THE IMPORTANCE OF CASH FLOW NEWS FOR INTERNATIONALLY OPERATING FIRMS

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June 2011

ABSTRACT

Internationally operating firms are exposed to frictions that increase the importance of unexpected changes in their future cash flows. Applying Campbell's (1991) variance decomposition framework, we find that cash flow news of internationally operating firms are more dominant than that of domestically operating firms. Moreover, the covariance between cash-flow and discount rate news is higher for firms with international exposure.

Keywords: Variance Decomposition, Cash-Flow News, Foreign Currency Exposure, Internationalization Process

JEL Classifications: G12, G15; EFM Classification Code: 330

We thank Assaf Eisdorfer and Tom O'Brien for their helpful comments.

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I. Introduction

Stock prices move by changes in either expected cash flows or discount rates. Based on the log linear dividend ratio model of Campbell and Shiller (1988), Campbell (1991) uses a vector autoregressive (VAR) model to decompose the variance of unexpected stock returns into the variances of cash-flow news and discount rate news (expected rate of return news) and their covariance term. He shows that expected return news is primarily responsible for moving stock prices at the market level. Vuolteenaho (2002) finds that at the firm level stock returns are mainly driven by cash-flow news; and he shows further that cash-flow news can be diversified within portfolios while discount rate news is highly correlated across firms.[1]

In this paper we argue that cash-flow news becomes more dominant in moving stock prices of internationally operating firms. Firms that produce and sell in different countries face more frictions than their domestically operating counterparts. Market entry and exit costs associated with exporting products or operating production facilities abroad can be substantial.

[1] Additional VAR decomposition papers include Campbell and Ammer (1993), who decompose returns of stock and bond markets and find similar results to Campbell (1991); Ammer and Mei (1996) use VAR decomposition to measure financial linkages between countries and find that cash flow news is highly correlated among countries; Campbell and Vuolteenaho (2004) decompose the CAPM beta into a cash-flow-beta and discount-rate-beta, arguing that news about future cash flows should have a higher price of risk. Priestley (2001) studies the time-varying persistence of expected returns, and finds that one unit of expected rate of return news can have an impact between 2% to 30% on asset prices. Eisdorfer (2007) finds that cash flow news become more dominant for financially distressed firms and that more bankruptcies occur following negative cash flow shocks than positive discount rate shocks.

Firm entry into a foreign-based market requires costly information gathering[2] on supply and demand conditions, business culture, risks, growth opportunities, competition, and structure of foreign institutions. Companies incur substantial sunk costs at an early stage due to country borders, trade restrictions and other barriers to entry. Additional entry, exit and operating costs are created by complex tax and regulatory environments. Firms operating production facilities abroad are subject to local laws and regulations which can significantly affect the firm's ability to operate in the foreign country. In addition, international operations expose firms to changes in foreign currency exchange rates (FX).

These frictions magnify the significance of unexpected changes or shocks. To illustrate this argument consider a firm that produces in its home country and sells in a foreign country, and suppose that at some point there is a negative shock to the demand of the firm's products in the foreign country. Due to the difficulties to react quickly to unexpected changes in a foreign country, this demand shock will force the firm to either keep its operation in the foreign country (and bear the low-demand costs), [3] or remove its operations from that country (and bear the costs of the frictions describe above). Either way such a shock to expected cash flows will have a stronger impact on the firm value than that for its domestic peers.

We study whether investors incorporate the relative importance of cash flow news into the pricing process of firms with international exposure. Using Campbell's (1991) approach, we

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[2] Johanson and Vahlne (1977) describe the internationalization process of firms as a sequence that starts by exporting a product and then moves to the establishment of a foreign sales subsidiary, to licensing agreements and similar contracts before actual investment in the form of foreign production facilities takes place. The individual firm then moves from a relatively low risk export oriented stage to a higher risk foreign production stage that involves foreign direct investment (FDI).

[3] Prior economic literature describes persistence in prices and quantities of traded goods, as well as FX effects on firm entry and exit decisions. Among others, Baldwin (1990) discusses hysteresis in international trade based on sunk market entry costs; Dixit (1989) shows that even small sunk costs can crate hysteresis in firm entry and exit decisions; Baldwin and Krugman (1989) describe persistent effects of large FX shocks on trade, similarly Baldwin (1989) describes persistent effects of FX rate changes on prices and quantities of traded goods, including U.S. import prices; Campa (1994) studies the chemical processing industry and shows that FX rate changes affect firm investment decisions abroad.

decompose the returns of all firms on Nasdaq, Amex and the NYSE, with the exception of financial firms and utility companies. Our sample spans the period from January 1973 to December 2009. Estimating the extent of international operations of a firm is problematic, mainly due to limited data availability. We measure the level of a firm's international exposure by estimating firm level FX equity exposures (following Jorion (1990, 1991)[4]). This broad market-based measure allows us to use a large sample of firms, including many small firms[5] with substantial international exposure. We argue that firms with higher FX equity exposure are more likely to receive foreign-based cash flow and discount rate news. We find that cash flow news is more dominant for internationally operating firms. Furthermore, we observe that the covariance between cash flow and discount rate news is higher for internationally exposed firms.

Our paper is closely related to Vuolteenaho (2002), Eisdorfer (2007), and Castrén, Osbat and Sydow (2006). The latter paper decomposes FX returns to study different segments of the FX market. Castrén et al. (2006) find that intrinsic value news[6] are dominating for equity and speculative money market investors while investors in currency options markets react more strongly to expected return news. Whereas Voulteenaho (2002) shows that the importance of cash flow news is affected by firm size, and Eisdorfer (2007) demonstrates that the firm's level of financial distress is positively related to the impact of cash flow news, our paper points out that the dominance of cash flow news is positively affected by the firm's degree of international exposure.

[4] The literature on FX exposures of individual firms is vast. See Bartram and Bodnar (2007) for a good summary of FX exposure-related literature.

[5] Chow, Lee and Solt (1997) find that small firms have higher FX exposures which they attribute to economies of scale in FX hedging; Bodnar and Wong (2003) find the same strong inverse relationship between firm size and FX exposure.

[6] Intrinsic value news is the approximate FX-equivalent of cash flow news.

The organization of this paper is as follows. Section two describes the variance decomposition framework as introduced by Campbell (1991), the estimation process of a firm's propensity of receiving foreign-based cash flow news, and size effects on variance decomposition and firm-level FX equity exposure. Section three describes the data. Section four presents the variance decomposition and the regression results, and section five concludes.

II. Methodology

A. The Variance Decomposition Framework

We follow Campbell (1991) and use a log-linear dividend-ratio model to decompose unexpected real stock returns into changes in the rational expectations of future dividend growth and future stock returns. Based on Campbell (1991), the unexpected real stock returns can be expressed as:

$$h_{t+1} - E_t h_{t+1} = (E_{t+1} - E_t)\sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} - (E_{t+1} - E_t)\sum_{j=1}^{\infty} \rho^j h_{t+1+j} \tag{1}$$

where h_{t+1} is the log return on a stock, d_{t+1} is the log dividend paid by the stock, ρ is a constant of linearization[7], Δ denotes a one-period change, and E_t is the rational expectation operator at time t. Based on Equation (1), unexpected stock returns are associated with changes in expectations of future cash flows or discount rates. For unexpected stock returns to be positive,

[7] ρ is a number slightly smaller than one and can be estimated by: $\rho = \frac{1}{(1+exp(f))}$ where f is the sample mean of the log dividend price ratio. Campbell and Shiller (1988) discuss the approximation process whereas Campbell and Mei (1993) and Vuoleenaho (2002) find that equation (1) holds well for a wide range of possible ρ. Based on our sample $\rho = 0.996$

either future dividend growth has to increase, or expected future stock returns have to decrease, or both. Equation (1) can be expressed in news-terms:

$$U_{r,t+1} = N_{cf,t+1} - N_{er,t+1} \tag{2}$$

$$U_{r,t+1} \equiv h_{t+1} - E_t h_{t+1} \equiv \mathit{unexpected\ stock\ return} \tag{3}$$

$$N_{cf,t+1} \equiv (E_{t+1} - E_t) \sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} \equiv \mathit{news\ about\ future\ cash\ flows} \tag{4}$$

$$N_{er,t+1} \equiv (E_{t+1} - E_t) \sum_{j=1}^{\infty} \rho^j h_{t+1+j} \equiv \mathit{news\ about\ future\ stock\ returns} \tag{5}$$

Following from equation (2), the variance of unexpected stock returns can be decomposed into the variance and covariance terms of cash flow and expected rate of return news:

$$Var(U_{r,t+1}) = Var(N_{cf,t+1}) + Var(N_{er,t+1}) - 2Cov(N_{cf,t+1}, N_{er,t+1}) \tag{6}$$

Furthermore, Campbell (1991) shows that news about cash flows and news about future returns can be expressed as:

$$N_{cf,t+1} = (e1' + \lambda')w_{t+1} \tag{7}$$

$$N_{er,t+1} = \lambda' w_{t+1} \tag{8}$$

where $\lambda \equiv e1'\rho A(I - \rho A)^{-1}$. A is the companion matrix of a first-order vector autoregressive (VAR) system of the form: $z_{t+1} = Az_t + w_{t+1}$ (where z is the vector of the VAR variables and w is the vector of the error terms with a corresponding variance/covariance matrix that is denoted by Σ.). $e1$ denotes a vector whose first element is one and whose other elements are zero. More persistent variables receive more weight in the pricing relation which is captured by the term $(I - \rho A)^{-1}$. The variance and covariance terms of equation (6) can be expressed as:

$$Var(N_{cf}) = (e1' + \lambda')\Sigma(e1 + \lambda) \quad (9)$$

$$Var(N_{er}) = \lambda'\Sigma\lambda \quad (10)$$

$$Cov(N_{cf}, N_{er}) = (e1' + \lambda')\Sigma\lambda \quad (11)$$

B. Estimating a Firm's Propensity of Receiving Foreign-Based Cash Flow News

In order to distinguish between foreign-based cash flow news and domestic based cash flow news, it is necessary to estimate the degree of a firm's international involvement. Firms with a high level of international activity will experience more foreign-based cash flow innovations relative to their domestic peers. Publicly available information on a firm's degree of international exposure is limited. Prior literature has identified proxy variables, such as the ratio of foreign-based income to total income, that are helpful in identifying firm-level international exposure. However, empirical results indicate that these variables are too narrowly defined and often fail to capture the complexities of international trade. Another commonly used solution is to limit the sample to firms that are obviously exposed to international trade, such as multinational corporations (MNCs). Unfortunately this approach omits many small to mid-sized firms with substantial international activity.

We avoid limiting our sample and use estimated FX equity exposure as our proxy variable. Jorion (1990, 1991), based on the work of Adler and Dumas (1984), suggests the following model:

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + \delta_j R_{FXt} + \varepsilon_{jt} \quad (12)$$

where R_{jt} is stock j's holding period return, R_{Mt} is the return of the value-weighted U.S. market index[8], and R_{FXt} is the rate of return of trade-weighted basket of foreign currency measured in USD terms[9]. Although Jorion's (1990, 1991) approach has been widely used in the empirical literature, we modify our model to capture potential lead/lag relations between changes in FX rates and equity returns[10]. In the spirit of Dimson (1979), we estimate the FX exposure coefficient as follows:

$$Dimson\_\gamma_{j,t} = \gamma_{1,j,t} + \gamma_{2,j,t-1} + \gamma_{3,j,t-2} \tag{13}$$

where $\gamma_{1,j,t}, \gamma_{2,j,t-1}$ and $\gamma_{3,j,t-2}$ are ordinary least squares estimates of the following model:

$$R_{j,t} = \alpha_{j,t} + \beta_{j,t} R_{Mt} + \gamma_{1,j,t} MCI\_R_t^{USD/FC} + \gamma_{2,j,t-1} MCI\_R_{t-1}^{USD/FC} + \gamma_{3,j,t-2} MCI\_R_{t-2}^{USD/FC} + \varepsilon_{j,t} \tag{14}$$

where $R_{j,t}$ is the CRSP holding period return of stock j, R_{Mt} is the monthly return of the value-weighted U.S. market index, and $MCI\_R_t^{USD/FC}$ is the continuously compounded rate of return of the major currency index (MCI)[11].

Although FX equity exposure measures post-hedging sensitivity of stock returns to changes in FX rates, it is commonly used in FX literature to proxy for FX cash flow exposure. We believe that firms with higher-magnitude FX cash flow exposures are more likely to receive

[8] Other commonly used market control variables include the equal-weighted U.S. market index, returns of size-matched equity portfolios, and the Morgan Stanley Capital International (MSCI) world index. Bodnar and Wong (2003) show that the choice of market control variable causes substantial differences in FX exposure estimates.

[9] As summarized by Bartram and Bodnar (2007), previous researchers have used different trade-weighted currency baskets, as well as bilateral FX rates. Although less precise, the use of currency baskets mitigates the multicollinearity problem that arises by using multiple bilateral FX rates.

[10] See Amihud (1994) for a more detailed description.

[11] The Major Currency Index (MCI) index is a trade-weighted basket containing the currencies of major U.S. trading partners. We use the convention of measuring the exchange rate in U.S. dollars per foreign currency. With this convention, the cash flow of an exporting firm would tend to have a positive FX exposure, and the cash flow of an importing firm would tend to have a negative FX exposure.

foreign-based cash flow news. Based on this view, we define international exposure broadly. In their seminal paper, Adler and Dumas (1984) describe a domestic utility company that is exposed "indirectly" to changes in FX rates through its major customers. Using our Dimson-Gamma FX exposure measure will therefore include firms that are indirectly exposed to international operations. On the other hand, if internationally operating firms manage their FX exposure effectively, FX equity exposure estimates might be close to zero[12]. Despite its shortcomings, Dimson-Gamma allows us to use a large sample of firms and captures firm-level international exposure across a wide spectrum.

C. Firm Size Effects on Variance Decomposition and FX Exposure Coefficients and Diversification Effects on Variance Decomposition

There is empirical evidence that firm size (market capitalization) affects variance decomposition results as well as FX exposure estimates. Vuolteenaho (2002) finds that the variance of cash flow news, the variance of expected rate of return news, and the covariance terms of the two news components decrease approximately monotonically with firm size. He also finds that cash flow news is relatively more important for larger firms and provides two potential explanations. First, the market is potentially underreacting to small-firm cash flow news (DeBondt and Thaler, 1985). Second, for small stocks, news about future higher profitability coincides with temporary increases in risk (Vuolteenaho, 2002).

Empirical findings in the FX exposure literature suggest a negative relation between the magnitude of firm-level FX exposure measures and firm size. Among others, Chow, Lee and

[12] The effects of FX hedging on firms' cash flow FX exposures is unclear. Bodnar, Hayt and Marston (1998) and Allayanis and Weston (2001) find that firms hedge currency risk. Conversely, Guay and Kothari(2003) find that cash flows from hedging are too small relative to firm size.; Hentschel and Kothari (2001) find no differences in risk between firms that hedge and firms that do not hedge with derivatives.

Solt (1997) and Bodnar and Wong (2003) document this relationship. Potential explanations of the FX exposure size effect include differences in FX hedging among firms. FX exposure estimates measure firm FX exposure net of its hedging activities. Small firms, through their relationships with financial institutions, do not have the same access to hedging tools as their bigger counterparts. In addition, economies of scale in hedging make it more costly for smaller firms to manage their FX exposures. In order to control for size effects, we form double-sorted portfolios based on size and FX equity exposure quintiles.

Moreover, Vuolteenaho (2002) shows that cash flow news can be diversified by forming equal-valued portfolios while expected rate of return news is highly correlated across firms. As a result, portfolio-level variance decomposition results can be affected by the level of diversification within portfolios. To control for potential differences in portfolio diversification, we decompose individual stock returns instead of portfolio returns. The equal-weighted quintile portfolios summarize firm-level variance decomposition results. We believe that this approach adds to the robustness of our results.

III. Data

Following Eisdorfer (2007), we use three different VAR specifications. As in Campbell (1991), the first specification includes the log of realized stock returns, the dividend yield, and the relative bill rate as the predictive variables in the VAR system. For the second and third VAR specifications, we replace the dividend yield with two alternative measures for future cash flows. Larrain and Yogo (2008) use net payout as a cash flow proxy. Net payout is measured as dividend plus equity repurchase, net of newly issued equity[13]. As suggested by Vuolteenaho (2002), our third VAR specification uses return on equity (ROE) as the predictive cash flow variable.

All data span the period from January 1973 to December 2009 and include all firms listed on Nasdaq, Amex and the NYSE with the exclusion of financials and utilities. Monthly stock return data were taken from CRSP, the monthly major currency index (MCI) data come from the Federal Reserve's H.10 tables, the monthly risk free rate was retrieved from Kenneth French's website, and firm net income data was obtained from the quarterly COMPUSTAT files.

Table I presents summary statistics and tests of stationarity for: 1) The monthly excess return of the U.S. value-weighted market index (RET), 2) the relative bill rate (RREF), which is the difference between the one-month U.S. treasury bill rate and its twelve-month backward moving average (see Fama and Schwert, 1977), 3) the monthly dividend yield (DP), which was calculated by using with- and without dividend stock returns data from CRSP following the approach by Fama and French (1988), 4) net payout (NP), which is dividends and stock repurchases net of new equity issued, following, 5) returns on equity (ROE) which is the sum of four quarters of net income, divided by current firm market capitalization, 6) the trade- weighted continuously compounded monthly return of a basket of major U.S. trading partner foreign currencies (MCI), and 7) the FX equity exposure measure, or Dimson-Gamma (GAMMA). In Panel B we report summary statistics for FX exposure quintiles, where FX Quintile 1 contains

[13] Following Boudoukh, Michaely, Richardson, and Roberts (2007), the net payout for firm i in month t is calculated by:

$$Dividend_t + (shrout_{t-1} \times cfacshr_{t-1} - shrout_t \times cfacshr_t) \times \left(\frac{prc_t}{cfacpr_t} + \frac{prc_{t-1}}{cfacpr_{t-1}}\right)/2$$

where $shrout$ is the number of shares outstanding, $cfacshr$ is the cumulative factor to adjust shares, prc is the month-end share price, and $cfacpr$ is the cumulative factor to adjust price. All data is available from CRSP.

firms with the most negative FX exposure coefficients (-1.588 on average). Conversely, FX Quintile 5 includes firms with the most positive FX exposure measures (1.347 on average).

All variables with the exception of Dimson-Gamma are stationary at the 95-percent confidence level according to the Augmented Dickey-Fuller test. The results of the Phillips-Perron test show that ROE might also include a unit root. Panel B indicates that firms with larger magnitude FX exposures experience higher equity return standard deviations, 6.944% and 6.837% for FX Quintiles 1 and 5, compared to 4.832% for Quintile 3. During our sample period, the average returns for the high FX equity exposure Quintiles were negative (-0.358% for Quintile 1 and -0.294% for Quintile 5) compared to positive average portfolio returns for Quintiles 2 through 4 (0.562% for Quintile 3). Furthermore, there is a negative relation between firm-level FX equity exposure and dividend yield; however this is not hold true net payout.

[Insert Table I approximately here]

IV. Empirical Findings

In the first part of this section we present variance decomposition results using realized equity returns, dividend yield and the relative bill rate as predictive variables in the VAR system. The second part reports variance decomposition results based on two alternative specifications of the VAR: 1) We replace dividend yield with net payout, and 2) We replace dividend yield with ROE as the cash flow proxy. In the third part of this section, we expand our initial analysis and present results of two regression models. We show that the significance of cash flow news, $Var(N_{cf})/Var(U_r)$ where N_{cf} is cash flow news, and U_r are total unexpected returns, is positively related to the firm's propensity of receiving foreign-based cash flow news.

A. Variance Decomposition Results when the Predictive Variables are Realized Returns, Dividend Yield and the Relative Bill Rate

Table II shows the VAR decomposition results using realized stock returns, dividend yield and the relative bill rate as the predictive variables. Individual firm variance decomposition results are trimmed by 1%[14] and sorted into 25 double-sorted portfolios. First, we sort firms into size quintiles, where Size 1 contains the smallest firms and Size 5 the largest firms. The second sort is by our FX exposure proxy (Dimson-Gamma). The FX 1 quintile contains firms with the most negative FX equity exposures, whereas FX 5 captures firms with the most positive FX equity exposure measures. FX 3 contains firms with the lowest propensities of receiving foreign-based cash flow news.

Consistent with the findings of Vuolteenaho (2002), we find that the variance of cash flow news is substantially higher than the variance of discount rate news. For the entire sample, the average variance of cash flow news is 0.0406 and the discount rate news variance is 0.0065. The covariance between cash flow and discount rate news is 0.0054, resulting in a positive correlation between the two news terms. Moreover, the variance of cash flow news and the variance of discount rate news decrease monotonically with firm size. The average variance of cash flow news decreases from 0.0240 in the Size 1 quintile to 0.0109 in the Size 5 quintile. Similarly, the average variance of discount rate news drops monotonically from 0.0033 to 0.0023 with increases in firm size.

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[14] We trim the firm-level variance decomposition results by excluding 1% of the right and left hand side tails of the following two variance significance ratios: $Var(N_{CF})/Var(U_R)$ and $Var(N_{ER})/Var(U_R)$. Our main empirical findings are not sensitive to this trimming.

Within each of the size quintiles, we observe that the variance of cash flow news is highest for FX quintiles 1 and 5 and smallest for FX quintile 3. The same U-shaped pattern holds true for discount rate news, as well as the covariance between cash flow and discount rate news.

[Insert Table II approximately here]

Table III examines the relative importance of the news components in driving stock prices. We measure the relative importance of cash flow news as the ratio of the variance of cash flow news to the variance of unexpected stock returns: $Var(N_{cf})/Var(U_r)$. Similarly, the significance of discount rate news is measured by the ratio of the variance of discount rate news to the variance of unexpected returns: $Var(N_{er})/Var(U_r)$. Finally, the importance of the interaction between cash flow and discount rate news is measured as the ratio of the covariance between the news terms (multiplied by negative two) to the variance of unexpected returns: $-2Cov(N_{cf}, N_{er})/Var(U_r)$. We report results for the entire sample and each of the 25 equal-valued double-sorted portfolios.

Consistent with Vuolteenaho (2002), we find that individual stock prices are primarily determined by cash flow news. Based on our entire sample, the importance of cash-flow news is 1.0664 compared to 0.2162 for discount rate news and -0.2826 for the covariance term. Moreover, cash flow news is more dominant in determining stock prices of firms with higher-magnitude FX exposures. For size quintile 3 (medium size firms), the significance of cash flow news for FX 1 is 1.110, 1.2009 for FX 5 and 1.0070 for firms in FX 3. The latter result indicates that cash flow news is more dominant for firms that are more likely to have foreign-based cash flow news. Within size quintiles 1 through 4, the effect is more pronounced for firms that are likely to be net exporters (positive Dimson-Gamma measures). In the largest size quintile the effect appears to be more balanced between firms with negative and positive FX exposures.

There is no discernible difference in the relative importance of discount rate news among the different size and FX exposure quintiles. However, the importance of the news covariance term increases with the level of the firm's international exposure. For medium-sized firms (Size 3), the significance of the news covariance term is -0.3144 for FX 1, -0.4242 for FX 5, and -0.2103 for FX 3. Similar to the findings in Panel B, the results are more pronounced for firms with positive FX exposure coefficients. ANOVA F-tests indicate that all differences among cash flow news and the news covariance terms (Panels B and D) are statistically significant at the 95-percent confidence level.

[Insert Table III approximately here]

Figure 1 summarizes the results in Panel B of Table III graphically. The relative importance is depicted on the vertical axis of the graphs and the FX quintile portfolios are on the horizontal axis. As observed in Table III, the significance of cash flow news follows a U- or V-shaped pattern within the size quintiles. The U-shape pattern is least pronounced for small-size firms and becomes more substantial with the size of the firm (Size 4 and Size 5 portfolios depict the most pronounced U-shapes).

[Insert Figure 1 approximately here]

B. Variance Decomposition Results when Cash Flow Proxy Variables are Net Payout and Return on Equity

Variance decomposition results are affected by the choice of predictive variables in the vector autoregressive system. Following Eisdorfer (2007), we use two alternative specifications of the vector autoregressive model. As suggested by Larrain and Yogo (2008), net payout, which is dividend payments plus net repurchases (repurchases minus newly issued equity) might be a better cash flow measure for the VAR system. Table IV reports the variance decomposition results that use realized stock returns, net payout and the relative bill rate as predictive variables. Consistent with the findings of Larrain and Yogo (2008), the average relative importance of cash flow news increases from 1.0664 to 1.1549, while the significance of discount rate news declines from 0.2162 to 0.1724. The news covariance term increases in significance (magnitude) from -0.2826 to -0.3273.

Consistent with our findings in Section A, cash flow news is more significant for internationally operating firms. For medium-sized firms, the relative importance of cash flow news in FX quintiles 1 and 5 are 1.1502 and 1.2559, compared to 1.1276 for firms in FX 3. This result is magnified for firms with the most positive FX exposures. On average, firms in FX quintile 5 have a relative importance of cash flow news of 1.2039 compared to 1.1547 for firms in FX 1 and 1.0986 for firms in FX 3. Furthermore, the relative importance of the news covariance term is higher for firms in FX quintiles 1 and 5, mirroring the pattern of the significance of cash flow news.

Using net payout as the predictive cash flow variable, we find similar results for discount rate news. Panel C shows that discount rate news of internationally operating firms is more significant than the discount rate news of their domestically operating peers. For medium-sized firms, the relative importance of discount rate news for FX quintiles 1 and 5 are 0.1560 and 0.2001, compared to 0.1312 for FX 3. For size quintiles 1 through 4 this result is more pronounced for firms with positive FX exposure measures. The effect is more balanced for the Size 5 quintile. Figure 2 depicts the significance of cash flow news across all size quintiles. The results are similar to Figure 1, showing that the choice of cash flow proxy does not affect our main findings.

[Insert Table IV approximately here]

[Insert Figure 2 approximately here]

Vuolteenaho (2002) suggests the use of return on equity (ROE) as a cash flow proxy. We use quarterly COMPUSTAT data to compute ROE. Estimating the VAR system based on quarterly observations affects variance decomposition results. The number of firms in our sample decreases from 11,967 to 2,120. To reduce noise in the VAR estimation process, we require a minimum of 48 consecutive quarterly observations for each firm. In order to avoid any seasonality in firm earnings, we measure ROE as the sum of the past four quarters of net income divided by the current market capitalization of the firm. The variance decomposition results using ROE as the cash flow proxy are reported in Table V and Figure 3 and show that our previous findings are robust to the choice of predictive variables in the VAR system.

Table V shows that the relative importance of cash flow news (medium-sized firms) for FX 1 and FX 5 are 1.1377 and 1.1324, compared to 1.0588 for firms in FX 3. Similarly, the importance of discount rate news in FX quintile 3 is 0.5033 relative to 0.5094 and 0.4128 in the FX 1 and FX 5 quintiles. The significance of the news covariance term is also higher for internationally exposed firms. For medium-sized firms, the significance of the news covariance terms are: -0.6410, -0.4716, and -0.6418 for FX 1, FX 3 and FX 5 respectively. However, using ROE does not indicate that there is a significant difference between firms with positive and negative FX exposure coefficients.

[Insert Table V approximately here]

[Insert Figure 3 approximately here]

C. Regression Results using the Relative Importance of Cash flow News Variance, Dimson-Gamma and Firm Size

In this subsection we report regression-based results, using the relative importance of cash flow news as the dependent variable and the firm's propensity of being exposed to foreign-based cash flow news as the explanatory variable (while controlling for firm size). The VAR system used to estimate the relative importance of cash flow news uses log realized returns, dividend yield and the relative bill rate as predictive variables. We estimate the following regression model and report our results in Table VI.

$$Var(CF^*)_i = \alpha_i + \zeta_i(Gamma)_i + \xi_i(Size)_i + \varepsilon_i \tag{15}$$

where $Var(CF^*)_i$ is the ratio of the variance of cash flow news to the variance of unexpected returns of firm i $\left(Var\left(N_{cf}\right)/Var(U_r)\right)$, $Gamma_i$ is the value of the Dimson-Gamma measure of firm i, and $Size_i$ is the natural log of the average market capitalization of firm i. We expect ζ_i to be negative in sign for firms with negative Dimson-Gamma measures (this subsample is likely to contain net importing firms). Conversely we expect ζ_i to be positive for firms with positive Dimson-Gamma estimates (this subsample is likely to contain net exporting firms). Vuolteenaho

(2002) finds that cash flow news become more important for lager firms, therefore we expect ξ_i to be positive in sign.

Panel A summarizes the regression results of equation (15) for 6,666 firms with negative Dimson-Gamma FX exposure coefficients. Consistent with expectations, $\tilde{\zeta}_i$ shows that on average, for each 1 unit decrease in Dimson-Gamma, the relative importance of cash flow news increases by 5.1 %, controlling for firm size. Furthermore, $\tilde{\xi}_i$ indicates that the relative importance of cash flow news increases with firm size. The heteroscedasticity consistent t-statistics indicate that both results are statistically significant at the 99-percent confidence level. 5,301 firms in our sample have positive FX exposure coefficients. Consistent with our expectations, each one unit increase in our Dimson-Gamma measure is associated with a 5.4% increase in the relative importance of cash flow news. Moreover, the relation between the importance of cash flow news and firm size is also positive.

[Insert Table VI approximately here]

V. Conclusions

Internationally operating firms are exposed to additional frictions which affect their ability to react to shocks. Market entry and exit costs associated with exporting products or operating production facilities abroad can be substantial. Companies incur substantial sunk costs at an early stage due to country borders, trade restrictions and other barriers to entry. These frictions magnify the significance of unexpected changes or shocks. We argue that due to these additional frictions cash-flow news becomes more dominant in moving stock prices of internationally operating firms.

Using three different VAR specifications, we decompose firm-level stock returns of all firms on Nasdaq, Amex and NYSE with the exclusion of financials and utilities. We define international exposure broadly by using a FX equity exposure to proxy for a firm's propensity of receiving foreign-based cash flow news. We control for size and diversification effects by forming double-sorted quintile portfolios (size and FX exposure) that summarize our firm-level variance decomposition results.

Our results indicate that investors distinguish between foreign- and domestic-based news components when valuing firms. Using log-returns, dividend yield, and the relative bill rate as predictive variables in the VAR system, we find that cash flow news is relatively more important for firms with higher-magnitude FX exposures. We observe similar results for the covariance terms between cash flow and discount rate news. The results are more pronounced for firms with positive FX exposure coefficients (firms that are likely net exporters). Similar results are found using net payout and ROE as alternative cash flow proxies.

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Table I
Descriptive Statistics, Stationarity Tests and Correlations

Table I presents descriptive statistics and tests of stationarity for our entire sample in Panel A, whereas Panel B splits the sample into FX exposure quintiles, where FX Quintile 1 contains the firms with the most negative FX exposure coefficients, conversely, FX Quintile 5 captures firms that have the most positive FX exposure measures. Summary statistics for the following variables are reported: 1) Continuously compounded holding period stock returns including dividends (RET); 2) The relative bill rate (RREF) is the difference between the one-month treasury bill rate and its one-year backward moving average; 3) The monthly dividend yield (DP) is computed using the returns with and without dividends from CRSP, following the approach of Fama and French (1988); 4) The net payout (NP) which is computed following the methodology of Boudoukh, Michaely, Richardson, and Roberts (2007) and is equals dividends plus stock repurchases minus new equity issued, divided by market equity; 5) Return on equity (ROE) which is calculated by adding the past four quarters of net income, divided by market equity (Eisdorfer (2007), Vuolteenaho (2002)); 6) The major currency index (MCI) denotes the monthly log returns of a trade-weighted basket of currencies of major U.S. trading partners, we use the reciprocal of the MCI index and therefore express changes in the value of the foreign currency basket measured by the USD; and 7) Dimson-Gamma, which is the FX equity exposure coefficient estimated by using a Dimson (1979) version of the approach suggested by Jorion (1991): $Dimson\_\gamma_{j,t} = \gamma_{1,j,t} + \gamma_{2,j,t-1} + \gamma_{3,j,t-2}$ where $\gamma_{1,j,t}, \gamma_{2,j,t-1}$ and $\gamma_{3,j,t-2}$ are OLS estimates of the following equation: $R_{j,t} = \alpha_{j,t} + \gamma_{1,j,t} MCI\_R_t^{USD/FC} + \gamma_{2,j,t-1} MCI\_R_{t-1}^{USD/FC} + \gamma_{3,j,t-2} MCI\_R_{t-2}^{USD/FC} + \varepsilon_{j,t}$. ADF Tau is the test statistic of the Augmented Dickey-Fuller test with its corresponding p-value, and PP Tau is the Phillips-Perron test statistic with its corresponding p-value. All results are based on monthly data on all firms listed on the NYSE, Amex, and Nasdaq with the exclusion of financial and utilities industries. The sample includes data from January 1973 to December 2009.

Panel A: Descriptive Statistics Entire Sample and Tests of Stationarity

	Mean	Median	SD	ADF Tau	ADF-p	PP Tau	PP-p
RET	0.154%	0.728%	5.650%	-9.731	0.0000	-15.847	0.0010
RREF	-0.008%	-0.008%	0.097%	-6.444	0.0000	-7.997	0.0010
DP	2.852%	2.652%	1.379%	-2.016	0.0421	-13.663	0.0010
NP	1.242%	0.223%	6.587%	-5.211	0.0000	-5.403	0.0010
ROE	6.321%	4.755%	3.971%	-2.660	0.0081	-1.880	0.3410
MCI	0.076%	0.056%	2.079%	-9.758	0.0000	-19.591	0.0010
GAMMA	-0.127	-0.161	0.125	-1.639	0.0958	-0.087	0.9490

Panel B: Descriptive Statistics for FX Quintile Portfolios

	FX Quintile 1			FX Quintile 2		
	Mean	Median	SD	Mean	Median	SD
RET	-0.358%	-0.079%	6.944%	0.411%	0.939%	5.427%
RREF	-0.008%	-0.008%	0.097%	-0.008%	-0.008%	0.097%
DP	2.296%	1.701%	3.501%	2.743%	2.489%	1.289%
NP	-3.037%	-3.108%	5.700%	-0.383%	-0.388%	6.551%
ROE	6.087%	4.223%	4.451%	7.146%	5.456%	4.526%
MCI	0.076%	0.056%	2.079%	0.076%	0.056%	2.079%
GAMMA	-1.588	-1.582	0.187	-0.516	-0.528	0.073

Table I Continued

	FX Quintile 3			FX Quintile 4		
	Mean	**Median**	**SD**	**Mean**	**Median**	**SD**
RET	0.562%	1.042%	4.832%	0.446%	0.767%	5.109%
RREF	-0.008%	-0.008%	0.097%	-0.008%	-0.008%	0.097%
DP	3.362%	2.911%	1.251%	3.231%	3.067%	0.998%
NP	1.623%	0.699%	7.288%	4.675%	0.753%	15.713%
ROE	6.803%	5.360%	3.779%	6.717%	5.487%	3.845%
MCI	0.076%	0.056%	2.079%	0.076%	0.056%	2.079%
GAMMA	-0.123	-0.156	0.091	0.247	0.180	0.138

	FX Quintile 5		
	Mean	**Median**	**SD**
RET	-0.294%	0.255%	6.837%
RREF	-0.008%	-0.008%	0.097%
DP	2.629%	2.117%	4.400%
NP	3.295%	-2.297%	23.969%
ROE	4.846%	3.583%	3.581%
MCI	0.076%	0.056%	2.079%
GAMMA	1.347	1.155	0.365

Table II
Variance Decomposition of Firm-Level Stock Returns when the Predictive Variables are Realized Returns, Dividend Yield and the Relative Bill Rate - Variance and Covariance of News Components

Table II reports the variance decomposition results of unexpected returns of 25 double-sorted equal-valued portfolios, using holding period stock returns including dividends, dividend yield (calculated using Fama and French (1988) approach), and the relative bill rate, as the predictive variables. The variance components are estimated as follows: $Var(N_{er}) = \lambda'\Sigma\lambda$, $Var(N_{cf}) = (e1' + \lambda')\Sigma(e1 + \lambda)$, and $-2Cov(N_{er}, N_{cf}) = -2(e1' + \lambda')\Sigma\lambda$, where $\lambda \equiv e1'\rho A(I - \rho A)^{-1}$, $e1$ is a vector whose first element is one and whose other elements are zero, N_{er} and N_{cf} denote expected return news and cash flow news, A is the coefficient matrix of the following first order VAR system: $z_{t+1} = Az_t + \omega_{t+1}, \omega_t \sim N(0, \Sigma)$, and ρ is the average ratio of the market price to the sum of the market price and the dividend, in this sample $\rho = 0.996$. Size 1 is the portfolio that contains the smallest firms, Size 5 the largest firms (measured by average firm market capitalization). FX 1 contains firms with the most negative FX exposure measures, whereas FX 5 contains with the most positive FX exposure measures. Panel A shows the average variance of cash flow news ($Var(N_{cf})$), the average variance of expected rate of return news (discount rate news) ($Var(N_{er})$), the average variance of unexpected stock returns ($Var(U_r)$), and the average covariance between the two news components for all firms in our sample ($Cov(N_{er}, N_{cf})$). Panel B, Panel C, Panel D Panel E, and Panel F report the results for Size portfolios 1 through 5. Standard errors are in parentheses.

Panel A: Average Values for the Entire Sample

	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
All Firms	**0.0406**	**0.0065**	**0.0362**	**0.0054**
	(0.000410)	(0.000136)	(0.000283)	(0.000174)

Panel B: Size Portfolio 1 (Small Firms)

FX Portfolio	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
FX1	**0.0569**	**0.0077**	**0.0533**	**0.0056**
	(0.001962)	(0.000699)	(0.001109)	(0.000981)
FX2	**0.0387**	**0.0045**	**0.0386**	**0.0023**
	(0.000971)	(0.000239)	(0.000830)	(0.000330)
FX3	**0.0362**	**0.0049**	**0.0351**	**0.0030**
	(0.001061)	(0.000307)	(0.000793)	(0.000421)
FX4	**0.0419**	**0.0056**	**0.0398**	**0.0039**
	(0.001182)	(0.000353)	(0.000866)	(0.000487)
FX5	**0.0595**	**0.0078**	**0.0562**	**0.0056**
	(0.001461)	(0.000434)	(0.001147)	(0.000567)

Panel C: Size Portfolio 2

FX Portfolio	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
FX1	**0.0514**	**0.0074**	**0.0463**	**0.0062**
	(0.001412)	(0.000455)	(0.001009)	(0.000585)
FX2	**0.0365**	**0.0054**	**0.0337**	**0.0041**
	(0.001069)	(0.000321)	(0.000806)	(0.000430)
FX3	**0.0319**	**0.0045**	**0.0302**	**0.0031**
	(0.001009)	(0.000264)	(0.000756)	(0.000366)
FX4	**0.0361**	**0.0048**	**0.0331**	**0.0039**
	(0.001131)	(0.000301)	(0.000790)	(0.000410)
FX5	**0.0578**	**0.0083**	**0.0501**	**0.0080**
	(0.001436)	(0.000519)	(0.001022)	(0.000629)

Table II Continued

Panel D: Size Portfolio 3				
FX Portfolio	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
FX1	**0.0444**	**0.0065**	**0.0392**	**0.0059**
	(0.001229)	(0.000443)	(0.000919)	(0.000525)
FX2	**0.0300**	**0.0046**	**0.0274**	**0.0036**
	(0.000901)	(0.000265)	(0.000689)	(0.000333)
FX3	**0.0273**	**0.0042**	**0.0251**	**0.0032**
	(0.000963)	(0.000276)	(0.000706)	(0.000330)
FX4	**0.0332**	**0.0052**	**0.0292**	**0.0046**
	(0.001038)	(0.000325)	(0.000703)	(0.000412)
FX5	**0.0523**	**0.0083**	**0.0418**	**0.0094**
	(0.001475)	(0.000560)	(0.000917)	(0.000680)
Panel E: Size Portfolio 4				
FX Portfolio	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
FX1	**0.0382**	**0.0066**	**0.0326**	**0.0061**
	(0.001395)	(0.000496)	(0.000920)	(0.000610)
FX2	**0.0250**	**0.0043**	**0.0229**	**0.0032**
	(0.000971)	(0.000316)	(0.000738)	(0.000358)
FX3	**0.0225**	**0.0041**	**0.0208**	**0.0029**
	(0.000966)	(0.000332)	(0.000685)	(0.000330)
FX4	**0.0239**	**0.0042**	**0.0218**	**0.0031**
	(0.000882)	(0.000266)	(0.000608)	(0.000304)
FX5	**0.0401**	**0.0062**	**0.0333**	**0.0065**
	(0.001405)	(0.000557)	(0.000921)	(0.000640)
Panel F: Size Portfolio 5 (Large Firms)				
FX Portfolio	$Var(N_{cf})$	$Var(N_{er})$	$Var(U_r)$	$Cov(N_{er}, N_{cf})$
FX1	**0.0300**	**0.0057**	**0.0245**	**0.0056**
	(0.001611)	(0.000506)	(0.000950)	(0.000677)
FX2	**0.0170**	**0.0036**	**0.0162**	**0.0022**
	(0.000945)	(0.000383)	(0.000737)	(0.000330)
FX3	**0.0138**	**0.0032**	**0.0135**	**0.0017**
	(0.000882)	(0.000301)	(0.000526)	(0.000346)
FX4	**0.0146**	**0.0035**	**0.0138**	**0.0022**
	(0.001027)	(0.000345)	(0.000562)	(0.000421)
FX5	**0.0276**	**0.0050**	**0.0226**	**0.0050**
	(0.001976)	(0.000599)	(0.000989)	(0.000845)

Table III
Variance Decomposition of Firm-Level Stock Returns when the Predictive Variables are Realized Return, Dividend Yield and the Relative Bill Rate – Relative Importance of News Components

Table III reports the variance decomposition results of unexpected returns of 25 double-sorted equal-valued portfolios, using holding period stock returns including dividends, dividend yield (calculated using Fama and French (1988) approach), and the relative bill rate, as the predictive variables. The variance components are estimated as follows: $Var(N_{er}) = \lambda'\Sigma\lambda$, $Var(N_{cf}) = (e1' + \lambda')\Sigma(e1 + \lambda)$, and $-2Cov(N_{er}, N_{cf}) = -2(e1' + \lambda')\Sigma\lambda$, where $\lambda \equiv e1'\rho A(I - \rho A)^{-1}$, $e1$ is a vector whose first element is one and whose other elements are zero, N_{er} and N_{cf} denote expected return news and cash flow news, A is the coefficient matrix of the following first order VAR system: $z_{t+1} = Az_t + \omega_{t+1}, \omega_t \sim N(0, \Sigma)$, and ρ is the average ratio of the market price to the sum of the market price and the dividend, in this sample $\rho = 0.996$. Size 1 is the portfolio that contains the smallest firms, Size 5 the largest firms (measured by average firm market capitalization). FX 1 contains firms with the most negative FX exposure measures, whereas FX 5 contains with the most positive FX exposure measures. Panel A, B and C report the portfolio averages of individual firm variance decompositions. Panel A shows the variance of cash flow news as a percentage of the variance of unexpected stock returns $Var(N_{cf})/Var(U_r)$, Panel B shows the variance of expected return news as a percentage of the variance of unexpected returns $Var(N_{er})/Var(U_r)$, and Panel C reports the percentage weight of the covariance between N_{cf} and N_{er} multiplied by a factor of -2, so $-2Cov(N_{cf}, N_{er})/Var(U_r)$. Standard errors are in parentheses. We also report ANOVA F-statistics and its corresponding p-values for a test of differences among means for each of the Size Quintiles.

Panel A: Percentage Weights of All Firms

	$Var(N_{cf})/Var(U_r)$	$Var(N_{er})/Var(U_r)$	$-2Cov(N_{cf}, N_{er})/Var(U_r)$
All Firms	**1.0664**	**0.2162**	**-0.2826**
	(0.0045)	(0.0030)	(0.0064)

Panel B: Weight of Cash Flow News Variance: $Var(N_{cf})/Var(U_r)$

	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	6.82	20.17	23.62	20.76	20.32
p-Value	<.0001	<.0001	<.0001	<.0001	<.0001
FX 1	**1.0404**	**1.0989**	**1.1110**	**1.1018**	**1.0870**
	(0.0120)	(0.0136)	(0.0157)	(0.0169)	(0.0226)
FX 2	**1.0042**	**1.0429**	**1.0458**	**1.0032**	**0.9221**
	(0.0104)	(0.0136)	(0.0154)	(0.0172)	(0.0220)
FX 3	**1.0038**	**0.9993**	**1.0070**	**0.9569**	**0.8619**
	(0.0114)	(0.0126)	(0.0144)	(0.0162)	(0.0228)
FX 4	**1.0435**	**1.0496**	**1.0690**	**0.9969**	**0.8971**
	(0.0117)	(0.0115)	(0.0143)	(0.0161)	(0.0236)
FX 5	**1.0780**	**1.1547**	**1.2009**	**1.1328**	**1.0672**
	(0.0138)	(0.0147)	(0.0169)	(0.0166)	(0.0234)

Table III Continued

Panel C: Weight of Discount Rate News Variance : $Var(N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	1.88	0.66	0.73	0.94	1.69
p-Value	0.1104	0.6201	0.5684	0.4386	0.1505
FX 1	**0.1445**	**0.1876**	**0.2035**	**0.2237**	**0.2558**
	(0.0068)	(0.0094)	(0.0107)	(0.0122)	(0.0141)
FX 2	**0.1433**	**0.1880**	**0.2029**	**0.2206**	**0.2661**
	(0.0074)	(0.0095)	(0.0100)	(0.0111)	(0.0142)
FX 3	**0.1665**	**0.1815**	**0.2034**	**0.2380**	**0.2781**
	(0.0090)	(0.0089)	(0.0094)	(0.0120)	(0.0153)
FX 4	**0.1634**	**0.1752**	**0.2118**	**0.2366**	**0.2807**
	(0.0084)	(0.0085)	(0.0102)	(0.0119)	(0.0182)
FX 5	**0.1626**	**0.1955**	**0.2233**	**0.2113**	**0.2336**
	(0.0093)	(0.0106)	(0.0116)	(0.0113)	(0.0132)
Panel D: Weight of Covariance Term: $-2Cov(N_{cf}, N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	4.01	11.09	14.05	8.55	8.77
p-Value	0.0030	<.0001	<.0001	<.0001	<.0001
FX 1	**-0.1849**	**-0.2865**	**-0.3144**	**-0.3254**	**-0.3427**
	(0.0167)	(0.0205)	(0.0228)	(0.0245)	(0.0311)
FX 2	**-0.1474**	**-0.2309**	**-0.2487**	**-0.2238**	**-0.1882**
	(0.0151)	(0.0191)	(0.0212)	(0.0225)	(0.0262)
FX 3	**-0.1702**	**-0.1807**	**-0.2103**	**-0.1949**	**-0.1400**
	(0.0176)	(0.0176)	(0.0188)	(0.0199)	(0.0259)
FX 4	**-0.2070**	**-0.2248**	**-0.2808**	**-0.2334**	**-0.1778**
	(0.0178)	(0.0168)	(0.0205)	(0.0217)	(0.0321)
FX 5	**-0.2406**	**-0.3502**	**-0.4242**	**-0.3441**	**-0.3008**
	(0.0213)	(0.0230)	(0.0253)	(0.0240)	(0.0306)

Table IV
Variance Decomposition of Firm-Level Stock Returns when the Predictive Variables are Realized Return, Net Payout and the Relative Bill Rate – Relative Importance of News Components

Table IV reports the variance decomposition results of unexpected returns of 25 double-sorted equal-valued portfolios, using holding period stock returns including dividends, net payout (calculated using Boudoukh et al (2007) approach), and the relative bill rate, as the predictive variables. The variance components are estimated as follows: $Var(N_{er}) = \lambda'\Sigma\lambda$, $Var(N_{cf}) = (e1' + \lambda')\Sigma(e1 + \lambda)$, and $-2Cov(N_{er}, N_{cf}) = -2(e1' + \lambda')\Sigma\lambda$, where $\lambda \equiv e1'\rho A(I - \rho A)^{-1}$, $e1$ is a vector whose first element is one and whose other elements are zero, N_{er} and N_{cf} denote expected return news and cash flow news, A is the coefficient matrix of the following first order VAR system: $z_{t+1} = Az_t + \omega_{t+1}, \omega_t \sim N(0, \Sigma)$, and ρ is the average ratio of the market price to the sum of the market price and the dividend, in this sample $\rho = 0.996$. Size 1 is the portfolio that contains the smallest firms, Size 5 the largest firms (measured by average firm market capitalization). FX 1 contains firms with the most negative FX exposure measures, whereas FX 5 contains with the most positive FX exposure measures. Panel A, B and C report the portfolio averages of individual firm variance decompositions. Panel A shows the variance of cash flow news as a percentage of the variance of unexpected stock returns $Var(N_{cf})/Var(U_r)$, Panel B shows the variance of expected return news as a percentage of the variance of unexpected returns $Var(N_{er})/Var(U_r)$, and Panel C reports the percentage weight of the covariance between N_{cf} and N_{er} multiplied by a factor of -2, so $-2Cov(N_{cf}, N_{er})/Var(U_r)$. Standard errors are in parentheses. We also report ANOVA F-statistics and its corresponding p-values for a test of differences among means for each of the Size Quintiles.

Panel A: Percentage Weights of All Firms

	$Var(N_{cf})/Var(U_r)$	$Var(N_{er})/Var(U_r)$	$-2Cov(N_{cf}, N_{er})/Var(U_r)$
	1.1549	**0.1724**	**-0.3273**
	(0.0035)	(0.0021)	(0.0052)

Panel B: Weight of Cash Flow News Variance:

	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	8.48	18.85	21.81	11.66	9.89
p-Value	<.0001	<.0001	<.0001	<.0001	<.0001
FX 1	**1.1033**	**1.1407**	**1.1502**	**1.1820**	**1.1970**
	(0.0125)	(0.0112)	(0.0112)	(0.0128)	(0.0152)
FX 2	**1.0569**	**1.1033**	**1.1354**	**1.1231**	**1.1260**
	(0.0102)	(0.0103)	(0.0114)	(0.0114)	(0.0130)
FX 3	**1.0523**	**1.0719**	**1.1276**	**1.1344**	**1.1067**
	(0.0097)	(0.0095)	(0.0110)	(0.0117)	(0.0156)
FX 4	**1.0862**	**1.1213**	**1.1400**	**1.1344**	**1.1154**
	(0.0107)	(0.0110)	(0.0106)	(0.0118)	(0.0159)
FX 5	**1.1307**	**1.2016**	**1.2559**	**1.2217**	**1.2094**
	(0.0127)	(0.0131)	(0.0135)	(0.0137)	(0.0169)

Table IV Continued

Panel C: Weight of Discount Rate News Variance: $Var(N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	18.31	22.11	17.38	10.59	8.14
p-Value	<.0001	<.0001	<.0001	<.0001	<.0001
FX 1	**0.1812**	**0.1868**	**0.1560**	**0.1574**	**0.1660**
	(0.0072)	(0.0072)	(0.0059)	(0.0072)	(0.0095)
FX 2	**0.1381**	**0.1397**	**0.1374**	**0.1209**	**0.1168**
	(0.0061)	(0.0061)	(0.0067)	(0.0063)	(0.0079)
FX 3	**0.1263**	**0.1180**	**0.1312**	**0.1277**	**0.1059**
	(0.0057)	(0.0051)	(0.0061)	(0.0069)	(0.0089)
FX 4	**0.1521**	**0.1547**	**0.1437**	**0.1265**	**0.1226**
	(0.0066)	(0.0073)	(0.0065)	(0.0068)	(0.0101)
FX 5	**0.1948**	**0.1933**	**0.2001**	**0.1730**	**0.1556**
	(0.0078)	(0.0074)	(0.0079)	(0.0078)	(0.0095)
Panel D: Weight of Covariance Term: $-2Cov(N_{cf}, N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	13.72	22.65	23.22	12.99	10.48
p-Value	<.0001	<.0001	<.0001	<.0001	<.0001
FX 1	**-0.2845**	**-0.3275**	**-0.3062**	**-0.3394**	**-0.3630**
	(0.0181)	(0.0168)	(0.0156)	(0.0187)	(0.0229)
FX 2	**-0.1950**	**-0.2430**	**-0.2727**	**-0.2440**	**-0.2428**
	(0.0151)	(0.0151)	(0.0167)	(0.0163)	(0.0192)
FX 3	**-0.1785**	**-0.1899**	**-0.2589**	**-0.2621**	**-0.2127**
	(0.0142)	(0.0135)	(0.0162)	(0.0173)	(0.0228)
FX 4	**-0.2383**	**-0.2761**	**-0.2838**	**-0.2609**	**-0.2380**
	(0.0161)	(0.0170)	(0.0158)	(0.0173)	(0.0240)
FX 5	**-0.3255**	**-0.3949**	**-0.4560**	**-0.3947**	**-0.3650**
	(0.0187)	(0.0191)	(0.0200)	(0.0202)	(0.0246)

Table V
Variance Decomposition of Firm-Level Stock Returns when the Predictive Variables are Realized Return, ROE and the Relative Bill Rate - Relative Importance of News Components

Table V reports the variance decomposition results of unexpected returns of 25 double-sorted equal-valued portfolios, using holding period stock returns including dividends, ROE (calculated using Eisdorfer (2007) approach), and the relative bill rate, as the predictive variables. The variance components are estimated as follows: $Var(N_{er}) = \lambda'\Sigma\lambda$, $Var(N_{cf}) = (e1' + \lambda')\Sigma(e1 + \lambda)$, and $-2Cov(N_{er}, N_{cf}) = -2(e1' + \lambda')\Sigma\lambda$, where $\lambda \equiv e1'\rho A(I - \rho A)^{-1}$, $e1$ is a vector whose first element is one and whose other elements are zero, N_{er} and N_{cf} denote expected return news and cash flow news, A is the coefficient matrix of the following first order VAR system: $z_{t+1} = Az_t + \omega_{t+1}, \omega_t \sim N(0, \Sigma)$, and ρ is the average ratio of the market price to the sum of the market price and the dividend, in this sample $\rho = 0.996$. Size 1 is the portfolio that contains the smallest firms, Size 5 the largest firms (measured by average firm market capitalization). FX 1 contains firms with the most negative FX exposure measures, whereas FX 5 contains with the most positive FX exposure measures. Panel A, B and C report the portfolio averages of individual firm variance decompositions. Panel A shows the variance of cash flow news as a percentage of the variance of unexpected stock returns $Var(N_{cf})/Var(U_r)$, Panel B shows the variance of expected return news as a percentage of the variance of unexpected returns $Var(N_{er})/Var(U_r)$, and Panel C reports the percentage weight of the covariance between N_{cf} and N_{er} multiplied by a factor of -2, so $-2Cov(N_{cf}, N_{er})/Var(U_r)$. Standard errors are in parentheses. We also report ANOVA F-statistics and its corresponding p-values for a test of differences among means for each of the Size Quintiles.

Panel A: Percentage Weights of All Firms

	$Var(N_{cf})/Var(U_r)$	$Var(N_{er})/Var(U_r)$	$-2Cov(N_{cf}, N_{er})/Var(U_r)$
	1.1633	**0.5070**	**-0.6704**
	(0.0217)	(0.0187)	(0.0366)

Panel B: Weight of Cash Flow News Variance: $Var(N_{cf})/Var(U_r)$

	Size 1	Size 2	Size 3	Size 4	Size 5
ANOVA F Stat:	1.33	1.02	0.19	1.09	2.94
p-Value	0.2558	0.3943	0.9451	0.3592	0.0213
FX 1	**1.2222**	**1.1534**	**1.1377**	**1.1279**	**1.3607**
	(0.0719)	(0.0708)	(0.0629)	(0.0833)	(0.1370)
FX 2	**1.0874**	**1.2136**	**1.0876**	**1.0815**	**1.0664**
	(0.0533)	(0.0783)	(0.0722)	(0.0906)	(0.1099)
FX 3	**1.1471**	**1.0444**	**1.0588**	**0.9565**	**0.9033**
	(0.0609)	(0.0573)	(0.0793)	(0.0501)	(0.0582)
FX 4	**1.1666**	**1.0690**	**1.1067**	**1.0402**	**1.0560**
	(0.0743)	(0.0530)	(0.0747)	(0.0485)	(0.0629)
FX 5	**1.2917**	**1.1446**	**1.1324**	**1.1495**	**1.0517**
	(0.0768)	(0.0670)	(0.0828)	(0.0824)	(0.0871)

Table V Continued

Panel C: Weight of Discount Rate News Variance: $Var(N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	5.69	1.71	0.71	1.92	0.77
p-Value	0.0002	0.1451	0.5860	0.1068	0.5474
FX 1	**0.6830**	**0.5394**	**0.5033**	**0.4903**	**0.4314**
	(0.0723)	(0.0546)	(0.0549)	(0.0790)	(0.0704)
FX 2	**0.3986**	**0.4844**	**0.4323**	**0.3499**	**0.4160**
	(0.0453)	(0.0669)	(0.0646)	(0.0654)	(0.0760)
FX 3	**0.3935**	**0.3476**	**0.4128**	**0.3511**	**0.3233**
	(0.0444)	(0.0610)	(0.0571)	(0.0481)	(0.0516)
FX 4	**0.4458**	**0.4122**	**0.3989**	**0.2679**	**0.3205**
	(0.0567)	(0.0671)	(0.0637)	(0.0340)	(0.0626)
FX 5	**0.6506**	**0.5357**	**0.5094**	**0.3825**	**0.3137**
	(0.0675)	(0.0636)	(0.0665)	(0.0556)	(0.0654)

Panel D: Weight of Covariance Term: $-2Cov(N_{cf}, N_{er})/Var(U_r)$					
	Size 1	**Size 2**	**Size 3**	**Size 4**	**Size 5**
ANOVA F Stat:	3.40	1.46	0.41	1.34	2.09
p-Value	0.0091	0.2136	0.8010	0.2535	0.0835
FX 1	**-0.9052**	**-0.6929**	**-0.6410**	**-0.6182**	**-0.7922**
	(0.1293)	(0.1098)	(0.1069)	(0.1519)	(0.1953)
FX 2	**-0.4861**	**-0.6980**	**-0.5199**	**-0.4313**	**-0.4823**
	(0.0855)	(0.1364)	(0.1265)	(0.1466)	(0.1734)
FX 3	**-0.5406**	**-0.3921**	**-0.4716**	**-0.3076**	**-0.2266**
	(0.0968)	(0.1125)	(0.1210)	(0.0780)	(0.0814)
FX 4	**-0.6124**	**-0.4812**	**-0.5057**	**-0.3080**	**-0.3766**
	(0.1238)	(0.1052)	(0.1303)	(0.0679)	(0.1033)
FX 5	**-0.9423**	**-0.6803**	**-0.6418**	**-0.5320**	**-0.3654**
	(0.1307)	(0.1145)	(0.1375)	(0.1250)	(0.1396)

Table VI
Variance Decomposition of Firm-Level Stock Returns when the Predictive Variables are Realized Returns, Dividend Yield and the Relative Bill Rate – Regression Analysis

Table VI reports the regression analysis results of the relative importance of cash flow news ($Var(N_{cf})/Var(U_r)$) for internationally operating firms using variance decomposition results that included the holding period return, the dividend yield, and the relative bill rate as predictive variables. Panel A and B report the estimates of regression 1: $Var(CF^*)_i = \alpha_i + \zeta_i(Gamma)_i + \xi_i(Size)_i + \varepsilon_i$ where the dependent variable is the variance of cash flow news of firm i as the percentage of the variance of unexpected stock returns of firm $i = Var(N_{cf})/Var(U_r)$, $Gamma$ is the Dimson-Gamma foreign currency exposure measure of firm i, and $Size$ is the natural log of the average equity capitalization of firm i. Panel A reports the estimation results of regression 1 for firms with a negative Dimson-Gamma, whereas Panel B includes firms with positive FX exposure coefficients. T-statistics use White's (1980) HC robust variance-covariance matrix

Panel A: Firms with Negative FX Exposure Coefficients			
Number of Observations = 6,666	**Test Statistic**	**p-value**	***Adjusted R^2***
F-Test	62.15	<.0001	0.018
White's Test	35.26	<.0001	
Variable	**Parameter Estimate**	**t-statistic**	**p-value**
Intercept	0.82596	22.82	<.0001
Dimson-Gamma	-0.05086	-8.72	<.0001
Log Firm Size	0.01397	4.5	<.0001
Panel B: Firms with Positive FX Exposure Coefficients			
Number of Observations = 5,301	**Test Statistic**	**p-value**	***Adjusted R^2***
F-Test	69.97	<.0001	0.0254
White's Test	50.72	<.0001	
Variable	**Parameter Estimate**	**t-statistic**	**p-value**
Intercept	0.91375	21.48	<.0001
Dimson-Gamma	0.05403	8.83	<.0001
Log Firm Size	0.01006	2.75	0.0060

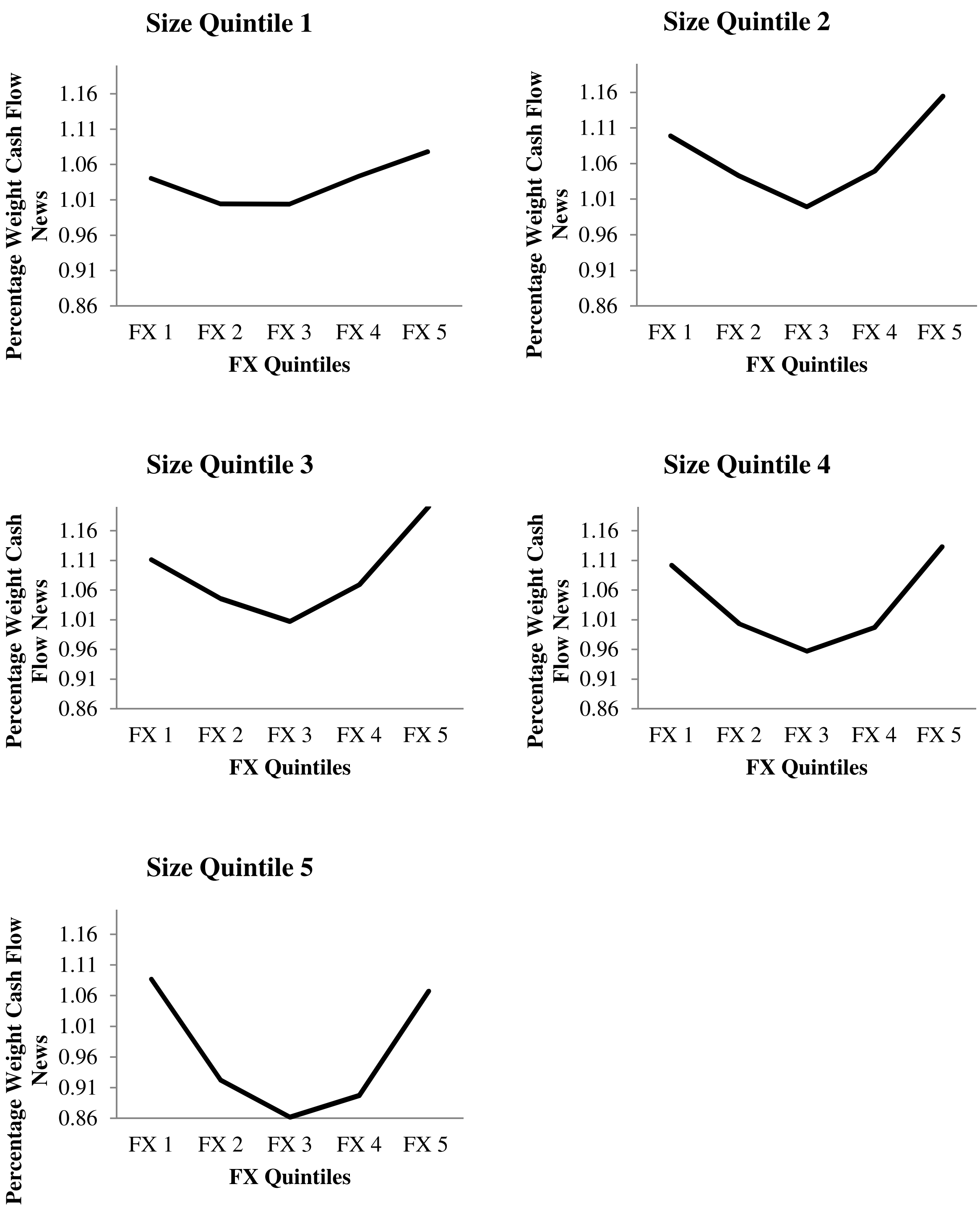

Figure 1. Variance Decomposition using Returns, Dividend Yield and the Relative Bill Rate as the Predictive Variables. Figure 1 shows the average portfolio values of the relative importance of cash flow news for individual firms ($Var(N_{cf})/Var(U_r)$) that are sorted into 25 double-sorted equal valued portfolios. The relative importance of cash flow news is depicted on the vertical axis. The variance decomposition used stock returns, dividend yield and the relative bill rate as predictive variables. The horizontal axis show the five FX portfolio categories where 1 contains firms with the most negative FX exposure measures, whereas 5 includes firms with the most positive FX exposure measures.

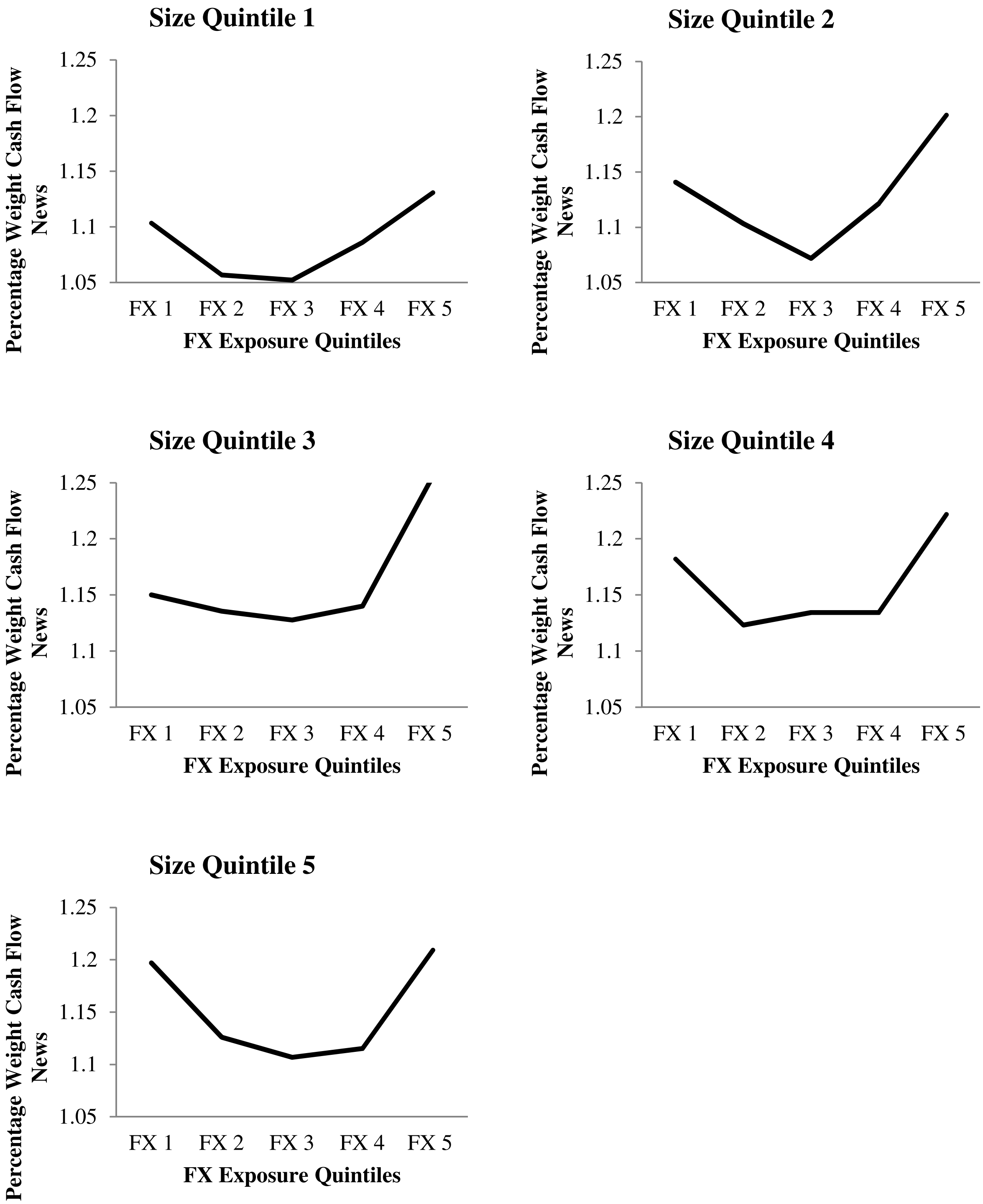

Figure 2. Variance Decomposition using Returns, Net Payout and the Relative Bill Rate as the Predictive Variables. Figure 2 shows the average portfolio values of the relative importance of cash flow news for individual firms ($Var(N_{cf})/Var(U_r)$) that are sorted into 25 double-sorted equal valued portfolios. The relative importance of cash flow news is depicted on the vertical axis. The variance decomposition used stock returns, net payout and the relative bill rate as predictive variables. The horizontal axis show the five FX portfolio categories where 1 contains firms with the most negative FX exposure measures, whereas 5 includes firms with the most positive FX exposure measures.

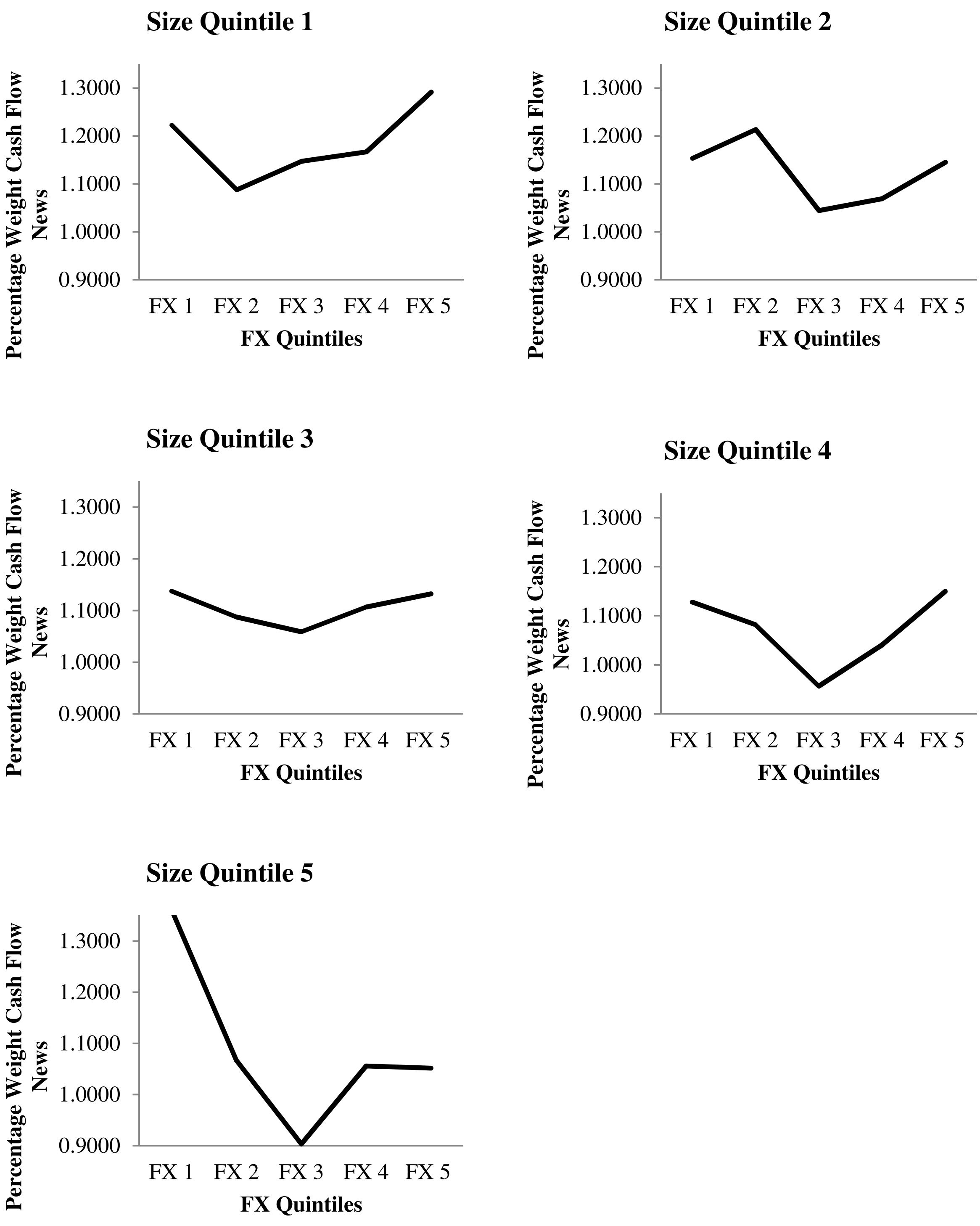

Figure 3. Variance Decomposition using Returns, ROE and the Relative Bill Rate as the Predictive Variables. Figure 3 shows the average portfolio values of the relative importance of cash flow news for individual firms ($Var(N_{cf})/Var(U_r)$) that are sorted into 25 double-sorted equal valued portfolios. The relative importance of cash flow news is depicted on the vertical axis. The variance decomposition used stock returns, ROE and the relative bill rate as predictive variables. The horizontal axis show the five FX portfolio categories where 1 contains firms with the most negative FX exposure measures, whereas 5 includes firms with the most positive FX exposure measures.