# Expert Q&A: Financial Markets

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## Economic growth and equity investing

CRA recently spoke to CRA Senior Consultant Brad Cornell about his paper "Economic Growth and Equity Investing" published in the *Financial Analysts Journal*. That paper examines the link between investment performance and economic growth. Brad Cornell is a visiting professor of financial economics at the California Institute of Technology. Prior to joining the Caltech faculty, Professor Cornell was the Bank of America Professor of Finance at the Anderson Graduate School of Management, University of California, Los Angeles, where he taught for 26 years.

### What motivated you to study the relationship between economic growth and equity investing?

The performance of equity investments, in the aggregate, is inextricably linked to economic growth. I find it remarkable that few studies on equity investing have explicitly taken the literature on economic growth into account. Earnings, the source of value for equity investments, are themselves driven by economic activity. Unless corporate profits rise as a percentage of GDP, which cannot continue indefinitely, earnings growth is constrained by GDP growth. This dynamic means that the same factors that determine the rate of economic growth also place bounds on earnings growth and, thereby, the performance of equity investments. The goal of my research was to bridge the gap between economic growth and equity investing, and to present a useful framework for forecasting long-run equity returns.

### Economic growth literature has a long and substantial history. What areas of that literature are particularly relevant to equity investing?

The focus of economic growth literature is explaining expansion in the standard of living as measured by real per capita GDP. A key insight from that literature is that, for an economy that has reached steady state, per capita GDP growth over the long run is entirely attributable to exogenous technological innovation. By increasing the marginal product of capital, technological progress breaks the deadlock imposed by diminishing returns and makes further growth in per capita output profitable. So long as the technological innovation continues, so too does the growth in per capita GDP. Therefore the literature on causes of and growth in productivity/technological innovation has a strong bearing on equity investing.

### What do you mean by an economy that has reached steady state?

It makes intuitive sense that adding more capital to the production process/function will increase output per capita. But this increase occurs at a declining rate. Consequently, rational producers stop adding capital when the marginal product of capital drops to its marginal cost. When the economy reaches that point, it is said to be in a steady state. Once the economy reaches the steady state growth path, the ratio of capital to labor remains constant and per capita GDP growth ceases unless the production function changes so as to increase the marginal product of capital. If the economy is below the steady state, room still exists for the deepening of capital. In that situation, the economy's growth rate can exceed the steady state growth rate because it is spurred by capital deepening as well as technological innovation. As the economy rises toward its steady state, the growth rate converges to the steady state level that is attributable to technological change. Most of the highly developed countries, including the US, are at (or close to) the steady state.

### Is there empirical support for the existence of steady state economies with a constant ratio of capital to labor?

There is strong empirical support for the view that highly developed countries are at steady state and that a common rate of technological advance is driving growth in all these steady state economies. For example, Barro and Ursua (2008) compiles information on world economic growth from 1923 to 2006. They divide countries into two groups. The first group comprises mature economies that were already developed before World War II. These countries, which account for virtually the entire global stock market capitalization, are the focus of this study. The second group consists of economies that were developed more recently or are still considered developing. Virtually all the growth rates for countries in the first group are close to the group average of 2.19 percent. The results for the second group are more heterogeneous, reflecting the fact that growth in some countries (e.g., Peru and Venezuela) has stalled for reasons not fully understood whereas others (e.g., South Korea and Taiwan) have experienced rapid capital deepening.

### So is 2.19 percent the steady state growth rate of per capita GDP that we, in the US, can expect in the future?

Actually, the compounded growth rate in per capita GDP for the US in real (i.e., inflation-adjusted) dollars from 1923 to 2006 has been only 1.42 percent. This reflects the fact that the US was close to steady state growth in 1923 after emerging from World War I relatively unscathed. In my research, I assume 2 percent as the estimate of future per capita GDP growth for developed economies. This number should be thought of as an achievable outcome but not one that can be taken for granted.

In addition to the possibility of a catastrophe, there are two other reasons why 2 percent may prove to be an optimistic growth forecast. First, national income accounting does not deduct costs associated with pollution and environmental degradation in the calculation of GDP. Although these costs have been a tiny fraction of GDP in the past, concern that they are growing rapidly is widespread. If that concern is justified, properly accounting for these costs could reduce the future growth rate of per capita GDP. Second, whether the historical rate of technological innovation is sustainable is far from clear. It is interesting that the rate of growth of real per capita GDP attributable to technological progress remained largely constant from 1950 to 2005, but over the same period, the number of researchers in the G-20 countries grew from 251,000 to 2.6 million. This suggests a declining marginal product of research as it becomes more difficult to make and apply new discoveries. If this trend continues, the rate of growth in per capita GDP could fall. Further, as the average historical population growth rate and the average projected population growth rate for developed economies is less than 1 percent, investors cannot reasonably expect long-run future growth in real GDP to exceed 3 percent.

### Equity investing is, of course, driven more by earnings growth than GDP growth. How does your assumption of real GDP growth of 3 percent tie into earnings growth?

That is correct—the fundamental source of value for equity investors is earnings, not GDP. That long-run real GDP growth is reasonably bounded at 3 percent does not necessarily mean that the same is true of earnings. We need to look at the ratio of earnings to GDP to answer your question. It turns out that in the long run, the ratio of aggregate earnings to GDP is generally stable. This implies that investors can expect aggregate real earnings growth to match, but not exceed, real GDP growth in the long run.

## Does this mean that equity investors can expect future aggregate earnings growth to be limited to 3 percent?

Well, generally yes, but there are a couple of issues that impact what current investors can expect. First, an investor's pro rata portion of a company's earnings will be affected by the company's share issuances and repurchases. If this dilution (or accretion) is ongoing, growth in aggregate earnings and earnings per share will diverge. Second and more important, current investors do not participate in the earnings of new businesses unless they dilute their current holdings to purchase shares in start-ups. Therefore, start-ups drive a wedge between the growth in aggregate earnings and the growth in the earnings to which current investors have a claim. Bernstein and Arnott (2003) estimate the combined impact of both effects on the rate of growth of earnings to which current investors have a claim. For the US equity market, one would deduct approximately 2 percent from the growth rate of aggregate earnings to estimate the growth rate of earnings to which current investors have a claim.

## Are you saying that current investors can expect future earnings growth to be just 1 percent?

Yes, but we have to be careful not to confuse growth in real earnings with expected stock returns. We also need to consider dividend yield on stocks. It turns out that over the last 50-year period the average dividend yield has been 3.3 percent. It follows that investors should not expect long-run real returns on common stocks to go much beyond 4 percent. But remember that this is a compounded annual return and converting it to an average annual return adds about 1 percent. Therefore, growth theory predicts that future annual real returns on common stocks should average no more than about 5 percent.

## Does that conclusion apply to global equity markets or only the US market?

Thus far, I have limited my analysis to the United States. This restriction is an obvious shortcoming because most major corporations are becoming increasingly global. Although a detailed examination of international data is beyond the scope of my current research, several general conclusions can be drawn. First, based on historical data, the real per capita GDP growth rates for the other developed countries should be comparable to the US growth rate in the future. Second, for the other developed countries, population growth rates are forecasted to be lower. As a result, the implied limitations on earnings growth remain largely unchanged and are perhaps even lower when other developed countries are included in the sample. Third, developing countries—particularly India and China, which are the most important by virtue of their size—will experience higher growth rates in real per capita GDP than the United States due to expected capital deepening. In addition, most developing countries are forecasted to have comparable or higher population growth rates than the United States. These forecasts suggest that companies doing business in the developing world will experience higher rates of earnings growth than they achieve in the developed world. Nonetheless, as those countries develop, both real GDP and population growth rates should decline. Furthermore, the fraction of total earnings attributable to business in the developing world is relatively small for most companies. Therefore, if a complete analysis were done on a global basis, the earnings bounds derived from US data and the related predictions regarding stock returns would be unlikely to be markedly affected.

## References

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