Does the Dividend Yield Predict International Equity Returns?

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Abstract

The use of the dividend yield as a forecaster for stock market returns is examined by focusing on the United States along with 36 international markets. By performing time series and cross section analyses, my conclusion is that dividend yield predicts future rates of return. This provides investors a simple and powerful tool to devise international investment strategies.

I. Introduction

The stock market has been quite the center of conversation among people of all walks of life during the past few years. The volatile nature of the market has forced numerous analysts and economists to examine the intricacies of the market and to try to develop a means to understand it. With the recent technological industry boom and the catastrophic dot com bubble burst, the stock market has been all over the charts with records being set for highest closing levels and largest one day drops.

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With the increased importance of the stock market over the last five years, various significant articles and books have been written, including Campbell and Shiller (1998; 2001), Shiller (2000), and Smithers and Wright (2000). All three pieces have promoted the notion that the U.S. market was greatly overvalued in January 2000 and that it will fall drastically in due time. Harney and Tower (2003) and Reinker and Tower (2002) further showed that it was still overvalued in January 2002 even after the major downturn. As was predicted by these writers, the U.S. market has dramatically fallen in the last three years sending hundreds of businesses to bankruptcy and shrinking individual wealth dramatically.

Prominent claims about how the stock market functions, however, have been made long before these articles were published. One of the major claims about the stock market was by Eugene Fama in 1965. In what came to be known as the Efficient Markets Hypothesis (EMH), Fama asserted that the stock market is efficient: a market in which prices always 'fully reflect' available information. This hypothesis was accepted by much of the financial community and became the model for approaching the market.

More recently, Burton Malkiel wrote a book, *A Random Walk down Wall Street* (1992), supporting the hypothesis of efficient markets with more up to date data series and improved statistical techniques. According to Malkiel's interpretation of the EMH, "stock prices follow a random behavior and therefore no trading rules could outperform random decisions" (49). Malkiel states that assets fully reflect past historical information such that there is no investment strategy which can return abnormal profits based on a previous sequence of prices. In other words, stock prices are completely unpredictable and the market is unbeatable.

Two economists, Campbell and Shiller, testified in front of the Federal Reserve Board in 1996 that despite the theory that stock returns are extremely difficult to predict in the short run, the long run outlook of the stock market was very poor on the basis of the mean reversion theory. Campbell and Shiller's theory was not supported by the stock market at that time, as the U.S. market reached all time high levels fueled by the technology sector. In their 1998 and 2001 articles, they continued to claim the market was grossly overvalued and the market's collapse was imminent.

In 2000, Robert Shiller further added to the stock market literature by publishing *Irrational Exuberance,* in which he uses Alan Greenspan's term "irrational exuberance" to boldly elaborate on his theory of the market being overvalued and consequently, his pessimistic future outlook for the U.S. market. Shiller's book provided an extensive list of causes for the stock market boom as he explored the psychological and structural factors leading to the unprecedented levels of the market.

In their articles, Campbell and Shiller focus on valuation ratios to determine a long run stock market outlook primarily for the United States. The highs and lows of the market led to valuation ratios at extreme levels when compared to historical levels. When valuation ratios, such as, price-earnings ratio and dividend yield, are at extreme levels, it is important to understand the consequences for the future of the stock market. Campbell and Shiller assume the distribution of valuation ratios is stable and therefore, should adhere to the mean reversion theory, i.e. when prices are relatively high, prices will eventually fall such that the ratios revert to their historical means. This simple theory justifies the gloomy outlook for the U.S. stock market promoted by Campbell and Shiller.

If Campbell and Shiller along with others are correct in assessing the US market as being overvalued, then other investment opportunities need to be explored and thoroughly researched to provide adequate alternatives for investors. Fortunately, Reinker and Tower (2002) explored this particular issue and concluded that foreign markets indeed provide greater prospects for higher returns than the U.S. market regardless of whether international index funds or individual country performances are considered.[2] Given that foreign markets are expected to provide higher returns, can dividend yields be used to forecast rate of returns in individual foreign markets? Campbell and Shiller (2002) attempted to answer the question "do dividend yields predict?" by focusing mainly on long run annual US data beginning from 1872 based on the S&P 500. Campbell and Shiller did not test whether dividend yields are able to predict short run future stock returns. Moreover, their analysis of international markets examined only a few (12) countries. Also they did not ask precisely: "Does the dividend yield predict real rates or return?" Instead, they

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[2] Reinker and Tower use the Gordon Formula and variations upon it to determine real rates of return for individual country indices and MSCI indices. Their results are based on annual data up to and including March 2002.

asked exclusively whether the dividend yield predicts dividend and price growth. Though Campbell and Shiller conclude stock price fluctuations return dividend yield ratios back to historical means, they fail to answer the more practical question most pertinent to investors.

Realizing this gap in research, I try to answer the simple and practical question: Do dividend yields forecast international stock market rates of return? I hope to provide more extensive and up to date results which can assist investors as they explore the myriad of investment options available in foreign markets. Instead of selecting only 12 countries as Campbell and Shiller did, I chose 37 countries with up to 30 years of annual data for some countries as I try to answer the greater yet simpler question: do international dividend yields matter?

II. Data & Calculations

By accessing Datastream, a financial database which gives information on price index, price-earnings ratio, dividend yield etc, I obtained information about 36 country indices assembled by Datastream. The S&P 500 yearly values were used for calculations regarding the U.S. The earliest annual data available for countries was 1973 with some countries containing only nine years worth of recorded data, however. The two key pieces of data obtained for each country index were the dividend yield and the stock price index in U.S. dollars. All data begin January 1 of the year and end with the most recent data in February 2003. Instead of performing calculations in nominal terms, values are converted into real terms. To convert to real terms, I used the Consumer Price Index (CPI) data for the U.S. available from the Bureau of Labor Statistics website. Real returns are adjusted for price inflation and provide investors a more practical measure.

With dividend yield measured as the previous year's dividend divided by the January stock price and using the principle that dividends are reinvested at the end of the year, the core calculation is the annual real rate of return, calculated by the following formula:

$$r_0 = [(Price_1 + y_{1*}Price_1) / Price_0] - 1 \qquad (1)$$

where r is the real rate of return in year 0, y is the dividend yield (D/P) at the beginning of year 1, and $Price_i$ is the real price of the stock index at the beginning of year i. Multiplying dividend yield by price index gives dividends. By adding dividends to next year's price and then dividing by price of current year and subtracting 1, the real rate of return (r) for the current year is determined, assuming that all prices have been converted into real values which is accomplished by dividing nominal price by the January CPI of the respective year.

Most of the regressions utilize the instantaneous average rate of return over the year which is the natural log of the annualized rate of return plus 1. Instantaneous rates of return are continuously compounded rates that have an important property as compared to the annualized rate of return. That property is the average instantaneous return over a number of years is the average of the instantaneous returns over the individual years.

Since I am interested in learning how well the dividend yield predicts the rate of return, I approach the issue in a variety of ways using both time and cross section data. I present three general approaches to determine the predictive power of dividend yields. The first approach is the most simple and general. By simply viewing the relationship between returns and dividend yield at the beginning of the period over 10 and 30 year periods, I hope to find a long run relationship between real rate of return and dividend yield for all countries with sufficient data. Second, I use time series data to ask whether years in which the initial dividend yield is high produce high real rates of return. Third, I use cross section data to ask whether it is best to invest in countries with high dividend yields. In answer to the 2nd and 3rd questions, I hope to provide conclusive results by examining each question through three different approaches.

III. Long Run Returns

My analysis begins with the first question: Do 10 and 30 year rates of return depend on the dividend yield? To answer this question, I examine three different 10 year periods along with one 30 year period. I regress the annualized geometric average real rate of return (r) on dividend yield (y) at the beginning of the period. The key component to analyze is the coefficient on the dividend yield. The general formula for the following 3 regressions is:

$$r = a[y] + b \quad (2)$$

where r is the real rate of return , a is the coefficient of dividend yield (y) and b is the intercept.

In Exhibit 1, there is quite a difference between the coefficients of y. The period from 1973-1982 has a coefficient of 1.589 which is 3 times larger than the coefficient for the 10 year period 1993-2002. In examining data across countries, for every 1% increase in the dividend yield at the beginning of the 1973-1982 period, there was a consequent 1.589 percentage point increase in the annualized rate of return during the 1973-1982 period.

Only 16 countries had annual data dating back to 1973. Exhibit 1 shows that if an investor buys stock in any one of the 16 markets included, he/she could expect to earn an average real return of 3.341% over the next 30 years if the dividend yield in that country is 0. For every 1% percentage point increase in y, the real annual rate of return rises by 0.834 percentage points although the coefficient is not significant.

IV. Pooled Time Series and Cross Section Data

Exhibit 2 answers the question: Does the 1 year rate of return depend on the dividend yield? By regressing the real one year rate of return on the dividend yield at the beginning of each year for all countries and all available years for a total of 751 observations, I find that coefficient of dividend yield is 3.321 for instantaneous r and 4.237 for annualized r. The coefficients are highly statistically significant based on the large t statistics. These large and significant coefficients indicate that the dividend yield *is* a strong predictor of rate of return. To realize that every 1 percentage point increase in dividend yield will increase instantaneous rate of return by 3.321 percentage points is quite incredible!

V. Time Series Analysis

Since I have learned that dividends help predict rate of return through a general analysis of countries' annual data, I further analyze the data to explore the robustness of the idea that dividend yields are useful predictors. My next approach is to analyze time series data to further enhance my understanding of the role dividend yields play in a country's rate of return. The 1st question I try to answer in this approach is: for each country, does the one year rate of return depend on the dividend yield? To answer this particular question, I take the real one year instantaneous rate of return and regress it on the dividend yield at the beginning of each year for individual countries. Admittedly, the number of years of data differs between countries. In Exhibit 3, 31 of the 37 countries have positive coefficients, some of which are quite large. The median coefficient country – Sweden – has a coefficient of dividend yield of 5.146. Hence, the one year rate of return does indeed depend positively on the dividend yield for almost all the countries.

Having explored the effect of each country's dividend yield on the rate of return, I now try to confirm the previous conclusion. By regressing the real one year instantaneous rates of return on the respective dividend yields of each country plus dummy variables for each country with no intercept, I hope to answer the question: does the typical country's one year rate of return depend on the dividend yield? The regression equation is:

$$r = a[y] + b[\text{country dummies}] \tag{3}$$

Where r is the real rate of return, a is the coefficient of y, y is the dividend yield, b is a row vector of coefficients for the dummies, and country dummies is a column vector of 36 individual country dummy variables. Intercept value is set to 0 to avoid singularity problems in performing the regression.

Exhibit 4 reveals the effect of a country's dividend yield on rate of return. With a highly significant t statistic and a standard error of only 0.869, the coefficient of country dividend yield of 4.803 is quite amazing. These results suggest that for every 1 percentage point increase in dividend yield, an investor in a typical country can expect to increase his rate of return by 4.803 percentage points! (This is slightly less than the figure for Sweden above) The dividend yield has quite a remarkable effect. Furthermore, in Exhibit 4, the coefficient for each country indicates its respective intercept value i.e. the rate of return when dividend yield is zero. China, for example, has a 9.726% rate of return when its dividend yield is 0. This regression also reflects performance relative to average annual performance of the same country. It tries to assess whether it is beneficial to move money in and out of the stock market in a typical country as that country's dividend yield fluctuates.

The last version of the time series analysis is shown in Exhibit 5. It further explores the influence of dividend yields on stock returns. For the typical country, does the deviation of the one year rate of return from that country's average depend on the deviation of the dividend yield from that country's average? In symbolic terms, the regression equation is:

$$[r - r_{country\ avg}] = a\,[y - y_{country\ avg}] + b \qquad (4)$$

where r is the real rate of return, $r_{country\ avg}$ is the average of the country's rates of return, a is the coefficient of the deviation of y from $y_{country\ avg}$, y is the dividend yield, $y_{country\ avg}$ is the average of the country's dividend yields, and b is the intercept value. As Exhibit 5 indicates, the 4.569 coefficient on the deviation of the dividend yield for the instantaneous rate of return is large, very statistically significant, and very close to the corresponding figures in Exhibit 4.

The time series analysis has provided adequate results to support the claim that dividend yields do predict real rates of return for individual countries. Comparing the key figures for instantaneous returns from Exhibits 3, 4, and 5, I see that the coefficient of dividend yield and its variants are respectively, 5.146, 4.803, and 4.569. These coefficients are very close to each other suggesting that each of the 3 different methods applied resulted in similar results. This leads me to conclude that dividend yield is an important predictor of future rates of return in international markets. Furthermore, the time series analysis also shows markets are inefficient.

VI. Cross Section Analysis

Do dividend yields predict returns in cross section data? When a country's dividend yield is high relative to that of other countries, does it predict better future returns? I start my analysis by exploring the relationship of dividend yields to rates of return for individual years in an attempt to answer the question: for each year, does the one year rate of return depend on the dividend yield? I regressed the real one year instantaneous rate of return on the dividend yield at the beginning of each year for each individual year. Exhibit 6 reveals that the median coefficient of dividend yield is 3.205 in 1986, which suggests a strong relationship between dividend yield and rate of return. However, this value is not statistically significant.

Having explored how in each individual year, the country rates of return depend on the dividend yield, I switched my focus to determining whether in a typical year, does the one year rate of return depend on the dividend yield? Similar to how I constructed a regression for a typical country (Exhibit 4), I perform the same regression except for years. I regressed the real one year instantaneous rate of return on the dividend yield plus dummy variables for each year with no intercept value. The regression equation for this experiment is:

$$r = a[y] + b[\text{year dummies}] \qquad (5)$$

where r is the real rate of return, a is the coefficient of y, y is the dividend yield, b is a row vector of the coefficients for the dummies, year dummies is a column vector of 30 individual year dummy variables, and the intercept is equal to 0.

In Exhibit 7, the Country dividend yield is the most important variable to examine. With a coefficient of 4.101 and a large t statistic of 5.9, the individual one year rate of return does indeed depend on the dividend yield. For every 1 percentage point increase in the dividend yield as we move between countries, Exhibit 7 indicates the real rate of return will increase by 4.101%! Such large movements indicate the high sensitivity of the rate of return to dividend yield. This answers the question of whether one should invest in international stocks with high dividend yields as opposed to stocks in countries with low dividend yields.

Finally, I ask the question: for the typical year, does the deviation of the one year real rate of return from that year's average depend on the deviation of the dividend yield from that year's average? To answer the question, I regressed the following:

$$[r - r_{year\ avg}] = a\,[y - y_{year\ avg}] + b \qquad (6)$$

where r is the instantaneous real rate of return of each year, $r_{year\ avg}$ is the average of the individual years' rates of return, a is the coefficient of the deviation of y from $y_{year\ avg}$, y is the dividend yield of each year, $y_{year\ avg}$ is the average of the years' dividend yields, and b is the intercept value.

According to Exhibit 8, the coefficient a is equal to 3.000 and b is equal to –0.113 for the instantaneous rate of return method, with a significant t statistic. Deviations from the average yearly dividend yield do predict similar deviations from the average yearly rate of return. Hence, investors can examine current dividend yields and determine whether they have a substantial deviation in dividend yield which makes a particular country worth investing in.

Overall, Exhibits 6, 7, and 8 all provide evidence that dividend yields are important in predicting real rates of return in cross section data. With the main explanatory variable coefficients of 3.205, 4.101, and 3.000, it is apparent that the various methods used to determine the influence of dividend yields on rates of return produced similar results. Having used 3 different approaches to arrive at the same conclusion, the similarity of the coefficients is the key result confirming my claim that dividend yields are important predictors.

VII. Major Results

By approaching my simple question about dividend yields from a wide variety of perspectives and collectively using time series and cross section data for 37 countries, I feel I have successfully shown that dividend yields are important and can be used as forecast variables for future stock market returns in international markets. The three components of my overall experiment result in quite similar values for the influence of dividend yields on the real instantaneous rate of return. My time series studies imply that for each one percentage point increase in the dividend yield leads to an increase in the real instantaneous rate of return of about 4.865% (4.569 - 5.146%) depending on the methodology employed. My cross section experiment reveals that for every one percentage point increase in the dividend yield leads to an increase in real instantaneous rate of return of about 3.550% (3.000 – 4.101%) depending on the methodology employed. Such figures are quite significant in magnitude and therefore serve to fully support my claim.

VIII. Conclusions

Over the years, there has been much debate about whether markets are efficient or not. The random walk theory states that stock returns should be unforecastable. My results, however, show otherwise. Through both cross section and time series analyses, I show that dividend yields can be used to predict real rates of return for international markets. Higher dividend yields result in higher rates of return. This implies markets are inefficient!

Realizing the importance of dividend yield, investors around the world can focus their energy in trying to distinguish between foreign markets en route to maximizing their returns. This study can assist investors in devising strategies for selecting between countries and market timing as well. With the overvaluation in the U.S. markets, foreign markets apparently provide a lucrative alternative.

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Exhibit 1
Do 10 and 30 year returns depend on the dividend yield?
(Annualized geometric average r regressed on y)

Time period	# of countries	Coefficient on y	Std. Error of estimate	t statistic	p value	Intercept value	R^2	Adjusted R^2
1/1973-12/1982	16	1.589	1.117	1.423	0.177	-5.141	0.126	0.064
1/1983-12/1992	19	0.706	0.354	1.993	0.063	9.732	0.189	0.142
1/1993-12/2002	27	0.545	0.371	1.468	0.155	2.748	0.079	0.043
1/1973-12/2002	16	0.834	0.510	1.636	0.124	3.341	0.161	0.101

Note:

In all exhibits, y is the dividend yield at the beginning of the year or period, calculated using the previous year's dividend

In all exhibits, r is the real rate of return

Std. error, t statistic, and p value refer to the coefficient of y

Annualized return = annual return compounded once a year

Exhibit 2
Does the 1 year return depend on the dividend yield?
(Real one year r regressed on the y at the beginning of each year for all countries and all available years.)

Type	Coefficient of y	Std. Error of estimate	t statistic	p value	Intercept value	R^2	Adjusted R^2
Inst. Ret	3.321	0.586	5.664	0.000	-5.199	0.041	0.040
Annualized	4.237	0.704	6.021	0.000	-2.316	0.046	0.045

Note:

My sample included 37 countries with data series of variable length observed between 1/1973 and 12/2002 for a total of 751 observations.

Inst. Ret = instantaneous r based on continuous compounding; logarithmic value of annualized r

Annualized = annual rate of return compounded once a year

Exhibit 3

For each country, does the one year return depend on the dividend yield?

(Real one year r (annualized) regressed on the y at the beginning of each year for individual countries.)

Country	# of years	Coefficient of y	Std. Error of estimate	t statistic	p value	Intercept value	R^2	Adjusted R^2
Argentina	9	-12.684	11.998	-1.057	0.331	42.455	0.157	0.017
Australia	30	6.838	3.421	1.999	0.056	-20.466	0.129	0.097
Austria	30	12.793	20.126	0.636	0.530	-13.306	0.015	-0.022
Belgium	30	-0.450	2.211	-0.203	0.840	9.638	0.002	-0.035
Canada	30	0.529	2.659	0.199	0.844	3.389	0.001	-0.036
Chile	13	22.354	4.942	4.523	0.001	-58.706	0.672	0.639
China	8	91.183	51.073	1.785	0.134	-85.553	0.389	0.267
Denmark	29	2.362	4.989	0.473	0.640	5.936	0.009	-0.030
Finland	14	0.700	11.749	0.060	0.954	14.974	0.000	-0.091
France	30	1.093	2.769	0.394	0.696	6.924	0.005	-0.031
Germany	30	-0.510	4.263	-0.120	0.906	8.846	0.001	-0.036
Greece	13	12.230	9.942	1.230	0.247	-22.925	0.131	0.044
Hong Kong	30	10.430	3.655	2.854	0.008	-23.948	0.232	0.203
Indonesia	12	4.288	10.018	0.428	0.679	-10.308	0.020	-0.089
Ireland	30	3.685	2.484	1.484	0.150	-1.993	0.075	0.041
Italy	30	-0.208	7.262	-0.029	0.977	9.579	0.000	-0.037
Japan	30	3.451	7.996	0.432	0.669	3.627	0.007	-0.030
Malaysia	17	9.069	7.920	1.145	0.271	-10.471	0.086	0.020
Mexico	13	26.352	12.802	2.058	0.067	-33.880	0.298	0.227
Netherlands	30	0.925	1.978	0.467	0.644	6.421	0.008	-0.029
New Zealand	15	2.781	4.728	0.588	0.567	-6.915	0.028	-0.053
Norway	23	8.121	6.710	1.210	0.240	-8.599	0.068	0.022
Philippines	13	25.801	17.203	1.500	0.165	-20.356	0.184	0.102
Poland	8	20.084	37.327	0.538	0.614	-9.044	0.055	-0.134
Portugal	13	-0.258	1.654	-0.156	0.879	5.534	0.002	-0.097
Singapore	30	11.985	5.144	2.330	0.028	-23.126	0.167	0.137
South Africa	30	4.087	2.847	1.435	0.163	-7.785	0.071	0.036
South Korea	15	54.548	12.834	4.250	0.001	-97.934	0.601	0.568
Spain	15	4.058	5.198	0.781	0.450	-5.978	0.048	-0.031
Sweden	**21**	**5.146**	**7.344**	**0.701**	**0.492**	**2.460**	**0.027**	**-0.028**
Switzerland	30	0.641	5.439	0.118	0.907	8.475	0.001	-0.037
Taiwan	14	33.864	16.793	2.017	0.069	-45.846	0.270	0.204
Thailand	16	7.082	5.123	1.382	0.190	-9.277	0.128	0.061
Turkey	13	16.344	7.244	2.256	0.048	-49.713	0.337	0.271
United Kingdom	30	7.734	2.512	3.079	0.005	-24.196	0.260	0.232
United States	30	-2.677	2.641	-1.014	0.319	16.196	0.035	0.001
Venezuela	13	48.505	30.020	1.616	0.137	-39.298	0.207	0.128

Note: 31 coefficients are positive; 6 are negative. Median coefficient and respective values are bolded.

Exhibit 4

Does the typical country's one year rate of return depend on the dividend yield?

(Real one year r (compounded continuously) regressed on y at the beginning of each year and dummy variables for each country with no intercept.)

Country	Coefficient	Std. Error	t statistic	p value
Country y	**4.803**	**0.869**	**5.528**	**0.000**
Argentina	-23.833	13.462	-1.770	0.077
Australia	-12.002	7.750	-1.549	0.122
Austria	2.115	7.058	0.300	0.765
Belgium	-10.810	7.645	-1.414	0.158
Canada	-10.553	7.418	-1.423	0.155
Chile	1.630	11.068	0.147	0.883
China	9.726	13.987	0.695	0.487
Denmark	1.019	7.193	0.142	0.887
Finland	6.375	10.400	0.613	0.540
France	-7.625	7.656	-0.996	0.320
Germany	-5.479	7.245	-0.756	0.450
Greece	-3.912	10.887	-0.359	0.720
Hong Kong	-2.121	7.639	-0.278	0.781
Indonesia	-11.300	11.256	-1.004	0.316
Ireland	-7.258	7.985	-0.909	0.364
Italy	-3.256	7.208	-0.452	0.652
Japan	1.904	6.945	0.274	0.784
Malaysia	9.524	0.111	0.912	1.057
Mexico	10.791	0.744	0.457	8.027
Netherlands	7.868	-1.374	0.170	-10.808
New Zealand	-17.535	10.871	-1.613	0.107
Norway	-0.472	8.154	-0.058	0.954
Philippines	4.440	10.707	0.415	0.679
Poland	6.109	13.981	0.437	0.662
Portugal	-14.226	11.185	-1.272	0.204
Singapore	-3.954	7.237	-0.546	0.585
South Africa	-10.781	7.760	-1.389	0.165
South Korea	4.977	10.029	0.496	0.620
Spain	-8.352	10.248	-0.815	0.415
Sweden	3.228	8.481	0.381	0.704
Switzerland	-0.465	7.105	-0.066	0.948
Taiwan	-3.309	10.318	-0.321	0.749
Thailand	-1.988	9.929	-0.200	0.841
Turkey	-10.526	11.687	-0.901	0.368
United Kingdom	-10.722	7.934	-1.351	0.177
United States	-9.428	7.368	-1.280	0.201
Venezuela	19.605	10.722	1.829	0.068

Note :

R^2 = .015

Exhibit 5
For the typical country, does the deviation of the one year rate of return from that country's average depend on the deviation of the dividend yield from that country's average?
(Deviation of r from that country's average r regressed on the deviation of y from that country's average y.)

Type	Coefficient on $y - y_{avg}$	Std. Error of estimate	t statistic	p value	Intercept value	R^2	Adjusted R^2
Inst. Ret	4.569	0.702	6.505	0.000	-0.687	0.053	0.052
Annualized	6.092	0.838	7.266	0.000	-0.040	0.066	0.065

Note:

My sample included 37 countries with data series of variable length observed between 1/1973 and 12/2002 for a total of 751 observations.

Std. Error, t statistic, and p value are for coefficient of $y - y_{avg}$

Exhibit 6

For each year, does the one year rate of return depend on the dividend yield?

(Real one year r (compounded continuously) regressed on y at the beginning of each year for each individual year.

Year	# of countries	Coefficient of y	Std. Error	t statistic	p value	Intercept value	R^2	Adjusted R^2
1974	16	-3.170	4.111	-0.771	0.453	-22.347	0.041	-0.028
1975	16	10.606	1.648	6.435	0.000	-27.966	0.734	0.716
1976	16	-2.378	3.403	-0.699	0.495	13.488	0.032	-0.033
1977	16	10.871	3.921	2.773	0.014	-36.829	0.339	0.295
1978	16	1.855	3.244	0.572	0.576	10.830	0.021	-0.044
1979	16	6.981	4.896	1.426	0.174	-17.244	0.119	0.061
1980	17	-5.353	5.771	-0.928	0.368	38.040	0.054	-0.009
1981	17	-2.591	1.690	-1.533	0.146	-6.036	0.136	0.078
1982	18	1.985	1.505	1.319	0.206	-18.938	0.098	0.042
1983	18	0.811	2.026	0.401	0.694	21.491	0.009	-0.049
1984	18	3.954	1.962	2.015	0.060	-22.169	0.193	0.145
1985	18	-9.710	8.123	-1.195	0.248	103.289	0.078	0.023
1986	**19**	**3.205**	**5.587**	**0.574**	**0.574**	**36.742**	**0.019**	**-0.039**
1987	22	3.404	2.600	1.309	0.207	-5.095	0.087	0.036
1988	25	-1.115	3.505	-0.318	0.754	25.221	0.005	-0.043
1989	27	11.118	5.865	1.896	0.070	-8.201	0.130	0.094
1990	33	10.874	3.450	3.152	0.004	-32.972	0.276	0.249
1991	33	0.912	2.152	0.424	0.674	10.879	0.006	-0.025
1992	33	-1.182	1.697	-0.697	0.491	-0.891	0.015	-0.016
1993	33	12.684	2.875	4.412	0.000	8.581	0.378	0.359
1994	36	1.541	3.399	0.453	0.653	-3.718	0.006	-0.025
1995	36	-0.067	2.683	-0.025	0.980	15.124	0.000	-0.029
1996	36	5.211	5.473	0.952	0.348	7.982	0.025	-0.003
1997	36	14.330	6.560	2.184	0.036	-27.814	0.120	0.095
1998	36	5.616	4.776	1.176	0.248	4.694	0.038	0.011
1999	36	18.608	6.147	3.027	0.005	-7.742	0.208	0.185
2000	36	3.752	3.388	1.107	0.276	-28.659	0.034	0.006
2001	36	3.991	2.528	1.579	0.123	-20.335	0.066	0.040
2002	36	2.307	3.573	0.646	0.524	-15.395	0.016	-0.022

Note: Median coefficients are bolded.

Exhibit 7

In a typical year, does the one year rate of return depend on the dividend yield?

(Real one year r (compounded continuously) regressed on y at the beginning of each year plus dummy variables for each year with no intercept.)

Year	Coefficient	Std. Error	t statistic	p value
Country y	4.101	0.695	5.901	0.000
1973	-37.545	32.173	-1.167	0.244
1974	-45.452	8.315	-5.466	0.000
1975	8.245	8.686	0.949	0.343
1976	-16.342	8.410	-1.943	0.052
1977	-6.747	8.367	-0.806	0.420
1978	1.805	8.263	0.218	0.827
1979	-5.719	8.259	-0.693	0.489
1980	-1.417	8.300	-0.171	0.865
1981	-33.279	8.276	-4.021	0.000
1982	-30.179	8.412	-3.588	0.000
1983	4.286	8.205	0.522	0.602
1984	-22.773	7.888	-2.887	0.004
1985	48.361	7.858	6.154	0.000
1986	34.337	7.589	4.525	0.000
1987	-6.847	7.380	-0.928	0.354
1988	10.829	6.956	1.557	0.120
1989	11.214	6.576	1.705	0.089
1990	-14.540	6.348	-2.290	0.022
1991	-0.245	6.010	-0.041	0.968
1992	-17.569	5.921	-2.967	0.003
1993	39.420	6.040	6.527	0.000
1994	-9.300	5.704	-1.631	0.103
1995	6.287	5.474	1.149	0.251
1996	10.477	5.498	1.906	0.057
1997	-5.490	5.485	-1.001	0.317
1998	8.675	5.579	1.555	0.120
1999	23.282	5.477	4.251	0.000
2000	-29.256	5.404	-5.414	0.000
2001	-20.576	5.487	-3.750	0.000
2002	-19.793	6.295	-3.144	0.002
Mean	6.359	7.591	-0.161	0.202

Note:

Std. error, t statistic, and p value are for each variable in Year column.

$R^2 = 0.145$

Exhibit 8
For the typical year, does the deviation of the one year real rate of return from that year's average depend on the deviation of the dividend yield from that year's average)
(Deviation of r from the year's average r regressed on the deviation of y from that year's average y)

Type	Coefficient on $y - y_{avg}$	Std. Error of estimate	t statistic	p value	Intercept value	R^2	Adjusted R^2
Inst. Ret	3.000	0.563	5.331	0.000	-0.113	0.037	0.036
Annualized	4.247	1.000	4.250	0.000	-95.206	0.024	0.023

Note:

My sample included 36 countries with data series of variable length observed between 1/1973 and 12/2002 for a total of 751 observations.

Std. Error, t statistic, and p value are for coefficient of $y - y_{avg}$