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Understanding the Cash Flow-Fundamental Ratio

Chyi-Lun Chiou
Department of Business Administration, Fu Jen Catholic University,
No. 510, Zhongzheng Rd., Xinzhuang Dist., New Taipei City,
24205, Taiwan, R.O.C. TEL:+886-2-2905-2734.
Email: 075110@mail.fju.edu.tw.

ABSTRACT: This article investigates the use of cash flow-fundamental ratio in forecasting stock market return and examines implications behind this ratio. By presuming the dynamics of cash flow-fundamental ratio I identify the relationship between economic uncertainty and risk premium. The evidence shows that cash flow-fundamental ratio is procyclical and is a predictor of cash flow growth and excess returns. The cash flow-fundamental ratio is proved to be negatively associated with risk premium. I also examine that the mean-reversion property of cash flow-fundamental ratio is triggered by profitability. In contrast to the assumption of stationary in stock price, mean reversion in profitability is more reasonable and has been proved by Fama and French (2000).

Keywords: Predictability of stock return; Cash flow-fundamental ratio.
JEL Classifications: G12

1. Introduction

The predictability of stock returns is one of the core issue in financial economics. Previous literature (e.g., Campbell and Shiller, 1989, 2001; Fama and French, 1988; Lamont, 1998; Vuolteenaho, 2000; Lewellen, 2004) shows that financial ratios based on rational expectations such as dividend yields, earning yields, and book-to-market ratios have forecasting power for the stock returns. Several other studies attribute the predictability of returns to irrational movements in stock prices (e.g., DeBondt and Thaler, 1985). These arguments share one common feature that predictability is driven by the mean-reversion of stock prices. However, what causes this mean reversion is ambiguous.[1] Furthermore, the stability of a financial ratio itself is often challenged. To fill this gap Jiang and Lee (2007) propose a new indicator based on a loglinear combination of dividend yields and book-to-market ratios in detecting returns profitability. They demonstrate that this new indicator not only is stationary but also is able to predict future stock returns. Although they show this indicator is superior to dividend yields or book-to-market ratios alone in forecasting tests, the explicit information or intuition behind this indicator is unclear.

In this paper I propose a valuation framework based on the cash flow-fundamental ratio to investigate the new indicator proposed by Jiang and Lee (2007). I presume that the cash flow-fundamental ratio is mean-reverting and governed by economic uncertainty. Accordingly, I find that the cash flow-fundamental ratio is associated with future profitability and excess stock returns. I investigate that a non-price financial ratio is capable of predicting stock returns when it has close relationship with economic uncertainty.

There are two features embodied in the cash flow-fundamental ratio. First, the cash flow-fundamental ratio forecasts returns because it contains information about time-varying economic uncertainty (conditional volatility of consumption). The evidence shows that realized consumption volatility is predicted by the cash flow-fundamental ratio for long horizons. A higher cash flow-fundamental ratio implies less uncertainty in the future, and hence, a lower risk premium is compensated. Second, the cash flow-fundamental ratio forecasts returns because cash flow growth

[1] While the former interpreters that the mean-reversion is due to rational time-varying discount rates, the latter states this mean-reversion is caused by the correction of market overreaction.

is associated with this ratio. Evidence shows that expected cash flow growth can be well predicted by the cash flow-fundamental ratio. A lower cash flow-fundamental ratio follows a higher cash flow growth rate. Although cash flow growth can be well predicted by cash flow-fundamental ratio at short and medium horizons, this ratio has very little predictable power in book equity growth at the same horizons.

It is argued that the predictive power of financial ratios relies on the mean-reversion property they hold. Valuation ratios based on prices such as dividend yield are capable of predicting future returns when stock prices are predictable. Referring to Campbell and Shiller (2001), the stability of a valuation ratio implies something must be predictable based on the indicator, either the numerator or the denominator. The evidence shows that the cash flow-fundamental ratio can predict future cash flow growth in a significant way. Based on the equilibrium in the framework, my results are also consistent with the rational pricing story that the cash flow-fundamental ratio captures information about the risk premium.

My contribution is twofold. First, my framework identifies the relationship between dividend changes and risk changes in aggregate level. In the traditional valuation model, the fundamental news about a stock valuation has two components: cash flows and discount rates (risk characteristics).[2] Current dividend-signaling models suggest that dividend increases reveal good news about future cash flows. However, empirical evidence provides little implications about such a prediction (e.g., Allen and Michaely, 2002). An alternative explanation proposed by Grullon et al. (2002), named the maturity hypothesis, then argues that dividends convey information about changes in risks, rather than about cash flow growth. I examine that when the cash flow-fundamental ratio rises because of the decrease in uncertainty, expected excess returns and cash flow growth decline. My framework verifies that if good news about dividend increases is not about an increase in future cash flows, then it might relate to a decline in systematic risks. However, the similar logic cannot be applied to book-to-market ratios or dividend yields.[3] Hence, it is not appropriate to examine the relationship between dividends and returns by means of dividend yields or book-to-market ratios.

Second, I show that the predictability of cash flow-fundamental ratio is irrelevant to the mean-reversion of stock prices as argued in dividend yields and book-to-market ratios. In general, changes in dividend yields or book-to-market ratios can reflect both changes in discount rates and cash flow growth; however, the relative importance of these two components is not quite clear. As documented by Bansal and Yarson (2004), an increase in economic uncertainty raises risk premium, as well as dividend yield. Since cash flow growth is hard to be predicted by this ratio (e.g., Menzly et al., 2004; Lettau and Wachter, 2007), the predictive power of dividend yield ties to the mean-reversion in stock prices.[4] By contrast, book-to-market ratio predicts future profitability with a negative relation and forecasts excess stock returns with a positive relation (Vuolteenaho, 2000). Although book-to-market ratio can forecast profitability and stock returns, the relationship between economic uncertainty and book-to-market ratios is not clear. The superiority of the cash flow-fundamental ratio relies on the feature that it can be related not only to future profitability and excess stock returns but also to economic uncertainty. This connection is critical because it is useful to relate profitability and stock returns with business conditions. In brief, my work is consistent with rational expectations, as shown in Campbell and Shiller (1989).

The remainder of the paper is organized as follows. In the next section, I propose the valuation framework based on the cash flow-fundamental ratio and the corresponding equilibrium in our model. Section 3 elaborates my empirical setting, including the description of data and empirical results to support asset pricing implications of our framework. The last section provides concluding comments.

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[2] Campbell and Vuolteenaho (2004) propose a two-beta model that splits a stock's risks in two loadings, cash flows and discount rates.

[3] See Campbell and Shiller (1989) and Vuolteenaho (2000).

[4] Some literature finds other significant indicators to predict dividend growth. For example, Menzly et al. (2004) propose that the relative share, the share of consumption each asset produces, is a good predictor of dividend growth at the aggregate level. Lettau and Wachter (2007) otherwise identify that consumption-dividend ratio has good predictive power for dividend growth especially at long horizons.

2. The Valuation Framework

In this section, I consider a representative agent who chooses consumption level to maximize an expected power utility function in which an explicit cash flows dynamics, a dividend yield with respect to book value, is introduced. I find this indicator has some critical asset pricing implications.

I consider an economy populated by a representative agent who maximizes an expected power utility function of the form:

$$\mathrm{E}_t\left[\int_t^{\infty} e^{-\delta(s-t)}\frac{C_s^{1-\gamma}}{1-\gamma}ds\right], \tag{1}$$

where C_t is the aggregate consumption level at time t, γ is the coefficient of constant relative risk aversion, and δ is the subjective discount rate. The aggregate wealth the agent holds is constructed by financial and nonfinancial assets. Hence, the aggregate consumption is financed by these two sources of income. I assume the agent is initially endowed with one share of a stock which pay dividends D_t in the form of the consumption good and its book equity is worth B_t.

The time-varying instantaneous cash flows generated is then defined as dividends with respect to book equity:

$$F_t = \frac{D_t}{B_t} = \exp(-X_t), \tag{2}$$

where X_t is assumed to follow a simple mean-reversion process:

$$dX = \kappa\left(\bar{X} - X\right)dt - \sigma\sqrt{X}dB_1, \tag{3}$$

in which κ is the speed of mean reversion, σ is some positive, and B_1 is a standard Brownian motion. Given that κ and $\bar{X}$ are positive, the value of X_t is nonnegative. This nonnegative property then ensures that the cash flow-fundamental ratio is always between zero and one. Because of the mean-reversion nature of the dynamics, the cash flow-fundamental ratio converges to a steady-state value as $t \to \infty$.

Next, I set the book equity-consumption ratio, one part of aggregate wealth-consumption ratio exogenously as,

$$\frac{B_t}{C_t} = Y_{t,} \tag{4}$$

where Y_t evolves as follows,

$$\frac{dY}{Y} = \eta\sqrt{X}dB_2. \tag{5}$$

Here, η is some positive and B_2 is another standard Brownian motion independent to B_1. In addition, we specify the aggregate consumption follows the process:

$$\frac{dC}{C} = gdt + \phi\sqrt{X}dB_3, \tag{6}$$

where $\phi > 0$ and B_3 is also a standard Brownian motion independent to B_2. I presume, however, the correlation between the two Brownian motions, B_1 and B_3, is ρdt.

Before moving on, I have to state why the dividend-book equity ratio is related to the dynamic of consumption. I assume consumption is composed of labor income and financial income. Furthermore, I assume that the former stands for expected consumption, while the latter relates to unexpected consumption change. My intuition is that the payout level, proxy by dividend-book ratio in this work, is positively related to unexpected consumption growth. Bansal and Yaron (2004) assume that both the volatility of consumption growth and the volatility of dividend growth are time-varying and governed by the same economic uncertainty. Instead of directly modeling dividend process, I examine the dividend-book ratio process to help us to identify the dividend payout policy. When the economy contains more uncertainty, both consumption and dividend will be expected to grow at higher speed in the near future; however, this uncertainty also makes the dividend payout stay at a lower level now. Besides, I assume that $\rho > 0$. The intuition is as follows. When a shock forces the economy become less uncertainty today, this shock also commits a positive innovation to consumption and dividend at the same time. Less uncertainty follows a higher dividend payout level, dividend level and consumption. However, the expected dividend growth rate becomes less attractive because of the lower retained earnings. Meanwhile, people also expect a lower excess return in the near future because of fewer growth opportunities.

An application of Ito's lemma implies the expected growth rate of book value and dividends,

$$E_t\left(\frac{dB}{B}\right) = gdt, \tag{7}$$

$$E_t\left(\frac{dD}{D}\right) = \left[g - \kappa\bar{X} + \left(\kappa + \frac{1}{2}\sigma^2 + \sigma\phi\rho\right)X_t\right]dt. \tag{8}$$

From equation (8) it is clear that the cash flow-fundamental ratio is negatively related to the cash flow growth if $\rho > 0$. This implies that if corporate dividend is procyclical, expected cash flow growth decreases with the cash flow-fundamental ratio. In addition, from equation (6) and (7), we note that expected consumption growth and book equity growth are both constant. It implies that both consumption and book equity are not predictable in my framework.

Appling the Euler equation, in equilibrium the price of the stock satisfies,

$$\begin{aligned} P_t &= E_t\left[\int_t^\infty e^{-\delta(s-t)}\left(\frac{C_s}{C_t}\right)^{-\gamma} D_s ds\right] \\ &= E_t\left[\int_t^\infty e^{-\delta(s-t)}\left(\frac{C_s}{C_t}\right)^{-\gamma} C_s F_s Y_s ds\right] \\ &= B_t\int_t^\infty e^{-\delta(s-t)} a_0(t,s) F_t^{-a_1(t,s)} ds. \end{aligned} \tag{9}$$

Here,

$$a_0(t,s) = \exp\left(\int_t^s -(1-\gamma)g - \kappa\bar{X}a_1(t,u)du\right), \tag{10}$$

and $a_1(t,s)$ is given by,

$$a_1(t,s) = \frac{1}{\sigma^2}\left[\kappa + (1-\gamma)\sigma\phi\rho + \Phi\left(1 - \frac{2}{1-\Omega e^{-\Phi(s-t)}}\right)\right], \tag{11}$$

and where,

$$\Phi = \sqrt{\left(\kappa + (1-\gamma)\sigma\phi\rho\right)^2 + \sigma^2\gamma(1-\gamma)\phi^2},$$

$$\Omega = \frac{\kappa + (1-\gamma)\sigma\phi\rho - \Phi}{\kappa + (1-\gamma)\sigma\phi\rho + \Phi}.$$

By simple calculation the process for excess stock returns implied by the model can be expressed as,

$$\mu_R = \left(H\sigma\phi\rho + \phi^2\right)\gamma X_t, \tag{12}$$

where H is the elasticity of market-to-book ratio with respect to F. Equation (12) shows that if the corporate dividend is procyclical, equity risk premium is negatively related to the cash flow-fundamental ratio, as documented by Jiang and Lee (2007). This result is contrary to prior evidences that high dividend yields predict high excess returns (e.g., Campbell and Shiller, 1989; Fama and French, 1988; Bansal and Yaron, 2004). I will discuss their difference explicitly in the next section.

Equation (12) also shows that the equity premium specified in my work is composed of two ingredients. The first term reflects the covariance between consumption growth and percentage changes in the cash flow-fundamental ratio. This term implies that the time-varying property of the risk premium is contributed to the time variation in the cash flow-fundamental ratio, given that the correlation coefficient ρ is not zero. The second term represents the consumption risk premium as described in many consumption-based pricing models. This term also identifies the time-varying property of discount rates. It shows that the cash flow-fundamental ratio is negatively related to discount rates.

3. Data and Model Implications

In this section, I provide evidences about the asset market implications of my framework described in the last section. In this work, I employ the dividend-to-book equity ratio as the proxy for cash flow-fundamental ratio. First I have to identify this ratio in an appropriate way and then provide some implications behind it. In theory, it is straightforward to define the dividend-to-book equity ratio as aggregate dividends divided by aggregate book equity. However, it may not be appropriate to estimate this ratio by using the reported data, for reasons described below. Both aggregate dividends and book equity, in practice, should be modified.

3.1. Data Description

I collect data for the S&P 500 index from Shiller (1989) and CRSP for the sample period of 1929-2004, including book equity, prices, earnings, dividends, and stock returns. The risk free rate is the rerun on 30 days Treasury bill rate from CRSP. All nominal quantities are deflated using the CPI.[5] For S&P 500, high quality book equity data is generally unavailable prior to 1977. It is, therefore, crucial to choose an appropriate proxy for the book equity. As we know, the common feature of book equity is well-described by the clean-surplus relation.[6] This accounting identity has been widely applied in many studies, such as Vuolteenaho (2000) and Pástor and Veronesi (2003).

Next, I need to specify a good proxy for dividends because the reported dividend level is artificial and involves some mis-measurement. First of all, previous literature has noted that firms try to smooth dividends over time; hence, the reported dividends may not reflect the true value of firms. For example, Lintner (1956) documents that managers have a target level of dividends equal to a fraction of current earnings. Recently, Marsh and Merton (1987), Wu and Wang (2000), and Allen and Michaely (2002) also identify a similar tendency among firms. In addition to earnings, dividend policy itself may be used to reveal other information to the market or to resolve agency problems (e.g., Allen and Michaely, 2002). Second, recent evidence suggests that repurchases have substituted for cash dividends over the past 15 to 20 years (e.g., Fama and French, 2001). Boudoukh et al. (2007) further point out that payout (dividends plus repurchases) yields have better forecasting power for stock returns than cash dividends alone. All these considerations suggest that the reported dividends alone are not a suitable reflection of the true cash flows generated by firms. To acquire more reliable information about the true value of firms we assume that aggregate dividends are equal to a constant fraction of aggregate earnings, suggested by Lee et al. (1999) and Longstaff and Piazzesi (2004). We assume the dividend payout ratio is 50 percent in accordance with the historical average for this sample period.[7] However, it should be noted that altering the payout ratio is irrelevant to our results.

Finally, I use annual consumption data from the National Income and Product Accounts reported by the Bureau of Economic Analysis (BEA) for the period 1929-2004. Consumption is defined as the sum of aggregate nondurables and services consumption. Nominal consumption is also deflated by realized inflation using the Consumer Price Index. The estimated population at each year end, taken from the Census Bureau, is used to calculate consumption in per capita.

To perceive how the book equity reported by the S&P 500 is close to the clean surplus book equity, I compare these two series and the corresponding dividend-to-book equity ratios for the period 1977-2004. Table 1 reports the comparison's results. Throughout my sample period, book equity calculated by the clean surplus relation is always higher than the book equity reported by the

[5] The consumer price index is obtained from the FRED® database.

[6] It should be noted that although we apply the clean surplus relation to construct a proxy for book equity, in theoretical framework, we do not assume the process for book equity is governed by this relation as assumed by Pástor and Veronesi (2003).

[7] The identical dividend-to-earning ratio is applied by Linter (1956), and Longstaff and Piazzesi (2004). The average dividend-to-earning ratio in our sample is 56.8 percent, and the median is 54.7 percent.

S&P 500. However, the correlation between these two book equity series is pretty high (99.69%). In addition, the two log dividend-to-book equity series constructed from these two approaches have a 98.25% correlation. And the correlation between changes in the two ratios is 99.08%. In summary, although book equity estimated by the clean surplus relation is higher than the reported level of S&P, the corresponding dividend-to-book equity ratios estimated by these two methods share a similar time series property.

Table 1. Comparison of reported book equity and book equity from clean surplus relation, 1977-2004.

This table compares dividend-to-book equity ratios for book equity based on the reported value and clean surplus relation. Dividends, D_t, is proxy by a constant payout ratio times the reported earnings, in which the constant payout is set to 0.5. Data of book equity, dividends, and earnings are from the S&P 500. Panel shows the descriptive statistics of the cash flow-fundamental ratio for sample period 1977-2004.

Level Correlation	Book Equity	Clean Surplus
	Reported by S&P	Book Equity
	99.69%	
Correlation of Levels of	Book Equity	Clean Surplus
log Dividend-to-Book Equity	Reported by S&P	Book Equity
	98.25%	
Correlation of Changes of	Book Equity	Clean Surplus
log Dividend-to-Book Equity	Reported by S&P	Book Equity
	99.08%	
Descriptive of	Book Equity	Clean Surplus
log Dividend-to-Book Equity	Reported by S&P	Book Equity
Mean	-2.66	-2.86
Standard Deviation	0.23	0.23
Autocorrelation	0.41	0.46

In our sample period, the correlation between percentage changes in the cash flow-fundamental ratio and consumption growth is 0.33. We find that the time varying property of the cash flow-fundamental ratio is related to business cycles. Figure 1 plots the time series of the cash flow-fundamental ratio and the market-to-book ratio for 1929-2004. As shown, these two ratios decline a lot at recessions, especially at the Great Depression. After war, they both switch to a higher stable level. Besides, they tend to be more volatile after 1990. The *t*-statistic for log cash flow-fundamental ratio from the regression of log market-to-book ratio on log cash flow-fundamental ratio is 7.39. Evidence suggests that the cash flow-fundamental ratio and the market-to-book ratio are positively related and both of them are procyclical. Based on our framework, this procyclicality in turn implies that the excess returns are countercyclical. Most importantly, this procyclical feature is critical to verify the negative relationship between the cash flow-fundamental ratio and cash flow growth as documented by our framework and evidences.

3.2. Asset Pricing Implications

Table 2 provides evidence that future realized consumption volatility is predicted by the cash flow-fundamental ratio. The dividend-to-book equity ratio, proxy of cash flow-fundamental ratio, predicts future realized volatility with negative coefficients. The *t*-statistics are all above 3 and the R^2s are around 5% for horizons of up to 10 years. If consumption volatility were not time-varying, the slope on the dividend-to-book ratio would be zero. As argued by my framework, this evidence indicates that corporate cash flows contain information regarding persistent fluctuations in economic uncertainty. Bansal and Yarson (2004) also document time-varying consumption volatility in terms of price-dividend ratio. However, they show that higher dividend yields follow greater fluctuations in economic uncertainty.

Figure 1. The cash flow-fundamental ratio and market-to-book ratio, 1929-2004.

The solid line is the standardized log cash flow-fundamental ratio. The dash line marked with "+" is the standardized log market-to-book ratio. Shaded areas indicate recessions as determined by the NBER. The cash flow-fundamental ratio is the ratio of earnings per share to book equity per share times the payout ratio which is set to 0.5. Book equity, B_t, is constructed by clean surplus relation. Data of book equity, prices, and earnings are from the S&P.

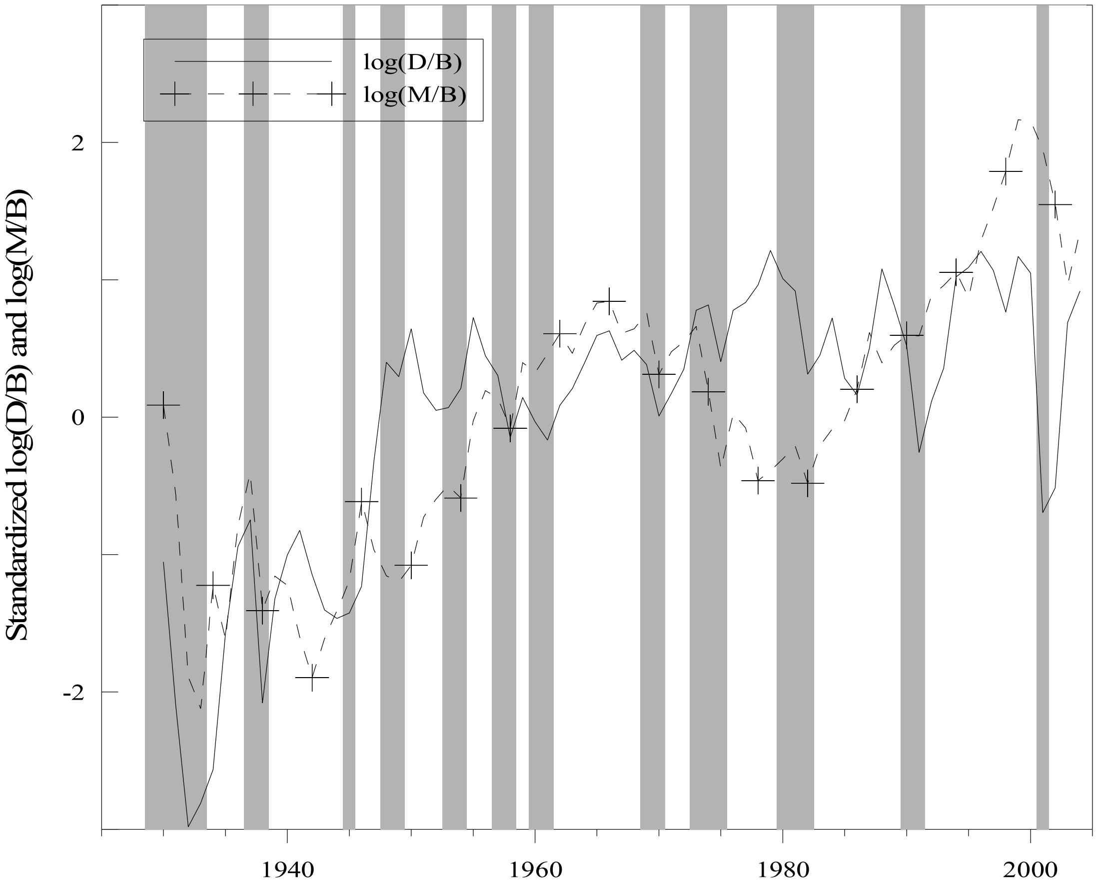

Table 2. Properties of consumption volatility

The entries provide regression results for $\left|\varepsilon_{g^a,t+H}\right| = \beta_0 + \beta_1 \log\left(D_t / B_{t-1}\right) + \upsilon_{t+H}$, where H indicates the forecast horizon in years and $\left|\varepsilon_{g^a,t}\right|$ represents the absolute value of the residual from the regression $g_t^c = \sum_{i=1}^{5} \alpha_i g_{t-i}^c + \varepsilon_{g^a,t}$, in which g_t^c denotes annual consumption growth rate. D_t / B_{t-1} is proxy of the cash flow-fundamental ratio. The statistics are relied on annual observations of real nondurables and services consumption from BEA for sample period 1929-2004. Dividends, D_t, is proxy by a constant payout ratio times the reported earnings, in which the constant payout is set to 0.5. Book equity, B_t, is constructed by clean surplus relation. Data of book equity, dividends, and earnings are from the S&P 500. For each data regression, *t*-stat is calculated by standard error which is corrected by Newey and West (1987) using 10 lags. And R^2 denotes the adjusted-R^2.

	Horizon in Years				
	1	2	3	5	10
β_1	-0.013	-0.009	-0.009	-0.011	-0.007
t-stat	-3.53	-3.04	-3.18	-4.15	-3.63
R^2	0.09	0.05	0.06	0.09	0.03

Panel A of Table 3 reports the results of long-horizon regression of excess returns on the cash flow-fundamental ratio or simplified by cash flow-to-book equity ratio for our sample. In my data, high cash flow-to-book equity ratio significantly predicts low excess returns in the medium horizon. Significant coefficients for absolute *t*-statistics above 2 happen at a horizon up to four years. The R^2 reaches 0.08 at a horizon of four years. However, the coefficients and the R^2s rise slowly with the horizon. This negative correlation provides a good explanation for results found in Jiang and Lee (2007) that higher dividend-to-book ratio predicts lower stock returns. Compared with the results of dividend yields and book-to-market ratios from previous studies, I find that the cash flow-to-book equity ratio has less predictive power for stock returns in the long horizon.

Panel B of Table 3 shows regression results where the dependent variable is the sum of annual consumption growth rates. At shorter horizons the cash flow-fundamental ratio has little predictive power. When considering longer horizons of up to eight years, however, consumption growth rates can be forecasted by this ratio with negative coefficients. I find the coefficients and R^2 increase as forecasting horizons become longer.

My cash flows model implies that the cash flow-fundamental ratio forecasts future cash flow growth. I further detect whether the cash flow-fundamental is able to predict future cash flow growth rate. Panel C of Table 3 shows the regression result of regressing the sum of annual dividend growth rate on cash flow-fundamental ratio. The evidence shows that β_1 is significantly negative for all horizons implying the higher in cash flow-fundamental the lower in cash flow growth. The cash flow-fundamental ratio is a significant predictor of cash flow growth at the aggregate level with R^2 equal to 3%, 22%, and 28% for the 1-, 4-, and 10-year horizons respectively. This evidence is also consistent with my framework that the cash flow-fundamental ratio and cash flow growth rate are negatively correlated if the corporate dividend is procyclical. Panel D of Table 3 reports the result of long-horizon regression of book equity growth on the cash flow-fundamental ratio. As we expected, the cash flow-fundamental ratio has little predictive power in book equity growth.

Combining information revealed in Panel C and Panel D of Table 3, I briefly interpret the driving force of the mean-reversion property behind the cash flow-fundamental ratio. As documented by Campbell and Shiller (2001), the stability of a financial ratio implies that either the numerator or the denominator must be predictable based on the ratio. Results from Panel C and Panel D verify that the cash flow-fundamental ratio is stationary as there is substantial predictability of cash flow growth at aggregate level. Evidence shows that it is the cash flows rather than book equity that facilitates the cash flow-fundamental ratio back to its mean value. In brief, referring to the results from Table 2 and Table 3, we demonstrate that the increase in cash flow-fundamental ratio is related to the decline in economic uncertainty and the predictability power of the cash flow-fundamental ratio on excess return is guided by this connection.

Next, I investigate why the dividend yield and the cash flow-fundamental ratio predict excess returns with an opposite sign. First, I find that these two financial ratios contain information about future economic uncertainty. Bansal and Yaron (2004) provide evidence that conditional volatility of consumption can be predicted by the price-dividend ratio with negative coefficients. In contrast, we find a higher cash flow-fundamental ratio predicts lower consumption volatility as shown in Table 2. As a high risk premium is expected when the economy is more uncertain, it is reasonable to expect that a lower price-dividend ratio or a lower cash flow-fundamental ratio predicts a higher return.

Second, the driving force of mean-reversion behind the price-dividend ratio and the cash flow-fundamental ratio is distinct. It is well known that the predictive power of any financial ratio relies on the stability of a valuation ratio. Previous studies have found that the price-dividend ratio is a poor predictor of dividend growth (e.g., Campbell and Shiller, 2001; Menzly et al., 2004; Lettau and Wachter, 2007). Therefore, literature proposes that it is stock price that restores the price-dividend ratio back to its mean value. In other words, the price growth should be forecast by the price-dividend ratio. When the growth in stock price is limited, a higher price-dividend ratio would result in a lower excess return. In contrast, in my framework it is the cash flows that governs the mean-reversion property of the cash flow-fundamental ratio. A higher cash flow-fundamental ratio predicts a lower cash flow growth rate and hence a lower excess return.

Table 3. Long-horizon regressions—predictability of excess returns, growth rates in consumption, cash flows, and book equity.

This table reports evidences on predictability of future excess returns and growth rates by the lagged dividend-to-book equity ratio. The corresponding regression model in Panel A is $\sum_{i=1}^{H} r_{t+i}^{m} - r_{t+i}^{f} = \beta_0 + \beta_1 \log(D_t / B_{t-1}) + \upsilon_{t+H}$, where $r_{t+i}^{m} - r_{t+i}^{f}$ is the excess return and H denotes the forecast horizon in years. The corresponding regression models in Panel B, Panel C, and Panel D are $\sum_{i=1}^{H} g_{t+i}^{j} = \beta_0 + \beta_1 \log(D_t / B_{t-1}) + \upsilon_{t+H}$, where $j = c, d, b$. g_t^c is the annualized consumption growth rate. g_t^d is the annualized cash flow growth rate. And g_t^b is the annualized book equity growth rate. D_t / B_{t-1} is proxy of the cash flow-fundamental ratio. The statistics are relied on annual observations of real nondurable and service consumption from BEA for sample period 1929-2004. Dividends, D_t, is proxy by a constant payout ratio times the reported earnings, in which the constant payout is set to 0.5. Book equity, B_t, is constructed by clean surplus relation. Data of book equity, dividends, and earnings are from the S&P 500. For each data regression, *t*-stat is calculated by standard errors which are corrected by Newey andWest (1987) using 10 lags. And R^2 denotes the adjusted-R^2.

	Horizon in Years					
	1	2	4	6	8	10
Panel A: Excess Returns						
β_1	-0.05	-0.12	-0.21	-0.27	-0.29	-0.37
t-stat	-1.32	-1.85	-2.35	-2.76	-2.05	-1.95
R^2	0.01	0.04	0.08	0.10	0.09	0.11
Panel B: Growth Rates in Consumption						
β_1	-0.00	-0.01	-0.03	-0.05	-0.06	-0.08
t-stat	-0.35	-0.89	-1.73	-1.82	-2.00	-2.11
R^2	0.01	0.01	0.05	0.09	0.14	0.20
Panel C: Growth Rates in Cash Flows						
β_1	-0.10	-0.24	-0.34	-0.36	-0.36	-0.35
t-stat	-2.54	-3.39	-4.69	-4.17	-4.11	-2.90
R^2	0.03	0.11	0.22	0.26	0.25	0.28
Panel D: Growth Rates in Book Equity						
β_1	0.01	0.02	0.07	0.11	0.14	0.18
t-stat	0.51	0.72	1.34	1.44	1.68	2.13
R^2	0.00	0.01	0.10	0.10	0.12	0.16

In summary, I interpret why a high cash flow-fundamental ratio predicts a lower excess return. On the one hand, high cash flow-fundamental ratios can predict lower consumption volatility, which implies less economic uncertainty. On the other hand, a lower cash flow growth is expected when the cash flow-fundamental ratio is high, which in turn implies a lower excess return. Besides, these two properties explain why dividend yields and cash flow-fundamental ratios predict excess returns with an opposite sign.

4. Conclusion

Previous literature has widely applied financial ratios such as dividend yields and book-to-market ratios to forecast asset returns. Jiang and Lee (2007) document that linear combination of log dividend yields and log book-to-market ratios have better performance than individual financial ratios in some aspects. However, the explicit information behind this loglinear model is still unknown. In this paper, I investigate the characteristics of cash flow-fundamental ratio to verify the rationale behind this loglinear model.

Two piece of information is found. First, the realized consumption volatility, which represents fluctuating economic uncertainty, is predicted by the cash flow-fundamental ratio. Second, the cash flow-fundamental ratio can forecast future cash flow growth in all horizons. Evidence shows that higher cash flow-fundamental ratios predict lower consumption volatility in the future as well as lower cash flow growth. Both features indicate that higher equity premium is compensated for a lower cash flow-fundamental ratio because of the increase in uncertainty. Moreover, for the cash flow-fundamental ratio, the ability to predict future cash flow growth ensures the stationary property needed by any financial ratio that possesses forecasting power.

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