Further Evidence on the Predictability of International Equity Returns

The Importance of Cash Flow in Country Selection

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Recent evidence suggest that certain valuation measures such as dividend yields and price-to-earnings ratios are useful predictors of international equity returns.[1] The purpose of this study is to present empirical evidence of the forecasting power of price-to-cash flow ratios and show that the tendency of undervalued stocks to outperform overvalued stocks over the long term can be exploited in the construction of global equity portfolios by implementing allocation strategies based on stock prices in relation to cash earnings.

Many successful value investors in the United States have focused on price-to-earnings to achieve above-average portfolio returns, because they are easily obtainable and easy to apply. International investors, who have to contend with considerable differences in accounting and reporting practices between individual countries, have found price-to-cash flow ratios to be even more reliable and useful measures of investment value. As cash flow is a function of the operations of a company rather than the result of inflation or accounting gimmickry, it also introduces an element of quality into the earnings picture that is sometimes missing in a narrowly defined earnings concept.

DATA

The data used in this study, which is based on quarterly observations, are drawn from the January, April, July, and October issues of Morgan Stanley Capital International Perspectives. For purposes of this study, the investment universe includes eighteen MSCI national equity indexes:

- Australia
- Austria
- Belgium
- Canada
- Denmark
- France
- Germany
- Hong Kong
- Italy
- Japan
- The Netherlands
- Norway
- Singapore/Malaysia
- Spain
- Sweden
- Switzerland
- United Kingdom
- United States

The indexes and ratios used are based on end-of-quarter stock prices of the companies included in the indexes during the period from January 31, 1970, through December 31, 1989.[2] Cash earnings are defined as net earnings after tax, minority interests, dividends on preferred stock, and distributions to employees plus reported depreciation on fixed-assets for the latest available twelve-month period. In those cases where final or interim earnings are announced before depreciation is reported, the latest annual depreciation is added to the current earnings figure.[3] The ratios are calculated by dividing the end-of-quarter index levels by cash earnings as defined above.

METHODOLOGY

On the assumption that the odds of beating global stock market indexes can be turned in the investors' favor by concentrating global equity investments in markets with below-average price-to-cash flow ratios, I tested a number of buy-and-sell strategies over the twenty-year period ending in December 1989, constructing hypothetical portfolios made up of MSCI country indexes.

The equity indexes are first sorted into quartiles according to their price-to-cash flow ratios:

Group I country indexes with the lowest price-to-cash flow ratios.
Group II country indexes with the second lowest price-to-cash flow ratios.
Group III country indexes with the second highest price-to-cash flow ratios.
Group IV country indexes with the highest price-to-cash flow ratios.

Then, six portfolios are constructed implementing the following high and low price-to-cash flow strategies:[4]

Strategy (1): Investing in Group I markets (i.e., the markets with the lowest price-to-cash flow ratios)
Strategy (2): Investing in Group I and II markets
Strategy (3): Investing in Group I, II, and III markets
Strategy (4): Investing in Group II, III, and IV markets
Strategy (5): Investing in Group III and IV markets
Strategy (6): Investing in Group IV markets (i.e., the markets with the highest price-to-cash flow ratios)

The hypothetical portfolios are constructed with equal initial investments in each market, regrouped according to their price-to-cash flow ratios, and rebalanced to equal investments in each national market at the end of each quarter. The quarterly total returns for the various strategies are calculated as the arithmetic average of the quarterly total returns of the national MSCI indexes included in each strategy. Total returns are calculated with gross dividends reinvested, as published by Morgan Stanley Capital International Perspective.

Because Morgan Stanley publishes data only on a market capitalization-weighted world index, I created an equally-weighted index including eighteen national equity indexes listed above as a benchmark against which to test the six portfolio strategies.[5] Thus, equally-weighted portfolios are measured against an equally-weighted benchmark, which Umstead [1990, p. 9] has called "the ultimate in international diversification"–and which, in my opinion, is the toughest benchmark to beat for global equity investors on a risk- or volatility-adjusted basis.

The risk, volatility, and return characteristics of the six portfolios in local currencies are shown in Table 1. Table 2 shows the corresponding data in U.S. dollar terms. The tables also include risk, volatility, and return characteristics of the market capitalization-weighted MSCI World Index and the equally-weighted benchmark index.[6]

RESULTS

Following are the most important findings of the analyses in local currencies detailed in Table 1:

TABLE 1

Country Selection Strategies Based on Cash Flow
Risk and Return Characteristics in Local Currencies
January 31, 1970-December 31, 1989

	MSCI World EW	MSCI World CW	Strategy (1)	Strategy (2)	Strategy (3)	Strategy (4)	Strategy (5)	Strategy (6)
Compound Annual Return (%)	15.52	12.45	19.17	17.17	16.44	13.31	10.10	4.37
Average Quarterly Return (%)	3.98	3.29	4.79	4.33	4.16	3.53	2.91	2.12
Highest Quarterly Return (%)	27.13	24.81	29.75	27.36	24.77	25.83	26.90	46.06
Lowest Quarterly Return (%)	-28.35	-23.80	-25.86	-26.30	-27.38	-29.93	-30.90	-50.72
Probability of a Quarterly Gain (%)	76.25	72.50	80.00	78.75	78.75	72.50	70.00	56.25
Average Gain in Winning Quarters (%)	7.05	6.89	7.49	6.98	6.89	7.20	7.66	10.80
Expectation (Chance) of Gain (%)	5.38	4.99	6.00	5.50	5.42	5.22	5.36	6.07
Standard Deviation of Quarterly Returns (%)	7.70	7.87	7.86	7.59	7.48	8.20	9.49	13.73
Probability of a Quarterly Loss (%)	23.75	27.50	20.00	21.25	21.25	27.50	30.00	43.75
Average Loss in Losing Quarters (%)	5.89	6.18	6.04	5.50	5.94	6.18	8.16	9.04
Expectation (Risk) of Loss (%)	1.40	1.70	1.21	1.17	1.26	1.70	2.45	3.96
Longest Losing Streak (# of Quarters)	6	7	5	5	5	7	7	7
Largest Drawdown from Previous High (%)	36.14	41.51	31.85	31.61	32.73	44.61	59.01	77.07
Risk Adjusted Return:								
— Return per Unit of Risk of Loss	2.84	1.94	3.96	3.70	3.30	2.08	1.19	0.54
Volatility-Adjusted Return:								
— Return per Unit of Standard Deviation	0.52	0.42	0.61	0.57	0.56	0.43	0.31	0.15
Number of Periods (Quarters)	80	80	80	80	80	80	80	80
Number of Losing Quarters	19	22	16	17	17	22	24	35
Number of Winning Quarters	61	58	64	63	63	58	56	45
Average Annualized Returns over Various Rolling Periods Ending Each Quarter (%)								
1-Year Rolling Periods	17.32	13.94	21.28	18.99	18.29	15.21	12.73	9.00
2-Year Rolling Periods	16.28	12.95	20.21	17.93	17.23	14.07	11.34	7.17
3-Year Rolling Periods	16.08	12.73	19.97	17.66	17.01	13.86	11.12	6.33
4-Year Rolling Periods	15.77	12.56	19.84	17.32	16.68	13.54	10.85	5.86
5-Year Rolling Periods	15.78	12.69	19.79	17.19	16.56	13.65	11.18	6.38

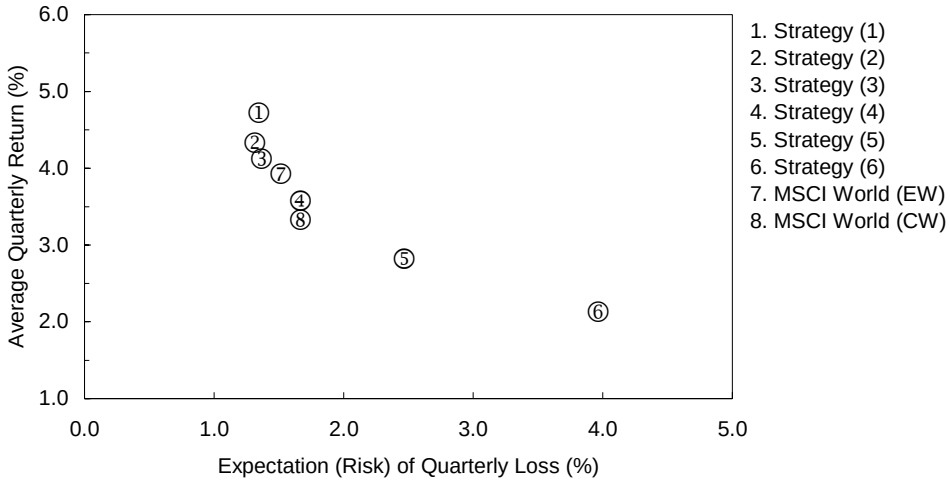
MSCI World EW: MSCI World Index Equally Weighted
MSCI World CW: MSCI World Index Weighted by Market Capitalization

1. The risk-adjusted return was highest for Strategy (1) (return per unit of risk of loss: 3.96) and lowest for Strategy (6) (0.54), if risk is measured by the expectation a quarterly loss, which means that Strategy (1) beat Strategy (6) by a factor of 7.3. The risk-adjusted return of the equally-weighted benchmark index (2.84) lay between the returns on the portfolios constructed on the basis of Strategies (3) and (4), while the risk adjusted returns resulting from all other strategies come out in just the order expected. For the risk/return trade-off of all six strategies and the market capitalization- and equally-weighted world indexes see Figure 1.

2. The volatility-adjusted return, i.e., the return per unit of standard deviation of quarterly returns, was highest for Strategy (1) (0.61) and lowest for Strategy (6) (0.15). Thus, Strategy (1) beat Strategy (6) by a factor of 4.1. Again, the return of the equally-weighted benchmark index (0.52), adjusted for volatility, lay between the returns resulting from Strategies (3) and (4), and the volatility-adjusted returns for all other strategies came out in just the expected order. The volatility/return trade-off for all strategies and the market capitalization- and equally-weighted world indexes are shown in Figure 2.
3. In terms of their total annual compounded returns, Strategies (1) through (6) finished in the expected order: Strategy (1)–investing in the markets with the lowest price-to-cash flow ratios–resulted in the highest total return (19.17%), 3.65 percentage points above the total return of the equally-weighted benchmark index, while Strategy (6)–investing in the markets with the highest price-to-cash flow ratios–resulted in the lowest total return (4.37%). See Figure 3.

FIGURE 1

Risk and Return Trade-Off
in Local Currencies

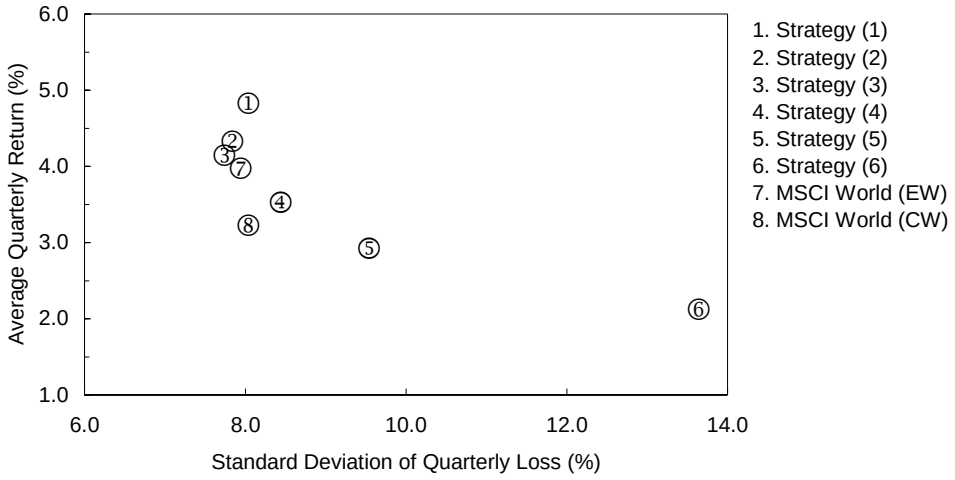


4. The average quarterly returns achieved with Strategies (1) through (6) were also negatively correlated with their price-to-cash flow rankings: Strategy (1) provided the highest quarterly average return (4.79%) compared to 3.98% for the equally-weighted benchmark index–which again occupied a middle position between the returns of the six strategies–while Strategy (6) resulted in the lowest return (2.12%).
5. Strategy (1) provided positive results in sixty-four quarters–the highest number of all strategies, while Strategy (6) had only forty-five winning quarters. (The equally-weighted benchmark index showed profits in sixty-one out of eighty quarters during the test period, compared to only fifty-eight winning quarters for the market capitalization-weighted world index.)
6. While the other performance measures shown in Table 1 are not in exact sequence, most demonstrate the dominating position of the low price-to-cash flow Strategies (1), (2), and (3)

over the high price-to-cash flow Strategies (4), (5), and (6). Portfolios constructed on the basis of Strategies (1) or (2) would have suffered the least drawdown (in terms of total value) from a previous high during the 1973-1974 bear market (31.85% and 31.61%, respectively) while a portfolio constructed on the basis of Strategy (6) would have lost 77.07%, followed by a 59.1% maximum loss for Strategy (5). The maximum drawdown of the equally-weighted world index was 36.14%, falling between the largest losses recorded for Strategies (3) and (4).

FIGURE 2

Volatility/Return Trade-Off
in Local Currencies



7. Strategy (1) beat the equally weighted world index in forty-eight out of eighty quarters, i.e., 60% of the time. Strategy (2) produced superior results over the benchmark in forty-four quarters, while Strategy (6) underperformed the benchmark in forty-five quarters, and Strategy (5) underperformed the benchmark in forty-four quarters out of the eighty-quarter test period.

8. T-tests of mean return differences showed that Strategies (1), (2), and (3) outperformed the equally weighted benchmark world index at significance levels 0.013, 0.061, and 0.065, respectively, while Strategies (4), (5), and (6) underperformed the benchmark at significance levels 0.015, 0.016, and 0.044 respectively. Hence, the t-tests show that the results of the various price-to-cash flow strategies relative to the equally weighted benchmark index are statistically significant.

9. The stability of the basic findings is demonstrated by the fact that both the quarterly average return figures and the average annualized return over one-, two-, three-, four-, and five-year rolling periods ending each quarter over the twenty-year test period are in sequence for all strategies (see Table 1). To test the stability of my findings further, I divided the twenty-year test period into two subperiods: 1970-1970 and 1980-1989. The average quarterly returns for the equally-weighted world index and the Strategies (1) through (6) in Table 3 show that the basic relationships presented hold over both subperiods. The period results suggest that the findings are generic rather than time-specific.

While a test of only four portfolio strategies of investing into the markets included in each of the four groups organized by cash flow levels would have shown the risk and return relationships even more clearly,[7] Strategies (2) through (5) were designed as combination strategies to simulate a more realistic diversification approach, given the relatively small number of investment vehicles available.

TABLE 2

Country Selection Strategies Based on Cash Flow
Risk and Return Characteristics in U.S. Dollars
January 31, 1970-December 31, 1989

	MSCI World EW	MSCI World CW	Strategy (1)	Strategy (2)	Strategy (3)	Strategy (4)	Strategy (5)	Strategy (6)
Compound Annual Return (%)	16.70	13.58	20.32	18.12	17.63	14.50	11.22	5.63
Average Quarterly Return (%)	4.33	3.58	5.18	4.66	4.53	3.86	3.22	2.51
Highest Quarterly Return (%)	32.48	26.04	37.10	34.48	30.03	30.17	30.48	52.12
Lowest Quarterly Return (%)	-21.80	-22.64	-16.79	-18.59	-19.68	-24.98	-28.20	-49.89
Probability of a Quarterly Gain (%)	76.25	75.00	68.75	72.50	76.25	73.75	70.00	57.50
Average Gain in Winning Quarters (%)	7.86	7.06	9.66	8.66	8.04	7.87	8.37	11.51
Expectation (Chance) of Gain (%)	5.99	5.29	6.64	6.28	6.13	5.80	5.86	6.62
Standard Deviation of Quarterly Returns (%)	8.92	8.38	9.80	9.25	8.89	9.13	10.11	14.75
Probability of a Quarterly Loss (%)	23.75	25.00	31.25	27.50	23.75	26.25	30.00	42.50
Average Loss in Losing Quarters (%)	7.02	6.85	4.68	5.91	6.76	7.39	8.80	9.66
Expectation (Risk) of Loss (%)	1.67	1.71	1.46	1.63	1.60	1.94	2.64	4.11
Longest Losing Streak (# of Quarters)	5	6	5	5	5	6	7	7
Largest Drawdown from Previous High (%)	38.75	40.11	35.34	35.46	36.16	45.56	57.91	76.46
Risk Adjusted Return:								
— Return per Unit of Risk of Loss	2.59	2.09	3.54	2.87	2.82	1.99	1.22	0.61
Volatility-Adjusted Return:								
— Return per Unit of Standard Deviation	0.48	0.43	0.53	0.50	0.51	0.42	0.32	0.17
Number of Periods (Quarters)	80	80	80	80	80	80	80	80
Number of Losing Quarters	19	20	25	22	19	21	24	34
Number of Winning Quarters	61	60	55	58	61	59	56	46
Average Annualized Returns over Various Rolling Periods Ending Each Quarter (%)								
1-Year Rolling Periods	18.95	15.37	23.19	20.60	20.09	16.67	13.92	10.63
2-Year Rolling Periods	17.75	14.49	21.67	19.24	18.78	15.46	12.56	9.02
3-Year Rolling Periods	17.25	14.21	21.01	18.67	18.22	15.01	12.05	8.15
4-Year Rolling Periods	16.39	13.81	20.10	17.73	17.28	14.26	11.35	7.45
5-Year Rolling Periods	15.71	13.62	19.12	16.88	16.43	13.83	11.11	7.67

MSCI World EW: MSCI World Index Equally Weighted
MSCI World CW: MSCI World Index Weighted by Market Capitalization

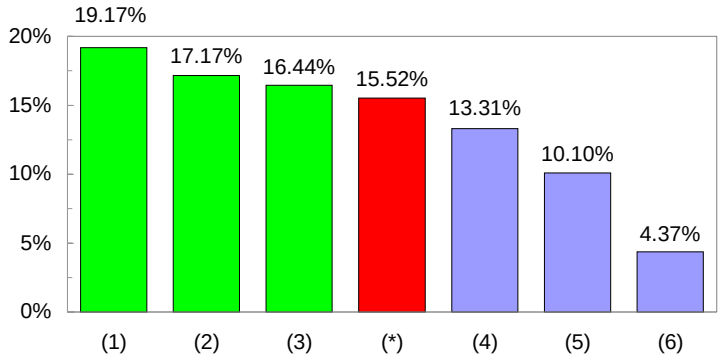
The portfolios constructed on the basis of Strategies (1) through (6) were also analyzed in U.S. dollar terms. Although, the value of the U.S. dollar against most foreign currencies fluctuated widely during the twenty-year test period, the risk-and-return characteristics of the strategies tested were similar to those observed in the local currency analyses. The results detailed in Table 2 suggest that, over the long term, currency considerations may be less important than many international investors are inclined to believe.

The most striking results of the analyses are the abnormally low risk-adjusted returns of Strategies (5) and (6), which, in local currencies, represented only 41.9% (Strategy 5) and 19.0%

(Strategy 6) of the risk-adjusted return of the equally-weighted world index, if risk is measured by the expectation of a quarterly loss.

FIGURE 3

Country Selection Strategies Based on Cash Flow
Compound Annual Returns (in Local Currencies)
January 1970-December 1989



Returns adjusted for volatility (standard deviation of quarterly returns) for Strategies (5) and (6) are also abnormally low. As shown in Figures 1 and 2, the low price-to-cash flow Strategies (1), (2), and (3) had higher return and lower risk and volatility characteristics than their counterpart high price-to-cash flow Strategies (4), (5), and (6). Thus, higher returns are not necessarily associated with higher risk or volatility. A comparison of the forecasting power of price-to-cash flow ratios and the predictive power of dividend yields, which was the subject of a previous study (Keppler [1991]), suggests that the former may actually be superior valuation measures for global equity investments.

TABLE 3

Average Quarterly Returns in Percent

	Benchmark World Index (EW)	Strategies (1)	(2)	(3)	(4)	(5)	(6)
1970-1989	3.98	4.79	4.33	4.16	3.53	2.91	2.12
1970-1979	2.52	2.96	2.92	2.69	2.13	1.01	0.84
1980-1989	5.43	6.61	5.74	5.64	4.92	4.82	3.40

Table 4 shows the risk- and volatility-adjusted returns for the strategies tested in the dividend and cash flow studies, expressed as a multiple of the corresponding returns of the equally-weighted benchmark index.

CONCLUSION

This study suggests that price-to-cash flow ratios have significant predictive power with respect to the relative performance of broadly diversified international equity investments. The usefulness of measures such as dividend yields and price-to-cash flow ratios as indicators of investment value has obvious implications for investment practice. Over the long term, globally oriented equity investors can achieve excess risk-adjusted returns by concentrating investments

in undervalued markets. Selection criteria such as price-to-cash flow ratios are thus valuable tools for enhancing the returns and reducing the risk and volatility of global equity portfolios.

TABLE 4

Comparison of Forecasting Power

	Dividend Study		Cash Flow Study	
Strategy	Risk-Adjusted Return	Volatility-Adjusted Return	Risk-Adjusted Return	Volatility-Adjusted Return
(1)	1.19	1.00	1.39	1.17
(2)	1.37	1.12	1.30	1.10
(3)	1.15	1.04	1.16	1.08
(4)	0.84	0.92	0.73	0.83
(5)	0.51	0.67	0.42	0.60
(6)	0.24	0.37	0.19	0.29

NOTES

[1] See Cutler, Poterba, and Summers [1988] and Keppler [1991].

[2] As the first price-to-cash flow ratios calculated for the national equity indexes are based on end of January 1970 figures, the study covers one two-month period (January 31 to March 31, 1970) and seventy-nine three-month periods.

[3] For further details, see notes at the end of each monthly edition of Morgan Stanley Capital International (MSCI) Perspective, New York.

[4] The portfolio strategies are designed with a view to the diversification requirements of most international investors. For risk, volatility, and return characteristics of Groups I through IV, see endnote 7.

[5] A comparison of the returns of the market capitalization-weighted World Index and the equally-weighted World Index shows that the total compound annual return of the latter exceeded the total compound annual return of the former by 3.07%. This is because of the "small-country effect," i.e. smaller markets provided a higher total return than the larger national markets included in the MSCI World Index.

[6] The corresponding risk and return measures for the S&P 500 Index for the twenty-year period ending December 31, 1989, are:

Compound annual return (%)	11.50
Average quarterly return (%)	3.10
Standard deviation of quarterly returns	8.19
Expectation of a quarterly loss (%)	1.76
Maximum drawdown from a previous high (%)	38.26
Number of winning quarters	55
Longest losing streak (number of quarters)	8

[7]

Group	I	II	III	IV
Compound annual return (%)	19.17	13.44	11.91	4.37
Average quarterly return (%)	4.79	3.52	3.25	2.12
Standard deviation of quarterly returns	7.86	7.96	8.69	13.73
Expectation of a quarterly loss (%)	1.21	1.45	2.05	3.96
Risk-adjusted return	3.96	2.42	1.58	0.54
Volatility-adjusted return	0.61	0.44	0.37	0.15
Number of winning quarters	64	60	58	45

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