

# UNCOVERING THE RELATIONSHIP BETWEEN REAL INTEREST RATES AND ECONOMIC GROWTH

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## Introduction

Social Security Trust Fund projections are based on assumptions concerning future long-run averages for real interest rates and economic (real wage) growth. In the Trustees Report, the uncertainty in these projections is described via alternative (high and low) assumptions. The question is whether or not this is an accurate description of the uncertainty, and in particular if long-run interest rates and growth rates are positively or negatively correlated.

Our best estimate of the long-run correlation is  $-0.20$ . This is a mildly negative correlation, meaning that the real interest rate is mildly countercyclical. However, the estimates are not precise, as it is difficult to estimate long-run correlations accurately.

The implications for long-term projections are as follows. A negative correlation implies that long-run costs due to a period of low interest rates will tend to be slightly offset by a period of high productivity growth (and conversely). This implication is consistent with the observation that the Trust Fund stochastic simulations tend to show less long-run variability than do the alternative assumption projections.

Economic theory has mixed predictions for the long-run relationship between real interest rates and real economic growth. Classical growth theory suggests that high real interest rates should increase savings rates which should spur economic growth. On the other hand, the Barro-Becker model suggests that high real interest rates are related to lower fertility and lower economic growth. This literature does not provide a definitive answer.

Long-run Trust Fund projections are largely determined by the long-run future average values of the inputs, in particular real interest rates and real economic growth. The uncertainty in these projections is determined by the long-run variances of these averages. The interaction between interest rates and economic growth can be summarized by their long-run correlation (the correlation between long-span averages). Our goal, therefore, is to estimate this long-run correlation.

## Methodology

There are two methods to estimate long-run correlations. One method uses Vector Autoregressions. The second method uses nonparametric weighting. We use both estimation methods, and they yield similar answers.

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To estimate long-run correlations, it is best to use the longest data span available. We construct data series for the period 1901–2011 (111 years). We also explore robustness of the estimation to subsamples. We use several measures of economic growth, including productivity indices, real wages, and real GDP.

## Findings

The estimates are remarkably similar across estimation method, data subsample, and growth measure. More specifically, we find a measured long-run correlation of -0.22 between real interest rates and nonfarm business productivity, a correlation of -0.17 between real interest rates and real wage growth, and a correlation of -0.20 between real interest rates and real GDP growth. 90% confidence intervals suggest that the true correlation lies between -0.5 and 0.2.

What are the implications for the long-term projections? We examine this question in a stylized simplified version of Trust Fund accumulation. As expected, a negative correlation between real interest rates and real output growth reduces the variability in the stochastic intervals. However, our calculations suggest that this effect is modest. The expected long-run change in real interest rates given a 1 percentage point increase in productivity growth is a decrease of 67 basis points, given a 1 percentage point increase in real wage growth is a decrease of 46 basis points, and given a 1 percentage point increase in real GDP growth is a decrease of 36 basis points.

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