The Relative Importance of Cash Flow News and Discount Rate News at Driving Stock Price Change

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Abstract: Which component is the main driver of stock price movement? Using vector-auto-regression-based (VAR) decomposition method, the literature finds that stock price movements are almost entirely derived by discount rate variation (DR) at the aggregate-level. Recently, extracting variations by the VAR system has been criticized. Employing implied cost of capital (ICC) approach with a sample of 809 companies over the period of 2000 to 2015, new findings demonstrate that cash flow variations (CF) are significant at aggregate-level, as well as portfolio-level. This study also finds that CF variation rises when the horizon extends from one-year ahead to five-year ahead. Running return decomposition at the portfolio-level shows that there are significant rising CF variations from small/large growth portfolios to small/large value portfolios. The results also show that DR demonstrates a good tracking power of the actual return for the period before 2005, but CF dominates at tracking after this period. Current research contributes to the literature by providing a fundamental explanation for the value premium.

Keywords: Cash flow news, discount rate news, return decomposition, value anomaly.
JEL classification: G10, G11, G12

1. Introduction

Financial academics have steadily devoted huge efforts to explain the stock market movements over a long period of time as part of their mission. In this regard, knowing how an asset is priced shares the same importance as knowing how to price an asset. One of the methods used to find stock price is to discount future cash flows of the stock at a proper discount rate. It is then logical to attribute change in stock price to change in one or both of following factors: future cash flows or discount rate. Practically, through time, market participants revise their expectations of future cash flows of an asset and the respective discount rate due to changing conditions of the market. However, the question which remained unsolved is that which component is more important. Accordingly, it is of high interest to know how much of the variance of an asset price is derived by each component. The answer to these questions has deep influence in wide range of financial issues like theoretical modelling of asset prices (Campbell and Cochrane, 1999) versus Bansal and Yaron, 2004), systematic risk (Campbell and Vuolteenaho, 2004), excess volatility puzzle (Shiller, 1981), macroeconomy (Bernanke and Gertler, 2001; Rigobon and Sack, 2003), investment, capital structure and so on. Hence, current research is motivated to shed light over the determinants of stock price movements and future development of asset pricing models.

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Received 12 July 2018; Accepted 8 August 2018; Available online 7 October 2018.

Through the literature, the prevailing methodology to ascertain the contributing portion of each component has been using Campbell (1991) return decomposition, which employs vector autoregression (VAR) to estimate the expected values. The above method practices a backward-looking strategy through regression analysis using past information of return, dividend and so on, to relate price change to discount rate revision or cash flow revision. Using above method, literature concludes the superior role of discount rate variations in driving stock price variations, where cash flow plays a trivial role.

Campbell's decomposition method lacks to provide consistent and reliable results due to several reasons. These reasons include: sensitivity to the sample chosen for the study, reliance of the results on the predictive variables, residual-based cash flow extraction. A recent study by Chen *et al.* (2013) simulates Campbell's return decomposition method and finds that depending on the sample period used, results differ considerably. As another instance, Chen and Zhao (2009) find that if they replace PE ratio variable, which is originally used, by other similar variables like book-to-market ratio or the dividend-yield, the relative importance of discount rate and cash flow changes dramatically.

Contrary to the literature, there is a noticeable association between cash flows and price change in the real world. The correlation between IBES five-year earning forecast (proxy for cash flow) and recession (proxy for price change) is about 70%, shown by Chen *et al.* (2013). This evidences the fact that cash flow variations play significant role at driving recession, as correlation is high.

Therefore, the objective of this research is to investigate the relative importance of cash flow variations and discount rate variations using Chen *et al.* (2013) return decomposition method at the portfolio level, as well as the aggregate level, at one- to five-year horizons. This method produces more reliable results due to avoiding prediction based on regression. Using direct earnings forecasts from International Brokerage Estimation System (IBES), implied cost of equity (ICC) is backed out to proxy discount rate. Since ICC has proved to be a better proxy for expected return, this study hopes to produce more reliable result than the Campbell method.

Our approach is in the spirit of Chen *et al.* (2013), who employs accounting information to compute implied cost of equity capital (ICC) to decompose stock price movement at the aggregate- and firm-level. We extend this approach to study price movements at the portfolio-level. Our results suggest that such an approach can shed fresh light on several fundamental issues in asset anomalies like value premium. More specifically, the objective of this study is to examine the variations in stock prices which is derived by cash flow/discount rate variations at the aggregate- and portfolio-level at one- to five-year ahead horizons.

Highlighting the importance of cash flow variations, which is highly ignored by the extant finance literature, can open new windows to rethink current challenges in finance. For example, Fama and French (1992) demonstrate priced size and value factors, while it is known today that size and value are characteristics proxying underlying unknown risk factors. Comparing mimicking size and value portfolios based on their cash flow and discount rate risks can help to shed some light on this issue.

At the empirical level, investigation about the contributions of each of cash flow variations and discount rate variations can help financial market participants to monitor market more efficiently and effectively for any piece of information related to drivers of stock price changes in the market, both at firm level and at the aggregate level. For example, knowing the sensitivity of a certain stock to cash flow or discount rate variations, they can foresee the effect of any coming variations on the price.

International portfolio managers have keen interest in the stock market volatility within emerging markets because emerging markets offer the opportunities of portfolio diversification and high rate of return for investors for the sake of risky nature of their markets (Koutmos and Booth, 1995). There is consensus among scholars that valuation of companies in emerging markets does not totally match with the valuation procedure in developed countries due to specific characteristics of the emerging markets as well as the company's distinguished characteristics (Dey, 2005). Among others, two main concerns of valuation in emerging markets are inflation and corporate governance. Comparing Malaysia with other emerging markets, like China and Korea with respect of inflation, Malaysia enjoys lower and smoother inflation rate compared to the other two for the period of 2000-2014. Another privilege of Malaysia over China and Korea relates to the report by the Asian Corporate Governance Association in 2014, in cooperation with CLSA Asia-Pacific Markets, in which Malaysia is ranked ahead of Taiwan, India, Korea, China, Philippines and Indonesia in corporate governance, and maintained its fourth position ranking in the region. Above positive merits of the Malaysian market lead this research to choose Malaysia as a proper candidate for the purpose of this study.

2. Literature Review

The first attempt to answer above-mentioned questions was made by Shiller (1981). With the benefit of hindsight, Shiller uses discounted dividend valuation method with constant discount rate to calculate present value of actual subsequent realized dividends for US stock market indices using data for the period of 1871 to 1979. He calls this present value "ex post rational price". Then he compares the rational price with the market price indices, noting that there is a huge spread between them. He concludes that the volatility in stock price is too high to be totally derived by changing realized dividends (excess volatility). He suggests that the movement in stock price should be attributed to the other component which is discount rate. Campbell and Shiller (1988) (CS) develop a vector-autoregression log-linearization approximation model based on Gordon growth model (1962) to study dividend-price variation through time. Campbell (1991) uses CS model to decompose aggregate stock return into two components: any dividend-price change due to changing discount rate (discount rate news or variations), and any dividend-price change due to changing cash flow (cash flow news or variations). He finds that discount rate variations are the main driving force at changing stock prices at the aggregate level and cash flow variations play a trivial role in bringing stock price change. Later researchers' work also conclude the superior role of discount rate variations at the aggregate level, such as Cochrane (1992), Campbell and Ammer (1993), Lettau and Ludvigson (2005), Lettau and Van Nieuwerburgh (2008), Van Binsbergen and Koijen (2009). Cochrane (2011) summarizes the literature about the discount rate in his presidential address in American Finance Association (2011), and says "*Previously, we thought returns were unpredictable, with variations in dividend-price ratios due to variations in expected cash flows. Now it seems all price-dividend variations corresponds to discount-rate variation* (page 1047)."

Vuolteenaho (2002) studies the importance of discount rate variations and cash flow variations at the firm-level using CS method. It concludes that cash flow variations do generate significant variability in stock returns at the firm level. It finds that stock returns are mainly driven by cash flow variations at the firm level. To justify minor role of cash flow variations at the aggregate level, he also adds that while expected return variations are highly correlated across firms, cash flow variations have idiosyncratic nature and can be diversified mostly away by diversification at the aggregate level. Therefore, he relates the contradictory results of the importance of cash flow variations at the aggregate and firm level to the diversification of cash flow variations at the aggregate level. At the firm level, other studies such as Cohen *et al.* (2003), and Callen and Segal (2004) also maintain that cash flow variations contribute more to price movements compared to discount rate variations. Later, findings based on CS model have been questioned due to inconsistency of predictive regression output.

Chen and Zhao (2009) criticize CS log-linearization model on three grounds. First, the output of predictive regression (as used in vector-autoregression system (VAR) to calculate expected return in CS model) is highly dependent to predictive variables. In other words, using different predictive variables yields different results (Welch and Goyal, 2007). Second, predictive regression is sensitive to sample of the study. Chen *et al.* (2013) say; "*For example, if we use dividend yield as the predictor, depending on whether we study a sample period of 1870–2010, 1926–2010, or 1946–2010, the conclusion ranges from the majority of aggregate price variation is driven by cash flow news to almost no variation of price variation is driven by cash flow news*". Third, at the predictive regression, discount rate is modeled directly, and cash flow is behaved as residual (residual based decomposition). Due to any misspecification error in the model, cash flow variations may contain any discount rate variations which is not captured by the model.

Engsted *et al.* (2012) maintain that conclusions based on VAR in decomposition context are sensitive to the predictive/state variables included in (page 1256). Bianchi (2015) also provides strong evidence that the empirical results of Campbell and Vuolteenaho (2004) depend on the sample selection. He shows that the fitness of their model (explaining 50% of the cross-sectional variation of returns of the period 1963 to 2001) can only be achieved if 1929, 1930 and 1930s data (30s stock market crash and depression period) are included in VAR estimation which generates risk variables (variations or news). In the absence of the above years' data, the explanatory power of their model diminishes to around zero. These shortcomings ruin the consistency of VAR regression output in CS method and cast doubt on their findings of the importance of cash flow and discount rate variations.

To address these shortcomings, Chen *et al.* (2013) present a novel method, using implied cost of capital to decompose US stock return for the period of 1926-2010. Using international Brokerage Estimation System (IBES) earnings estimates enables their study to incorporate direct earnings forecasts into valuation model to extract cash flow variations and discount rate variations. Applying this method to aggregate and firm-level stock returns, they witness significant cash flow variations at both levels in contrary to the literature, where its significance is increasing by extending time horizons. What they miss to provide a remedy is to consider the fact that IBES estimates are biased toward large companies whose large capitalizations make them outstanding and attractive for analysts' investigation (La Porta, 1996). This means that their sample of study includes more large firms than small firms. Chen *et al.* (2013) concentrate on aggregate and firm-level investigation and they do not cover portfolio-level analysis in their study. Investigation at the portfolio-level is essential since it can provide fundamental explanation about some return anomalies at the portfolio-level like value and size, introduced by Banz (1981), Basu (1983) and Fama and French (1992, 1993).

In the field of asset pricing, the importance of CF and DF can be reflected in studies like Campbell and Cochrane (1999) , Bansal and Yaron (2004) and Campbell and Vuolteenaho (2004). Campbell and Cochrane (1999) propose a consumption-based asset pricing model with a time-varying risk premia (DR) to explain popular dynamic asset pricing phenomena at the aggregate-level. They posit that the output of their model is in line with the volatility literature back then, when movements in stock price-dividend ratio (return) was mainly due to DR variation and CF (expected future dividend growth rate) variation played a trivial role (page 207). However, Bansal and Yaron (2004) suggest another consumption-based asset pricing theory insisting on the importance of the expected dividend growth rate in their model. They believe that "The dividend elasticity of asset prices and the risk premia on assets rise as the degree of permanence of expected dividend growth rates increases." (page

1482). They formalize this institution in their model by including expected dividend growth fluctuations (CF). Campbell and Vuolteenaho (2004) develop an asset pricing model by disintegrating CAPM beta into cash flow beta and discount rate beta. CF (DR) beta is computed by the correlation between an asset CF (DR) with the market CF(DR). Computation of CF and DR have direct implications for the above pricing models. Current study proposes a novel method to calculate CF and DR without resorting to predictive regression which is criticized on different grounds. IBES earnings estimates provide more accurate forecasts than predictive regression. This study also elaborates the importance of CF and DR over the long-run horizons which is helpful for long-run risk assessment. It is worth mentioning that the recent empirical paper by Fama and French (FF) (2015) relates to the findings of this study, highlighting the importance of CF variations.

3. Theoretical Background

The finite horizon expected return model represents a new approach to estimate expected return. It is motivated by the assumption that current forecasts are capable of predicting abnormal performance till a finite point in the future.

The finite model states that (1) forecasts of abnormal performance have a finite horizon, N, beyond which investors expect a corporation to earn for all future time a return on equity investment equal to the expected return on its shares; and (2) the expected return on a share is the discount rate that equates the share's current price with a dividend expectation, where the dividend in each period from 1 to N is equal to its forecast and the dividend in each period from N + 1 to infinity is equal to the forecast for normalized earnings in period N + 1 (Gordon and Gordon, 1997).

We start derivation of finite expected return with the well-known proposition that the expected return on a share is the discount rate that equates the share's current price with its dividend expectation; that is,

$$P = \sum_{T=1}^{\infty} \frac{D_T}{(1+r)^T} \tag{1}$$

On the assumption that the dividend expectation may be represented with its first-period value and one growth rate for all future time, above equation becomes;

$$P = \sum_{T=1}^{\infty} \frac{D_1 * (1+g)^{T-1}}{(1+r)^T} = \frac{D_1}{r-g} \tag{2}$$

where,

P = current share price

g = expected growth rate

D_1 = expected dividend per share for next period

Assuming that retained earnings and dividends are the sole means for equity investments and funds distribution channel to shareholders, Gordon (1962) show that the value of expected return that satisfies above equation is;

$$r = DY_1 + g = \frac{EPS_1 * (1-b)}{P} + ROE * b \tag{3}$$

where,

DY_1 = next period dividend yield (next period dividend divided by current share price)
EPS_1 = next period expected return
b = retention rate
ROE = return on equity investment

The above formula assumes that an enterprise can be expected to earn for all future time a ROE that is not necessarily equal to the return investors require on its shares. Under the opposite assumption, that a corporation's ROE for all future time must equal its expected return and it pays hundred percent of its earnings in dividends;

$$r = \frac{EPS_1}{P} \tag{4}$$

Same formula can be achieved by Easton (2004) model, assuming the corporation doesn't have abnormal earning. This study utilizes the above formula to compute ex-ante implied cost of equity capital for the analysis.

As discussed in section 5, and in line with Hou *et al.* (2012) and Gordon and Gordon (1997), this study substitutes dividend with earning, because dividends are subject to much more uncertainty and manipulation compared to earnings. Aside from being parsimonious, this method doesn't resort to many assumptions which are made under other methods. The empirical results of the ICC computation in this study also shows that ICC is well in an acceptable range of previous studies in the context of Malaysia.

4. Methodology

Our return decomposition method uses direct forecasts of firms' cash flows, provided by analysts, which is available from International Brokerage Estimation System (IBES) database. To be specific, given the stock price, this method uses IBES consensus forecasts for future cash flows to calculate discount rates (like Pastor *et al.*, 2008), called implied cost of capital (ICC). Then, the stock price change can be decomposed into two components based on cash flow discounted theory: first, cash flow variations which is defined as the change in price while discount rates are kept constant, second, discount rate variations which is defined as the change in price while cash flows are kept constant. This way we can avoid problems of predictive regressions, which VAR-based decomposition method suffers from. This study then investigates the relationship between return, cash flow variations and discount rate variations at market and portfolio levels.

4.1 Cash Flow Variations and Discount Rate Variations

The price present value formula can be rewritten as,

$$\begin{aligned} P_t &= \frac{EPS_1}{r} \\ &= f(c^t, q_t) \end{aligned} \tag{5}$$

Fundamentally, equity price P_t is a function of cash flow forecast variables available at time t (c^t) and discount rate (q_t). The proportional price change (capital gain return) between periods t to $t+j$ can then be shown as,

$$\begin{aligned} r_t &= \frac{P_{t+j} - P_t}{P_t} \\ &= \frac{f\left(c^{t+j},\ q_{t+j}\right) - f(c^t, q_t)}{P_t} \\ &= CF_t + DR_t \end{aligned} \tag{6}$$

where

$$CF_j = \left(\frac{f\left(c^{t+j},\ q_{t+j}\right) - f\left(c^t, q_{t+j}\right)}{P_t} + \frac{f(c^{t+j},\ q_t) - f(c^t, q_t)}{P_t}\right)/2 \tag{7}$$

represents cash flow variations, because discount rate q is held constant at $t+j$ and t in the numerator and any change in capital gain return is driven by cash flows. Likewise,

$$DR_j = \left(\frac{f\left(c^t,\ q_{t+j}\right) - f(c^t, q_t)}{P_t} + \frac{f\left(c^{t+j},\ q_{t+j}\right) - f(c^{t+j}, q_t)}{P_t}\right)/2 \tag{8}$$

represents discount rate variations, because cash flows c is held constant at t and $t+j$ in the numerator and any change in capital gain is driven by discount rates. To further investigate the variation of capital gain return through CF and DR variations,

$$VAR(r_t) = COV\ (CF_T, r_t) + COV\ (DR_t, r_t) \tag{9}$$

where VAR and COV stands for variance and covariance respectively. Now divide two sides by $VAR(r_t)$, and we have,

$$1 = \frac{COV\ (CF_T, r_t)}{VAR(r_t)} + \frac{COV\ (DR_t, r_t)}{VAR(r_t)} \tag{10}$$

$\frac{COV\ (CF_T, r_t)}{VAR(r_t)}$ is the slope of regressing CF_T on r_t. $\frac{COV\ (DR_t, r_t)}{VAR(r_t)}$ is the slope of regressing DR_T on r_t. Therefore, to realize the proportion of return variance which is driven by cash flow variations or discount rate variations, one can simply regress cash flow variations and discount rate variations on the capital gain return respectively and conclude based on regression coefficients. This technique is used at the aggregate- and portfolio-level in this study over a window of five-year ahead horizon.

5. Earning versus Dividends

There are several reasons justifying usage of earnings instead of dividends for the purpose of this research. The first reason relates to dividend-irrelevance theory, proposed by Miller and Modigliani (1961), where they show that under no tax and bankruptcy cost, dividend policy of a firm has no influence on the firm's capital structure or stock return. Using this theory, several researchers like Ohlson (1995) develops "discounted residual income" model to relate earnings and price. The second reason is the regulatory requirement that dividends should be paid from realized earnings. This means that earnings are the original variable where dividend variable is originated from. Third, dividends are lagged function of earnings, and therefore, entailed lesser information compared to earnings. Also, dividends are affected by dividend smoothing (Leary and Michaely, 2011; Lintner, 1956) and dividend catering (Baker and Wurgler, 2004) which distort the quality of information inherited in dividends. These effects convert dividends into a variable of low-frequency nature which is not suitable for the current research. This issue gets worse at the times where companies pay little or no dividends. Fourth, some studies indicate that returns have higher correlation with earning measures than with cash flows or dividends (Kleidon, 1986). And finally, studies like Bradshaw (2002) shows that majority of equity analysts (75%) use earnings measures to make investment recommendations, while at the opposite, only a small fraction of analysts (5%) use cash flow measures to make recommendations. The reasons mentioned above have justified this study to prefer earning over the dividends to proxy cash flow.

6. Data

This study covers a period of 16 years, starting from 2000 to the end of 2015, and the sampling unit is from a population of 809 companies listed in Bursa Malaysia Securities Berhad (BMSB), which is formerly known as Kuala Lumpur Stock Exchange (KLSE). The data for sampling frame have been retrieved from Thomson Reuters Datastream database. Therefore, the collected data are bound by the assumptions of Datastream. The sampling design comprises four filtering processes on collected data. First, the company should be listed in Bursa Malaysia main market. Second, companies' shares shall not be in suspension status for more than twelve months at any time period. Third, companies should not go under delisting process during the period of this study. Fourth, data associated with each variable should be available fully in Datastream. IBES estimates are retrieved from IBES database available in Datastream. To minimize the influence of outliers, this study winsorizes all variables' data at 1^{st} to 99^{th} percentiles.

For portfolio-level analysis, mimicking portfolios are constructed following Fama and French (1992, 1993). As shown in Table 1, this study splits stocks into six portfolios based on their size, measured by their market capitalization (price times shares), and value/growth, measured by the book-to-market ratio. Stocks are divided into three book-to-market groups based on the breakpoints for the bottom 30% (low), middle 40% (neutral), and top 30% (high) of the ranked book-to-market ratio. In June of each year, stocks are sorted based on their market capitalization. Median is used to divide stocks into two groups: small and large.

Table 1: Portfolio construction

	Book-to-market ratio		
Market Capitalization	Low	Medium	high
Small	Portfolio 1: Small Growth	Portfolio 2: Small Neutral	Portfolio 3: Small Value
Large	Portfolio 4: Large Growth	Portfolio 5: Large Neutral	Portfolio 6: Large Value

Following Fama and French online monthly-updated database instructions, the portfolios, which are constructed at the end of each June, are the intersections of two portfolios formed on size (market equity, ME) and three portfolios formed on the ratio of book equity to market equity (BE/ME). The size breakpoint for year t is the median KLSE market equity at the end of June of year t. BE/ME for June of year t is the book equity for the last fiscal year end in t-1 divided by ME for December of t-1. The BE/ME breakpoints are the 30th and 70th KLSE percentiles. The portfolios for July of year t to June of t+1 include all KLSE stocks for which we have market equity data for December of t-1 and June of t, and (positive) book equity data for t-1.

7. Empirical Findings and Interpretations

7.1 Aggregate-level return decomposition

Table 2 reports the year-by-year summary statistics of the sample firms at the aggregate-level in this study. The data spans the time from 2000 to 2015. Sample includes all the firms which were active in any year of the above period, even if they didn't make to the end of the period, to avoid survivorship bias. In this study, ICC has been calculated by Gordon and Gordon (1997) model using analysts' earnings forecasts.

The average annual earning to price ratio ranges from 5.32 percent in 2000 to 14.70 percent in 2013. We also have number of firms with analyst coverage in sixth column. It is clear from the table that as the time proceeds to the end of the sample period, the number of firms covered by analysts gradually increases. It reveals the fact that analysts grow interest through time to report their estimates of future earnings of companies in Malaysia. In respect of ICC, there is a downward trend in the median/mean ICC after 2008 in the sample period. The trend began with the decline in Malaysian Government T-bill discount rate (proxy for risk-free rate) to around 2.05 percent in 2009. While T-bill rate recovered after 2009, median/mean ICC decreased afterwards. The correlation between mean and median ICC is 93 percent (not present in this table), and mean ICC has always been higher than median ICC, indicating that there are far positive number beyond the median that are dragging mean to a higher value. This, however, is not a concern for this study, since we use ICC at firm-level and aggregate mean or median do not intervene in later deduction. There is a downward trend in the annual aggregate ICC standard deviation, reported in the last column of table 2, showing that variation and dispersion in aggregate ICC from almost 10 percent in 2000 to around 3.5 percent in 2015. In fact, there are only for years 2000 and 2001 when ICC standard deviation is around 0.10. After these two years, ICC standard deviation is less than 7 percent, going down to almost 2.5 percent in 2014. The tight cross-sectional distribution of ICCs can be verified also by looking at the first and third quartiles.

Table 3 reports the return decomposition results using Chen *et al.* (2013) decomposition method. Panel A demonstrates the means and variances of equity capital returns, cash flows and discount rate variations over one to five years ahead horizon at the aggregate level. As the investment horizons rises, mean and variance of CF and DR increase. Generally, mean and variance of CF is higher than their corresponding DR mean and variance in all horizons. Also, CF variance increases more than DR variance as horizon extends. There is a drop in CF and DR variance beyond third year. The reason can be related to the fact that there is huge drop in the number of estimates available for firms beyond third year.

Table 3: Return decomposition using IBES-generated ICC

	Horizons (Annual)				
	1	2	3	4	5
Panel A: Summary Statistics					
Mean Return	0.107	0.171	0.228	0.291	0.330
Mean CF	0.077	0.157	0.252	0.272	0.389
Mean DR	0.008	0.036	0.032	0.121	0.150
Variance Return	0.280	0.663	1.144	1.302	1.050
Variance CF	0.734	3.104	6.997	1.811	3.467
Variance DR	0.734	2.961	6.857	1.585	3.159
Panel B: Return Decomposition					
CF	42.99%	54.21%	65.17%	67.56%	68.72%
DR	57.01%	45.79%	34.83%	32.44%	31.28%

Table 2: Summary statistics at aggregate-level

	No. of Firms	Market Cap (in billion)	Annual E/P (%)	No. of Firms with Forecasts-eps1	ICC Q1 (%)	ICC Median (%)	ICC Mean (%)	ICC Q3 (%)	ICC Std. Dev. (%)
2000	385	225	5.32	99	4.40	6.10	8.00	8.52	9.89
2001	249	181	11.42	90	7.26	9.64	12.45	13.74	11.86
2002	416	222	14.12	105	5.59	7.28	8.18	9.16	5.27
2003	325	230	9.59	105	7.35	9.80	11.11	13.30	6.61
2004	412	337	7.22	136	5.97	7.95	8.49	9.85	3.90
2005	330	334	8.60	126	6.96	9.86	10.66	11.99	6.41
2006	296	387	8.09	124	5.94	8.00	9.25	11.74	5.29
2007	333	502	9.00	148	5.72	7.42	8.73	10.30	5.03
2008	275	435	11.10	142	7.11	9.37	10.87	13.28	5.98
2009	217	414	10.49	107	6.47	8.75	10.15	13.10	5.54
2010	291	613	9.17	153	6.23	8.45	9.87	11.89	5.85
2011	288	769	9.34	136	6.00	8.09	8.91	11.07	3.92
2012	262	797	10.23	129	6.54	8.72	9.45	11.80	3.97
2013	257	954	14.70	127	5.15	7.01	7.91	9.75	3.57
2014	303	973	7.40	157	4.91	6.50	6.88	8.45	2.65
2015	309	955	9.24	160	4.54	6.47	7.16	8.84	3.56

In Panel B, return variation is decomposed into CF and DR. At the aggregate-level, unlike the literature, there is distinctive cash flow component. At the one-year ahead horizon, CF explains 42.99 percent of variations in capital gain return, the rest amounts to 57.01 percent which is explained by the DR variations. This means at the annual horizon; discount rate variations play more important role in driving price change.

Beyond the one-year ahead, however, it is cash flow variations which take the leading role at driving price change at market portfolio. At the two-years ahead horizon, CF drives 54.21 percent of change in market price change. CF portion increases by lengthening horizons by 65%, 67% and 68% respectively for three-, four- and five-years ahead. Except the annual horizon, CF portion is much higher, almost double, of the portion of DR. This finding is in line with the findings of Chen *et al.* (2013) in the context of the USA. However, it is a new evidence concerning the importance of cash flow innovations at the aggregate-level which is largely denied by the previous studies using Campbell and Shiller VAR methods (Cochrane, 2011).

7.2 Portfolio-level Return Decomposition

Table 4 presents a concise version of the summary statistics for six portfolios. It reports the overall number of observations available for the six portfolios with their corresponding time-series mean of ICCs and standard deviations. Small firms apparently hold higher ICCs comparing to large firms. It is proved when one compares portfolios 1-3 with portfolios 4-6. Small-value firms (portfolio 3) holds the highest ICC of 13.24 percent among small firms. As a general trend, as firms move from growth side (portfolios 1 and 4) to value side (portfolios 3 and 6), ICCs increase. All mean ICCs and corresponding standard deviations stated in the table are well in the range of ICCs reported in the Malaysian context literature. It is also worth to mention that there is direct association between ICC and earning/price ratio. As ICCs grow larger, earning/price ratio rises.

Table 4: ICCs by portfolio

	Number of Observations	Mean	Standard Deviation
Portfolio 1	114	8.42%	3.18%
Portfolio 2	198	12.76%	6.68%
Portfolio 3	154	13.24%	6.12%
Portfolio 4	741	6.91%	3.56%
Portfolio 5	551	9.46%	5.64%
Portfolio 6	231	9.98%	8.42%

One of the purposes of this study is to investigate the relative importance of cash flow and discount rate variations at the portfolio-level, sorted by size and value. The literature encompasses many studies advocating firms' size and value as priced risk factors (Banz, 1981; Fama and French, 1993). Size and value do not meet the requirements to be considered as priced risk factors (Pukthuanthong and Roll, 2014). Therefore, using a novel method, this study is an attempt to provide fundamental explanations of what size and value can represent for utilizing cash flow and discount rate variations.

Table 5 reports the summary statistics of CF and DR of our sample using IBES estimates at the six portfolio-level. For the mean return, growth portfolios, whether large or small, have the lowest return among six portfolios. However, at the other side, value small/large portfolios enjoy the highest returns. Mean CF is also following the same pattern as the mean return in six portfolios. Mean CF rises when moving from portfolio one/four to portfolio three/six, i.e. moving from growth portfolios to value portfolios, mean cash flow increases. While the ascending pattern is very clear for CF, DR is following a mild rising pattern.

Mean DR increases from portfolio one/four to portfolio two/five, however, with the strong presence of CF value at portfolios three/six, mean DR deviates from previous pattern. Variance of CF is slightly higher than variance of DR at all horizons in all portfolios, except one-year ahead horizon of portfolio two and four.

Table 5: Summary statistics of equity capital gain returns, CFs & DRs at portfolio-level

		Horizons				
		One	Two	Three	Four	Five
Portfolio One	Mean(ret)	0.0052	-0.0147	0.0277	-0.0449	-0.0453
	Mean CF	0.0791	0.1797	0.0360	0.0654	0.1074
	Mean DR	0.0749	0.0019	0.1478	0.1559	0.2013
	Var (ret)	0.2885	0.3410	0.5385	0.3505	0.4094
	Var (CF)	0.1154	0.2594	0.3220	0.4173	0.2343
	Var (DR)	0.1150	0.2563	0.2237	0.2754	0.1138
Portfolio Two	Mean(ret)	0.0541	0.1030	0.1869	0.1953	0.2520
	Mean CF	0.0005	0.0265	0.1874	0.2304	0.0927
	Mean DR	0.0601	0.1690	0.1463	0.0534	0.3655
	Var (ret)	0.1455	0.2485	0.3575	0.4121	0.4331
	Var (CF)	0.1913	0.4410	0.6639	2.2830	0.6962
	Var (DR)	0.2225	0.3450	0.4261	2.1837	0.6643
Portfolio Three	Mean(ret)	0.1573	0.2372	0.3268	0.4419	0.5023
	Mean CF	0.1743	0.6245	1.8014	0.5356	0.6439
	Mean DR	0.0102	-0.2714	-1.4043	0.0670	0.3396
	Var (ret)	0.1912	0.2480	0.3846	0.5352	0.6178
	Var (CF)	0.3296	6.8266	86.6086	0.9224	1.4677
	Var (DR)	0.2945	6.8151	86.5215	0.3579	0.5333
Portfolio Four	Mean(ret)	0.0125	0.0501	0.1389	0.2153	0.2905
	Mean CF	0.0380	0.0603	0.1319	0.2116	0.2627
	Mean DR	0.0009	0.0360	0.0455	0.0553	0.0859
	Var (ret)	0.1230	0.1707	0.3169	0.4477	0.5801
	Var (CF)	0.1202	0.2184	0.3324	0.5065	0.6857
	Var (DR)	0.1490	0.1911	0.2783	0.4408	0.5988
Portfolio Five	Mean(ret)	0.0859	0.1923	0.2868	0.3905	0.5347
	Mean CF	0.0859	0.0849	0.0506	0.1829	0.3824
	Mean DR	0.0189	0.1726	0.3257	0.3468	0.3250
	Var (ret)	0.1681	0.3020	0.4651	0.6517	0.8525
	Var (CF)	1.8367	0.7656	1.6669	1.8796	1.2439
	Var (DR)	1.8346	0.6926	1.4466	1.4570	0.8919
Portfolio Six	Mean(ret)	0.1062	0.2460	0.3498	0.4455	0.6036
	Mean CF	0.2028	0.6088	0.7625	0.7112	0.9696
	Mean DR	-0.0626	-0.2857	-0.3345	-0.1026	-0.1470
	Var (ret)	0.1732	0.3362	0.4394	0.5786	1.0265
	Var (CF)	0.9547	22.4153	21.7611	7.1949	20.2225
	Var (DR)	0.8736	21.6347	21.7424	6.9055	19.479

Table 6 reports capital gain return decomposition into CF and DR shocks at portfolio-level using IBES earnings estimates. The percentages in the table show how much each of

CF and DR explain the variation in the return of the respective portfolio. In portfolio one, which represents small-growth stocks, it is DR which dominates in three out of five horizons. The difference is not much at two-year horizon (53% vs 47%), however, at five-year horizon, CF value is much large than DR (71% versus 29%). In portfolio two, neutral-growth stocks, DR dominates at the one- and two-years horizons with a descending trend (63% and 55%) until CF dominates at the three- and four-years horizons. In portfolio three, small-value stocks, DR is superior to CF at the one- and two-years horizons (51% and 76%), but CF dominates undeniably at the three- to five-years horizons.

Table 6: Return decomposition using IBES estimates

Portfolio		Horizons				
		One	Two	Three	Four	Five
Portfolio 1	CF	41.39%	53.34%	42.98%	43.42%	70.62%
	DR	58.61%	46.66%	57.02%	56.58%	29.38%
Portfolio 2	CF	36.32%	44.74%	52.80%	55.49%	42.27%
	DR	63.68%	55.26%	47.20%	44.51%	57.73%
Portfolio 3	CF	48.51%	23.40%	61.81%	67.56%	74.96%
	DR	51.49%	76.60%	38.19%	32.44%	25.04%
Portfolio 4	CF	42.90%	57.83%	61.51%	67.22%	62.50%
	DR	57.10%	42.17%	38.49%	32.78%	37.50%
Portfolio 5	CF	42.65%	42.49%	65.46%	67.64%	67.54%
	DR	57.35%	57.51%	34.54%	32.36%	32.46%
Portfolio 6	CF	45.87%	102.53%	64.16%	79.70%	81.40%
	DR	54.13%	-2.53%	35.84%	20.30%	18.60%

In portfolios four (large-growth stocks), five (large-neutral stocks) and six (large-value stocks), DR dominates at the one-year horizon, while CF takes dominance back from two- to five-years horizons. In all of large portfolios, CF rises over time, while DR declines. The dominance of CF over DR variations is more sensible in large stock portfolios (four to six), compared to small stock portfolios (one to three). This means that cash flow variations explain more of the variations in returns compared to discount rate variations.

8. Pre- and Post-financial Crisis

It is advised to examine the time-series trend of CF, DR and return in the sample period of the study for the sake of examining the effect of major financial events occurred in this period on the temporal behavior of CF, DR and return. In 2008, Malaysia has been hit by the negative shocks of financial crisis originated from the financial industry of the United States. GDP growth declined to 0.1% in the fourth quarter of 2008, compared to almost 6% average GDP growth in the first nine of this year. Since financial crisis is covered in the sample year of this study, it is advised to look at the trend of CF and DR in this period. For this purpose, Figures 1 depicts the annual trend in return, CF and DR in the aggregate-level at one-period ahead horizon.

For the period from 2000 to 2005, DR is properly associated with market return and tracks it significantly. In the same period, while showing good tracking power from 2000 to 2002, CF is not showing better association than DR in 2004 and 2005. However, after 2005 CF shows tracking power of actual return very well in one-year ahead horizon.

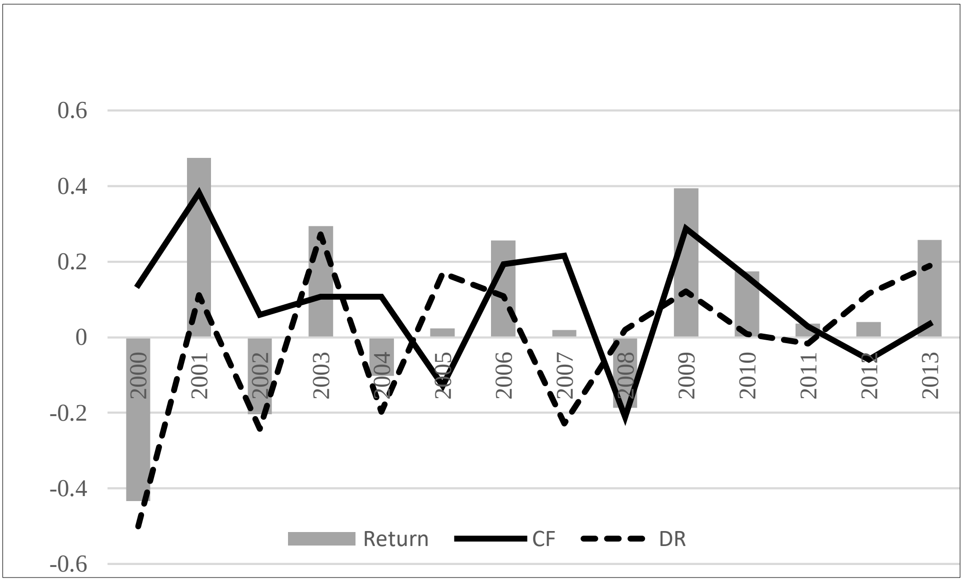

Figure 1: CF, DR and financial crisis

9. Comparison of ICC in Current Study with the Literature

Guedhami and Mishra (2009) found average ICC around 8.9 percent for 72 companies in Malaysia for the year 1996. Foong and Lim (2016) covered 76 firms and reported 15.54 percent for the period of 2002 to 2009. Hail and Leuz (2006) had a sample of 1,248 firm-year observation, covering 10 years from 1992-2001, and reported average ICC of 10.65 percent. Othman (2012) estimated average ICC around 8.3 percent with standard deviation of 18.3 percent for the period of 2000-2007 for 461 Malaysian listed companies. In this study, for the period of 2000-2015, ICC is estimated around 9.25 percent which is well in the range of the studies mentioned above. The standard deviation of ICC in this study is 5.83 percent which is much lower than above studies. There are no other studies in the context of Malaysia to the best of the author's knowledge which examined ICCs at portfolio level.

10. Concluding Remarks

Financial market participants, from academicians to investors and regulators, are interested to know how to price an asset or stock. Among many plausible methods, a practical suggestion is to do reverse engineering of the asset/stock's price to its constituents and utilize the same constituents for pricing asset. Once the constituents of an asset price have been known, it is time then to model it through different pricing models. The purpose of this study is focused on the first part of this task using return decomposition method and the modeling part is saved for future researches. Employing ICC-based return decomposition technique, this study investigates the relative importance of cash flow variations and discount rate variations at aggregate- and portfolio-level (sorted by size and value). Aggregate-level analysis helps to find the relationship between macroeconomic events like financial crisis with the changing trend of CF and DR. The motivation behind investigating CF and DR at portfolio-level is that size and value lacks the features of a priced risk.

Summary statistics of CF and DR shows that mean CF is higher than mean DR at all horizons at the aggregate-level. The variance of CF is higher than the variance of DR at all horizons. The results of the aggregate-level decomposition show that CF drives 0.43, 0.54, 0.65, 0.67, and 0.69 of the change in capital gain return at one- to five-year ahead horizon, respectively. CF has an important role right from one-year ahead horizon and its importance dominates DR beyond one-year horizons. The return decomposition results prove that DR is the main driver in short-term (less or equal one year ahead horizon). Also, beyond one-year, CF share in not negligible and dominates DR with a considerable magnitude. In sum, the findings provide evidences on the importance of CF which is highly ignored in the literature.

At the portfolio-level, the overall picture of the return decomposition output shows several patterns. First, in all small/large value/growth portfolios, it is DR which dominates at one-year horizon (short-term). This is in line with the results of the aggregate-level decomposition. Second, the importance of CF increases with lengthening horizon. In small/large value portfolios, CF dominates DR beyond one-year horizons. In five-year ahead horizon, CF drives over 0.70 of the change in return. Third, moving from growth portfolios (one and four) to value portfolios (three and six), the contribution of CF to change in return generally increases, with few exceptions. These patterns present fundamental explanation for the fact that value premium is related to the cash flow news of value stocks.

Examination of importance of CF and DR helps to comprehend one of the channels by which firm' accounting information is absorbed in investment opportunities in the market. Value relevance of accounting information (earning per share) is of great interest for regulators, policy makers, practitioners and investors. Knowing the changing nature of CF and DR highly matters for market participants' understanding of stock price change origination. At the empirical level, investigation about the contributions of each of cash flow variations and discount rate variations can help financial market participants to monitor market more efficiently and effectively for any piece of information related to drivers of price change in market, both at firm level and at the aggregate level. For example, knowing the sensitivity of a certain stock to cash flow or discount rate variations, they can foresee the effect of any coming variations on the price. This study shows that value stocks are more affected by the cash flow variations, rather than discount rate variations.

Finally, highlighting the importance of cash flow variations should warn regulatory bodies to monitor accounting standards of earning announcement of the companies more efficiently and effectively. This entails ensuring companies undergo proper accounting procedures and methods to provide reliable earning measures and ensure earning quality in their financial statement. Firms' earning can be manipulated by some accounting procedures, among them discretionary accrual management and earning smoothing. This also relates to IBES analysts who benchmark their earnings' forecasts with the actual (street) earning, which is computed by deducting discretionary items form firm's earning. This way analysts make sure there is a fair comparison between their forecasts and companies' actual earning.

Fama and French (2015) proposed five-factor asset pricing model which precedes the explanation power of their three-factor model. Profitability and investment factors are added to beta, SML (size premium), HML (value premium) factors. Profitability factor accounts for cash flow variations which is the focus of this study. Insertion of CF measure improved the explanation power of their model. Consequently, the advantage of using cash flow measures in the asset pricing model is acknowledged in Fama and French's recent work. They also acknowledge that "the factors are just diversified portfolios that provide different combinations of exposures to the unknown state variables." This means that SML and HML factors are not the true risk factors (Pukthuanthong and Roll, 2014). The cash flow-based explanation of this study may be the answer to these reservations (underlying unknown risk factors). The findings of this study document significant cash flow variations in value portfolios. The credibility of cash flow-based explanation is risen when FF found that the inclusion of profitability and investment factors led to the value factor (HML) become redundant. This means that profitability captured the marginal effect of HML in FF model. This is in line with the finding of this study that the return movements in value portfolios are mostly driven by cash flow variations. In the case of size anomaly, cash flow-based explanation could not reach a conclusive deduction in this research. Likewise, FF still employs SML in their five-factor model.

In conclusion, the current study is based upon the argument that cash flow shocks have an important role in driving stock price movements and return. This finding has a significant bearing on the theoretical asset pricing models. At the theoretical level, the result of this study can help developing asset pricing models with cash flow and discount rate risks for asset valuation. The potential model can help digesting other issues in finance such as capital budgeting, capital structure, investment theories and so on.

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