Economic Growth and Equity Returns

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Abstract

It is widely believed that economic growth is good for stockholders, and growth forecasts are a staple of international asset allocation decisions. However, the cross-country correlation of real stock returns and per capita GDP growth over 1900-2002 is negative. Alternatively stated, economic growth does not benefit equity holders. Equity holders receive dividends on the shares they own today. Economic growth occurs from high personal savings rates and increased labor force participation, and from technological change. If increases in capital and labor inputs go into new corporations, these do not boost the present value of dividends on existing corporations. Technological change does not increase profits unless firms have lasting monopolies, a condition that rarely occurs. Countries with high growth potential do not offer good equity investment opportunities unless valuations are low.

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1. Introduction

It is widely believed that economic growth is good for stock returns, and economic growth forecasts are a staple of international asset allocation decisions. Investing in emerging markets with good long-term growth prospects, such as China, is widely viewed as more attractive than investing in countries such as Argentina or the Philippines with prolonged periods of low growth that are expected to persist. But does economic growth benefit stockholders? This paper argues on both theoretical and empirical grounds that the answer is no. Empirically, Dimson, Marsh, and Staunton (2002) report a cross-sectional correlation of –0.27 for the compounded real return on equities and the compounded real growth rate of GDP for 16 countries over the 1900-2000 period.

I am not arguing that economic growth is bad. There is ample evidence that people who live in countries with higher incomes have longer life spans, lower infant mortality, etc. Real wages are higher. But although consumers and workers may benefit from economic growth, the owners of capital do not necessarily benefit. In the case of countries, a country can grow rapidly by applying more capital and labor without economic profits necessarily being earned by the owners of capital.

In general, there is no consensus on how to estimate future stock returns. This is especially true for emerging markets, where frequently there is only limited data on past stock returns. This paper argues that limited historical data on stock returns is not a constraint, since this data is irrelevant for estimating future returns, whether in emerging markets or developed countries. This point has been made before, although possibly not as explicitly, in Fama and French (2002) and Siegel (2002), among other places. Of greater originality, this paper argues that not only is the past irrelevant, but to a large extent knowledge of the future real growth rate for an economy is also irrelevant. I argue that the only three pieces of information are needed for estimating future equity returns. The first is the current P/E ratio, although earnings must be smoothed to adjust for business cycle fluctuations. The second is the fraction of corporate profits

that will be paid out to shareholders via share repurchases and dividends, rather than accruing to managers or blockholders when corporate governance problems exist. The third is the probability of catastrophic loss, i.e., the chance that "normal" profits are a biased measure of expected profits because of "default" due to hyperinflation, revolution, nuclear war, etc. The latter is the survivorship bias issue, applied to the future.

The reason that future economic growth is largely irrelevant to predicting stock returns in an economy is as follows. Investors realize returns on stocks that they hold today. If an economy grows because personal savings is invested in new firms, or invested in existing firms through debt and equity infusions, the gains on this capital investment do not accrue to existing shareholders. Empirically, what matters for stock returns is how much of an economy's growth comes from reinvestment of earnings into positive NPV investments in existing publicly traded companies, versus how much of it comes from personal savings that are then invested in private companies or in new issues of equity from existing companies.

The claim that knowledge of future economic growth rates is irrelevant must be qualified. In the short run, there is ample evidence that unexpected changes in economic growth affect stock prices. Stock prices decline when the probability of an economic recession increases, and stock prices increase when the probability of economic recovery increases. Recessions are definitely bad for corporate profitability, and cyclical recoveries are good. I would argue that cyclical effects should rationally have an effect on equity valuations, but the effects should be largely transitory, and thus should not have a big impact on the present value of dividends for a given firm. I believe that the large stock price effects associated with recessions are partly do to higher risk aversion at the bottom of a recession, but also due partly to an irrational overreaction. Overreaction results in excessive volatility and mean reversion over multi-year horizons, patterns that have been documented by Shiller (1981) and Fama and French (1988) using U.S. data and Poterba and Summers (1988) using international data. And certainly if there is an unexpected collapse of an economy, due, for instance, to war or expropriation, as happened in Russia in the years after 1917, this rationally affects returns (making them –100%). But, more generally, whether the Chinese economy grows by 7% per year or by 3% per year for the foreseeable future is largely irrelevant for the future returns on Chinese stocks. There is also an asymmetry—if a country has negative growth, this is probably bad for stocks. But for positive rates of long-term growth, whether the growth rate is 3% or 7% shouldn't matter.

The remainder of this paper is as follows. Section 2 discusses the importance of survivorship bias. Section 3 discusses the sources of economic growth. Section 4 discusses economic growth and stock returns. Section 5 deals with estimating future stock returns, and Section 6 discusses dividend yields and expected stock returns. Section 7 presents a quantitative estimate for the future. Section 8 concludes.

2. Survivorship bias

It is conventional wisdom today that the country that has had the historically highest real equity returns, and the highest equity risk premium, is the U.S. (Jorion and Goetzmann (1999)). Part of this is attributed to survivorship bias; it was not obvious a century ago that Germany would be on the losing end of two world wars, nor that the U.S. would be on the victors' side not only in the two world wars but in the cold war, too. The quantitative effect of this survivorship bias is unclear, but is not likely to be very large for three reasons.

First, as Li and Xu (2002) argue, for survivorship bias to have a large effect, there must be a high probability that a country's stock market will be wiped out, and at the beginning of 1900 there was a general feeling of optimism about the future in the developed world. This optimism was reflected in relatively high stock valuations, not the conservative multiples that would be observed if investors were concerned about the possibility of catastrophic losses.

Second, to a remarkable extent, the economically advanced countries in 1900 are the economically advanced countries today. The most notable exception is Japan, which has gone from moderately poor to rich. Argentina is the only country that has moved from relatively rich to relatively poor. For the 16 countries that Dimson, Marsh, and Staunton (2002) analyze over an entire 101 year period beginning in 1900, the authors guess (p. 22) that these countries "may easily have exceeded 90 percent" of world market capitalization in 1900.

Third, even if survivorship bias is important in explaining realized stock returns, it is not clear that survivorship bias should affect the equity risk premium, since bond and T-bill investors suffer just as much from devastation as equity holders do. In the 1950s and 1960s, when it might plausibly be argued that a nuclear war involving the U.S. and the Soviet Union had a significant probability of occurring in future decades, real rates of interest on U.S. government bonds were very low, suggesting that investors had no significant desire for immediate consumption before they were incinerated.

Since historical returns are irrelevant in predicting future equity returns, whether or not prior realized returns are affected by survivorship bias is unimportant. But what if today's stock prices are depressed because of a concern that a catastrophic event may wipe out a country's financial markets? This should show up in both a high promised yield on bonds, and depressed P/E ratios. In this scenario, the earnings yield on stocks will overestimate future expected equity returns for the same reason that the yield to maturity on corporate bonds overestimates the expected return. In both cases, there is a "default" probability, and the expected returns are lower than the "promised" returns. Alternatively stated, if corporate governance problems are not of major importance, the smoothed earnings yield on the stock market is an estimate of the future expected return conditional on a catastrophic event not occurring.

3. Economic growth

Part of the analysis in this paper is analogous to the Krugman-Young critique of Asia's economic miracle. Paul Krugman and Alwyn Young argue that the high growth rates of the Soviet Union in the 1930-1970 period, and the high growth rates in many East Asian countries in 1960-1993, arose from taking societies with vast amounts of under-utilized labor and very little capital, and applying capital (due to high savings rates) and labor (by moving people out of subsistence agriculture) with the application of imported technology. While this transition was occurring, high rates of economic growth occurred.[1] Here, I am joining Krugman (1994) and Young in arguing that much of the real economic growth in emerging markets comes from high savings rates and the more efficient utilization of labor, neither of which necessarily translates into higher profits accruing to the shareholders of existing firms.

Siegel (2002, Chapter 6) points out that for valuing the market, aggregate earnings growth does not matter. Investors are concerned about the growth in earnings per share (EPS). Economic growth requires increased capital expenditures, and this requires either reinvesting more earnings (and paying out fewer dividends in the short term) or higher personal saving that is invested in firms that issue shares. Thus, higher future earnings from the higher investment

[1] There has also been a further one-time forty-year window of especially high labor force participation due to the demographic transition as family size falls and a higher fraction of the labor force is in the 20-64 age range. This "demographic dividend" is a temporary change because 65 years after the birth rate drops, the reduced number of young dependents is replaced by an increased number of old dependents.

either are traded off for lower present dividends, or else they accrue to other shareholders, which is of no benefit to current shareholders.

Within the U.S., certain industries have grown over time, and others have declined. Industries that have grown during the last century include the airlines, computer hardware, automobiles, and pharmaceuticals. Industries that have declined include railroads, steel, and tobacco. But the owners of airlines have not gotten rich, nor have the owners of auto companies during the last 35 years. Cigarette companies, on the other hand, have done very well for shareholders, even though a lawsuit settlement resulted in their agreement to make hundreds of billions of dollars in payments to non-shareholders starting in the late 1990s. On the other hand, the owners of IBM and Merck have done very well, and the owners of railroads and steel companies have done badly. In general, economic profits are earned by companies only if entry from competitors is limited and employees do not extract the rents (or more than the rents), and these conditions are not highly correlated with the growth or decline of industries.

Suggestive evidence regarding the importance of reinvested earnings in accounting for the growth of stock market capitalization is contained in Dimson, Marsh, and Staunton (2002, Chapter 2). At the beginning of 1900, railroads comprised 63% of the market cap of U.S. stocks. The return on reinvested capital in this industry, which now represents 0.2% of U.S. market cap, has not been high. Capital reinvested in the auto, steel, and airline industries also has not resulted in a high return on investment. Instead, much of the market cap of U.S. companies today has come from industries that barely existed, or did not exist at all, one hundred years ago—information technology (IT) and pharmaceuticals.[2] Arnott (2001) makes this point, too.

In addition to increased inputs of capital and labor, economic growth comes from technological progress. As Warren Buffet (1999), Jeremy Siegel (1999, 2000), and Robert Arnott (2001) argue, technological change benefits consumers, but in a competitive economy, the owners of capital do not benefit.

Although economic growth does not directly lead to higher corporate profitability, Romer (2000) argues that higher growth should lead to higher discount rates because people are less willing to defer current consumption for future consumption when they will be wealthier. This effect would result in more conservative valuations when long-run growth is expected to be high.

[2] Table 2-5 of Dimson, Marsh, and Staunton (2002) reports that at year-end 2000, 34.3% of U.S. market cap was in the IT and pharmaceuticals sectors, as contrasted with zero percent in these sectors at the beginning of 1900.

Indeed, the effect of an unanticipated change in growth prospects would be to lower stock prices as multiples contract. Romer focuses on the discount rate effect, whereas this paper is arguing that the cash flows accruing to the shareholders of existing corporations will not necessarily increase at a higher rate, when economy-wide growth accelerates.

4. Economic growth and stock returns

Figure 1, which reproduces two of the three series in Figure 11-6 of Dimson, Marsh, and Staunton (2002), shows the relation between real equity returns and real GDP per capita growth for 16 countries over the 1900-2000 period. To quote the authors (p. 156):

> [Figure 1 shows] the total real return from equities in each country. Visually, real returns seem unrelated to GDP growth, and statistically, the correlation is –0.27 for 1900-2000 and –0.03 for 1951-2000. These findings, while based on much longer periods than earlier research, are not new. Siegel (1998) found that from 1970-97, the correlation between stock returns and GDP growth was –0.32 for seventeen developed countries, and –0.03 for eighteen emerging markets. He suggests two explanations. First, the largest firms quoted on most countries' stock markets are multinationals, whose profits depend on worldwide rather than purely domestic economic growth. Second, he argues that expected economic growth was largely factored in to stock prices at the start of his period, but that in some high growth countries (e.g., Japan) investors pricing subsequently proved overly optimistic."

My calculations for these 16 countries over the 1900-2000 period gets a correlation of –0.42 with a p-value of 0.11 rather than the –0.27 that Dimson, Marsh, and Staunton report. Apparently there is some effect from whether local currency units or purchasing power parity numbers are used for real GDP growth. Their figure 11-6 appears to have slightly higher per capita income growth for South Africa, Sweden, and the UK than I use in Table 1.[3]

It is worth noting that in Figure 1 and Table 1 the U.S. does *not* have the highest real return on equities since 1900. Sweden, Australia, and South Africa all have higher compounded real returns. Although not shown, if the real return on T-bills is subtracted to compute the equity risk premium, Australia and South Africa are both still ahead of the United States. The main reason that the rankings in Dimson, Marsh and Staunton (2002) are different from those in Jorion and Goetzmann (1999), where the U.S. is ranked first, is because Dimson, Marsh and Staunton

[3] Dimson, Marsh, and Staunton mainly use Mitchell (1998) as their source for historical per capita income numbers, whereas I use Maddison (1995).

include the dividend yield, whereas Jorion and Goetzmann only report the capital gain component of returns.

Why is there a negative correlation between real returns and real per capita income growth? Siegel (1998) hypothesizes, as mentioned above, that part of the negative correlation between real stock returns and per capita GDP growth is because high growth was impounded into prices at the start of the period. This argument has less merit when 101 years of data is used, rather than 28 years. But I think that there is a general tendency for markets to assign higher P/E and P/D multiples when economic growth is expected to be high, which has the effect of lowering realized returns because more capital must be committed by investors to receive the same dividends. If dividend growth was subsequently higher, this wouldn't be a problem, but Campbell and Shiller (2001) and Arnott and Asness (2003) report that dividend growth is subsequently *lower* when dividend yields are low.

Table 1 also reports the growth rate of real dividends per share for 16 countries for the 101 year period from 1900-2000. It is puzzling why real dividends have not grown faster than they have. Over the 1900-2000 period, the average earnings yield for the U.S. has been just under 7% and the average dividend yield has been about 4.5%.[4] This implies that the reinvestment rate has been about 2.5% of price, suggesting that the real growth rate of dividends per share should have been about 2.5%, rather than the 0.6% that Dimson, Marsh, and Staunton (2002) report. One explanation of the lower growth rate of dividends per share is that the rebalancing policy of the S&P 500 index creates a downward bias in earnings and dividend growth (Arnott and Bernstein (2003)). This is because when firms are replaced in the index, the new firms tend to have lower dividend and earnings yields than the prior firms. (If a firm with a 10% dividend yield comprising 1% of the index is replaced with a firm that has a 0% dividend yield, the dividend yield of the index drops by 0.1%.) This bias has been important in the last decade for the U.S., but it is not clear how important the quantitative magnitude of this bias has been over the last century in all 16 countries.

In Table 1, growth rates over the last century are reported. Table 2 reports the levels of real per capita GDP in 1900 and 2000, and the cumulative population growth in each of the 16

[4] Figure 11-2 of Dimson, Marsh, and Staunton (2002) reports a 10.1% per year geometric mean nominal total return on U.S. equities from 1900-2000 and a 5.4% per year geometric mean nominal capital gain. 1.101 divided by 1.054 implies a 4.5% average dividend yield.

countries used in Table 1. The variation in population growth rates is large relative to the variation in real GDP per capita growth rates.

Table 3 reports the mean geometric real return and mean growth rate of real per capita GDP for a sample of 19 countries over a shorter time period, that of the 31 years from 1970-2000, and for 13 other countries over the even shorter 13-year period 1988-2000.[5] 16 of the 19 countries are the same as in Dimson, Marsh, and Staunton (2002), with Austria, Norway, and Singapore added. The simple correlation between geometric mean annual real stock returns and arithmetic mean real per capita annual GDP growth is –0.25 (p=0.31) for these 19 countries. For the other 12 countries, mainly emerging markets, the correlation is 0.02 (p=0.96). In general, the shorter the time period, the more positive will the correlation be because business cycle effects are being picked up. Over long periods, the correlation should be closer to zero, although Romer's (2000) discount rate effect should keep it positive. The fact that it becomes fairly negative is rather surprising.

A possible reason for a negative correlation is that optimistic investors will bid up stock prices, lowering the dividend yield. Because investors must then put up more capital to receive the same dividends, the return is lower. If countries with high economic growth rates consistently have stocks priced at higher multiples, this effect could explain the negative correlation.

A simple numerical illustration will show how high valuations in intermediate periods will lower compounded returns due to a lower dividend yield. Assume a two-year return horizon in a three period world (time=January 1, 2000; December 31, 2000; and December 31, 2001) with dividends of $1 per share paid on December 31st of each year. For case 1, assume prices of $10 at each of the three dates. The return for the first year is therefore 10%, and the return for the second year is 10%, giving a compound return of 10% per year. Alternatively, assume a price path of $10 at the beginning and end, but a price of $100 in the middle. The returns are now 910% for the first year and –89% for the second year, giving a compounded return of 5.5% per year.

[5] The geometric mean return is computed as the arithmetic average real return minus ½ the variance of real returns for each country. The growth rate of per capita GDP is the arithmetic mean, except for Ireland and South Africa, where it has been computed as the geometric mean using constant local currency units. Since the time-series variance of per capita GDP growth is small, there is little difference between arithmetic and geometric returns.

So far, I have not discussed corporate governance. One reason that GDP growth does not necessarily translate into high returns for minority stockholders is that managers may expropriate profits via sweetheart deals, tunneling, etc. There is a large literature focusing on this, but most of the emphasis has been on how corporate governance problems would keep public equity markets from becoming large. The assumption is that minority investors would correctly evaluate in advance the chance of receiving future dividends, and if the legal and institutional mechanisms are weak, firms would be unable to sell equity to the public at terms that are attractive enough to make it an optimal financing/ownership mechanism. This assumes that investors price protect themselves.

If investors do not price protect themselves, then it is possible that public equity markets would be bigger than otherwise, but that realized returns would be low because profits would accrue to managers rather than minority shareholders. Alternatively, empire building may dominate, with too much of profits reinvested in negative NPV projects and too little paid out as dividends. LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (2000) report evidence that dividends are higher in countries where minority shareholders have better rights.

5. Estimating future stock returns using earnings yields

If past stock returns are irrelevant for predicting future stock returns, and future economic growth rates are also irrelevant, what does matter? The answer is simple: earnings yields. Corporate earnings can either be paid out or reinvested (cash used by one company to acquire another publicly traded company is equivalent to a share repurchase—it is merely using company A's cash to retire company B's shares). Repurchases are similar to dividends, in that cash flows out of the corporate sector into the hands of individuals, who then either buy newly issued shares or use the cash for consumption.

One way to forecast compounded real stock returns is to use the "Siegel model" propounded by Jeremy Siegel (1999 and 2002, Chapter 6):

$$E(r) = E^*/P$$

where E* is normalized earnings per share (EPS smoothed to take out business cycle effects). Earnings are either paid out as dividends or in share repurchases, or reinvested. Whether earnings are paid out or reinvested, the compounded real return will be the same if the average (normalized) ROE does not change over time.

As a matter of arithmetic, P/E ratios fluctuate due to changes in both the numerator and denominator. Since current earnings fluctuate based on business cycle effects, a market P/E might be temporarily high because earnings are temporarily depressed. This is why Campbell and Shiller (2001) use a ten-year moving average of earnings—this procedure smoothes out business cycle effects.

If earnings yields predict future stock returns on theoretical grounds, there should be empirical evidence supporting this. Campbell and Shiller (2001) note that when smoothed earnings yields are low, future returns will be lower than average unless earnings grow faster than average. They present evidence that when smoothed earnings yields are low, future real earnings growth is slightly lower than average. A low smoothed earnings yield does, however, predict low real stock price growth over the following ten years. In other words, P/E ratios revert towards the mean through price changes rather than earnings changes.

6. Dividend yields and expected real stock returns

An alternative way to forecast the expected return on stocks is given by the Gordon dividend growth model:

$$E(r) = \text{dividend yield} + g$$

where the dividend yield = dividends/price and g is the growth rate of dividends. This equation assumes that the expected change in the price/dividend ratio is zero. Using U.S. data from 1951-2000, Fama and French (2002) report an average dividend yield of 3.70% and a real growth rate of dividends per share of 1.05%. Consistent with this, Dimson, Marsh, and Staunton (2002, Chapter 11) report a real growth rate of 0.6% for 1900-2000, with a near-zero growth rate in the first half of the century. Fama and French (2002) report that earnings, at a real growth rate of 2.82% per year, grew faster than dividends in the 1951-2000 period.

It is worth noting that dividend yield regressions and the Campbell and Shiller earnings yield regressions forecast stock returns over one to ten year periods, whereas the Siegel model is forecasting returns over a horizon of thirty years or more where mean reversion in P/E ratios is relatively unimportant. In practice, P/E ratios and dividend yields do mean-revert over multi-year periods. The longer the horizon for forecasting returns, the less important is the mean reversion.

Goyal and Welch (2003) emphasize that the dividend yield for 1926-2002 in the U.S. does not reliable predict the year-ahead excess market return, $R_m - r_f$. They focus on t-statistics, although their point estimate for the regression $\ln(R_m - r_f)_t = a + b\ln(div/P)_{t-1} + \varepsilon_t$ has a positive slope coefficient. Specifically, in their Table 2 they report a coefficient for b of 0.102 with a Newey-West adjusted t-statistic of 1.51. Since both their dependent and independent variable are measured as logarithms, an increase in dividend yield from 2% (ln(0.02)=-3.91) to 6% (ln(0.06)=-2.81) implies a change in predicted returns of 0.112, or 11.2% per year, an economically significant effect.

Campbell and Shiller (2001), Goyal and Welch (2003), and other authors note that in the post-1983 period share repurchases increased dramatically as an alternative mechanism for paying out cash. Consequently, as a matter of arithmetic, the dividend yield has declined relative to the cash payout yield (dividends plus repurchases divided by price). Lamont (1998) shows that both E/P and D/P ratios have predictive power for future returns, with the time variation in dividend payout ratios picking up business cycle effects.

7. A quantitative estimate for the future:

Using the Siegel model, the future compounded real annual return on U.S. stocks is about 4.5%. This is based on an earnings yield today of about 4.5%, with a P/E of about 22 for the U.S. market using normalized earnings. In defining earnings, one must choose between trailing and forecasted earnings, operating or "bottom line" earnings, and whether one wants to adjust for business cycle effects on the grounds that the earnings of U.S. companies in 2001-2002 may be a bit below trend. This forecast assumes that the long-run average earnings yield has decreased from its historical average of about 7% to 4.5% in the future. To the degree that there is mean-reversion towards an earnings yield of 7%, returns will be lower while the transition is occurring.

Using the Gordon dividend growth model, the future compounded real annual return is also about 4.5%. This forecast is based on the current dividend yield on the S&P 500 of 1.9%, with expected growth rate of dividends per share of 2-3%, including a boost of about 0.8% from the net effect of repurchases, issuances from option exercise, and the effects of the exercise proceeds and the associated tax benefits to corporations from option exercise. This would give a compounded real return of 3.8-4.8%, although the returns would be lower if the earnings yield

increases via price decreases. Campbell and Shiller (2001) show that this is historically how mean reversion in dividend yields has occurred.

These forward-looking estimates are substantially below the 6.3% historical average compounded real return on U.S. equities from 1900-2002 that is reported in Table 1. If global capital markets are not perfectly integrated, what about future returns in other countries?

The *Financial Times* reports the dividend yield on various stock markets and stock market groupings on a daily basis. On February 21, 2003, the dividend yield for the emerging markets category was 2.6%, compared with 3.6% for Europe, 1.9% for the U.S., 1.0% for Japan, and 2.4% for the world. Although the dividend yield is higher for most countries in the world than in the U.S., with the notable exception of Japan, share repurchases are much less common in almost all other countries. If per share dividend growth is 1% higher in the U.S. than in the other countries due to a higher rate of share repurchases, then the dividend yield in the U.S. should be 0.5% lower than in the world, since the U.S. is about 50% of the world market portfolio. Notably, share prices have come down and dividend yields have increased in emerging markets since the emerging markets bubble peaked at the end of 1993. And even A shares in China have come down in price to the point where the FTSE/Xinhua A200 stock price index yields 3.9%. Consequently, real compounded annual returns in the 4 to 5% range look feasible for the long-run future, although it is harder to justify this high a number for Japan than it is for other countries.

I have not mentioned anything about taxes on dividends, or the effect that a Bush administration dividend tax law change might have. While there is no consensus on the effect of tax law changes, my own opinion is that the marginal investor today is probably an institutional investor representing clients in tax-deferred retirement accounts. For these accounts, the payouts are taxed as ordinary income when received from the account, so the differential taxation of capital gains versus dividends, and changes in dividend taxation at the personal level, are irrelevant. So I don't anticipate that long-run pre-tax returns will be altered much.

8. Conclusion

This preliminary paper argues that past equity returns are irrelevant for predicting future equity returns, a point that is far from new, even if it has still not sunk in on most finance

professors (see Welch (2000)). If the past is irrelevant, then whether survivorship bias has had a quantitatively large or small impact on measured returns is unimportant.

This paper also argues that future economic growth is largely irrelevant for predicting future equity returns. The logic is that long-run equity returns depend on dividend yields and the growth of per share dividends. Others have made this argument in the context of U.S. equity markets, but I have not seen this argument made with respect to emerging markets (maybe this reflects my ignorance). Economic growth can come from technological change and either from reinvesting earnings into existing firms, or the infusion of cash into new firms. Historically, much of economic growth has come from the infusion of cash into new firms, which does not result in a higher growth rate of dividends per share for existing firms. Technological change has tended to benefit consumers and labor, rather than the owners of capital.

What, then, does predict future equity returns? The answer is simple: the current earnings yield. The major adjustment that needs to be made is to smooth earnings for the effects of business cycles. Economic growth doesn't matter. As a first approximation, the return on existing shares will equal the earnings yield on these shares, subject to the caveats that expropriation by insiders or catastrophic market meltdowns will prevent minority shareholders from receiving future earnings. These earnings can be either paid out or reinvested, boosting future payouts. If the earnings are paid out in the form of share repurchases rather than dividends, this will boost the growth rate of dividends per share, but the real return will still just be the earnings yield.

If the earnings yield is the real cost of equity capital, does this mean that the textbooks are wrong to say that the E/P ratio of a company is not its cost of equity capital? The answer is yes and no. A company can rationally be expected to earn above- or below-normal ROE for a period of time (economic profits), so in general it is incorrect to state that a firm's cost of equity capital is its earnings yield. But for the market as a whole, above- and below-normal rates of profit growth largely cancel out, so in fact the market's smoothed earnings yield is the expected real return on the market.

Economic growth can occur for two broad reasons-- productivity growth or increased inputs. Krugman (1994) and Young have argued that the high growth in East Asia that has occurred in the last fifty years has been due largely to increased factor inputs—a high personal savings rate and increased labor force participation, combined with rapid improvements in health

and educational attainment. Neither of these necessarily benefit the owners of capital. As Warren Buffet (1999) and Jeremy Siegel (1999, 2000) have pointed out, in a competitive economy technological change largely benefits consumers through a higher standard of living, rather than the owners of capital. And if individuals save more and invest their savings, the increased amount of capital per worker will result in higher real wage rates, which is of no benefit to the owners of shares in existing corporations. The point is that economic growth does result in a higher standard of living for consumers, but it doesn't necessarily translate into a higher present value of dividends per share for the owners of the existing capital stock. Thus, whether future economic growth is high or low in a given country has little to do with future equity returns in that country.

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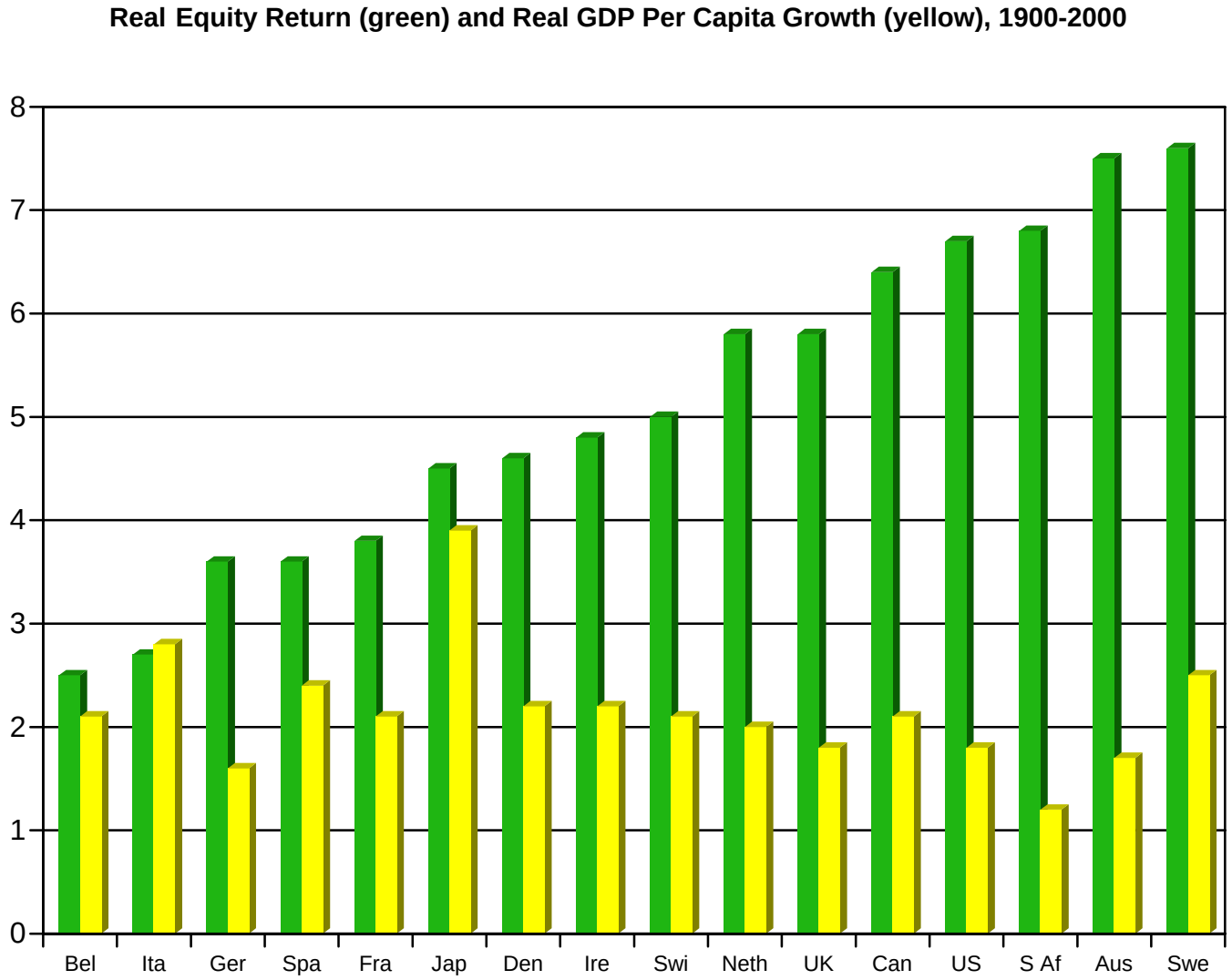

Figure 1—Reproduced from Dimson, Marsh, and Staunton (2002, Figure 11-6), with geometric annual means plotted.

Table 1

Real dividend per share and real per capita GDP growth rates and real stock returns

Panel A: Dimson, Marsh, and Staunton's numbers for 16 countries from 1900-2000 (2002, Figure 11-6) for real per share dividend growth rates and geometric mean real returns per year for the 101 year period. The 1900-2002 returns are from Dimson, Marsh, and Staunton (2003), where not only have two years of returns been added, but the real returns for some periods for some countries have been revised (e.g., the Belgian returns were revised downwards for every decade from 1900-1989). For real per capita GDP growth, data comes from Tables D-1a,D-1b, and D-1f of Angus Maddison (1995) *Monitoring the World Economy 1820-1992* Paris: OECD Development Centre Studies for 1900-1994 and from the World Bank's *World Development Indicators* for the post-Maddison years. Real per capita income is expressed in terms of dollars of 1990 Geary-Khamis dollars through 1994, and then the 1994 number from Maddison (1995) is multiplied by the ratio of 2000/1994 real per capita income in local currency units from *World Development Indicators* to obtain the 2000 number. (South Africa is for 1913 rather than 1900, and the 1992 number is multiplied by the 2000/1992 ratio.)

	1900-2000			1900-2002
Country	Real dividend per share growth	Real per capita GDP growth	Mean real geom. return	Mean real geom. return
Australia	0.9%	1.6%	7.5%	7.4%
Sweden	2.3%	2.1%	7.6%	7.3%
South Africa	1.5%	1.0%	6.8%	6.7%
United States	0.6%	1.9%	6.7%	6.3%
Canada	0.3%	2.1%	6.4%	5.9%
United Kingdom	0.4%	1.4%	5.8%	5.2%
Netherlands	-0.5%	1.8%	5.8%	5.0%
Denmark	-1.9%	2.0%	4.6%	4.6%
Ireland	-0.8%	2.1%	4.8%	4.3%
Japan	-3.3%	3.0%	4.5%	4.1%
Switzerland	0.1%	1.9%	5.0%	4.1%
Spain	-0.8%	2.0%	3.6%	3.2%
France	-1.1%	2.0%	3.8%	3.1%
Germany	-1.3%	1.9%	3.6%	2.8%
Italy	-2.0%	2.4%	2.7%	2.1%
Belgium	-1.7%	1.7%	2.5%	1.8%

Panel B: Siegel's numbers for the U.S. from 1871-2001 (2002, Table 6-1) for real per share dividend growth and real GDP growth (geometric means), converted into per capita numbers using population numbers from Maddison (1995) with updates by author.

	dividend growth	GDP growth	population growth	per capita GDP growth
1871-2001	1.1%	3.9%	1.5%	2.4%
1871-1945	0.7%	4.5%	1.7%	2.8%
1946-2001	1.6%	3.1%	1.3%	1.8%

Table 2

Levels of per capita GDP and cumulative population growth, 1900-2000

Country	Real per capita GDP 1900	Real per capita GDP 2000	Population growth, 1900-2000
United Kingdom	4,593	18,996	53%
Australia	4,299	20,209	420%
United States	4,096	26,418	267%
Belgium	3,652	19,968	52%
Netherlands	3,533	20,140	203%
Switzerland	3,531	22,271	115%
Germany	3,134	21,016	124%
Denmark	2,902	22,067	107%
France	2,849	20,218	46%
Canada	2,758	21,359	470%
Sweden	2,561	19,767	76%
Ireland	2,495	20,669	19%
Spain	2,040	15,366	112%
Italy	1,746	18,357	75%
South Africa	1,451	3,598	825%
Japan	1,135	20,973	183%

Source: Tables D-1a,D-1b, and D-1f of Angus Maddison (1995) *Monitoring the World Economy 1820-1992* Paris: OECD Development Centre Studies, and the World Bank's *World Development Indicators* for real per capita income figures. Real per capita income is expressed in terms of dollars of 1990 Geary-Khamis dollars through 1994, and then the 1994 number from Maddison (1995) is multiplied by the ratio of 2000/1994 real per capita income in local currency units from *World Development Indicators* to obtain the 2000 number. (South Africa is for 1913 rather than 1900, and the 1992 number is multiplied by the 2000/1992 ratio.) Population growth numbers are from Dimson, Marsh, and Staunton (2002) in some cases and Maddison (1995) Tables A-3a and A-3b in other cases, with updates for the mid and late 1990s by the author.

Table 3
Mean real stock returns and per capita GDP growth for 19 countries for 31 years and 13 countries for 13 years

The correlation between the mean geometric annual real return and mean per capita GDP growth is –0.25 (p=0.31) for the top 19 countries for 1970-2001 and 0.02 (p=0.96) for the bottom 13 countries for 1988-2000. Geometric mean real returns are from chapters 18-33 of Dimson, Marsh,and Staunton (2002) for 1970-2000, with the CPI used for inflation adjustments. For 1988-2000, returns come from Datastream, where the MSCI total return indices with gross dividends being reinvested are used with CPI deflators. John Wei provided returns for Taiwan. The geometric mean real GDP per capita growth rates (using constant local currency units) come from the World Bank's *World Development Indicators*.

Country	Years	Mean geometric real return	Mean GDP growth per capita
Australia	1970-2000	3.4%	1.9%
Austria	1970-2000	1.8%	2.6%
Belgium	1970-2000	9.9%	2.4%
Canada	1970-2000	6.2%	2.0%
Denmark	1970-2000	6.9%	1.7%
France	1970-2000	7.4%	2.1%
Germany	1970-2000	6.1%	1.9%
Ireland	1970-2000	8.6%	4.2%
Italy	1970-2000	2.1%	2.3%
Japan	1970-2000	3.7%	2.9%
Netherlands	1970-2000	9.7%	2.0%
Norway	1970-2000	3.0%	2.9%
Singapore	1970-2000	3.1%	5.9%
South Africa	1970-2000	6.0%	0.1%
Spain	1970-2000	3.5%	2.5%
Sweden	1970-2000	11.0%	1.8%
Switzerland	1970-2000	6.4%	1.1%
United Kingdom	1970-2000	6.3%	2.1%
United States	1970-2000	6.9%	2.1%
Argentina	1988-2000	6.9%	1.3%
Chile	1988-2000	16.1%	5.1%
Finland	1988-2000	21.9%	2.1%
Jordan	1988-2000	-1.8%	-1.3%
South Korea	1988-2000	-2.2%	5.7%
Malaysia	1988-2000	5.6%	4.9%
Mexico	1988-2000	12.3%	1.8%
New Zealand	1988-2000	0.9%	0.9%
Philippines	1988-2000	1.9%	1.2%
Portugal	1988-2000	2.1%	3.4%
Taiwan	1988-2000	4.5%	5.1%
Thailand	1988-2000	-1.8%	5.2%
Turkey	1988-2000	6.9%	1.9%