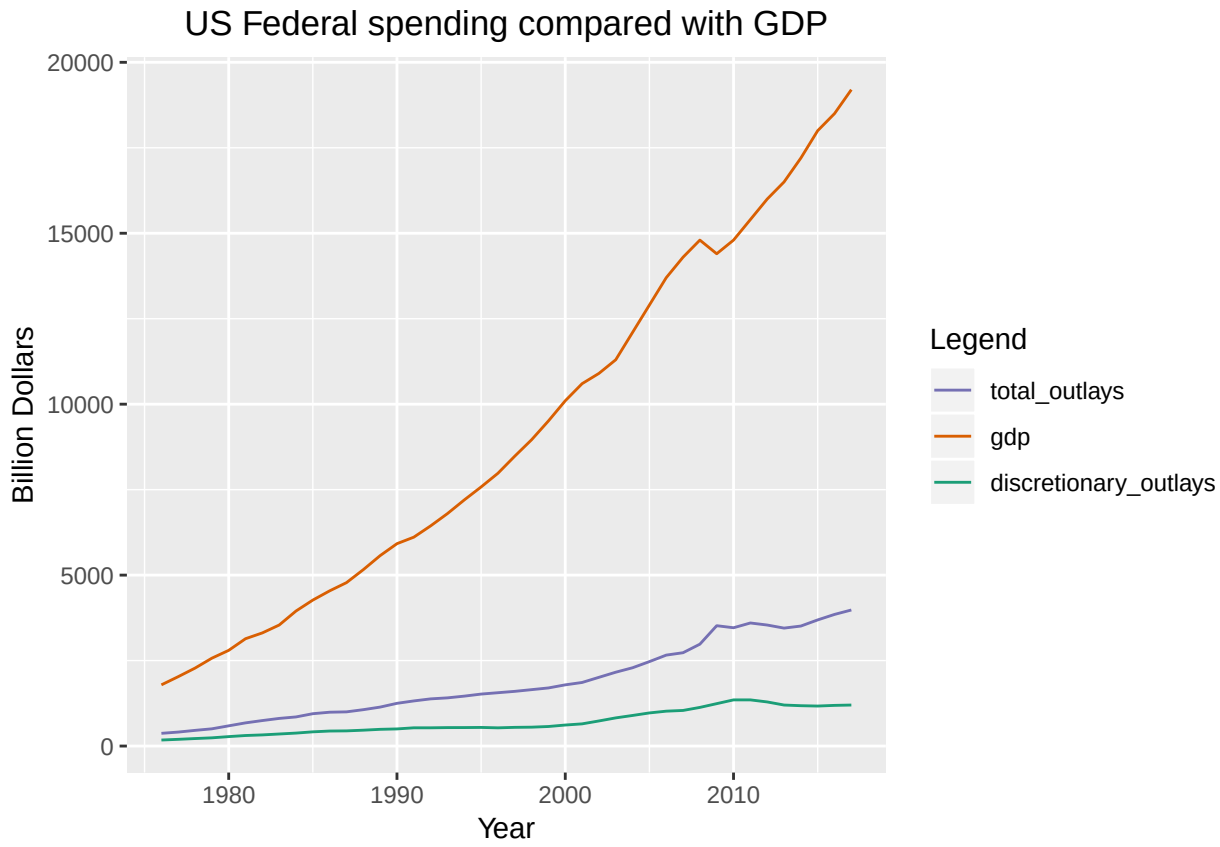
$$(R^2 = 0.0008861\ ,\ p = 0.7407).$$


GCC R&D Budget versus Total Spending ($mil)
GCC R&D Budget
500
400
300
200
2000000
2500000
3000000
3500000
4000000
Total Spending



Federal Spending compared with GDP

It is interesting to note that the US Federal spending did not grow at the same rate as the Gross Domestic Product, as we can observe in the chart below



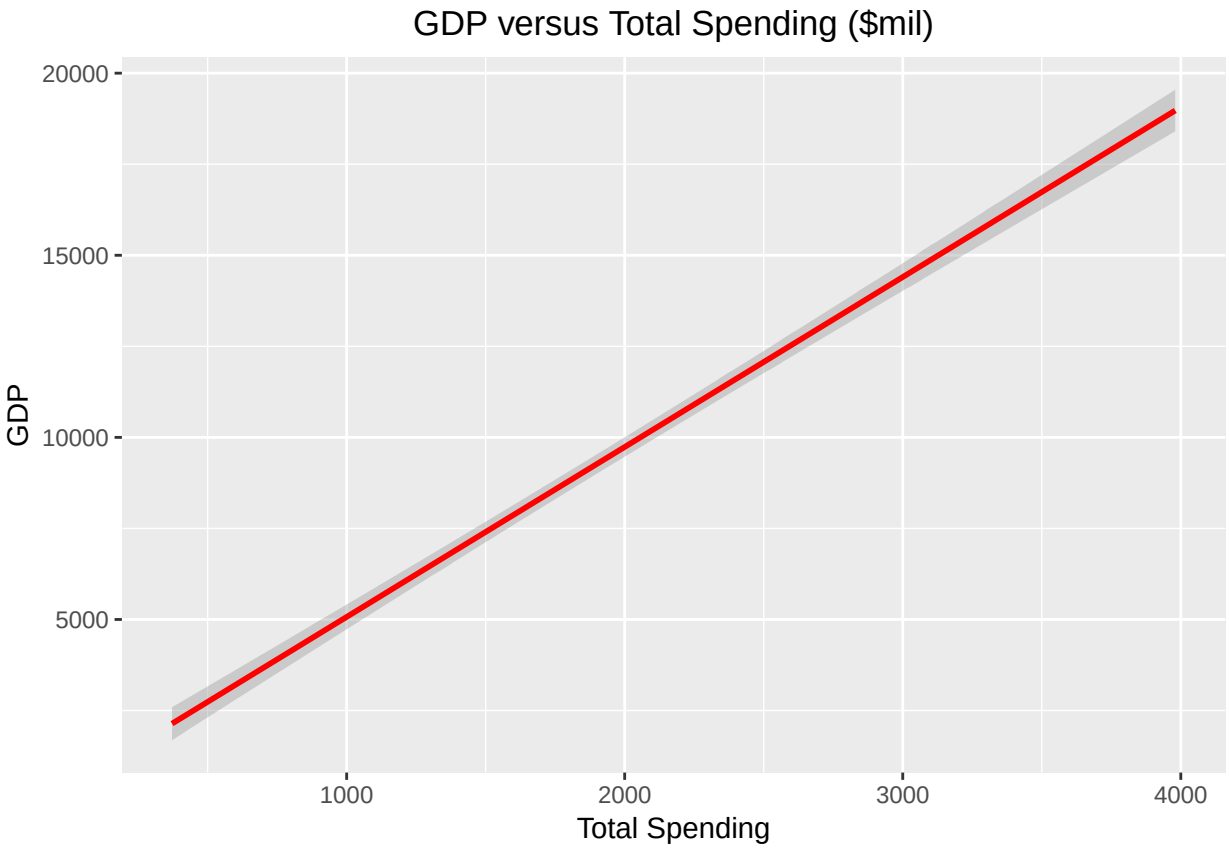
GDP compared with Total and Discretionary Spending

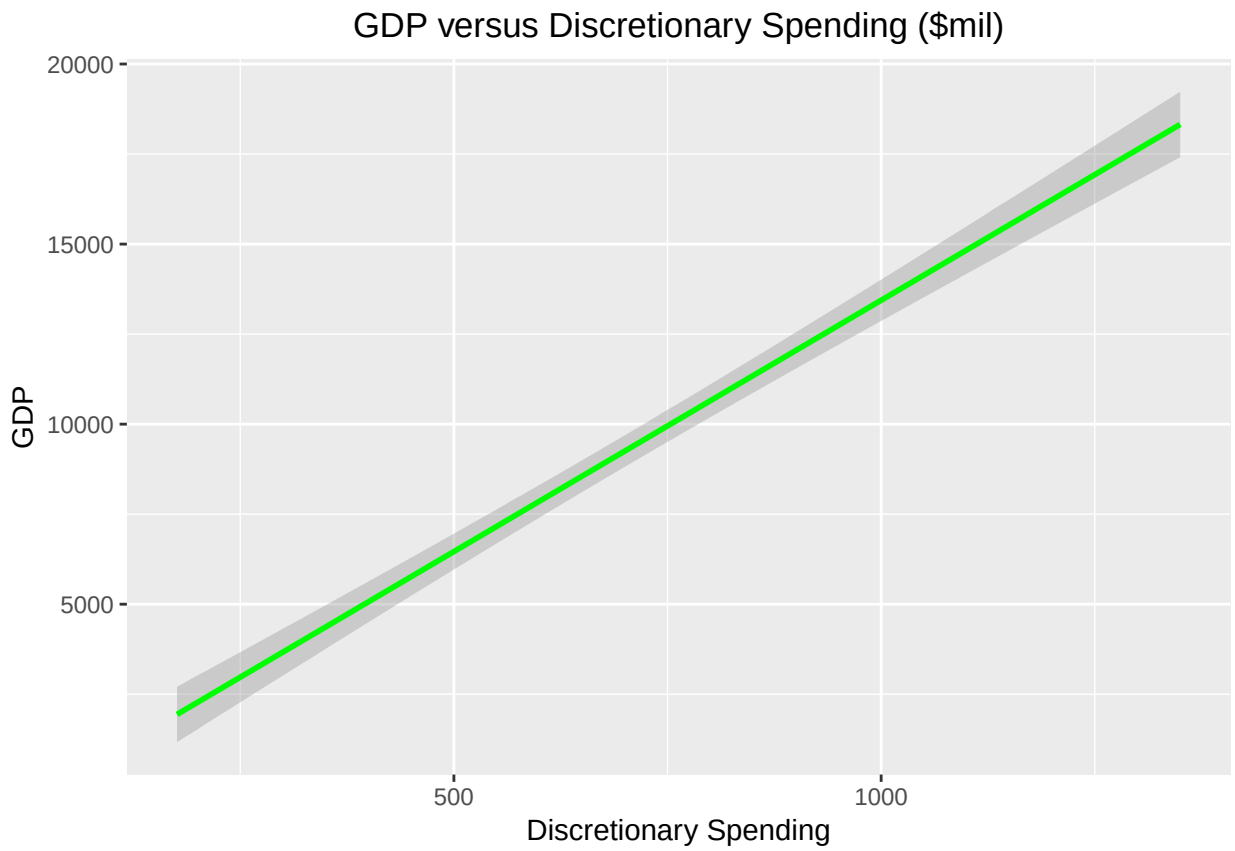
Even if the growth rate is not the same, the GDP shows a very strong and positive correlation with Total Spending

$$(R^2 = 0.9745\ ,\ p = 1.692e - 33),$$

and with Discretionary Spending

$$(R^2 = 0.9308\ ,\ p = 8.12e - 25).$$


GDP versus Total Spending ($mil)
20000
15000
10000
5000
GDP
1000
2000
3000
4000
Total Spending


GDP versus Discretionary Spending ($mil)
20000
15000
10000
5000
GDP
500
1000
Discretionary Spending