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Ranked Market Information as a Stock Return Indicator

ABSTRACT

The paper is set up to evaluate, firstly, whether rankings of individual stocks according to some financial indicator contain additional information in excess of the information already contained in the levels of the indicators with respect to predictability of future returns. Secondly, we are interested in the relation between the predictive impact of the indicators and the state of the market at the time the predictions are made. Using monthly financial market information on the individual stocks in the S&P500 Index, for the period 1975–1993, we find that especially the filtered information contained in rankings according to the market indicators explain a significant part of the cross-sectional variation in future returns. Generally, the unconditional impact of the indicators seem to be unstable over time. However, for some of the indicators we map a clear relationship between the impact of the indicator and the specific market condition. This relationship is especially strong for the impact of ranked volatility.

Keywords: *Ranking, financial indicators, predictability*

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I. INTRODUCTION

During the last two decades the academic community has frequently reconsidered the issue of stock market efficiency and predictability of stock returns. The empirical evidence suggests that prices do not reflect all publicly available information, hence indicating that future stock returns are at least to some extent predictable. Consequently, there seem to be anomalies present on the stock markets that are not consistent with the concept of market efficiency. For a thorough review see, e.g., Fama (1976, 1984, 1986), Fama and Bliss (1987), Campbell and Shiller (1988), Fama and French (1988a, 1988b, 1989, 1993, 1995, 1996), Keim and Stambaugh (1986) and Shiller (1989), Jensen et al. (1996), Patelis (1997).

Although the use of financial ratios in predictability studies has been extensive in the past, the use of the filtered information contained in their rankings has received little attention. An exception is found in Kane and Meade (1997). The use of rankings of stocks according to some financial indicator is appealing as the impact of the major forces of the economy, e.g., industrial production, personal income, and inflation is filtered through the ranking technique. However, the evaluation of the stock performance using ranked information does not use the state of the surrounding economy as a reference. On the other hand, rankings may contain information that will predict the future behavior of market participants and, hence, predict future stock returns. One reason for this could be that it is easier for a portfolio manager to use the ranked market indicators in order to make his investment decisions for the proportion of the portfolio to be invested in the stock market. Another reason could be that if there are less active participants or laggards on the market it is more likely that this group of investors will build up their portfolio according to the ranked value of a specific market indicator rather than according to the actual level of that indicator.

Interesting results indicating return predictability are found in, e.g., Fama and French (1989). They state that dividend yields and term and default spreads predict excess returns on stocks and corporate bonds. Jensen et al. (1996) and Patelis (1997) extend the Fama and French analysis by considering business conditions and monetary policy and find that the results vary dramatically with the monetary environment. The hypothesis that dividend yields forecast returns has a long tradition among practitioners and academics (see Ball (1978), Fama and French (1988a), Rozeff (1984)). Fama and French (1988a) argue that the reason for the predictive power of dividend yields is that stock prices are low relative to dividends when discount rates and expected returns are high and vice versa and, hence, the dividend yields varies with expected returns.

Cross-sectional relationships between book-to-market value, size, price-to-earnings and returns have also been reported in, e.g., Fama and French (1992). Specifically, they found that on average the larger the book-to-market value ratio, the larger the rate of return. A recent analysis by Loughran (1997), however, indicates that the Fama and French's empirical findings may be driven by exceptional features of the data and, hence, the predictive power of the book-to-market ratio may be overstated.

Regarding the earnings-to-price ratio (E/P), Fama and French found that on average the larger the E/P ratio the larger the rate of return. Furthermore, they tracked the influence of size and found a clear inverse relationship between size and average return. That is, stocks of smaller firms tend to have higher returns than stocks of larger firms. As they point out, this size effect is more like a "small firm effect" since the average return for very small firms tend to be notably higher than the returns of slightly bigger firms.

The present study extends the literature in mainly two ways. Firstly, the paper provides further evidence on the predictability of stock returns and the impact of financial indicators measured not only as levels/ratios but also as rankings. Secondly, we examine the impact of the financial indicators under different market conditions.

We use the information in a number of market oriented financial measures in order to predict returns on the individual stocks contained in the S&P500 index. Specifically, these financial measures are the projected dividend yield, the price-to-book ratio, the market capitalization, the cashflow-to-price ratio, the price-to-earnings ratio and the volatility. The applied financial measures are widely used to evaluate the stock market performance of a company and are well documented in the financial literature (Gibson 1982).

Firstly, our results confirm predictability of stock returns based on financial market indicators. Furthermore, the empirical results support the assumption that the rankings of stocks according to financial indicators contain additional information about future stock returns within a linear regression framework. Monthly regressions of 6-months future returns on our information set of financial indicators, levels/ratios as well as rankings, result in an average adjusted R-square of about 11%. Using ranked indicators only we obtain an average explanatory power of 10%.

Secondly, the results indicate a weak relationship between market conditions and the impact of the financial indicators. A similar type of relationship is found in Fama and French (1989) and in Jensen et al. (1996). Our conclusions are, however, not conclusive for all the financial indicators considered.

The paper is organized as follows: Our data is described in Section II. The empirical results of the predictability analysis using ranking and level/ratio variables is given in Section III. The effect of different market conditions on the influence of the indicators is investigated in Section IV. Finally, a summary of the main results is found in Section V.

II. THE DATA

The sample of stocks we use are the 500 stocks included in the S&P500 Stock Index. The data covers monthly observations for almost 19 years, from June 1975 to December 1993. A stock is included in or excluded from the Index based upon financial information as of December 31st of each year. Those 500 stocks selected at that point of time are incorporated in the data set for the following 12 months. The fact that some of the stocks will drop out of the S&P500 Index due to, e.g, mergers, acquisitions or bankruptcy during a particular year will cause the number of stocks in the sample to be less than 500. Furthermore, taking the future return horizon into account an individual stock must be included in the Index for at least two years to be incorporated in our data set. These selection rules reduce the sample size in the cross-sectional analysis generally to an average of about 400. The return horizon to be predicted is set to six months. We measure the future return as a realized annualized compounded return, $r(t+1, t+T)$, with $T=6$ through the entire sample period.

$$r(t+1, t+T) = \{(1+r_{t+1})(1+r_{t+2}) \dots (1+r_{t+T})\}^{12/T}-1,$$

where r_{t+1} is the return for month $t+i$, $i=1,2,\dots,T$.

A description of the information variables in the data set is given in Table 1. Observations on these variables are collected on a monthly basis.

TABLE 1. The market related financial indicators

VARIABLE	ABBREVIATION	TYPE
DIVIDEND YIELD	DYLD	RATIO
PRICE TO BOOK	PBK	RATIO
MARKET CAPITALIZATION	MC	LEVEL
CASH FLOW TO PRICE	CFP	RATIO
PRICE TO EARNINGS	PE	RATIO
RANKED VOLATILITY (#1= LOWEST)	RKVOL	RANKING
RANKED DIVIDEND YIELD (#1=HIGHEST)	RKDYLD	RANKING
RANKED PRICE TO BOOK (#1= LOWEST)	RKPBK	RANKING
RANKED MARKET CAPITALIZATION (#1=LOWEST)	RKMC	RANKING
RANKED CASH FLOW TO PRICE (#1=LOWEST)	RKCFP	RANKING
RANKED PRICE TO EARNINGS (#1=LOWEST)	RKPE	RANKING

III. THE PREDICTIVE IMPACT OF LEVEL/RATIO AND RANKED VARIABLES

In order to evaluate the predictive impact of the level/ratio as well as the ranked financial indicators we utilize linear cross-sectional regressions. The objective is to find relationships between ex post future returns and our set of financial market indicators and to identify those that have high and persisting ability to predict the future returns.

We apply OLS regressions of the future stock returns $r(t+1, t+T)$ on the set of information variables, $\boldsymbol{X}(t)$, known at time t, where T is set to six months.

$$r(t+1, t+T) = \alpha + \beta \mathbf{X}(t) + \varepsilon(t+1, t+T). \quad (1)$$

The explanatory set, $\boldsymbol{X}(t)$, contains all variables listed in Table 1, a level/ratio variable group containing DYLD, PBK, MC, CFP and PE and a ranked variable group including RKDYLD, RKPBK, RKMC, RKCFP, RKPE and RKVOL. The total number of independent variables is therefore 11[1].

The cross-sectional regressions are run with a fixed set of the eleven indicators as regressors over all periods. This will make the interpretation and the comparison over time easier as the coefficients will in this way represent estimates of the same partial derivatives. We are interested in the explanatory power of the resulting empirical models and the significance of the estimated coefficients. Note, however, that we utilize the *t*-statistic as a descriptive measure rather than as a formal test of significance. Figure I shows the time series of adjusted R-squares for the 204 monthly cross-sectional regressions. Since the return horizons are overlapping there will be a systematic pattern related to the length of the return window.

The average adjusted R-square of 11.2% with a standard deviation of 6% indicates that our explanatory set $\boldsymbol{X}(t)$ contains information that is relevant in explaining the variation in the future realized returns. Another important result is that all monthly regressions are significant. We are able to fit a well-specified regression model containing one or more significant regression coefficients for the financial indicators proposed.

Table 2 gives the number of times the absolute *t*-statistic is greater than 2 for each of the 11 financial indicators along with their average standardized coefficient and corresponding standard deviation.

1 A third group of variables was also used in a preliminary analysis. This group contained the annual difference of all level/ratio and ranked variables. First order differences may capture possible dynamics. However, our empirical results indicate that these variables add no significant additional information for prediction purposes. Detailed results can be found in Knif et al. (1995).

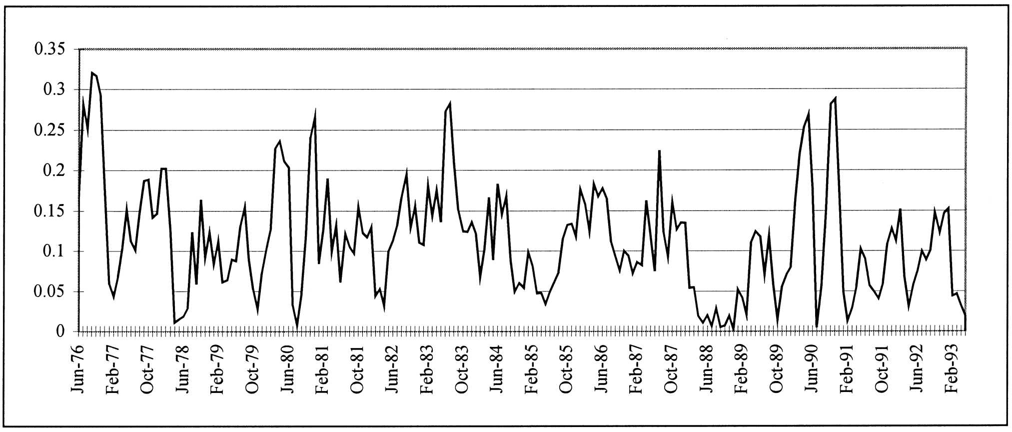

FIGURE I. Adjusted R-squares from the cross-sectional regressions of r(t+1, t+T) on the fixed explanatory set, X(t), including all 11 level/ratio and ranked variables

$r(t+1,\ t+T) = \alpha + \beta X(t) + \varepsilon(t+1,\ t+T)$

TABLE 2. Regressions of r(t+1, t+T) on the fixed explanatory set, X(t), including the 11 level/ratio and ranked indicators

$r(t+1, t+T) = \alpha + \beta X(t) + \varepsilon(t+1,\ t+T)$

Financial indicator	N. of times | *t*-statistic |>2	Average of standardized coefficient[(a)]	Std. dev. of standardized coefficient	Average absolute *t*-statistic	Std dev. absolute *t*-statistic	Average *t*-statistic	Std. dev. of *t*-statistic
DYLD	50	–0.03	0.28	1.40	1.12	–0.14	1.76
PBK	49	0.05	0.12	1.27	1.04	0.62	1.50
MC	10	–0.00	0.06	0.78	0.63	–0.14	1.02
CFP	63	–0.04	0.19	1.51	1.17	–0.40	1.85
PE	16	–0.01	0.06	0.87	0.66	–0.24	1.08
RKVOL	95	–0.05	0.15	2.10	1.57	–0.77	2.55
RKDYLD	28	–0.03	0.24	1.15	0.94	–0.17	1.47
RKPBK	51	–0.02	0.16	1.36	1.09	–0.24	1.72
RKMC	72	–0.06	0.13	1.78	1.50	–0.95	2.10
RKPE	63	–0.02	0.16	1.55	1.29	–0.29	2.06
RKCFP	55	–0.06	0.24	1.50	1.18	–0.45	1.85
adjusted *R-square*	0.112 (0.06)[(b)]						

(a) The standardized regression coefficients are obtained by dividing the parameter estimate by the ratio of the sample standard deviation of the dependent variable to the sample standard deviation of the regressor.

(b) Average adjusted R-squares for 204 monthly regressions. The number in parentheses denotes the standard deviation.

As a way to compare the impact of the individual financial indicators on the future returns variable we calculate the standardized regression coefficients by dividing the parameter estimate by the ratio of the sample standard deviation of the dependent variable to the sample standard deviation of the regressor. In general, the average of the standardized regression coefficients will give an indication of the direction in the average contribution.

Table 2 suggests that there is a set of indicators that consistently participate in the prediction of future realized returns with a high impact. These financial indicators are ordered according to the number of times the absolute *t*-statistic is greater than 2 as follows: *RKVOL*, *RKMC*, *RKPE*, *CFP*, *RKCFP*, *RKPBK*, *DYLD* and *PBK*. If these level/ratio and ranked financial indicators contribute significantly in the prediction of the future realized return it would be interesting to know how the information in the indicators could be used for the formation of trading strategies. However, the results show that the average standardized coefficients are low with a relatively high standard deviation suggesting that the coefficients in the models do not have stable signs over different time periods. This, of course, makes the interpretation of the impact of a specific financial indicator difficult. However, according to Jensen et al. (1996), the impact of an indicator could be related to the specific business condition and this is analyzed more closely in the next section.

In order to further compare the influence of the ranked variable group with that of the level/ratio variable group on the prediction of future returns we repeat the analysis once again for the level/ratio and ranked variable group separately.

Figure II along with Table 3 show the performance of the rankings and the level/ratio variable group. The average adjusted R-square is 10% when $\boldsymbol{X}(t)$ is set to contain the ranked

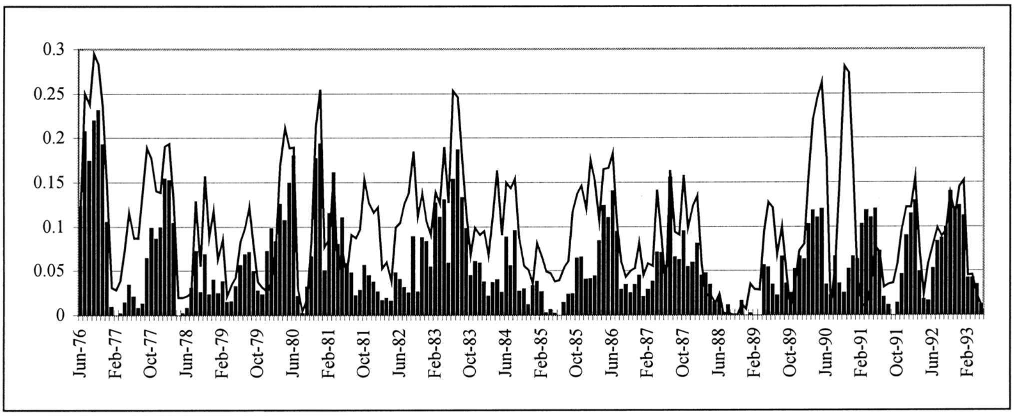

FIGURE II. Adjusted R-squares from cross-sectional regressions of r(t+1, t+T) on the explanatory set $X_r(t)$ including ranked variables (continuos line) and the set $X_l(t)$ including the level-ratio variables (column graph).

TABLE 3. Regressions of r(t+1, t+T) on the explanatory set X(t) using levels/ratios and rankings separately

r(t+1, t+T) = α + βX(t) + ε(t+1, t+T)

X(t) Level/ratio Variables					
Financial indicator	**N. of times | *t*-statistic | >2**	**Average absolute *t*-statistic**	**Std. dev of absolute *t*-statistic**	**Average standardized coefficient[(a)]**	**Std. dev. of Std. coeff.**
DYLD	110	2.499	1.905	0.018	0.162
PBK	59	1.505	1.374	–0.002	0.115
MC	57	1.465	1.102	–0.025	0.083
CFP	81	1.891	1.450	0.021	0.127
PE	39	1.134	0.885	–0.022	0.067
adjusted R-squared	0.06 (0.05)[(b)]				
X(t) Ranking Variables					
RKVOL	95	2.286	1.606	–0.044	0.151
RKDYLD	59	1.442	1.146	–0.003	0.119
RKPBK	56	1.400	1.076	0.015	0.142
RKMC	89	1.853	1.525	–0.060	0.127
RKPE	70	1.831	1.416	–0.026	0.156
RKCFP	61	1.547	1.241	–0.024	0.165
adjusted R-squared	0.10 (0.06)				

(a) The standardized regression coefficients are obtained by dividing the parameter estimate by the ratio of the sample standard deviation of the dependent variable to the sample standard deviation of the regressor.

(b) Average adjusted R-squares for 204 monthly regressions. The number in parentheses denotes the standard deviation.

variable group alone and 6% when only the level/ratio variable group is used. This result shows the importance of the filtered market information contained in the ranked variables.

Table 3 also shows the number of times the absolute *t*-statistic for each indicator is above the threshold of 2. The pattern is similar to that of Table 2.

IV. THE IMPACT OF FINANCIAL INDICATORS UNDER DIFFERENT MARKET CONDITIONS

According to Fama and French (1989) and Jensen et al. (1996) expected returns on common stocks contain a risk premium that is connected to market conditions. Hence, changing market conditions may be a reason for the fluctuating signs of the indicators in the above regressions. However, these changes in sign do not present an obviously clear pattern through time.

In order to examine the relation between market conditions and the unstable coefficients of the financial indicators we estimate the following time series model

$$(2) \qquad \beta_i(t) = \frac{\partial r(t+1, t+6)}{\partial X_i(t)} = a + bR_m(t-T, t) + \varepsilon(t),$$

where $\frac{\partial r(t+1, t+6)}{\partial X_i(t)}$ is estimated by the monthly standardized coefficient for a specific financial indicator as obtained from equation (1) and $R_m\ (t-T,\ t)$ is the return on the S&P500 index evaluated for $T = 6$. This time series regression model is estimated for each individual financial indicator.

A significant intercept in the model (2) would indicate that a switch in the sign of the impact of the indicator does not on average happen when the market switches from bull to bear or vise versa. This will on average happen at a level of market return, *-a/b*, that is different from zero. However, in order to interpret this level of market return breakpoint in a meaningful way both the intercept and the slope have to be significant. Table 4 shows the results of the time series regression.

Table 4 suggests that for five of the 11 indicators: *CFP*, *MC*, *RKMC*, *RKPE*, and *RKVOL*, the impact seems to be related to market conditions. Furthermore, for three of the indicators: *CFP*, *RKMC*, and *RKPE*, the switch of sign of their impact seems to occur at a level of market return that is clearly above zero.

In order to check the robustness of this pattern corresponding analyses are performed for market return horizons of 3, 9 and 12 months as well. Detailed results of this analysis is found in Knif et al. (1995). The impact of all the ranked variables (except ranked price-to-book) seems to be related to the state of the market for at least one maturity. The result that the impact of ranked price-to-book is not related to market conditions is to be expected on the basis of the results of Loughran (1997). According to Loughran the predictive power of book-to-market is driven by a January seasonal in book-to-market and an exceptionally low return on small, young, growth stocks.

TABLE 4. Time series regressions of the standardized coefficient on present annualized compound returns

Financial indicator	slope b	*t*-value	intercept a	*t*-value	breakpoint –a/b
CFP	0.222	2.06	–0.057	–3.51	0.256
DYLD	–0.084	–0.54	–0.026	–1.12	–0.313
MC	–0.082	–2.52	–0.001	–0.27	–0.015
PBK	–0.003	–0.05	0.048	4.74	15.33
PE	–0.029	–0.87	–0.011	–2.25	–0.391
RKCFP	–0.019	–0.15	–0.057	–2.81	–2.93
RKDYLD	–0.122	–0.89	–0.018	–0.89	–0.15
RKMC	0.286	4.06	–0.081	–7.58	0.281
RKPE	0.193	2.22	–0.037	–2.84	0.192
RKPBK	–0.084	–0.92	–0.018	–1.27	–0.208
RKVOL	–0.402	–5.07	–0.012	–1.00	–0.029

Ranked volatility has a highly significant slope for all return horizons. The significance of the slope for cash flow to price and market capitalization is, however, lost as the return horizon is changed. At a return horizon of one year the impact of ranked cash flow to price and ranked as well as level of dividend yield becomes significantly related to the state of the market. We find, in line with the results reported in Fama and French (1989), that the impact of both level/ratio and ranked projected dividend yield is significant and negative for the longer maturities.

For the level/ratio variables cash flow to price, price to book and price to earnings the constant term is significantly different from zero for all maturities. Two ranked variables (ranked market capitalization and ranked price-to-earnings) have a significant intercept for all maturities.

V. SUMMARY AND CONCLUSIONS

The paper is set up in mainly two parts. Firstly, we wish to evaluate whether rankings of individual stocks according to some financial indicator contain additional information in excess of the information already contained in the levels of the indicators with respect to predictability of future returns. Secondly, we are interested in the relation between the predictive impact of the indicators and the state of the market at the time the predictions are made.

In a first analysis we find, using financial market information on the individual stocks contained in the S&P500 Index, for the period 1975–1993, that a set of financial indicators were able to predict a significant part of the cross-sectional variation of future returns. The analysis on 204 partly overlapping cross-sectional regressions show that especially the ranked variable group contains significant information on future returns. Hence, the results do not contradict our assumption that rankings of stocks using financial indicators are able to predict future behavior of stock market participants.

In the second part the impact of each individual financial indicator is related to the market condition at the time the information is to be used. The market condition is measured as the present compound return for four different maturities. Generally, the unconditional impact of the indicators seem to be very unstable over time. However, for some of the financial indicators the present market condition seems to be related to its impact on the predictability of future returns. This relationship was especially strong for the impact of ranked volatility. ■

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