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Economic Evaluation of Health and Wealth

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Economic Evaluation of Health and Wealth

Abstract

This paper examines the relationship between wealth and health outcomes in the United States. Building upon the work of Schwandt and others, I compare factors such as national savings and stock market outcomes with the health of American retirees. Using data provided by the Health and Retirement Study for the years 1998-2011, I use various methods including instrumental variable regression and panel data analysis to conclude that national wealth and public health share a highly positive relationship.

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BACKGROUND

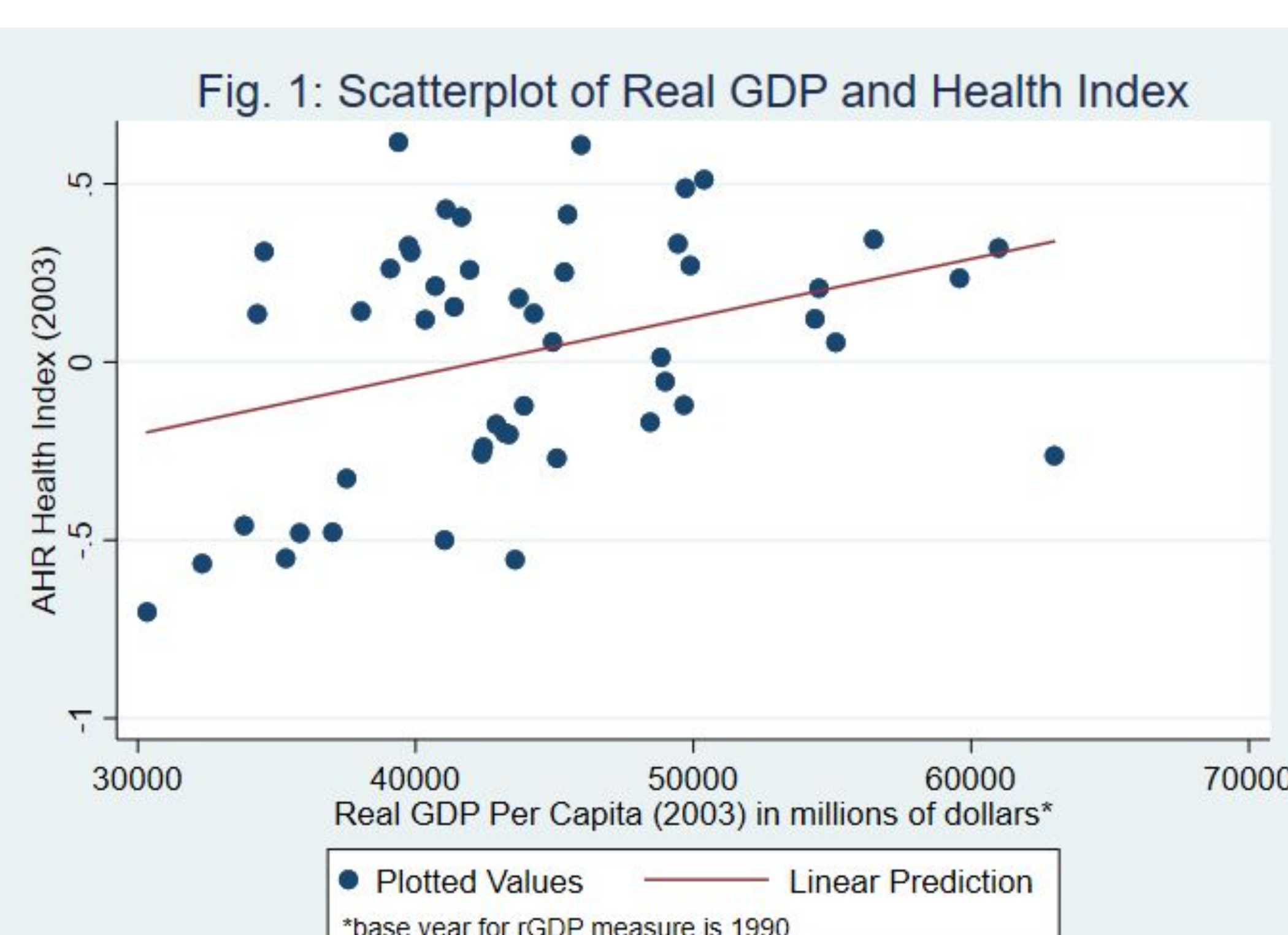
The relationship between wealth and health outcomes is one of the most important topics in the field of health economics. If it could be demonstrably shown that wealthier people live much healthier lives, then economic growth would certainly need to have a bigger role in health care reform. However, the literature on this topic is intensely mixed, and it has proven to be one of the most hotly debated topics in the field, with some, such as Arthur van Soest, concluding that the “health-wealth gradient” is not an important factor to consider in health care reform, but others, such as Hannes Schwandt, concluding that wealth is an important factor to consider.

DAT

Data was assembled from the following sources:

- America’s Health Rankings, a product of UHF. This rating system measures health outcomes such as cancer deaths, diabetes and infant mortality to assign each state an index value of health outcomes from -1 to +1.
- BEA estimates of real GDP per capita in the years 2003 and 2013. Both years’ estimates use a base year of 1990.
- Region-based effects were controlled using regional groups as defined by the BEA.

Some of the more interesting EDA results are shown in Fig. 1. In terms of GDP, there is a large gap between the top seven states and the rest. The linear prediction shows an apparent positive relationship between wealth and health outcomes, but this is before any real model-building takes place.



METHODS

The goal of this model is to estimate the effect of real GDP on health outcomes. With observations from the years 2003 and 2013, this dataset made a great candidate for instrumental variable analysis. Thus, the main methods used in model-building were instrumental variable analysis and two-stage least squares regression.

In the first stage, I use GDP in the year 2003 as an instrument upon GDP in the year 2013. GDP in 2003 meets the requirements of a strong instrument: it is highly correlated with GDP in 2013, but uncorrelated with a state’s health index in 2013 (see Fig. 2). Using an instrument gives a much more accurate estimate, reducing the possibility of omitted variable bias in the model.

In the second stage, I use the instrumented variable to estimate the effect of GDP upon health outcomes, producing the regression output seen in Fig. 3.

RESULT

According to this model, there is little to no causal effect of a state’s GDP on health outcomes, with the results being insignificant and inconclusive in almost every measurable way. In Fig. 3, the z-statistic of 0.99 and the corresponding p-value show that the coefficient of the GDP variable is not statistically significant at the 5% or even 10% level. In addition, the 95% confidence interval shows that it is uncertain whether the effect of GDP on health outcomes is positive or negative – such an uncertain result means that this model shows no evidence of a causal link between a state’s GDP and its health outcomes.

CONCLUSIONS

These findings support the conclusion, as argued by Arthur van Soest and others, that the “health-wealth gradient,” while an interesting idea, doesn’t adequately describe how health outcomes transpire in the United States. Factors besides individual wealth must be prioritized in the modeling of health outcomes.

Fig. 2: Correlation Matrices (Stata Output)

```

. corr gdp03 gdp13
(obs=50)

      |      gdp03      gdp13
-----+-----
gdp03 |      1.0000
gdp13 |      0.8400      1.0000

. corr gdp03 hi13
(obs=50)

      |      gdp03      hi13
-----+-----
gdp03 |      1.0000
hi13  |      0.2283      1.0000
    
```

IMPROVEMENTS / FURTHER RESEARCH

- Continuing to develop and improve the data set will make for more robust results.
- Longitudinal analysis could be used as an alternative to instrumental variable regression, but this would require a change in the way observations are grouped.
- An exploration into the policy implications of these findings will greatly enhance the research.

Fig. 3: Regression Results (Stata Output)

```

Instrumental variables (2SLS) regression      Number of obs   =       50
                                             Wald chi2(8)    =      24.49
                                             Prob > chi2     =     0.0019
                                             R-squared      =     0.3278
                                             Root MSE     =     .1407

-----+-----
      hi13 |      Coef.   Std. Err.   z    P>|z|   [95% Conf. Interval]
-----+-----
      log_gdp13 |   .1710241   .1722323    0.99  0.321   -1.166545   .5085932
      mideast |  -.0380567   .081425   -0.47  0.640   -1.1976467   .1215333
      greatlakes | -.1329603   .0844434   -1.57  0.115   -1.2984664   .0325457
      plains |  -.0385074   .0736054   -0.52  0.601   -1.1827714   .1057565
      southeast | -.0677994   .0776132   -0.87  0.382   -1.2199186   .0843198
      southwest | -.1240421   .09297    -1.33  0.182   -1.3062599   .0581757
      rockymtn |  .1190398   .0835461    1.42  0.154   -0.0447076   .2827871
      farwest |  .1512494   .072238    2.09  0.036   .0096655    .2928333
      _cons | -1.788047   1.874053   -0.95  0.340   -5.461124   1.885029

-----+-----
Instrumented:  log_gdp13
Instruments:  mideast greatlakes plains southeast southwest rockymtn
              farwest log_gdp03
    
```