Predicting Equity Returns for 37 Countries: Tweaking the Gordon Formula

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Abstract

Recently, there has been a lot of discussion about whether and how much the U.S. stock market is overvalued, leading some economic gurus to suggest that foreign markets may be good investments. We ask whether this is the case and apply the Gordon formula to predict future real rates of return on three Morgan Stanley Capital International indices and 37 individual country indices. Our conclusion is that, as a whole, foreign markets do indeed promise significantly higher future returns than the U.S. market does, suggesting that an increased focus on international diversification by investors and fund managers could be beneficial. JEL classification: G11 & G12.

I. Introduction

Over the past few years, it has become almost axiomatic that the U.S. market was overvalued during the later part of the 1990s, experiencing a bubble fueled by hype about technology and Internet stocks. Several influential pieces, including Campbell and Shiller (1998; 2001), Shiller (2000), and Smithers and Wright (2000), explained and popularized the idea that the U.S. market was grossly overvalued, and the doomsayers were validated when the market tumbled.

However, questions remain about whether the U.S. market, as measured by the Standard and Poor's 500 index, is still overvalued. One way to figure out the answer is to compare the prospective return of the S&P500 index with likely prospective returns from investing in other countries and to ask "What change in the price of the S&P500 index would align these returns?" This paper tries to do just that. The essence of the Campbell- Shiller argument is that the S&P500 index is overvalued as compared with

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past history. We ask the same question in a cross section rather than in a time series context.

If the S&P500 index is overvalued, then investors will want to avoid the U.S. large cap stocks that dominate the S&P500. But where should these investors put their money in order to maximize their returns? Are foreign markets a good shelter from the dangers of overvaluation in the United States? And if so, how do investors access and exploit the opportunities available to them in foreign markets? We also explore these issues.

The Gordon formula states that the real return from buying and holding a stock forever and consuming the dividends is the dividend yield plus the real rate of dividend growth. We use this formula to predict the real rate of return for three Morgan Stanley Capital International (henceforth, MSCI) indices and 37 individual country indices. To predict future growth rates, we extrapolate past growth rates of dividends and earnings, adjusting these historical growth rates to account for deviations from historical norms. These adjustments are new twists on current methodology. We present our methodology, the derivations of our adjustments, our calculated results, and a brief look at some possible ways investors can access foreign markets. To see what impact our adjustments have, we present four alternative calculations for each index.

II. The Universe of International Index Funds

Before considering whether the performance of investments in international markets is likely to be superior to that of the U.S. market, we need to understand what sort of vehicles exist that give investors investment opportunities in foreign markets. Since it is difficult and costly for investors to access foreign markets on their own, a better choice would be to take advantage of one of the numerous mutual funds that invest into foreign regions or countries, some of which attempt to match the performance of specific foreign indices. Using Morningstar's Principia Pro disk, we compiled a list of just over two-dozen mutual funds that are based on international indices.

While the specific indices on which these funds are based vary, over 20 of the funds are based on a MSCI index. The MSCI indices are generally regional indices, for example, MSCI Europe, and reflect economic performance in each region as a whole. Of these MSCI-based funds, most are based exclusively on one of three indices: MSCI Europe, MSCI Pacific, or MSCI EAFE (Europe, Australia, and Far East). Although there are separate indices known as the MSCI Pacific Free and the MSCI EAFE Free, we ignore the difference between these designations and the standard MSCI Pacific and EAFE.[2] Correlations from annual data from 1988 to 2002 show that the free and standard indices are highly correlated, so that any differences are negligible. We also found even higher correlations for the annual percentage change in price for both indices (Chart 1). As a result, we use only the MSCI EAFE and Pacific, reasoning that our results will be applicable to the corresponding free indices as well.

Chart 1: Correlations Between MSCI and MSCI Free Indices

Basic MSCI Index	**MSCI Free Index**	**Correlation levels**	**Correlation annual changes**
EAFE	EAFE Free	.9999	.99998
Pacific	Pacific Free	.9968	.99992

Since we are examining mutual funds, it is important to note that these funds seek to track the performance of a certain index and will not necessarily always do so. Thus some funds may outperform or underperform the corresponding MSCI index. Moreover, mutual funds charge expenses, thereby cutting into the rate of return a fund delivers compared to the market return. A third caveat: foreign governments generally take a percentage of the dividends paid to international mutual funds as taxes. This also reduces the potential rate of return.

III. DataStream: A Poor Man's MSCI

As discussed above, many available funds are based on MSCI indices. Unfortunately, Duke University's Fuqua business school library does not pay for access to the full range

[2] Free indices measure the opportunity that is available to non-domestic institutions, excluding companies and share classes that cannot be purchased by foreigners.

of available information on the MSCI indices. As a result, the only information we were able to access on the MSCI indices was the price index data from January 1973 on. These data are available through DataStream. But fortunately, DataStream gives us access to information on price, dividend yields, and price/earnings ratios for various regional indices that DataStream has created. These regional indices are very similar in scope to the MSCI indices. Thus although mutual funds are not based on DataStream's regional indices, they are similar enough to the MSCI indices that the DataStream indices can serve as close working approximations of the MSCI ones.

In order to judge whether the DataStream indices could serve as proxies for the MSCI indices, we calculated correlations between the DataStream information on prices and the MSCI information on prices. The correlations turned out to be extremely high. For all of the indices, the correlations were well above .95, usually in a .99-plus range. We also correlated the annual percentage change of each index with the DataStream indices. These correlations were also very high. This leads us to believe that we can use the DataStream information in place of the MSCI data without losing much predictive power or accuracy. The correlations are shown below:

Chart 2: Correlations Between MSCI and DataStream

MSCI Index	**DataStream Index**	**Years**	**Correlation levels**	**Correlation annual changes**
EAFE[3]	Europe and Far East	1973-2002	.9984	.9847
EAFE Free	Europe and Far East	1988-2002	.98997	.9842
Europe Free	Europe	1973-2002	.9997	.9859
Pacific	Pacific	1973-2002	.9968	.9984
Pacific Free	Pacific	1988-2002	.9690	.9844

Although we recognize that working with DataStream information instead of directly with the MSCI data is less than ideal, there is at least one substantial advantage arising from this limitation. We suspect that many universities have access to DataStream indices

[3] Europe, Australia and Far East.

but not to the MSCI information. This lack of available information is especially problematic for an individual investor, who will probably be forced to use whatever limited data is available and not be able or willing to pay for the MSCI data. Because of this, our limitations end up making our work and methodology more easily extended by others.

IV. Data

In order to make our predictions, we first obtained the information from DataStream for the three regional indices discussed above and 36 individual country indices constructed by DataStream. For the U.S. market, we used information for the S&P500 available on Shiller's website and from the Standard and Poor's *Security Price Index Record*, but truncated it so that we only examined from 1973 onward in order to conform with the data range of the other indices. The relevant data for all of these markets are the price index in U.S. dollars, the dividend yield, and the price/earnings ratio. All figures are for January 1of the year, with the most recent measurement coming in January 2002. In order to convert everything into real terms, we used Consumer Price Index (CPI) data from the Bureau of Labor Statistics, which is available on the web. **From this point forward, everything, including growth rates and rates of return, is in real terms.**

Using the index price and the price/earnings ratio, it is trivial to calculate earnings. Similarly, multiplying the index price by the dividend yield gives dividends. With earnings and dividends calculated, we want to calculate the historical rate of growth for both these variables. We calculate the growth rate of earnings and dividends by taking the natural logs for every year and then graphing these natural logs against time in years. The slope of the curve gives us the historical growth rate as percentage change per year because of the properties of natural logs.

V. Intuition

The Gordon formula states that the return from buying and holding a stock and consuming the dividends is equal to the dividend yield plus the growth rate of dividends.[4] While the formula is simple, applying it sensibly is tricky. We present four different methods we used to convert the available historical data into predictions of future rates of return. The first method is to predict the future rate of return as the sum of the dividend yield for 2002 (2001 dividends divided by the January 1, 2002 index price) and the historical growth rate for real earnings or dividends (as a predictor for the future growth rate of real dividends) as given to us by DataStream. Since this is the simplest application of the Gordon formula, without any adjustments whatsoever, we call this the **basic predictor** and denote the rates of return calculated with this method as RR_E^{BASIC} and RR_D^{BASIC}, where the subscript indicates whether earnings or dividends are used as the predictor.

But if we are going to assume that earnings (or dividends) grow as fast in the future as the have in the past, we need to assume that the same fraction of earnings will be reinvested in the firm in the future as in the past. Reinvestment is the fraction of earnings not paid out as dividends. Consequently, we adjust the dividend yield to assume that dividends and hence reinvestment, which is just retained earnings, will continue to be the same fraction of earnings as it was in the past. Our calculations for this method therefore adjust the current dividend yield. Hence the name the **adjusted dividend yield predictor**, which we denote as RR_E^{ADY} and RR_D^{ADY}.

Alternatively, if we allow the amount of reinvestment to change, then we can expect the earnings growth rate to change as well. So, if current dividends are low relative to earnings, then we would expect the future rate of growth for earnings to be higher than it has been historically. This is because if dividends are currently lower than historically,

[4] A simple way to think about the Gordon formula is that the rate of return equals the dividend yield plus the rate of appreciation of the stock, and over the long term, the rate of capital gains on a stock will be equal to the growth rate of earnings (or dividends, since the long term growth of earnings and dividends should be equivalent). See Smithers and Wright (2000, p.275) for a nice alternative intuitive derivation of the Gordon formula.

that means that reinvestment is higher than usual, fueling higher than usual growth. With this calculation, therefore, we must adjust the growth rate, and therefore call it the **adjusted growth rate predictor**, which we denote: RR_E^{AGR} and RR_D^{AGR}.

But it is unrealistic to say that firms can either use their earnings only to pay out dividends or to reinvest as we have assumed in the past two calculations. Our most complicated adjustment incorporates the fact that firms use their earnings to repurchase outstanding shares of stock in addition to other uses. In this case, the growth rate should be slower if the stock price is high relative to earnings, since the firm can then afford to buy back fewer shares of stock. Similarly, if dividends are high relative to earnings, a lower fraction of earnings will be used to repurchase stock, lowering the predicted growth rate. This adjustment generates what we label the **constant reinvestment predictor** because its key variation is that it includes a term for stock repurchases, which enables us to assume that a constant fraction of earnings is reinvested in the firm. We denote this predictor RR_E^{CRP} and RR_D^{CRP}.

Since we have explained the intuition behind our calculations, we will proceed with the mathematical proofs of how we derive our calculations. Those readers not interested in proofs or the equations we use should skip ahead to section XI.

VI. Relating the Rate of Return to Fundamentals

Now we derive the adjustments discussed above. Our goal for this section is to relate the rate of return from investment and the rate of growth of dividends to fundamental ratios.

$$y=D/P \qquad (1)$$

where y is the dividend yield, D is dividends per share and P is the price per share.

$$E=mk \qquad (2)$$

where E is earnings per share, k is the capital stock per share and m is the constant marginal product of capital. The reason this remains constant is that we assume earnings are produced solely with capital and with constant returns to scale.

$$R=rE \tag{3}$$

where R is the money spent on repurchasing shares of stock per share and r is the historical fraction of earnings spent on repurchasing stock.

$$D=\delta E \tag{4}$$

where δ is the constant historical fraction of earnings paid out as dividends.

$$I=[1-(r+\delta)]\ E \tag{5}$$

where I is investment per share used to build up the capital stock.

$$P/E = e \tag{6}$$

where e is defined as the price/earnings ratio.

$$P/k=q \tag{7}$$

where q is defined as the price/capital stock ratio, i.e. Tobin's q.

The capital stock of all the firms in the index, K, equals the capital stock per share times the number of shares, S:

$$K = kS. \tag{8}$$

Differentiating with respect to time yields:

$$dk/dt = (dK/dt)/S - (k\ dS/dt)/S. \tag{9}$$

The proportional change in the number of shares outstanding is:

$$dS/S = -R/P \tag{10}$$

where R is the amount spent per share repurchasing shares.

The first term on the right hand side of 9 is simply I. Substituting I and then 10 into 9, and then applying 7 yields

$$dk/dt = I + R/q. \quad (11)$$

Drawing on 2, 3, 5 and 11 we have

$$dk/dt=[1-(r+\delta)]\, E+rE/q. \quad (12)$$

Equations 12 and 2 combine to yield

$$dk/dt=[1-(r+\delta)]\, mk+rmk/q. \quad (13)$$

Assuming δ, m r, and q are all constant causes price, dividends, earnings and the capital stock to all grow at the same rate and the real rate of return (RR) to be the proportional rate of growth of the capital stock plus the dividend yield:

$$RR = g + y \quad (14)$$

where g is the growth rate of the capital stock per share defined as:

$$g = (dk/dt)/k. \quad (15)$$

Using 1,4, 6 and 13 we rewrite 14 as

$$RR=[1-(r+\delta)]\, m + rm/q + \delta/e. \quad (16)$$

From 2, 6 and 7

$$q = me. \quad (17)$$

This combined with 16 allows us to write

$$RR = [1-(r+\delta)]\, m + (r + \delta)/e. \quad (18)$$

In the special case where $r+\delta = 1$ then

$$RR = 1/e. \quad (19)$$

This means that RR is inversely proportional to e, the price earnings ratio.

In the special case where $r+\delta=0$ then

$$RR = m. \tag{20}$$

In this case RR is just the marginal product of capital since all earnings are reinvested in new capital. Consequently, the capital stock will grow at the same constant rate, m, regardless of the price earnings ratio. Therefore, when an index has a high e relative to historical levels, 19 gives a conservative prediction whereas 20 gives the more optimistic prediction of the future rate of return.

From 2 and assuming that m remains constant,

$$g = (dk/dt)/E =(dk/dt)/k \tag{21}$$

where g is the common growth rate of earnings and capital.

From 10 and 21

$$g = [1-(r+\delta) + r/q]m. \tag{22}$$

VII. The Basic Application of the Gordon Formula

The simplest way to apply the Gordon formula is just to predict that real dividends will continue to grow from their current levels in the future at the same rate as some fundamental for the stock has grown in the past. Adding a growth rate and the dividend yield from the current year gives the basic estimate of the real rate of return:

$$RR^{BASIC} = g_H + y_c \tag{23}$$

where g_H is the historical growth rate of earnings or dividends obtained as the slope of the regression of the natural log of earnings or dividends on time and y_c is the dividend yield for the current year. Our formula gives the internal real rate of return that equates the current price of the index to the present value of its steam of real dividends, starting at their current level and growing forever at g_H.

But if the fraction of earnings paid out as dividends currently differs from its historical level, the future growth rate should differ from the historical rate. The next three models explore alternative ways we account for this fact.

VIII. The Adjusted Dividend Yield Predictor

We denote historical median values for the right hand side variables in equation 22 with "H" subscripts. We denote the historical growth rate of earnings or dividends as $g_{H,}$ where g_H is the slope of the regression of the natural log of dividends or earnings on time. Thus, it is the historical average of the instantaneous growth rate. If all the right hand variables in 22 with the H subscripts are constant, the equation holds exactly. We assume that m is constant, and with these substitutions equation 22 continues to hold approximately. Henceforth, we ignore the approximation error. We denote projected constant future values for these same variables with "f" subscripts. Rewriting 22 once with H's and once with f's, and solving them simultaneously to eliminate m yields:

$$g_f = g_H[1-(r_f+\delta_f) + r_f/q_f]/\{1-(r_H+\delta_H) + r_H/q_H\}. \tag{24}$$

We assume no stock repurchases, so the r's equal zero. We assume firms pay out the same fraction of earnings as dividends as they have done historically, so the δ's are identical. Thus, the projected real growth rate is:

$$g_f = g_H. \tag{25}$$

Shiller suggests using a 10-year trailing average of earnings as the appropriate measure of earnings to predict the rate of return for the stock market over time. He does this because earnings tend to wobble about a trend. The idea is similar to Milton Friedman's use of permanent income in explaining consumption behavior. We adopt a similar idea, but one more suitable for short time series. We regress the natural log of earnings on time and observe the regression formula for the trend line. We then take the antilog of this trend line and label the values we obtain for each year as trend earnings, or E_T. We define the current trend price/earnings ratio as the most recent (January 2002) price divided by the most recent value of trend earnings, E_{cT}, and denote it by e_{cT}.

We define δ_H as the median historical dividend payout ratio, calculated as the median ratio of dividends to trend earnings for each year. To obtain the adjusted historical dividend yield, we divide by the trend price earnings ratio for the current year, e_{cT}, which yields

$$y_f = \delta_H / e_{cT}. \qquad (26)$$

Thus our adjusted dividend yield is what the dividend yield would be if the ratio of dividends to trend earnings were equal to the median historical dividend payout ratio. We need to make this adjustment to reflect the idea that only if the future dividend payout ratio equals the historical one is it reasonable to think that future growth will be equal to the historical growth rate, as explained intuitively above. We use the median historical dividend payout ratio, because to use the mean would give undue weight to very large or very small ratios generated when earnings are at the extremes.

Substituting 25 and 26 into 14 gives us our first variant of the predictive form of the Gordon equation, a variant closely related to Shiller's (2000, p.260) version:

$$RR^{ADY} = g_H + \delta_H / e_{cT}. \qquad (27)$$

In words, we predict the real rate of return by adding to the average historical growth rate of dividends or earnings a variant of the historical dividend yield, where the adjustment to the yield reflects the current valuation of the index. We label these RR_D^{ADY} or RR_E^{ADY}, with ADY standing for adjusted dividend yield and the subscripts depending on whether past growth rates of dividends or earnings are used for g_H. Another way to think about the calculation is that we adjust the current dividend yield by multiplying it by the historical median dividend payout ratio divided by the current one. The logic behind our formula is the same calculation of the internal rate of return as for the basic predictor, except that here we adjust the initial level of dividends.

IX. The Adjusted Growth Rate Predictor

Now we consider an approach closely related to our ADY predictor, but focusing on adjusting the growth rate instead of the dividend yield. We assume that dividends will grow at a constant rate from their current levels, so we do not adjust the current dividend yield, y_c. δ_c is the current dividend payout ratio, defined as current dividends divided by current trend earnings. Plugging δ_c for δ_f in 24 and assuming no repurchases (so r continues to equal 0) yields

$$g_f = g_H[1-\delta_c]/[1-\delta_H]. \qquad (28)$$

Substituting 28 into 14 gives us:

$$RR^{AGR} = g_H[1-\delta_c]/[1-\delta_H] + y_c. \quad (29)$$

where RR^{AGR} is the adjusted growth rate version of the prospective real rate of return. Again we use subscripts D or E depending on whether dividends or earnings are used to calculate the historical growth rate.

Intuitively, the lower the current dividend payout ratio relative to the historical median dividend payout ratio, the larger the percentage of earnings reinvested in the firm, and hence the greater the prospects for future growth. Likewise, high current dividend payouts relative to historical medians mean that less money is getting reinvested currently than in the past, thus depressing future growth. Again, the logic of our internal rate of return calculation is the same as in the basic case. Here, however, the postulated future real growth rate of real dividends is different.

X. The Constant Reinvestment Proportion Predictor

Now we ask: How can we use the Gordon formula to predict the rate of return when e, r, δ and q remain at their current levels? What makes this problem tricky is that we no longer assume r is equal to zero. What makes the problem important is that, at least in the United States, stock repurchases have assumed an important role in recent years. We presume the same is true for other countries. The effect of our calculation is that for indices where a small proportion of earnings is paid out as dividends and where the price/earnings ratio has risen radically over its historical average, the prospective rate of return is reduced. This method of calculation introduces into the Gordon formula a larger role for the trend price/earnings ratio, which we think is important because some variant of the price/earnings ratio is a metric frequently and sensibly used to predict market performance. See, for example, the predictions in Tower and Gokcekus (2001).

In the absence of evidence to the contrary, we assume that $r+\delta$ both historically and in the future is equal to the median historical level for the S&P500 index, the one index for which we have a great deal of information. We calculate this information from Wright (2002). Most of our data runs from 1973 through 2001, so we calculate the median value for this period. It is given by

$$(r+\delta)_{500} = 0.554565 = 55\%. \quad (30)$$

For each index, δ_H is calculated as the median historical δ over the period with E_T in the denominator.

We calculate r_H for each index as

$$r_H = (r+\delta)_{500} - \delta_H. \quad (31)$$

This means that we assume the sum of the two ratios historically for the index in question is the same as the historical sum for our benchmark index, the S&P500.

We assume

$$(r_f+\delta_f) = (r_H+\delta_H). \quad (32)$$

In words, the reinvestment fraction of earnings stays unchanged.

We project the current dividend payout ratio to hold forever, so

$$\delta_f = \delta_c. \quad (33)$$

Consequently,

$$r_f = (r+\delta)_{500} - \delta_c. \quad (34)$$

y_f is given by

$$y_f = y_c. \quad (35)$$

In words, the current dividend yield obtains forever.

This along with 14, 24, 33 and 34 gives us for the constant reinvestment proportion version of the real rate of return:

$$RR^{CRP} = g_f + y_f \quad (36)$$

$$= g_H\{1-(r+\delta)_{500} + [(r+\delta)_{500} - \delta_c]/q_f]\}/ \{1-(r+\delta)_{500} + [(r+\delta)_{500} - \delta_H]/q_h\} + y_c.$$

The q's are not observable. From 17, we can rewrite 36 as

$$RR^{CRP} = g_f + y_f \qquad (37)$$

$$= g_H\{1-(r+\delta)_{500} + [(r+\delta)_{500} - \delta_c]/(me_{T)}\}/\ \{1-(r+\delta)_{500} + [(r+\delta)_{500} - \delta_H]/(me_H)\} + y_{c.}$$

The m's also are not observable. Since they are the ratios of E to K, we approximate them by the observed level of these variables historically for the non-financial portion of the S&P500 provided by Wright (2002). The historical level of m for 1973 through 2001 is 0.05670182.

The net effect of all this is to inject into the calculations a mechanism by which an increase in the price/earnings ratio above its historical level (assuming r is positive) depresses prospects for future growth in addition to lowering the dividend yield. Consequently, indices that are highly valued relative to history, i.e., have high e_{cT}'s, will have lower prospective rates of growth associated with them. Again, our formula gives us the internal real rate of return of an investment consisting of buying the index and consuming a constantly growing stream of real dividends. Here we use the current level of dividends for the start of the stream and the postulated growth rate is different from that of the other predictors.

Since earnings growth never exactly equals dividend growth, the two numbers will generate somewhat different predicted rates of return. But they define the endpoints of a range in which our point estimate for the rate of return on equity will lie. Consequently, we present both predictors. With our other calculations, this same idea applies. At the end of the day, therefore, we have completed four different types of calculations based on the Gordon formula that have given us eight different possible values for the future rate of return for a stock index. Which one is most accurate depends on how the world works, but our hunch is that the last calculation (the CRP calculation) is the most reasonable. We proceed by applying these four calculations to stock indices from individual countries and the composite MSCI indices.

XI. Is Our Model Consistent With the Empirical Evidence?

Is there evidence that a high dividend payout ratio reduces earnings growth? Using Shiller's data from January 1871-December 2001, we regressed the 10 year growth rate of real earnings on the contemporaneous 10 year dividend payout ratio, where the dividend payout ratio is defined as the average of 10-year real dividends to the average of real 10-year earnings, and the growth rate is the slope of the regression of ln real earnings on time. We find that each 1-percentage point increase in the dividend payout ratio reduces the growth rate by 0.49 percentage points per year.

So is our model consistent with the empirical evidence? We have two measures of consistency. First, our model predicts that when all earnings are paid out as dividends no growth in earnings occurs. According to our regression analysis, as the dividend payout ratio rises from 0 to 100 percent, the annual rate of growth of real earnings falls from +4.5 percent to -0.4 percent. Second, substituting 17 into 22, and allowing δ to change, we find $dg = -m\, d\delta = -0.0567\, d\delta$, which is to say each percentage point increase in the dividend payout ratio reduces the growth rate by 0.57 percentage points per year, which is not far from the 0.49 predicted by the regression.

XII. Interpreting the Gordon Calculations

It is important to understand exactly what our calculations mean. The basic calculation of the Gordon real rate of return (RR) is the RR that results from buying and holding the index forever while consuming the dividends. It also describes the RR for buying and then selling the index after a finite time period, whether the dividends are consumed or reinvested if we assume that the stock price continually adjusts to keep the dividend yield constant. This also applies to the ADY and AGR calculations.

Since the CRP calculation assumes that a fraction of trend earnings are used to continually repurchase stock, the CRP calculation is conditional on the assumption that the price/trend earnings ratio and the dividend yield remain constant at their initial levels, and thus it applies for finite or infinite holding periods and applies whether dividends are consumed or reinvested.

Of course, few investors will wish to hold investments forever, and few investors expect constancy of dividend yields. Investors are typically interested in returns over shorter time periods, and we think these calculations provide useful guidance for shorter-term performance. We believe that investors will ultimately shift resources from indices with low projected performance to those with higher projected performance, driving down the prices of the former and up the prices of the latter. Consequently, we believe our calculations are useful for real world investors.

XIII. Predictions for the MSCI Indices

We begin with our predictions for the three major regional indices we have examined, the DataStream versions of the MSCI EAFE, Europe, and Pacific indices. We compare our results for these three with our calculations for the S&P500. For all of these indices, we use data from 1973 to 2002. We see from Chart 3, that the EAFE has the highest rate of return across the board, but that dividend yields are highest for Europe. We see from the bottom rows of our all inclusive Chart 3 that all three MSCI indices outperform the S&P500, regardless of which method of calculating future returns we use and regardless of whether we use historical dividend growth or historical earnings growth. Indeed, we were startled by the magnitude of the difference between the S&P500 and the other indices. In general, the foreign regional indices offer more than double the rate of return on the S&P500, suggesting that mutual funds based on these indices may offer significantly better returns than the U.S. market does. This suggests that the S&P500 is significantly overvalued relative to foreign markets.[5]

[5] DataStream calculates its price/earnings ratio as the capitalization of all the stocks in the index divided by total earnings of the stocks in the index, with negative earnings treated as zero. For the S&P500 index, our earnings figures are net earnings, i.e., we subtract negative earnings from positive ones. This means that in Chart 3 we would expect the e's for the S&P500 to exceed the others. This means that ideally we should use a bigger m for the non-S&P500 indexes, but we did not make the adjustment. Otherwise our analysis is unaffected.

XIV. Predictions for Individual Foreign Countries

Applying the same methodology to 36 individual foreign countries, also shown in Chart 3, reveals interesting results that show not just which regions offer the best prospects for future growth, but which specific countries are likely to drive such growth. Although it is more difficult for individual investors to exploit high returns in some individual foreign countries compared to the ease of buying an index-based regional mutual fund, there are numerous country funds available for purchase. From time to time, these funds are listed in the *Wall Street Journal*.

The country data was gathered from the DataStream indices for these countries. We have analyzed every country for which DataStream provides information. In addition, we tried to supplement this data with information from *Standard and Poor's Emerging Markets Factbook*, but found these data series too short and produced with too much of a lag to be very helpful. Thus, we chose to focus solely on the DataStream information. Our major conclusion is that the median values across all countries for the future rates of return are all higher than the expected future rates of return on the S&P500.

Although there is wide variation between individual countries (ranging from returns of –30.95 percent annually in Thailand and –30.77 percent annually in Indonesia up to 17.07 in Hong Kong and 15.73 in Sweden), there are numerous individual countries with greater expected returns across the board than the U.S. market. However, the U.S. market promises to outperform some foreign countries and there are also numerous countries with wide variability in the predictions. In general, European countries offer excellent returns relative to the United States, while Southeast Asia, Australia, Canada, and Mexico, offer far less impressive returns.[6]

Several readers of the paper have commented on our failure to account for currency fluctuations. We believe that by focusing on real growth over long periods and on trend earnings we have managed to abstract to some extent from currency fluctuations. For

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[6] It is illuminating to contrast our results with those of Bernstein (2002, Table 2.2). His table considers other asset classes.

example a temporary jump in the value of the Yen, holding dividends, stock price and earnings in Yen constant, should not affect our calculated growth rates or the variables including the rates of return in Chart 3. When the Yen depreciates, Japanese labor costs in dollars fall, as do revenues on sales of non-tradables in Japan. Whether this will push dollar-denominated dividends and earnings up or down is uncertain.

XV. Predictions for Some Mutual Funds

Additionally, our analysis can be applied to mutual funds that invest a specified proportion of their assets in different countries. It is trivial to calculate the expected return for such a fund once the proportions of investment and the expected returns on the individual countries are known. Morningstar's Principia Pro disk makes finding the pertinent information and doing these calculations easy. The Principia Pro disk presents the allocation percentages in each of the five major countries for each fund, and one can sum up the investments in individual stocks, again from the Principia Pro disk, to obtain the complete country breakdown.

Here we present country breakdowns for some important funds, where the presented RRs are weighted averages for the various countries over the two CRP calculations.

- Vanguard's Emerging Markets Stock Index Fund (based on the Select Emerging Markets Free Index) invests in the following countries in these percentages: KOR 22, SAF 16, TAI 13, BRA 12, MEX 11, HK 7, ISR 6, THA 2, TUR 2, POL, 2, US 1, PRC 1, HUN 1, ARG 1, PHI 1, INDO 1, (RR .90%).
- Vanguard's European Stock Index Fund (based on the MSCI Europe Index): UK 36, FRA 12, SWI 11, GER 10, NET 8, ITA 5, SPA 5, FIN 3, SWE 2, BEL 2, IRE 1, DEN 1, US 1, THA 1, AUSTRALIA 1, NOR 1, GRE 1, POR 1, (RR 5.77%).
- Vanguard's International Growth Fund: UK 21, FRA 17, JAP 15, NET 12, SWI 4, HK 3, KOR 3, IRE 3, ITA 3, SWE 3, THA 3, SIN 2, SPA 2, GER 2, US 2, FIN 1, BEL 1, (RR 4.85%).
- Vanguard's International Value Fund: UK 17, JPN 17, FRA 13, SWI 9, GRE 7, HK 6, NET 4, MEX 4, SIN 4, SPA 4, KOR 3, RUS 3, BRA 3, SWE 3, TAI 3, ITA 2, BEL 2, FIN 1, IRE 1, THA 1, (RR 5.75%)

- Vanguard's Pacific Stock Index Fund (based on the MSCI Pacific Free Index): JPN 74, AUSTRALIA 15, HK 7, SIN 3, (RR 3.32%).
- Fidelity's China Region Fund: HK 81, TAI 18, UK 1, (RR 10.46%).
- Scudder's Latin America Fund: MEX 50, BRA 42, CHL 5, PAN 2, ARG 1, PER 1, (RR -.51%).
- Vanguard's 500 Index Fund: US 100 (RR 2.42%).

XVI. Is the S&P500 Index Overvalued?

Campbell and Shiller (1998; 2001) and Shiller (2000) look at the past behavior of the S&P500 and conclude that it is overvalued. In one case Shiller (2000) does use the Gordon formula to search for an appropriate level for the S&P500. He (2000, figure 9.1) finds that the price for the S&P500 index that is equal to the present value of its dividends (discounted at the historical real rate of return of the stock market of .06 percent per month) is a mere 339, based on our reading of his graph. Using the average of the CRP predictors in Chart 3, we calculate that for the S&P500 to provide a real rate of return of 5 percent, close to our median estimate for our 36 foreign countries, the S&P500 index would have to fall to 403. This is 35 percent of its average January 2002 level. For it to provide a real rate of return of 6 percent, close to our estimate of the real rate of return for Europe, it would have to fall to 322, which is 28 percent of the average January 2002 level. We should note, however, that these estimates are more pessimistic than those in Tower and Gokcekus (2001) (403 and 322 instead of 624 and 490). Gokcekus and Tower use 1.4 percent for their growth rate. This figure, derived from a longer time series, is larger than the growth rates for the S&P dividends and earnings that we use here. But the qualitative conclusions of both studies are consistent.

Incidentally, this section serves to demonstrate the utility of Chart 3. The figures in Chart 3 are sufficient to calculate new predicted rates of return, as index prices fluctuate, without needing to replicate our entire analysis. The only tricky elements are that one must use equation 37 to calculate δ_H and remember that $\delta_c = y_c e_{cT}$.

XVII. Conclusions

This research and reflecting upon it leads us to several conclusions. We believe that foreign markets offer the prospect of higher returns than the U.S. market, whether we consider international index funds or the performance of individual countries. Therefore, investors should take a closer look at the opportunities available in these foreign markets when deciding how best to allocate their portfolios.

We think that our methodology of returning to the fundamentals of investment, looking at dividends, share repurchases, earnings, trend earnings, and growth, then combining these using Gordon calculations is a wise way to analyze markets. We encourage investors to consider these fundamentals. We also believe our adjustments for the Gordon formula should be useful to investors in coming to quantitative results and helping them think about the issues at hand, like how much to put away for retirement or how much to be willing to pay in additional taxes or expenses to hold a mutual fund specializing in foreign equities or those focused on a single sector.

Data on dividends, earnings, book value and price for individual US stocks back to 1963 is available on line from CRISP (the Center for Research in Securities Prices). There is no comparable data source for foreign stocks. Consequently, we lament the lack of and inaccessibility of pertinent, accurate, and easily accessible data on particular stocks in foreign markets. Perhaps one reason why foreign markets offer such high rates of return relative to the U.S. market and why foreign markets appear to be significantly less overvalued than the U.S. market is that because there is little information available, investors do not feel comfortable diving blindly into foreign markets.

We think that Dimson, Marsh and Staunton (2002, p.208) make an important point. They argue that when the prospective equity risk premium over fixed income securities is low, as it is today, it makes sense for investors to make larger portfolio bets on securities that appear to be mispriced and reduce the emphasis of their portfolios on broad market exposure. We believe that the risk return payoff for broad investment in Canada or in the

S&P500 index is too unappealing to justify investment in them, especially since there are inflation protected Treasury bonds guaranteeing returns of more than 3 percent per year.

We hope that Morningstar and other mutual fund advisory services will start to present statistics and analytical tools like the ones presented here. We find that mysterious black box calculations purporting to determine which mutual funds are the best are not very useful. Far better, we believe would be to present calculations of likely rates of return based on the rates of growth of the fundamentals for the particular basket of stocks owned by the fund. At the very least, these calculations should be offered as a complement to other calculations. Toward this end, we plan to update our calculations from time to time on Tower's web site, http://www.econ.duke.edu/tower.

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Notes to Chart 3

1) Start is the start date for the series from DataStream used to predict real rates of return.

2) g_E is the historical growth rate of real earnings, calculated from a regression.

3) g_D is the historical growth rate of real earnings, calculated from a regression.

4) y_c is the current dividend yield (as of January 2002).

5) y_f is the adjusted dividend yield (as of January 2002). It is the dividend yield that would have obtained if the fraction of trend earnings paid out as dividends had been equal to its historical fraction.

6) e_c is the current price earnings ratio (as of January 2002).

7) e_{cT} is the current trend price earnings ratio (as of January 2002).

8) Me_T is the median historical trend price earnings ratio. The ratio of e_{cT} to Me_T is a measure of market overvaluation relative to history.

9) RR_E^{BASIC} and RR_D^{BASIC} are the basic predicted rates of return from buying and holding the equity index and consuming the dividends. They are calculated as y_c plus g_E or g_D. These are simple benchmark calculations that our other predictors are designed to improve on.

10) RR_E^{ADY} and RR_D^{ADY} are similar except that they are calculated by replacing y_f with y_c. They are designed to recognize that growth rates will be the same as in the past only if the dividend payout ratio is the same as it has been historically. ADY stands for adjusted dividend yield.

11) RR_E^{AGR} and RR_D^{AGR} are the same as the basic calculation except that they are calculated with adjusted growth rates (hence the name AGR). They are designed to recognize that growth rates will be the higher than in the past to the extent that the dividend payout ratio is less than it has been historically.

12) RR_E^{CRP} and RR_D^{CRP} are the same as the basic calculation except they are calculated under the assumption that a constant fraction of trend earnings is paid out as dividends or used to repurchase equity with the rest used to reinvest in the firm. This means that a constant reinvestment proportion (hence, CRP) of trend earnings is maintained. This calculation automatically predicts lower real rates of return when the ratio of price to trend earnings rises. We think this is an important mechanism, so these are our most trusted calculations. Consequently, we have emphasized them with a bold typeface.

Chart 3: Predictions

	Start	g_E	g_D	y_c	y_t	e_c	e_{cT}	Me_T	RR_E^{BASIC}	RR_D^{BASIC}	RR_E^{ADY}	RR_D^{ADY}	RR_E^{AGR}	RR_D^{AGR}	RR_E^{CRP}	RR_D^{CRP}
		Growth %		DYs %		PEs			BASIC %		ADY %		AGR %		CRP %	
Argentina	1994	1.25	3.00	6.83	6.85	9.10	8.17	15.24	8.08	9.83	8.10	9.85	8.08	9.84	**8.07**	**9.82**
Australia	1973	-0.35	1.67	2.91	2.58	19.50	17.89	11.64	2.56	4.58	2.23	4.25	2.60	4.40	**2.62**	**4.27**
Austria	1973	5.32	4.83	2.34	3.53	13.40	9.44	16.78	7.66	7.17	8.85	8.36	8.55	7.98	**10.72**	**9.95**
Belgium	1973	4.15	2.21	3.21	3.34	11.20	11.62	12.80	7.36	5.42	7.49	5.55	7.46	5.47	**7.65**	**5.57**
Canada	1974	-0.48	-1.39	1.70	1.70	18.40	22.69	11.73	1.22	0.31	1.22	0.31	1.22	0.31	**1.30**	**0.55**
Chile	1990	1.93	2.84	2.72	3.44	15.50	15.37	16.59	4.65	5.56	5.37	6.28	5.11	6.23	**5.18**	**6.34**
China	1995	-1.04	6.41	1.14	1.08	42.80	35.97	35.26	0.10	7.55	0.04	7.49	0.14	7.31	**0.13**	**7.39**
Denmark	1974	5.85	4.37	1.67	1.73	15.10	15.12	13.30	7.52	6.04	7.58	6.10	7.60	6.10	**7.27**	**5.85**
Finland	1989	6.98	1.08	2.54	1.56	20.90	19.39	11.79	9.52	3.62	8.54	2.64	7.62	3.33	**6.80**	**3.20**
France	1973	4.40	3.65	2.62	3.08	18.00	15.60	13.77	7.02	6.27	7.48	6.73	7.62	6.77	**7.58**	**6.74**
Germany	1973	2.92	1.10	2.00	2.19	18.20	16.35	16.04	4.92	3.10	5.11	3.29	5.06	3.15	**5.05**	**3.15**
Greece	1990	5.59	10.23	2.56	3.26	14.00	11.15	10.68	8.15	12.79	8.85	13.49	8.83	14.04	**8.95**	**14.26**
Hong Kong	1973	7.98	1.10	2.84	4.93	15.10	10.58	14.00	10.82	3.94	12.91	6.03	14.50	4.45	**17.07**	**4.80**
Indonesia	1992	-11.46	-17.05	2.01	3.86	11.90	6.89	14.95	-9.45	-15.04	-7.60	-13.19	-11.44	-18.01	**-20.02**	**-30.77**
Ireland	1973	3.58	3.32	2.21	2.24	16.60	20.32	12.34	5.79	5.53	5.82	5.56	5.83	5.56	**5.48**	**5.24**
Italy	1987	-2.10	-1.81	2.83	2.22	16.60	21.08	17.80	0.73	1.02	0.12	0.41	1.24	1.46	**1.21**	**1.43**
Japan	1973	1.38	1.37	0.94	1.37	40.80	30.27	37.43	2.32	2.31	2.75	2.74	2.62	2.61	**2.57**	**2.35**
Malaysia	1987	4.62	-2.61	2.32	4.84	15.10	11.95	19.98	6.94	-0.29	9.46	2.23	10.24	-2.15	**11.62**	**-2.94**
Mexico	1991	0.96	-6.36	1.51	1.34	14.70	12.09	12.02	2.47	-4.85	2.30	-5.02	2.45	-4.69	**2.44**	**-4.64**
Netherlands	1973	3.23	3.49	3.02	2.97	16.10	16.00	10.41	6.25	6.51	6.20	6.46	6.46	6.20	**5.94**	**6.17**
New Zealand	1989	-5.11	-0.35	5.33	5.40	17.80	13.81	13.91	-5.11	-0.35	0.22	4.98	0.29	5.05	**-0.02**	**4.96**
Norway	1981	4.07	6.27	2.65	2.49	10.60	10.66	11.50	6.72	8.92	6.56	8.76	6.63	8.78	**6.76**	**8.97**
Philippines	1989	-0.71	3.10	1.43	1.83	16.00	8.28	15.69	0.72	4.53	1.12	4.95	0.69	4.65	**0.34**	**6.17**
Poland	1995	-3.46	2.64	1.40	1.16	10.50	13.97	13.80	-2.06	4.04	-2.30	3.80	-1.92	3.93	**-1.88**	**3.90**
Portugal	1991	-9.32	2.94	3.19	1.61	16.50	20.60	11.89	-6.13	6.13	-7.71	4.55	-1.59	4.70	**-1.10**	**4.54**
Singapore	1973	4.82	2.00	2.33	3.68	15.20	11.87	20.33	7.15	4.33	8.50	5.68	8.52	4.90	**9.88**	**5.46**
South Africa	1973	0.45	-0.01	3.58	4.17	10.70	9.99	12.12	4.03	3.57	4.62	4.16	4.08	3.57	**4.13**	**3.57**
South Korea	1988	-1.97	-8.45	1.36	1.99	12.30	15.42	16.18	-0.61	-7.09	0.02	-6.46	-0.89	-8.28	**-0.95**	**-8.56**
Spain	1988	-0.32	-1.35	1.80	2.65	15.10	16.64	12.11	1.48	0.45	2.33	1.30	1.46	0.11	**1.43**	**0.22**
Sweden	1983	9.81	7.20	2.04	3.01	13.80	12.00	17.11	11.85	9.24	12.82	10.21	13.63	10.55	**15.73**	**12.09**
Switzerland	1973	4.08	4.40	1.86	1.43	20.70	19.84	12.22	5.94	6.26	5.51	5.83	5.46	5.74	**4.84**	**5.08**
Taiwan	1989	6.68	3.55	1.80	2.09	21.60	15.57	30.65	8.48	5.35	8.77	5.64	8.93	5.59	**10.55**	**6.49**
Thailand	1988	-3.87	-12.44	2.00	6.34	11.10	8.13	15.93	-1.87	-10.44	2.47	-6.10	-4.69	-19.49	**-8.25**	**-30.95**
Turkey	1991	2.09	-11.10	1.09	4.65	22.10	10.52	11.56	3.18	-10.01	6.74	-6.45	4.71	-18.13	**5.62**	**-22.96**
United Kingdom	1965	2.74	2.79	2.97	3.94	19.90	16.86	14.40	5.71	5.76	6.68	6.73	7.04	7.12	**7.39**	**7.47**
Venezuela	1993	-11.27	-18.70	3.15	2.24	11.90	14.77	16.36	-8.12	-15.55	-9.03	-16.46	-5.85	-11.79	**-5.91**	**-11.88**
Medians		2.01	2.11	2.33	2.62	15.35	14.95	13.95	4.79	4.43	5.44	4.97	5.09	4.68	**5.12**	**4.88**
S&P500	***1973***	1.16	1.25	1.31	1.36	45.80	35.22	14.50	2.47	2.56	2.52	2.61	2.51	2.60	**2.37**	**2.46**
EAFE	***1973***	3.80	3.72	2.17	2.56	19.80	17.10	20.17	5.97	5.89	6.36	6.28	6.42	6.33	**6.58**	**6.48**
Europe	***1973***	3.15	3.17	2.56	2.86	17.30	17.83	15.03	5.71	5.73	6.01	6.03	6.05	6.07	**5.99**	**6.01**
Pacific	***1973***	3.54	3.42	1.53	2.22	25.40	19.87	26.64	5.07	4.95	5.76	5.64	5.94	5.79	**6.07**	**5.92**