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How an Aging Population Affects the U.S. Economy

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Background

- As the amount of elderly citizens in a country increase, the old age dependency ratio (OADR), defined as the ratio of the elderly population (aged 65 and older) to the young, working population (aged 15 to 64) increases. As the OADR increases, governments face higher levels of pressure to fund healthcare programs and pensions. This, in turn, causes government spending to increase, likely leading to an increase in taxes to fund or offset the increase in spending.
- The data used is hand collected from various sources, including USASpending.gov, the U.S. Census; compiled into a dataset spanning 2010 to 2021.
- By comparing the trends in the OADR and government spending by state per capita, we seek to make relevant policy suggestions to ease some of these predicted issues.

Methods

A simple linear regression model was used to determine how much the OADR affects government spending in each state per capita from each year between and including 2010 and 2021. Spending data from USASpending.gov and the OADR calculated from the U.S. Census tables were combined into a dataset for the regression

Independent variable:
Old age dependency ratio

Dependent variable:
Government spending by state per capita

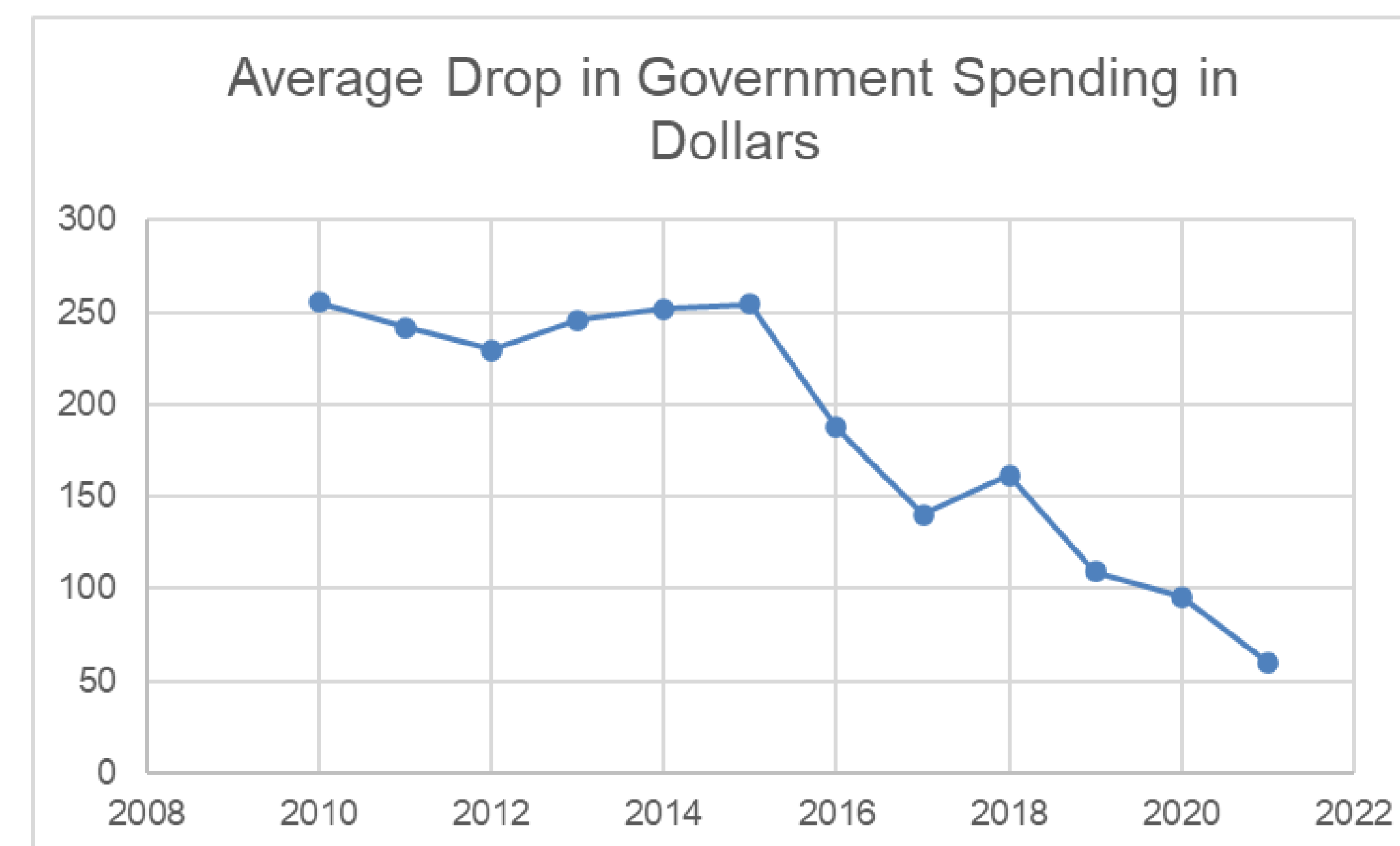
Model:
$$GS_t = \beta_0 + \beta_1 OADR_t + \epsilon_t$$

Where:
 GS_t = State and local government direct expenditure per capita each year
 $OADR_t$ = Old age dependency ratio each year
 ϵ_t = Standard error term

We predict that the coefficient on $OADR_t$ will be positive, indicating that as OADR increases, so does government spending.

Other time series data for specific sectors of government spending and the birth rate that couldn't be used in the regression were gathered to show trends and potential correlation in the data.

Results



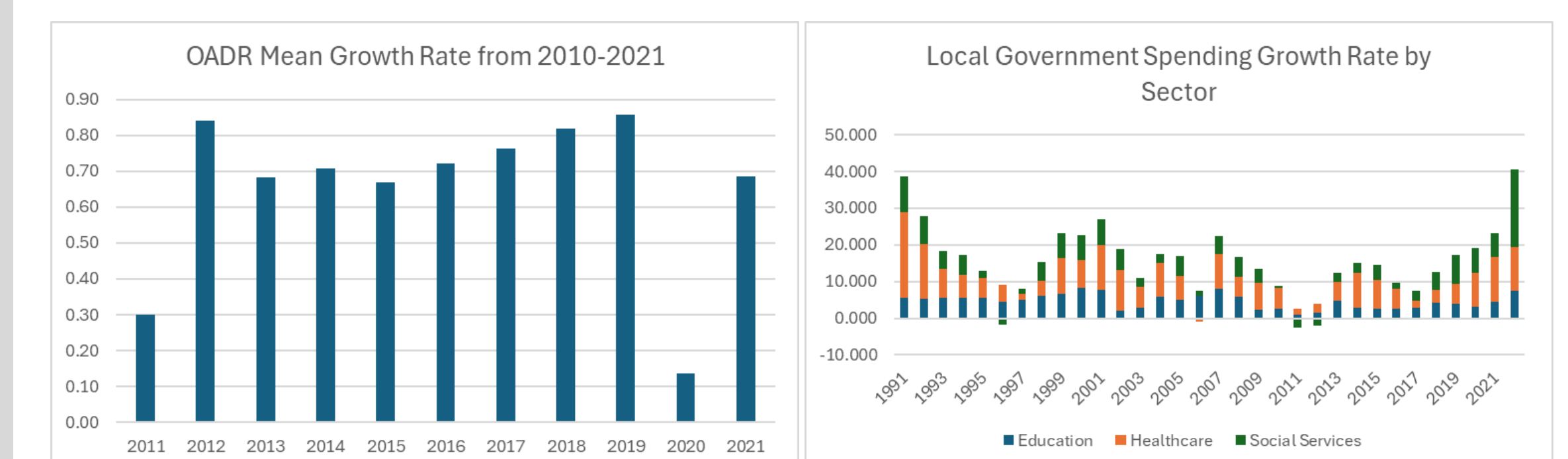
- The chart above shows the coefficients of the OADR variable for each year from 2010 to 2021. Since all the values are negative, this implies that government spending per capita decreases as OADR increases, which is contrary to the prediction.
- This could have occurred because of omitted variable bias or because total government spending was used instead of a specific sector of spending.
- The trend of the coefficients show that the OADR has a decreasingly negative effect on government spending. For example, in 2014, as the OADR increases by 1%, state government spending per capita would decrease by about \$250.
- Since this is a simple linear regression, the model explains only part of the variation in per capita government spending. However, it still shows strong correlation.
- The impact of OADR on the drop in state government spending decreases over time.

Limitations

- The model likely suffers from omitted variable bias since only OADR is included as an independent variable.
- The inclusion of additional economic variables such as birth rate, and specific government spending sectors such as healthcare and social services was not possible since they were measured under different parameters.

Discussion

- The impact of OADR decreasing over time could be attributed to an increase in taxes, which would offset the decrease in government revenue and thus balance out the drop in spending.
- The OADR shows a correlation with local government spending in healthcare and social services, which would likely increase as OADR increases.



Future Directions

- Including other variables such as birth rate and GDP could reduce omitted variable bias and yield more effective results, especially for the coefficients on OADR.
- Having more data sources match each other's time frame would make it much easier to compile 30 observations to perform linear regression.
- Other regression types such as lin-log regression could be used to compare the year-over-year or quarter-over-quarter percent change of the variables could help strengthen the study.
- Focusing on healthcare, education, and social service spending, for example, could yield more accurate results on how government spending is affected by a change in OADR.

References

Gov't Receipts, Expenditures & Investment | FRED | St. Louis Fed. (n.d.). FRED. Retrieved March 5, 2024, from <https://fred.stlouisfed.org/categories/107>

(n.d.). U.S. Census Bureau. Retrieved March 10, 2024, from <https://www2.census.gov/>

U.S. State Spending Profiles | USASpending. (n.d.). USA Spending. Retrieved April 6, 2024, from <https://www.usaspending.gov/state>