Systematic Risk and Share Turnover
[or Beta as a Measure of Mispricing]

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Abstract

This paper documents a simple and powerful cross-sectional mechanism: a higher rate of investor participation in trading a stock translates into a greater contribution of the stock to market movements. The participation-driven overreaction (1) forms a persistent source of excess market volatility and, by implication, return predictability, (2) introduces a strong mechanical element into the beta-return relation, making this relation conditional on market state and challenging the meaningfulness of traditional tests of the CAPM, and (3) suggests that the low-risk anomaly (Black et al. (1972)) reflects a reversal of overreaction in the cross-section of stock returns. The endogeneity of market beta challenges the mainstream interpretation of the systematic risk-return relation and the notion of risk-adjusted returns in the finance literature.

Keywords: Market volatility; Short- and long-horizon betas; Parallel response to common shocks; Crowded-trade problem; Endogenous beta; Low-risk anomaly; Risk-return relation

Understanding the sources of high volatility of market prices is one of the biggest challenges facing asset pricing research (Shiller (1981, 1989, 2014), Cochrane (2011)). While there is a consensus in the contemporaneous literature that a substantial part of market volatility is non-fundamental, or discount rate, volatility,[1] there is no agreement regarding the nature of this excess volatility. The 'behavioral' literature relates the excess volatility to factors such as investor sentiment and limits to arbitrage. The 'rational' view attributes it to time-varying expected returns reflecting rational pricing. Given the complexity of real markets and investor behavior and the multiplicity of the potential triggers of market movements, the lack of consensus in the literature is not surprising.

Recognizing the challenges of explaining market movements over time, in this paper I propose to take a cross-sectional perspective to understanding market volatility. Since a stock's contribution to the amplitude of market movements is measured by its market beta, solving the excess volatility puzzle, as a *quantitative* puzzle, is directly linked to understanding the systematic patterns in the cross-sectional dispersion of beta. The stocks with a systematically higher beta in the cross section drive the amplitude of market movements.

A universal empirical fact associated with the amplitude of price changes is its strong positive relation to the contemporaneous trading volume. This relation holds across time, data frequencies and asset classes, at both individual asset and aggregate market levels (see Karpoff (1987) for a representative survey of the documented patterns). This pervasive relation is consistent with the intuition of standard measures of price impact (Kyle (1985), Amihud (2002)), and it reflects the fact that *prices and traded quantities are driven by the same market dynamics*. The universality of the association between volume and the amplitude of price changes and its simple intuitive appeal provide the motivation for the focus of my analysis on exploring the role of volume as a determinant of high volatility of market prices. However, this association *per se* is not directly informative about the nature of market volatility: disentangling its sources (the flow of value-relevant information and trading noise / sentiment) is not a trivial task. I address this issue by taking a cross-sectional perspective on the relation between volume and market volatility.

[1] The evidence indicates that in the post-war period the discount rate (DR) variance dominates the total variance of the market return. Campbell (1991) decomposes the market return variance into the DR and cash flow (CF) news components using the log-linear approximation framework of Campbell and Shiller (1988) and finds that in 1952–1988 the DR and CF components make about 75% and 12% of the monthly market return variance, with the remainder attributed to covariance between the DR and CF components. Chen et al. (2013) employ an alternative decomposition approach based on analyst cash flow forecasts and report that in 1985–2010 the proportions of the DR and CF news components of the market return variance are 84% and 16% at the quarterly, 64% and 36% at the annual, 47% and 53% at the two-year, and about 40% and 60% at the four- to seven-year horizons.

The intuition underlying the cross-sectional effects is simple. The common market factor in stock returns is the product of a similar response of individual stocks to common shocks.[2] Other things equal, a larger amount of capital responding to a shock will result in a stronger price movement due to the limited capacity of the market to absorb trading volume without an associated price impact. In the cross section, this implies an intrinsic association between trading volume and systematic volatility of a stock, as measured by beta. In fact, since a stock's contribution to market movements is measured by beta, the association between volume and beta can be seen as the cross-sectional counterpart of the pervasive time-series association between market volume and price movements discussed above. As explained in the following, the advantage of the cross-sectional approach to understanding the relation between volume and systematic volatility is a framework to utilize an important characteristic of the cross-sectional dispersion in volume – its persistence over time.

[INSERT FIGURE 1 and TABLE I]

To motivate my analysis of the relation between trading activity and systematic volatility in the cross section, Figure 1 plots the average returns of the turnover decile portfolios of the NYSE and AMEX common stocks on Black Monday, October 19, 1987. There is a monotonic decline in returns across the portfolios sorted on the contemporaneous October 19 turnover, with the difference in returns of the top and bottom portfolios equaling -14%. This strong negative association is not surprising given that a higher trading intensity on the considered day is expected to reflect a higher panic-selling intensity and, consequently, a higher selling pressure. What is more interesting is that the pattern in returns across the portfolios sorted on the past turnover (measured as the average turnover in August and September 1987) is very similar to the contemporaneous effect. While the amplitude of the market movement on Black Monday is particularly helpful to present a visual picture of the cross-sectional association between turnover and the contribution to market movement, the documented pattern is not specific to the considered event. Table I (discussed in further detail in the paper) reports the estimates of year-by-year cross-sectional regressions of the Dimson (1979) market betas on past and contemporaneous turnover in 1951–2011, controlling for the effects of size and book-to-market ratio (B/M). The strength and persistence of the documented positive association between beta and turnover are quite striking. They imply that the pattern in the relation between (past and contemporaneous) trading activity and the systematic returns observed in Figure 1 typically

[2] The term "common shock" in this paper refers to any exogenous stimuli generating a common market-wide movement in stock prices.

holds on an observation-by-observation basis over six decades of data.[3] Thus, share turnover defines the cross-sectional structure of market volatility: the stocks' contribution to the amplitude of market movements increases uniformly with their average turnover *throughout time*. Turnover appears to proxy for beta. It should be clear that understanding the nature of this pervasive relation has a potential to contribute to the resolution of the excess volatility puzzle, as a quantitative puzzle.

I study the relation between share turnover and market beta based on returns for different holding periods, including daily, monthly, one-, two- and three-year returns. The following features of this relation are essential for understanding its nature:

- The relation between turnover and beta is driven primarily by the persistent cross-stock differences in turnover. The past turnover is a strong predictor of the market exposure, because the past turnover is a good proxy of the contemporaneous turnover. (The pattern in Figure 1 helps to visualize this effect.)
- The relation between turnover and beta originates in extremely persistent effects in short-horizon price movements. The uniformity of this relation through time is central for the assessment of *plausibility* of its potential interpretations. This relation is not a consequence of nonsynchronous trading. It does not appear to depend on time-varying market conditions, including the potential variation in investor sentiment. It is as strong and persistent in the periods when trading was dominated by individual investors (with no access to historical data and computational technology and no familiarity with the notion of market beta) as in the recent period dominated by more "sophisticated" institutional investors known to have a demand for stock characteristics different to individual investors (e.g. Gompers and Metrick (2001)). The evidence points to a persistent cross-sectional association between the amount of trading and the amplitude of market-related price movements, consistent with *a higher price impact of higher turnover stocks*.
- The hypothesis of a systematic positive causal relation from beta to turnover is rejected by the data. This causal relation is, in fact, negative.
- The relation between turnover and beta is characterized by a very slow decay with an increase in the return horizon used to estimate the betas, remaining, however, strong even for the multi-year betas.

[3] Specifically, the systematic returns increase (decrease) with share turnover in positive (negative) market states. To put the turnover effect in perspective, it is worth emphasis that the strength of relation of the Dimson betas to size and B/M does not come anywhere close to that documented for turnover.

Two questions arise from these observations. First, what is the source of persistently higher cross-sectional turnover that leads to persistently (day-to-day) higher exposure to the market movements? Second, how are short- and long-horizon effects related?

The persistent cross-stock differences in turnover reflect the differences in the rate of investor participation in trading a stock. Specifically, the investor participation drives the average dollar volume, and the rate of investor participation refers to the average dollar volume scaled by market capitalization. This scaling is important for the interpretation of the metric of share turnover, as it accounts for the cross-stock differences in a characteristic known to exhibit an inverse relation to trading costs. Hence, the evidence shows that a higher rate of investor participation in a stock leads to a persistently higher exposure to the market movements, reflected in a higher market beta.

How are participation and market exposure related? Other things equal, higher investor participation will be associated with a larger amount of capital responding to common shocks. And, other things equal, a larger amount of capital responding to a common shock will result in a stronger price movement. The described mechanism can be seen as a general case of the *crowded trade* problem discussed in various contexts in the recent literature (e.g. Khandani and Lo (2007), Brunnermeir (2009), Stein (2009)). The basic idea is that prices overshoot when investors react in unison and their trading strategy lacks a fundamental anchor. In the context of the present analysis, the argument is that, since the market is not well anchored by fundamentals (e.g. Shiller (2015, p.165)), a parallel response to a common shock by many investors is associated with a problem that the participating investors cannot be sure whether the "information" they react to has already been discounted in prices, leading to overshooting. Black (1986, p. 532) makes a related argument in response to Arrow's (1982) assertion that excessive reaction to current information characterizes all the securities and futures markets. In the cross-section, this argument implies more overshooting for stocks with higher rates of investor participation. The persistence of the association between turnover and beta reflects the mechanical nature of the described amplification effect.

The relation between turnover and the short-horizon betas translates into a relation between turnover and the long-horizon betas, too. This is because the persistence of cross-sectional variation in turnover makes the market exposure driven by turnover highly positively autocorrelated. Consequently, one- and multi-period (short- and long-horizon) betas are interrelated. As discussed in the paper, the nature of this effect is similar to that of the relation between short- and long-horizon return predictability by persistent (slow-moving) variables (e.g. Fama and French (1988b)).

The strong association between trading intensity and systematic returns has important implications for the interpretation of a number of phenomena fundamental to asset pricing research:

1. At the aggregate market level, this association is a persistent source of excess volatility and, by implication, return predictability. Given the limits of arbitrage, the persistent participation-driven overshooting is expected to be an important source of the slow-decaying temporary price components inducing the negative autocorrelation in long-horizon market return, as predicted by models of inefficient markets (Shiller (1984), Summers (1986), deLong et al. (1990a), Campbell and Kyle (1993), Shleifer and Vishny (1997)) and documented in empirical research (Fama and French (1988a), Poterba and Summers (1988)).

2. The endogeneity of market beta challenges the traditional view on the systematic risk-return relation in the asset pricing literature.[4] Specifically, given that the trading intensity of a stock is a first-order determinant of the stock's market exposure in all market states, the stocks with higher turnover will have higher/lower systematic (beta-driven) returns in positive/negative states. As long as the pattern in non-systematic returns (alphas) does not change this pattern in systematic returns, the relation of beta to expected return will be mechanically conditional on market state. Indeed, I find that this pattern holds, for example, at the monthly return horizon, as the cross-sectional dispersion in the monthly alphas is relatively small. Specifically, average returns increase/decrease monotonically across the turnover decile portfolios in months with positive/negative market returns, reflecting the pattern of variation in betas. Hence, *share turnover predicts winners/losers in months with positive/negative market return*. The turnover effect introduces a strong mechanical element into the market risk-return relation, both in the CAPM and multi-factor model frameworks.[5]

3. If the market is excessively volatile, then high beta stocks will tend to be the stocks that contribute to this excess volatility most. To the extent that higher beta reflects higher excess systematic volatility, the following arguments apply. As the market moves up and down, the positive and negative beta-driven price movements will tend to offset each other. However, since historically the average market return is positive, higher beta stocks will earn on average higher systematic returns. Therefore, if beta reflects mispricing (overshooting), then, without an offsetting cross-sectional mechanism, higher beta stocks will be relatively overpriced. In this context, the cross-

[4] According to the traditional view, the response of the utility-maximizing agents to the estimates of risk (variances and covariances) results in equilibrium patterns in average returns.

[5] In this context, my results provide a simple alternative interpretation of the conditional beta-return relation explored in e.g. Pettengill et al. (1995).

sectional perspective on the equity premium puzzle (Shiller (1982), Hansen and Singleton (1983), Mehra and Prescott (1985)) implies that, without an offsetting pattern, in the cross-section of stocks this puzzling premium will be increasing with stock betas.

Black, Jensen and Scholes (1972) and large subsequent literature document an empirical regularity often referred to as the *low-risk* or *low-beta anomaly* – the systematic negative association between alpha and market beta. The literature puts forward a number of alternative interpretations of this association related to, for example, leverage constraints (Black (1972), Frazzini and Pedersen (2014)), asset managers' benchmarking and lottery demand (Baker, Bradley, and Wurgler (2011)) and differences in opinion (Hong and Sraer (2015)). These interpretations, however, do not address the basic question regarding the nature of *underlying* variation in market beta (and hence the nature of market volatility) and the implications of this variation for the cross-sectional pattern in the market-driven returns. Considering the arguments above, the negative relation of alpha to beta is consistent with a correction of the market-driven overpricing in the cross-section of stocks. If beta measures mispricing, then a flat security market line (SML) implies a correction of this mispricing. This interpretation is in sharp contrast with the traditional view of the beta-return relation, which considers the positive slope of the SML as evidence of "rational" pricing.[6] To the extent that the cross-sectional dispersion in alpha reflects a correction of beta-driven mispricing, the standard interpretation of alpha as a "risk"-adjusted return makes little sense.

In the context of analysis of the turnover effect in this paper specifically, the decomposition of the turnover-return relation into the beta-driven and alpha components shows that the cross-sectional dispersion in alpha is sufficiently large to fully reverse the pattern in the beta-driven returns at the annual and longer return horizons. The evidence suggests that, in addition to the reversal of the market-driven overpricing discussed above, there is a further effect which contributes to the empirical pattern associated with the low-risk anomaly. This effect is driven primarily by a reversal of the large contemporaneous alpha of the top turnover decile portfolio. Since beta and turnover are strongly positively associated, the negative relation of turnover to the next period alpha is reflected in the negative relation of beta to this alpha, too.[7]

[6] I emphasize that these arguments apply to the interpretation of the beta-return relation in general and are not targeted to the turnover effect exclusively.

[7] The negative relation of turnover to future (risk-adjusted) returns is documented in, for example, Lee and Swaminathan (2000) and Datar et al. (1998).

4. The fact that the strong relation between turnover and beta holds throughout the sample period, 1951–2011, characterized by a substantial variation in investor composition, suggests that the investors which dominate share turnover in the market drive the volatility of the market return.

This paper establishes a link between two prominent strands of literature in asset pricing research: the literature on the nature of market volatility (initiated by Shiller (1981) and LeRoy and Porter (1981)) and the literature on the role of investor attention/participation in asset price formation (Shiller (1984), Merton (1987), Lee and Swaminathan (2000), Huberman and Regev (2001), Grullon, Kanatas, and Weston (2004), Tetlock (2007), Barber and Odean (2008), Fang and Peress (2008), Hou, Peng, and Xiong (2009), Duffie (2010), Da, Engelberg and Gao (2011), among many others). While the latter strand of literature covers a variety of topics, the basic message of many of the studies is that a greater investor attention/participation translates into a stronger response to news. My paper contributes to this literature by establishing a simple and intuitive fact: *A greater investor participation in a stock translates into a greater participation of the stock in market movements.* This relation does not rely on specific assumptions regarding investor preferences, beliefs, motivation, foresight, cognitive abilities and access to information. The powerful mechanical nature of the market impact of investor participation, driving both short- and long-horizon volatility of the market return, presents a direct challenge to the traditional "rational" views in asset pricing research.

The outline of the paper is as follows. Section I describes the data. Section II studies the relation between stock characteristics and market beta based on short-horizon returns. Section III proposes a regression framework for the analysis of the relation between stock characteristics and long-horizon betas and presents the related empirical evidence. Section IV studies the implications of the relation between turnover and beta for the cross-sectional returns. Section V presents an explanation of the relation between turnover, beta and returns based on the documented empirical regularities. Section VI concludes.

I. The Data

The analyzed sample consists of all NYSE and AMEX listed firms with share codes 10 or 11 available from the CRSP database during the period from January 1951 to December 2011. The NASDAQ firms are not included in the sample in order to avoid the issue of the double counting of dealer trades and the changes in definition of the NASDAQ volume over time (Anderson and Dyl (2005)) making the cross-sectional comparisons to the NYSE and AMEX firms problematic.

The tests in the paper are based on returns measured over different horizons, including the daily, monthly, one-, two- and three-year horizons. The annual return, both at the individual stock and common factor levels, is calculated as the cumulative monthly return. The annual stock sample is restricted to stock-years with the monthly return data available from the CRSP file for all 12 months of the year.[8] The two- and three-year returns are calculated as the cumulative yearly returns. If at least one of the yearly returns is missing, the multi-year return is set to be missing. While the annual and higher-frequency returns are non-overlapping, the multi-year returns are overlapping yearly observations (Fama and French (1988b) follow a similar approach).

The measure of trading activity of a stock is its share turnover, defined as the ratio of the number of shares traded to the number of shares outstanding. The tests presented in the paper control for the effects of market size and B/M. Market size is the product of the stock price and the number of shares outstanding. The strong association between beta and size is a well-established empirical regularity (Jegadeesh (1992), Fama and French (1992)). B/M is the ratio of the book equity of a firm for the fiscal year ending in a given calendar year to the firm's market equity in December of that year. The book equity is computed following the procedure described in Fama and French (1993) using the data from COMPUSTAT annual files. For the pre-1963 period, I use the book equity data employed in Davis, Fama, and French (2000) available from Kenneth French's website.[9] Controlling for B/M is important given the evidence that low (high) turnover stocks display many characteristics of value (glamour) stocks (e.g. Lee and Swaminathan (2000)); thus, the effects captured by turnover may proxy for those of B/M or vice versa. As to the relation of B/M to beta specifically, the literature documents substantial shifts in this relation through time (e.g. Franzoni (2001), Campbell and Vuolteenaho (2004), Fama and French (2006), Ang and Chen (2007)). Fama and French (2006, Figure 1) plot year-by-year differences between the betas of high and low B/M stocks in 1926–2004. The evidence indicates three regimes in the relation between B/M and beta. This relation is positive between the early 1930s and the early 1950s. Between the 1950s and the early 1970s the differences between high and low B/M betas oscillate around zero. In the 1970s these differences turn negative and remain negative in the following decades. It is noteworthy that the timing of the latter change in the relation coincides with the beginning of the sharp upward trend in market turnover (e.g. French

[8] As an alternative, I have considered a sample of stocks with a minimum of six monthly return observations and filled the missing monthly observations with the value-weighted market return. In addition, I have considered a sample without any restrictions on the number of monthly return observations. In both cases, the empirical evidence is very similar to that presented in the paper.

[9] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

(2008, Figure 1)). This timing also roughly coincides with the introduction of NASDAQ; as noted above, the sample employed in the present study does not include the NASDAQ stocks.

The data on common return factors employed in section IV are obtained from Kenneth French's website. Further details on definition of the variables are given in the context of specific analysis in the paper.

II. Stock Characteristics and Betas Based on Daily Returns

This section studies the relation between share turnover and market beta based on daily returns. For each stock-year in the sample I estimate the daily Dimson (1979) beta based on a specification with five leads and lags of the CRSP value-weighted market return. I present the year-by-year estimates of the following cross-sectional regression:

$$Beta_{i,t} = \beta_0 + \beta_{turn} logTurn_{i,t-1(/t)} + \beta_{size} logSize_{i,t-1} + \beta_{bm} logBM_{i,t-1} + e_{i,t} \quad (1)$$

where $Beta_{i,t}$ is the Dimson beta in year t; $logTurn_{i,t}$ / $logSize_{i,t}$ is the log of the average monthly turnover / size in year t; $logBM_{i,t}$ is the log of the ratio of book equity for the fiscal year ending in the calendar year t to market equity in December of that year. In addition, I present the year-by-year estimates of the regression:

$$\begin{aligned} Beta_{i,t} = \beta_0 + \beta_{turn,l} LowTurn_{i,t-1(/t)} + \beta_{turn,h} HighTurn_{i,t-1(/t)} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} \\ + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1} + e_{i,t}, \end{aligned} \quad (2)$$

where the right-hand-side variables are dummy variables. Specifically, $LowTurn_{i,t}$($HighTurn_{i,t}$) / $Small_{i,t}$ ($Big_{i,t}$) / $LowBM_{i,t}$ ($HighBM_{i,t}$) dummy is equal to 1 if turnover / size/ B/M of a stock i in year t is in the bottom (top) tercile of the cross-sectional distribution of this variable, and zero otherwise.

[INSERT TABLE I AND FIGURE 2]

Table I reports the estimates of (1) and (2) in Panels A and B, respectively. Both Panels A and B report the estimates of the regressions with the lagged (year $t-1$) turnover variables and with the contemporaneous (year t) turnover variables. The estimates of the specification in (1) and (2) show qualitatively similar evidence. There is strong and highly significant positive relation between turnover and beta in *all* 61 years of the sample period in both regressions with the lagged and contemporaneous turnover, *with no exceptions*. The specification in (2) presented in Panel B allows one to evaluate the magnitude of dispersion in betas. In the specification with the lagged (contemporaneous) turnover, the sample means $\beta_{turn,l}$ and $\beta_{turn,h}$ are -0.27 (-0.29) and 0.31 (0.35), respectively, with the mean difference $\beta_{turn,h}$ - $\beta_{turn,l}$ equal 0.58 (0.64). Figure 2 plots the year-by-year estimates of $\beta_{j,l}$ and $\beta_{j,h}$ and their differences. While the lagged and contemporaneous turnover effects are similar, the spread in betas associated with the contemporaneous turnover is typically larger than that associated with the lagged turnover.

The documented pattern suggests that *the market mechanism which drives the relation between turnover and beta involves the source of persistence of the cross-sectional dispersion of share turnover*. Indeed, the cross-sectional dispersion of turnover is highly persistent: Table A.I in the Appendix reports the estimates of the year-by-year cross-sectional regressions of the log turnover in year t on the log turnover in year t-1. The average autoregressive coefficient is 86%. A further important observation when considering the pattern in Table I and Figure 2 is that there is no discernible trend of an increase or decrease in the relation between turnover and beta over time. The relation is strong in all six decades of the sample period. Moreover, the fact that the coefficients on both high and low turnover dummies are large in magnitude, with no pronounced asymmetry, indicates that the relation is not primarily due to the effects associated with either very high or very low turnover stocks.

Further results in Table I show that the relation between size and the Dimson beta is almost always positive in the 1950s and 1960s. There is, however, a change in the late 1960s, with this relation becoming predominantly negative. The timing of this change seems to coincide with the deregulation of brokerage commissions,[10] the computerization of the order flow and growth of institutional trading in the U.S. Overall, the effects of size are highly variable over time. For the sample, on average, the difference in betas of big and small stocks is only -0.02; if we consider the post-1969 period, this difference is -0.13. The relation of B/M to beta is predominantly negative. The average spread in betas of high and low B/M stocks is -0.12. Thus, the results indicate that the dispersion in the Dimson betas associated with size and B/M does not come anywhere close to that associated with share turnover.

Therefore, at a minimum for the relatively short return horizons considered here, cross-sectional variation in share turnover is associated with an extremely persistent and large variation in

[10] The mandatory fixed commissions on very large orders were terminated in 1968 and the fixed commissions were terminated altogether in May 1975 (e.g. Eisenach and Miller (1981)).

market beta. While the presented analysis is based on the Dimson betas with the purpose to account for the effects of non-synchronous trading, in unreported results I document an extremely strong and persistent relation of turnover to the simple daily betas. The strength of association between turnover and beta in short sub-periods like individual years, indicates that the absolute value of the market-related price changes of high turnover stocks typically exceeds that of low turnover stocks on an observation-by-observation basis throughout the sample period.[11]

III. Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Regression Analysis

A question that follows from the evidence in the previous section is whether the turnover effect is just a high-frequency phenomenon. To address this question, one needs to analyze the relation of stock characteristics to the lower-frequency betas. In the following, I propose a regression framework which facilitates this analysis and present the related empirical evidence.

A. Specification

I estimate panel regressions of the following form:

$$R_{i,t} = \alpha_0 + \sum_{j=1}^{k}\left[\alpha_{j,l} LowChar_{j,i,t-1} + \alpha_{j,h} HighChar_{j,i,t-1}\right] + R_{M,t}\left(\beta_0 + \sum_{j=1}^{k}\left[\beta_{j,l} LowChar_{j,i,t-1} + \beta_{j,h} HighChar_{j,i,t-1}\right]\right) + R_{M,t-1}\left(\gamma_0 + \sum_{j=1}^{k}\left[\gamma_{j,l} LowChar_{j,i,t-1} + \gamma_{j,h} HighChar_{j,i,t-1}\right]\right) + \varepsilon_{i,t}, \quad (3)$$

where $R_{i,t}$ is the return on stock i and $R_{M,t}$ is the CRSP value-weighted market return. The presented specification provides a framework to study the relation between the level of stock characteristic j, $Char_j$, in $t-1$ (or at other lags) and return sensitivity to the market, i.e. beta, in t, where t may cover daily, monthly, yearly, and other time intervals. In particular, the coefficients on interaction terms with $R_{M,t}$ (the β_j coefficients) capture the effects of the characteristic-related variation in market betas. I further account for cross-sectional variation in effects such as continuation, reversal and delayed adjustment to the realization of the market return by including the interaction terms with $R_{M,t-1}$ (the γ_j coefficients). Finally, α_js measure the characteristic-related variation in stock alphas. Thus, the presented specification decomposes the return-characteristics relation into *systematic*, i.e. related to covariation with the market index, and *non-systematic*

[11] A similar strong and persistent relation between turnover and beta holds on a quarter-by-quarter basis.

components. For the sake of parsimony, I use a coarse sort of stocks into groups with high and low values of a characteristic (top and bottom terciles of distribution, as defined in the previous section). Section IV of the paper presents additional evidence for the turnover portfolios based on a finer sort. I focus on the specifications with the discrete variables and on the analysis of stock portfolios, as my main interest is in evaluating the magnitude of dispersion in betas.

Table II reports the evidence on decomposition of the monthly, one-, two-, and three-year returns. The analysis of the monthly and yearly returns is based on the following regression:

$$\begin{aligned} R_{i,t} &= \alpha_0 + \alpha_{turn,l} LowTurn_{i,t-1[/t]} + \alpha_{turn,h} HighTurn_{i,t-1[/t]} + \alpha_{size,l} Small_{i,t-1} + \alpha_{size,h} Big_{i,t-1} + \alpha_{bm,l} LowBM_{i,t-1} + \alpha_{bm,h} HighBM_{i,t-1} \\ &+ R_{M,t}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t-1[/t]} + \beta_{turn,h} HighTurn_{i,t-1[/t]} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1}\right) \\ &+ R_{M,t-1}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t-1[/t]} + \gamma_{turn,h} HighTurn_{i,t-1[/t]} + \gamma_{size,l} Small_{i,t-1} + \gamma_{size,h} Big_{i,t-1} + \gamma_{bm,l} LowBM_{i,t-1} + \gamma_{bm,h} HighBM_{i,t-1}\right) + \varepsilon_{i,t}, \end{aligned} \quad (4)$$

where index t denotes the monthly and yearly observations, respectively. As noted in section I, the two- and three-year returns are overlapping yearly observations. The specifications estimated for these multi-year returns are presented in Table II. To analyze the patterns over time, Table III reports the monthly estimates for the 12 five-year consecutive sub-periods of 1951–2011.[12] In addition, to get an insight into the generality of the full sample evidence, Tables A.II, A.III, A.IV and A.V in the Appendix report separate estimates for the stocks in each of the Fama and French 12 broad industry groups for the monthly, one-, two- and three-year returns, respectively.[13] Following the approach in the previous section, I present evidence from both specifications with the lagged and contemporaneous turnover. As should become clear from the following analysis, the comparison of the lagged and contemporaneous effects is helpful for understanding the nature of the relation of turnover to beta (as well as to alpha).

B. Results

B1. Betas

[INSERT TABLE II]

The estimates in Table II indicate a positive and significant association between turnover and beta for all four return horizons, with the magnitude of the effect declining slowly with horizon. In

[12] The first sub-period is six years long (1951–1956) in order to avoid excluding the first year of the sample period.

[13] When considering the within-industry evidence, it is important to keep in mind that the results may be affected by varying degrees of cross-sectional heterogeneity in individual industries. A similar argument in principle applies to the sub-period results.

particular, in the specification with the lagged (contemporaneous) turnover, the estimates of $\beta_{turn,l}$ and $\beta_{turn,h}$ are highly significant: -0.24 (-0.27) and 0.26 (0.37) for the monthly, -0.19 (-0.20) and 0.27 (0.32) for the one-year, -0.16 (-0.16) and 0.18 (0.21) for the two-year, and -0.14 (-0.18) and 0.17 (0.13) for the three-year betas. The within-industry estimates reported in the Appendix confirm a strong relation between turnover and beta in all industry groups (Tables A.II–A.V and Figure A.1).

Further results in Table II indicate a negative relation between size and beta, consistent with the literature. The monthly $\beta_{size,l}$ and $\beta_{size,h}$ are highly significant: 0.11 and -0.17, respectively.[14] The magnitude of the positive yearly $\beta_{size,l}$ is considerably larger (0.31) and the magnitude of the negative yearly $\beta_{size,h}$ is smaller (-0.08) than the corresponding monthly estimates. Therefore, the yearly effect is mainly driven by the large betas of small stocks. At the two- and three-year horizons, the spread in betas of big and small stocks drops substantially, with $\beta_{size,h}$ turning positive but insignificant.[15] The relation of B/M to beta tends to be negative but weak.

[INSERT TABLE III AND FIGURE 3]

I now turn to the sub-period evidence for the monthly betas presented in Table III. Understanding the monthly effects is of particular relevance in the context of the existing empirical asset pricing research, as much of this research is based on the monthly return observations. The results indicate a highly significant and positive relation between turnover and beta in *all* 12 sub-periods of 1951–2011. Figure 3 Panel A plots the sub-period estimates of $\beta_{turn,l}$ and $\beta_{turn,h}$, and Panel B plots their differences, $\beta_{turn,h}$ - $\beta_{turn,l}$. It is noteworthy that these differences are the largest in the two most recent sub-periods: around 0.70 and 0.90 in case of the lagged and contemporaneous turnover, respectively.

The pattern in Figure 3 indicates that the effects of the lagged and contemporaneous turnover are positively associated, suggesting the same underlying mechanism. However, in spite of the short time interval of *just one month*, the contemporaneous effect is visibly larger than the lagged effect in all sub-periods but 1997–2001 (where the difference between the two effects is small). A similar pattern of the contemporaneous effect exceeding the lagged effect is observed in all industry groups

[14] Unless otherwise stated, when discussing the estimates related to size and B/M, I refer to the estimates in the specifications with the lagged turnover.

[15] This general pattern of an increase in the negative spread between betas of big and small stocks from the monthly to the yearly return horizon and a subsequent decline for the longer horizons is observed for stocks in many industry groups (Tables A.II–A.V). The uniformity of the sign of the relation between turnover and beta across industries and return horizons is not observed in case of size. In particular, for the longer horizons, the spread between betas of big and small stocks turns positive for a number of industries (energy, finance, health and utilities).

(Table A.II). This pattern is an important hint to the nature of the relation between turnover and beta. In particular, given the high degree of persistence of cross-sectional dispersion of turnover, the results suggest that turnover in month *t-1* predicts market exposure in month *t*, because turnover in *t-1* is a good proxy for turnover in *t*. Indeed, additional tests support this conjecture.[16] The evidence is consistent with the relation between turnover and beta being driven by a direct contemporaneous association between amount of trading and the absolute value of market-related price movements.

Further results in Table III indicate a negative relation between size and the monthly betas in the sub-periods starting in the late 1960s (consistent with the pattern in Table I for the Dimson betas). It is noteworthy that the cross-sectional dispersion in the monthly betas associated with turnover is typically *substantially larger* than that associated with size both over time (Table III) and in individual industries (Table A.II). Finally, the results show that while the relation between B/M and betas is negative in most sub-periods, there are a few exceptions, including the two recent sub-periods.

B2. Gammas

The γ coefficients measure the lagged response to the realization of the market return. The estimate of γ_0 in Table II is positive and significant for the monthly returns, implying that stocks tend to continue to move in the direction of the realization of the market return in the previous month. For the one-, two- and three-year return horizons, γ_0 is negative and significant, consistent with the long-run negative serial correlation in stock returns (e.g. Fama and French (1988a)). These monthly continuations and long-run reversals hold in most of the industry groups (Tables A.II–A.V).

The monthly γ_{turn}s associated with the lagged turnover do not demonstrate a noteworthy pattern. In contrast, the monthly γ_{turn}s related to the contemporaneous turnover show strong effects. Specifically, $\gamma_{turn,h}$ is positive and highly significant for the full sample (Table II), all sub-periods (Table III) and all industries (Table A.II), implying that stocks with high contemporaneous turnover

[16] To test this conjecture, it makes sense to consider a specification which controls for both month *t-1* and *t* turnover variables. However, since these variables are highly correlated, the estimates of such a specification are likely to suffer from statistical biases (see, for example, Greene (2003, pp. 56–57)). Nonetheless, to get an insight into the general pattern, I have estimated regressions including both the lagged and contemporaneous turnover dummies. In comparison to the estimates in Table III, in these regressions the positive spread between $\beta_{turn,h}$ and $\beta_{turn,l}$ related to the contemporaneous turnover typically increases, while the estimates of $\beta_{turn,h}$ and $\beta_{turn,l}$ related to the lagged turnover either experience strong declines in magnitude and significance or change their signs (these estimates are available upon request). Therefore, the pattern is that once one accounts for the contemporaneous turnover, the lagged turnover tends to lose its predictive power.

show a systematically stronger lagged response to the realization of the market return in the previous month. Thus, stocks with high contemporaneous turnover not only overreact (in relative terms) to the contemporaneous realization of the market return, but, in addition, they continue to react to the realization of the past market return. The latter evidence can be seen as consistent with a positive feedback trading in the market (De Long et al. (1990b)). The estimates of $\gamma_{turn,l}$ are negative and their magnitudes tend to be close to the magnitudes of the positive γ_0, implying that stocks with low contemporaneous turnover tend not to demonstrate the discussed continuation effects.

I emphasize the difference in the nature of the effects captured by γ_{turn} and β_{turn}. The $\gamma_{turn,h}$ coefficient on the interaction term with the contemporaneous turnover captures the effect of "excess" turnover in month *t* generated by a delayed response to the realization of the market return in month *t-1*. This effect seems to be largely unrelated to the persistent cross-stock differences in turnover as the estimates of γ_{turn} related to the lagged turnover do not show a consistent pattern. In contrast, the effects captured by the β_{turn} coefficients are driven primarily by the persistent cross-stock differences in turnover, as β_{turn}s on the terms with the lagged and contemporaneous turnover show similar patterns. However, there appears to be an additional effect of "excess" contemporaneous turnover, which makes the dispersion in β_{turn} related to the contemporaneous turnover systematically greater than that related to the lagged turnover.

As noted above, the yearly and longer-horizon returns experience reversals captured by the negative γ_0. The estimates of γ_{turn} in Table II show a tendency of high turnover stocks to experience stronger reversals than the market on average. For instance, the yearly $\gamma_{turn,h}$ on the interaction term with the lagged turnover is -0.14 with t = -3.3. Given the strong relation of market exposure of a stock to its contemporaneous turnover at the yearly horizon, this evidence implies that the contemporaneous "overreaction" of high turnover stocks in year *t-1* is followed by a partial reversal in the following year *t*. The rest of the long-horizon estimates of $\gamma_{turn,h}$ are all negative, too, but not always statistically significant. Consistent with the full sample estimates, the "excess" reversals associated with high turnover are documented for stocks in a number of industries at the yearly horizon (Table A.III); however, the two- and three-year estimates do not show a systematic pattern (Tables A.IV and A.V).

The estimates of γ_{size} show a distinct pattern, too. The monthly $\gamma_{size,l}$ and $\gamma_{size,h}$ in Table II are highly significant 0.18 and -0.11, respectively. Given the monthly γ_0 of 0.11, these estimates indicate that while small stocks show considerably stronger continuation effects than the market on average, the large stocks do not show such continuation effects. The described pattern repeats over time (Table III) and in all industry groups (Table A.II). This evidence is in general consistent with the documented increase in the spread between the betas of small and large stocks, $\beta_{size,l}$ and $\beta_{size,h}$, from the monthly to the yearly return horizon, with the yearly spread characterized by asymmetry (i.e. being driven by larger betas of small stocks). The continuation effects at the monthly horizon turn into reversals at the longer horizons. Specifically, at the one-, two- and three-year horizons, $\gamma_{size,l}$ is negative and $\gamma_{size,h}$ is positive. Given the negative γ_0, this implies that smaller stocks experience stronger long-run reversals than larger stocks, which is in line with Fama and French (1988a). These reversals are consistent with the documented decrease in the spread between the betas of small and big stocks at the two- and three-year horizons.

The evidence for the monthly γ_{bm} does not show strong effects. However, it is noteworthy that $\gamma_{bm,h}$ is positive and significant in the four recent (post-1992) sub-periods (Table III), consistent with stronger monthly continuations of high B/M stocks. The estimates of the yearly and longer-horizon $\gamma_{bm,l}$ and $\gamma_{bm,h}$ in Table II are significantly positive and negative, respectively. This implies that high/low B/M stocks experience stronger/weaker long-run reversals to the realization of the past long-horizon market return than the market on average. This pattern repeats in most of the industry groups (Tables A.III–V). It is of interest to explore the link between this effect and the long-run reversal in stock returns, as well as the return patterns captured by the Fama and French (1993) value factor. The related analysis is, however, outside the scope of the present paper.

B3. Alphas

The estimates of the α_{turn} coefficients in Table II show that while the relation of the lagged turnover to non-systematic returns is negative, the contemporaneous effect is positive. This pattern holds at all horizons. While the signs of these relations are consistent with the large literature on the relation between volume and returns, the documented pattern is in particular similar to that reported in Lee and Swaminathan (2000), who also study the interaction between turnover and long-horizon returns.[17] The absolute value of the spread between $\alpha_{turn,h}$ and $\alpha_{turn,l}$ increases with the return horizon in case of both the lagged and contemporaneous effects. It is noteworthy that while at the monthly return horizon the magnitude of the positive contemporaneous spread is substantially larger than that of the negative lagged spread, the magnitudes of the contemporaneous and lagged spreads are quite close at the longer horizons. To the extent that the lagged and contemporaneous effects are related, this evidence is suggestive that the temporary idiosyncratic shocks take time to reverse. This conjecture is particularly interesting in the context of the large literature on the short-horizon reversals of stock returns (Jegadeesh (1990), Lehmann (1990)). I provide some further evidence on the interaction between turnover and alpha in the next section of the paper.

The estimates of α_{size} and α_{bm} confirm the well-established negative relation of size and positive relation of B/M to future returns. Similar to the case of the turnover alphas, the magnitudes of the spread between $\alpha_{size,h}$ and $\alpha_{size,l}$ and between $\alpha_{bm,h}$ and $\alpha_{bm,l}$ increase with the return horizon. These results are consistent with an increase in forecasting power of persistent variables with the return horizon documented in the literature (e.g. Fama and French (1988b)). If short-horizon returns are predictable by a persistent variable, then return predictability builds with horizon due to the positive autocorrelation of the expected returns.[18]

IV. Turnover Portfolios and Return Components

The evidence presented in the previous sections indicates a strong cross-sectional association between share turnover and market beta. Moreover, the results show distinct patterns in the relation of turnover to non-systematic returns (alphas). In this section, I take a closer look at the patterns and magnitudes of systematic and non-systematic return components of the turnover-sorted portfolios.

[INSERT TABLE IV AND FIGURE 4]

Table IV presents the characteristics of the monthly rebalanced equally-weighted turnover portfolios, P1–P10. Panel A presents the estimates for the portfolios sorted on the previous month's turnover, while Panel B shows the estimates for the portfolios sorted on the current month's turnover. The table reports the mean excess returns (stock returns in excess of risk-free

[17] For the surveys of the literature on the relation between volume and returns, see, for example, Karpoff (1987) and Gervais et al. (2001).

[18] See Cochrane (2005, pp. 393–394) for a textbook discussion of this relation.

rate), the CAPM alphas and betas, the Carhart (1997) 4-factor model alphas and market betas, and, in addition, the systematic returns.[19] The systematic return is measured as the difference between the excess return of a portfolio and its alpha. I report the "CAPM systematic return" and the "4-factor systematic return", which are based on the CAPM alpha and the 4-factor model alpha, respectively. The "CAPM systematic return" refers to the return attributed to covariation with the market factor, similar to the general notion of systematic return employed in the previous sections of the paper. The "4-factor systematic return" refers to the return attributed to covariation with the market, size, value and momentum factors.

The estimates are presented for the full sample (732 months) and separately for the months with positive (454 months) and negative (278 months) market return. The estimates for the positive and negative market states are obtained by including positive and negative market return dummies in a factor model regression. Figure 4, Panels A and B, plots the estimates reported in Table IV, Panels A and B, respectively. The results for both the lagged and contemporaneous turnover sorts show a *monotonic* increase in market beta across the turnover portfolios in both the single- and multi-factor models, for both the full period and separately for the positive and negative market states. The full sample spread between the CAPM betas of the top and bottom decile portfolios is around 0.7 (1.0), with the beta of portfolio P1 equal to 0.76 (0.62) and the beta of P10 equal to 1.44 (1.65) for the lagged (contemporaneous) turnover sort.[20]

I now turn to the relation of turnover to excess returns and their systematic and non-systematic components. To facilitate the comparison of magnitudes of the return components, in Figure 4 I use an equal number of return units on the vertical axis of the plots of the excess returns, systematic returns and alphas (3.5% in Panel A and 9% in Panel B).

The evidence for the portfolios sorted on the past turnover in Panel A indicates a monotonic increase (decrease) in excess returns and in systematic returns across the portfolios in positive (negative) market states. The variation in alphas is small as compared to the variation in systematic returns, and, therefore, the variation in excess returns is driven primarily by their systematic

[19] While the analysis in this section are based on excess returns, specifications estimated using raw returns show similar evidence and are available upon request.

[20] Given the monotonic increase in betas across the turnover portfolios, one may expect that a more heterogeneous stock sample will be characterized by even stronger dispersion in betas. In this context, one may conjecture that addition of the NASDAQ stocks to my sample of the NYSE and AMEX stocks will result in even stronger dispersion in betas related to share turnover.

components.[21] There is some decline in alphas across the portfolios (especially across P5–P10) in the negative market states. As a result, in the negative states the slope of decline in excess returns is somewhat steeper than that in systematic returns. The spread between the excess returns of the top and bottom turnover portfolios is 2.12% and -2.84% in the positive and negative states, respectively.

The pattern of cross-sectional variation in returns in the full period is a combination of the effects in the positive and negative market states. Since positive market states dominate the sample period, in the full period both systematic and excess returns tend to increase with turnover. Some decline in the excess returns of the high turnover portfolios (P9 and P10) is driven by the corresponding decline in the alphas in the negative market states.

Therefore, *the cross-sectional variation in the monthly returns related to the past turnover is driven primarily by the variation in systematic returns*. The variation in alphas is small in relative terms. An important implication of this result is that if the analyzed sample period is dominated by positive/negative market states, then, all else equal, we may expect to find a positive/negative relation of turnover – and, as a consequence, beta – to expected monthly returns. Hence, all else equal, in the sample periods dominated by positive market states, the evidence will be consistent with the predictions of a model such as the CAPM, while in negative states, it will not. Given the large and very persistent dispersion in market beta related to turnover, the interpretation of the relation between beta and expected returns is linked to the nature of the relation between turnover and beta.

In contrast to the results for the portfolios sorted on the past turnover in Panel A, the evidence in Panel B shows that the alphas increase with the contemporaneous turnover (consistent with the regression results in section III). The estimates indicate a pronounced non-linearity: while the increase in alphas across the first nine decile portfolios is gradual, there is an abrupt *jump in the alpha of the top decile portfolio*. This strong pattern repeats in both positive and negative market states, affecting the pattern in the excess returns. In particular, in positive market states, both the systematic return and alpha contribute to an increase in the return across the portfolios. The

[21] A comparison of the 4-factor model alphas to the CAPM alphas indicates that controlling for the exposure to size, value and momentum factors results in downward shift in the alphas of all 10 turnover portfolios, leaving the general cross-sectional pattern in the alphas largely unchanged. Consequently, while the patterns in the cross-sectional variation of the CAPM and 4-factor systematic returns are similar, the 4-factor systematic returns are larger than the CAPM systematic returns. This general pattern tends to hold for all considered return horizons, being consistent with the well-established cross-sectional patterns in average returns associated with size, value and momentum.

difference between the monthly return of high (P10) and low (P1) turnover portfolios exceeds 8.5%. In contrast, in negative market states, the increase in alpha partially offsets the decline in systematic return. The strong positive contemporaneous relation between turnover and return for the full period is clearly driven by the sharp increase in alphas across the portfolios in both positive and negative market states. Hence, while the alphas associated with the past turnover have only limited impact on the cross-sectional variation in the monthly returns, the contemporaneous alphas play an important role in driving this variation.

[INSERT TABLE V AND FIGURE 5]

The evidence for the one-, two- and three-year returns is presented in Table V and Figure 5.[22] The estimates for the portfolios sorted on the lagged and contemporaneous turnover are in Panels A1–A3 and B1–B3, respectively. Consistent with the evidence from the regression analysis, there is a strong positive association between turnover and the long-horizon betas. The magnitude of the dispersion in betas across the portfolios declines with the return horizon.

The standard CAPM model of Sharpe (1964) and Lintner (1965) predicts a positive relation between beta and expected return. The evidence for the portfolios sorted on the past turnover in Panels A1–A3 shows exactly the opposite pattern: the increase in beta across the portfolios is accompanied by a decline in returns for all three return horizons. This decline is driven by a sharp, almost monotonic, decline in portfolio alphas. The negative association between alpha and market beta is consistent with the well-established cross-sectional regularity often referred to as the low-risk anomaly, first documented by Black et al. (1972). The evidence here points to a potentially important role of share turnover in identifying the source of this association.

Turning to the portfolios sorted on the contemporaneous turnover in Panels B1–B3, the pattern is opposite to that observed in Panels A1–A3. There is a strong increase in return across the turnover portfolios driven by both its components: systematic return and alpha. Similar to the monthly frequency, the low-frequency alphas show a strong evidence of non-linearity: the alphas of stocks with the highest turnover (portfolio P10) are substantially larger than the alphas of the rest of the portfolios. Moreover, the alphas of stocks with the lowest turnover (portfolio P1) are particularly low. The variation in alphas across the portfolios P2–P9 (especially in case of the 4-factor model

[22] At these frequencies, the number of negative market return observations is small (14, 8 and 6 for the one-, two- and three-year returns, respectively), implying a low statistical power of the conditional tests. I therefore do not present the conditional evidence for these frequencies. However, I can report that restricting the sample to the periods with the positive market return results in estimates qualitatively similar to the full sample estimates.

alphas) is relatively small. The described non-linearity in alphas is reflected in similarly extreme high and low excess returns of the portfolios P10 and P1, respectively.

[INSERT FIGURE 6]

To get a better visual picture of interaction between systematic and non-systematic return components of the lagged and contemporaneous turnover portfolios, in Figure 6 I plot these components in one chart. I present the evidence for the monthly and yearly returns, with the purpose to highlight the differences between the monthly and lower frequency estimates.[23] The pattern which stands out for the monthly frequency is the large cross-sectional dispersion in the contemporaneous turnover alphas, with a particularly large alpha of the portfolio P10. Hence, sorting on the previous month's turnover is expected to proxy for sorting on the past short-horizon performance known to be associated with a reversal (Jegadeesh (1990)). Indeed, the estimates indicate a decline in alphas across the portfolios with the high previous month's turnover. However, the magnitude of variation in the lagged turnover alphas is substantially smaller than that in the contemporaneous turnover alphas. The relative magnitudes of the lagged and contemporaneous effects change at the yearly frequency. As discussed, there is a sharp decline in alphas across the portfolios sorted on the previous year's turnover. To the extent that the lagged and contemporaneous turnover alphas are interrelated, the results capture the fact that the contemporaneous increase in value of high turnover stocks is associated with low future returns.[24] Indeed, the particularly low alpha of the top decile lagged turnover portfolio matches with the particularly high alpha of the top decile contemporaneous turnover portfolio. However, while the contemporaneous effect is concentrated in the extreme portfolios, the lagged turnover alphas show a steady decline across the portfolios. Therefore, it is unlikely that this decline in alphas is fully attributed to the reversal of the contemporaneous alphas. What is obvious from the observed pattern is that the decline in alphas fully offsets the increase in systematic (beta-driven) returns across the turnover portfolios. I note that the interpretation of this negative relation – and more generally, the interpretation of the negative association between alpha and market beta (the aforementioned low-risk anomaly) – depends on the nature of the cross-sectional variation in market beta. I comment on this relation further in the next section of the paper.

[23] The pattern for the one-year returns is representative for the two- and three-year returns (see Figure 5).

[24] The ultimate cause of this relation is linked to the source of the contemporaneous association between turnover and alpha. As discussed, there is a large literature documenting a positive contemporaneous relation between volume and returns. For the cross-sectional analysis of interaction of the contemporaneous and lagged effects in case of the long-horizon returns, see Lee and Swaminathan (2000).

V. Explanation of the Relation between Turnover, Beta and Returns

Why is higher turnover associated with higher market exposure? In addressing this question, it is important to emphasize the fact that the relation between turnover and beta originates in highly persistent effects in short-horizon returns. The relation demonstrates a very slow decay with an increase in the return horizon, remaining, however, strong even for multi-year betas.[25] Since a long-horizon return is a combination of short-horizon price movements, it is essential first to understand the nature of the relation of turnover to the short-horizon betas.[26] One could then turn to exploring the conditions under which this relation persists for the long-horizon betas.

There are two potential directions of causality underlying the relation between turnover and beta: (a) from turnover to beta, and (b) from beta to turnover. In general terms, the causality from turnover to beta implies that trading moves prices; in particular, more share turnover results in a larger magnitude of the market-related price movements. In case of causality from beta to turnover, beta is treated as being exogenous, and (for some reason) higher beta attracts more trading in a stock. The latter case of causality from beta to turnover as an explanation of the empirical evidence, for example the evidence in Table I, would involve:

(a) a strong preference of market participants to trade higher beta stocks more than lower beta stocks in short sub-periods throughout 1951–2011 (in both positive and negative market states) and, assuming existence of such a preference,

(b) the ability of market participants to sort stocks according to their betas in short sub-periods throughout 1951–2011, in order to generate the effects as strong and persistent as those observed in aforementioned table (including the effects during the 1950s and 1960s, when trading was dominated

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[25] This is in contrast to, for example, the negative relation between beta and size, which is quite weak at short horizons, tends to strengthen with an increase in return horizon up to a certain point, but then weakens again for multi-year returns (see the estimates in Tables I and II).

[26] As discussed, the employed measure of the short-horizon beta is the daily Dimson beta rather than a simple daily beta in order to account for the direct effects of non-synchronous trading. The presented evidence is inconsistent with the non-synchronous trading driving the documented relation between turnover and beta. First, the relation is observed for the low-frequency betas, with the betas increasing monotonically across the turnover decile portfolios (hence, the effect is not attributed to the thinly traded stocks). Second, if the relation between turnover and, for example, the monthly beta were driven by non-synchronous trading, then in Tables II, III and A.II one would expect the absolute magnitude of negative $\beta_{turn,l}$ to be considerably larger than that of positive $\beta_{turn,h}$; moreover, one would expect $\gamma_{turn,l}$ to be large and positive, reflecting the fact that low turnover stocks adjust with a lag. However, the estimates of β_{turn} and γ_{turn} do not support this scenario. Finally, given that the levels of trading activity have increased dramatically over time (e.g. French (2008, Figure 1)), the effects of non-synchronous trading are expected to decline over time. The sub-period results do not show evidence of a decline in the relation between turnover and beta over time. Conversely, the results for the monthly betas indicate that this relation is the strongest in the most recent two five-year sub-periods (Table III and Figure 3).

by individual investors, the notion of "beta" was not familiar to investors, and historical data and computational technology were not available to investors).

In light of the extreme persistence of the association between beta and turnover over time, I consider the plausibility of (a) and (b) to be very low.[27] To formally test the hypothesis that higher beta attracts more trading, I have estimated the panel regressions of (i) Dimson beta in year *t*, $Beta_{i,t}$, and, alternatively, (ii) the change in Dimson beta from year *t-1* to *t*, $\Delta Beta_{i,t}$ $(= Beta_{i,t} - Beta_{i,t-1})$, on the change in turnover from year *t* to *t+1*, $\Delta Turn_{i,t+1}$ $(= logTurn_{i,t+1} - logTurn_{i,t})$, controlling for the stocks' size and B/M. I find that, in both cases, (i) and (ii), the coefficient on $\Delta Turn_{i,t+1}$ is negative and significant. Considering a possibility that investors may need time to adjust their trading patterns, I have repeated the analysis by replacing $\Delta Turn_{i,t+1}$ by $\Delta Turn_{i,t+2}$. Again, the coefficient on $\Delta Turn_{i,t+2}$ is negative. Thus, the empirical evidence is *opposite* to that implied by the positive causal relation from beta to turnover. The described estimates are available upon request.

Therefore, reflecting on the estimates in, for example, Table I, the question to be addressed is: why does higher turnover always lead to greater exposure to market movements? The fact that the relation between beta and turnover is driven primarily by the permanent (i.e. persistent) cross-sectional differences in turnover is an important hint to understanding its nature. The question one needs to address specifically is: *What is the source of persistently higher cross-sectional turnover that always leads to greater exposure to market movements?*

I start by reflecting on this question in the context of the first two decades of the sample period, the 1950s and 1960s, when trading volume was still dominated by individual investors (therefore, abstracting from complexity of investor composition in the more recent decades). As documented in Table A.I, the cross-sectional serial correlation of the average yearly turnover in this period varies around 90%. What keeps turnover of stock *i* persistently higher than that of stock *j* over consecutive years?

It is well documented that the portfolios of real-world individual investors contain only a small fraction of available securities (e.g. Friend and Blume (1975), Blume and Friend (1978), Shiller (1984)).[28] Merton (1987) uses this fact to argue that investors include in their portfolios only securities they know about, and if an investor does not follow a specific firm, she is unlikely to react

[27] I have carried out an additional analysis of the year-by-year variation in Dimson betas across the yearly rebalanced turnover decile portfolios, controlling for the portfolio loadings on the size, value and momentum factors. I find a *monotonic* increase in Dimson betas across the 10 turnover portfolios in almost all individual years of 1951–2011.

[28] In a set of papers, Brad Barber and Terrance Odean provide an analysis of the patterns in trading behavior of individual investors (e.g. Odean (1998a, 1998b, 1999), Barber and Odean (2000, 2001, 2008, 2011)).

to (trade on) news which may be perceived as relevant for the value of that firm. As noted by Merton, while the breadth of investor cognizance (or recognition) is an important determinant of cross-sectional variation in the size of investor base, there are further factors which, to a varying degree, may influence this size, e.g. "market segmentation and institutional restrictions including limitations on short sales, taxes, transactions costs, liquidity, imperfect divisibility of securities". All else equal, a larger investor base will be associated with a higher average dollar trading volume.

The relation between the size of the investor base and trading volume becomes more complex if some groups of investors dominate stockholdings. This is of particular relevance during the recent decades when stock ownership has become increasingly dominated by institutional investors (French (2008), Chordia, Roll and Subrahmanyam (2011)), with institutional ownership being more concentrated as compared to the widely dispersed retail ownership and institutional investors trading on average much more frequently than individual investors. During the recent decades, the factors making a stock attractive for ownership by actively trading institutions have continuously gained weight in determining the cross-sectional variation of trading volume.

Thus, the active market participation in a stock, as measured by its average dollar volume, is a function of multiple factors, which are likely to vary through time. The average share turnover effectively measures the level of market participation in a stock scaled by its market capitalization. I refer to this scaled measure as the participation rate.[29] The results show that this participation rate is a first-order determinant of the cross-sectional variation in market exposure. The strength and extreme persistence of this relation through time hint to its mechanical nature.[30]

Indeed, the relation between participation and market exposure is intuitive. A common non-diversifiable factor in stock returns is the product of a similar (and parallel) response of individual stocks to common shocks. All else equal, higher investor participation will be associated with a

[29] Lee and Swaminathan (2000) present a detailed cross-sectional analysis of share turnover. One of their main conclusions is that turnover provides an important information about popularity (or neglect) of a stock, which is associated with cross-sectional variation in valuation ratios and analyst following. Their evidence indicates relatively low correlation between turnover and the traditional liquidity measures (such as size, price and relative bid-ask spread), and it also does not provide support for the idea that the variation in turnover primarily reflects the variation in investor disagreement about the value of a stock. Consistent with the interpretation in Lee and Swaminathan, the literature uses trading activity as a proxy for investor attention in time-series and cross-sectional contexts (e.g. Barber and Odean (2008), Hou, Peng, and Xiong (2009), Gervais, Kaniel, and Mingelgrin (2001)). Further literature establishes a positive association between trading volume and "measures of communication activity" (see Tetlock (2007) and the references therein).

[30] Gompers and Metrick (2001) present evidence that institutions have different demand for stock characteristics to individual investors. Therefore, while a strong increase in the market role of institutions through time is expected to be accompanied by changes in the demand of the "representative" investor, the relation between turnover and beta remains very stable through time. This fact suggests that special patterns in the cross-sectional demand are unlikely to drive this extremely persistent relation, further hinting to its mechanical nature.

larger amount of capital responding to a common shock. And, all else equal, larger amount of capital responding to a common shock will result in a stronger price move, i.e. a higher market beta. In this context, the discussed scaling of participation by market capitalization is important, as it controls for the cross-stock differences in a characteristic known to be associated with the measures of liquidity related to trading costs.

The discussed mechanism is related to the so-called *crowded-trade* problem considered in various contexts in the recent literature. For instance, Khandani and Lo (2007) and Brunnermeier (2009) discuss this phenomenon in the context of price swings associated with quant trading strategies in August 2007, while Stein (2009) considers the case of arbitrage activity aiming to exploit predictable return patterns. The central idea is that prices overshoot when investors react in unison and their trading strategy has no fundamental anchor.[31] The cross-sectional relation between turnover and the magnitude of market-related price changes can be seen as a representative case of the crowded trade problem. This is because (i) a common factor in returns is by definition the outcome of common reaction to a shock, i.e. investors acting in unison, and (ii) more participation in this common reaction implies a larger crowded trade and, therefore, a stronger price move, ceteris paribus. The overshooting associated with a parallel response to a common shock involves the fact that the true market value is not observable.

To understand the relation between the short- and long-horizon effects, I draw a link to the literature on predictability of returns by persistent variables. As discussed in section III, this literature shows that the forecasting power of persistent variables increases with the return horizon due to strong positive autocorrelation of the forecasted returns. A mechanism of the related nature is expected to characterize the relation between turnover and beta, too. Specifically, the persistence of the cross-sectional turnover implies that the turnover-driven market exposure is highly positively autocorrelated. This provides the link between short- and long-horizon betas. In particular, following the logic in Cochrane (2005, p. 394), let $\beta_t = bTurn_t + \varepsilon_t$ and $Turn_{t+1} = \rho Turn_t + \delta_t$, where β_t measures the sensitivity of a stock return to the market return in period t, and β_t and $Turn_t$ are demeaned. It follows that

[31] Stein (2009) presents a formal model of the crowded trade problem in the context of arbitrage activity. The basic mechanism is summarized as follows: "if an unexpectedly large number of other arbs suddenly adopt the same strategy, there is no price-based mechanism to mediate the congestion that arises, and these stocks may become overvalued." The model by Stein (2009) distinguishes itself from other models of arbitrage (e.g. the model in de Long et al. (1990a)) by not assuming that arbitrageurs base their demand on the perfect estimate of fundamental value.

$$\beta_{t+1} + \beta_{t+2} = b\left(1+\rho\right)Turn_t + b\delta_{t+1} + \varepsilon_{t+1} + \varepsilon_{t+2},$$
$$\beta_{t+1} + \beta_{t+2} + \beta_{t+3} = b\left(1+\rho+\rho^2\right)Turn_t + b\rho\delta_{t+1} + b\delta_{t+2} + \varepsilon_{t+1} + \varepsilon_{t+2} + \varepsilon_{t+3}. \tag{5}$$

Given ρ near one (as documented in Table A.I), the coefficient on $Turn_t$ in (5) increases with the return horizon, at a declining rate. Consequently, if we treat the average beta over individual periods as an approximation for the multi-period beta, we will get that the relation between turnover and beta decays slowly with the return horizon.

Now, if the turnover effect reflects a relative overreaction in the cross-section of stocks, then we may expect this overreaction to get reversed at some point. A part of this cross-sectional overreaction will get reversed mechanically as the market return switches between positive and negative values (i.e. positive and negative overreactions will offset each other). However, since the average market return is positive, positive overreactions will tend to dominate and high turnover stocks will have high market-related (beta-driven) average returns. Indeed, as the results in the previous section show, the beta-driven returns increase across the turnover portfolios. However, a further empirical regularity revealed by the analysis is that these *beta-driven returns get offset by a decline in alphas*.

The term "overreaction" or "overshooting" involves an implicit comparison to some appropriate degree of reaction to news.[32] Given the complexity of the real markets and investor behavior, and the multiplicity of the potential triggers of common price movement, the definition of benchmarks measuring the appropriate reaction to these triggers, as they arise through time, is arguably very difficult. The evidence on a persistent pattern of *relative* overreaction in the cross-section of stocks in this paper provides important information about the nature of market volatility, without dealing with the measurement of the appropriate reaction to news. Investor participation defines the cross-sectional structure of market volatility: the stocks' contribution to the amplitude of market movements increases with their participation rates. Therefore, if the excess market volatility is a quantitative puzzle, the evidence here provides at least a partial resolution of this puzzle. The parallel response to common shocks is a persistent amplifying force behind the scale of market movements.

If the market is excessively volatile – as argued in this paper and the large literature started by Shiller (1981) and LeRoy and Porter (1981) – then market beta will tend to capture the degree of

[32] See, for example, the related discussion in DeBondt and Thaler (1985).

market-related overshooting in the cross-section of stocks. The systematic negative association between alpha and beta (the low-risk anomaly) in the sample periods with a positive market return implies a reversal of this overshooting. Without this offsetting effect, the high-beta stocks will be relatively overpriced. Thus, if beta measures mispricing, then the positive slope of the SML is an evidence of the cross-sectional mispricing, while a flat or negative SML implies a correction of this mispricing. Following these arguments, the empirical relation between risk and return, considered to be consistent with the CAPM of Sharpe (1964) and Lintner (1965), reflects cross-sectional mispricing. Given the multi-decade debate around the excess volatility of the market return, it is surprising that this view on the relation between beta and return has not been advanced in the literature.

VI. Conclusion

This paper documents a remarkably strong association between share turnover of a stock and its contribution to the amplitude of market movements. The source of this relation is the market force behind the persistence of the cross-sectional variation in turnover, namely the investor participation in a stock. A higher rate of participation translates into a persistent pattern of relative overreaction to common shocks, resulting in a large cross-sectional dispersion in market beta at both short and long return horizons. The endogeneity of market beta provides a new perspective on a number of phenomena fundamental to the asset pricing research, including the nature of market volatility, the relation between risk and return and the notion of risk-adjusted returns. The evidence in the paper suggests that market beta should be added to the list of the measures of cross-sectional mispricing identified in the literature. The paper presents a direct challenge to the normative "rational" asset pricing theory. In fact, the results indicate that, in the real markets, the core relations predicted by this theory reflect mispricing.

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Figure 1
Cross-sectional Relation between Turnover and Returns on Black Monday, 1987

This figure plots the average returns on the turnover decile portfolios of the NYSE and AMEX common stocks on October 19, 1987. The portfolios are sorted on the contemporaneous October 19 turnover and the lagged turnover which is measured as the average turnover in August and September 1987.

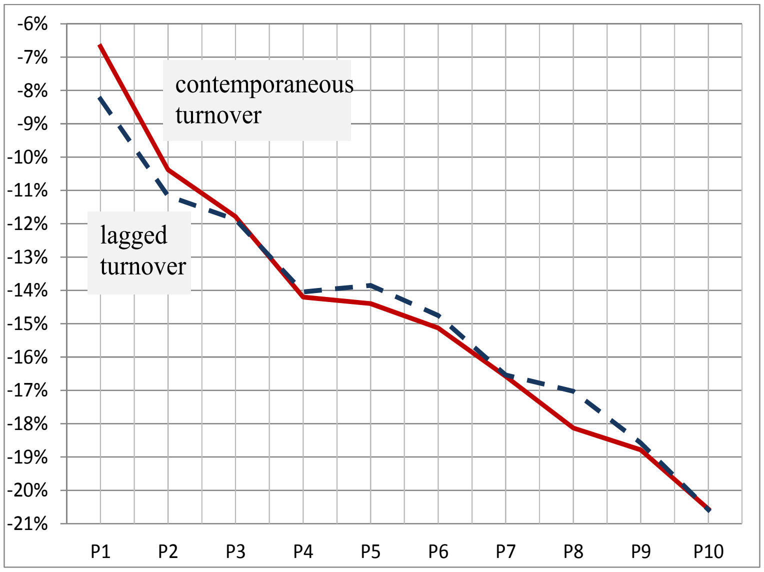
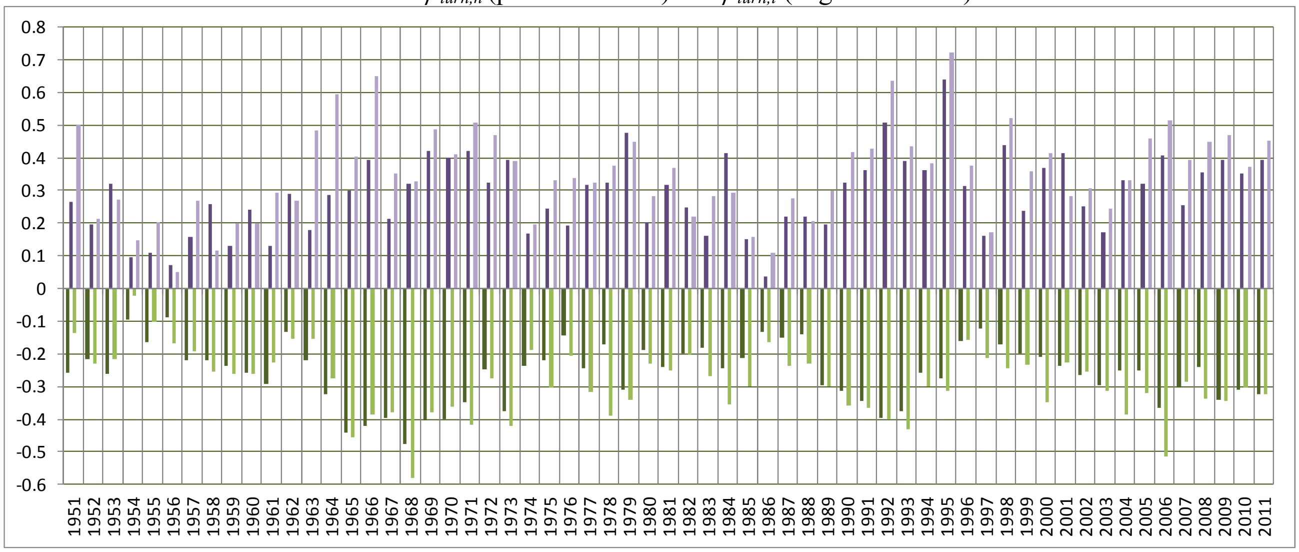


Figure 2
Relation between Turnover and Daily Dimson Beta over Time

This figure plots the coefficients on the turnover dummies reported in Table I. Specifically, Panel A plots the coefficients on the high and low turnover dummies, $\beta_{turn,l}$ and $\beta_{turn,h}$, while Panel B plots their difference, $\beta_{turn,h}$ - $\beta_{turn,l}$. The light colors indicate the estimates associated with the contemporaneous turnover.

Panel B1: $\beta_{turn,h}$ (positive values) and $\beta_{turn,l}$ (negative values)



Panel B2: $\beta_{turn,h}$ - $\beta_{turn,l}$

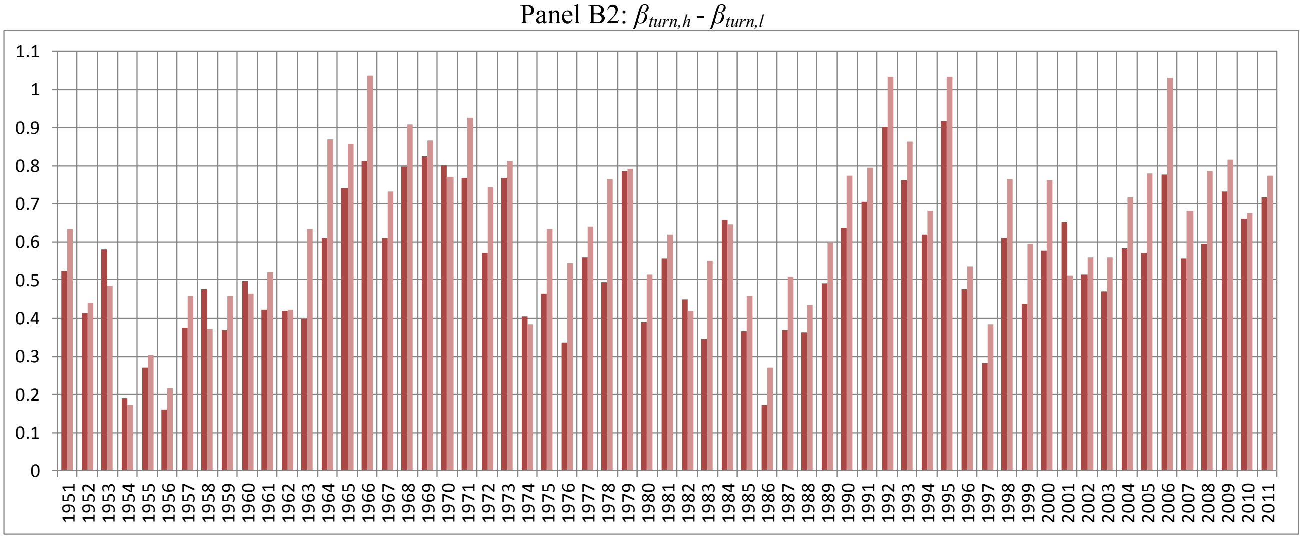
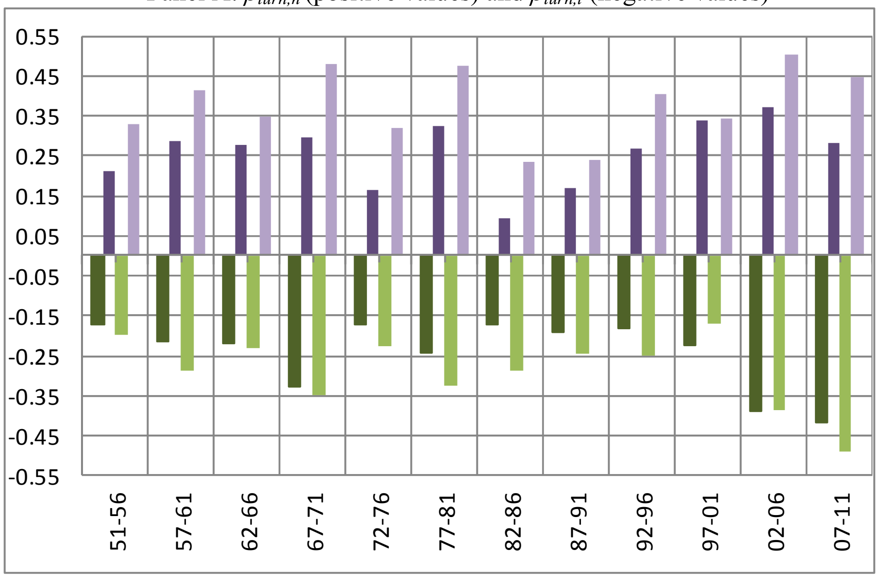


Figure 3
Relation between Turnover and Monthly Beta over Time

This figure plots the estimates of coefficients on the interaction terms of the market return R(M,t) with the turnover dummies reported in Table III. Specifically, Panel A plots the coefficients on the high and low turnover dummies, $\beta_{turn,l}$ and $\beta_{turn,h}$, while Panel B plots their difference, $\beta_{turn,h}$ - $\beta_{turn,l}$. The light colors indicate the estimates associated with the contemporaneous turnover.

Panel A: $\beta_{turn,h}$ (positive values) and $\beta_{turn,l}$ (negative values)



Panel B: $\beta_{turn,h}$ - $\beta_{turn,l}$

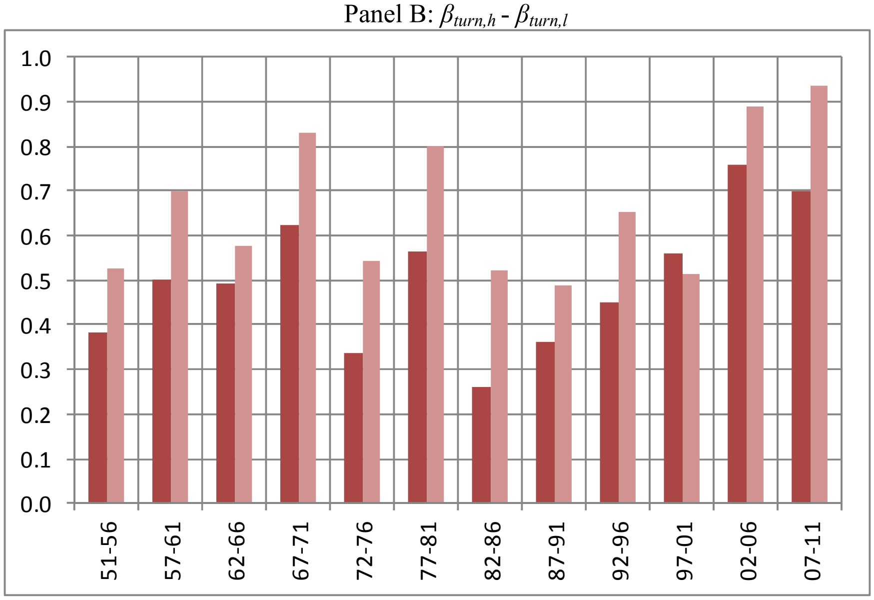
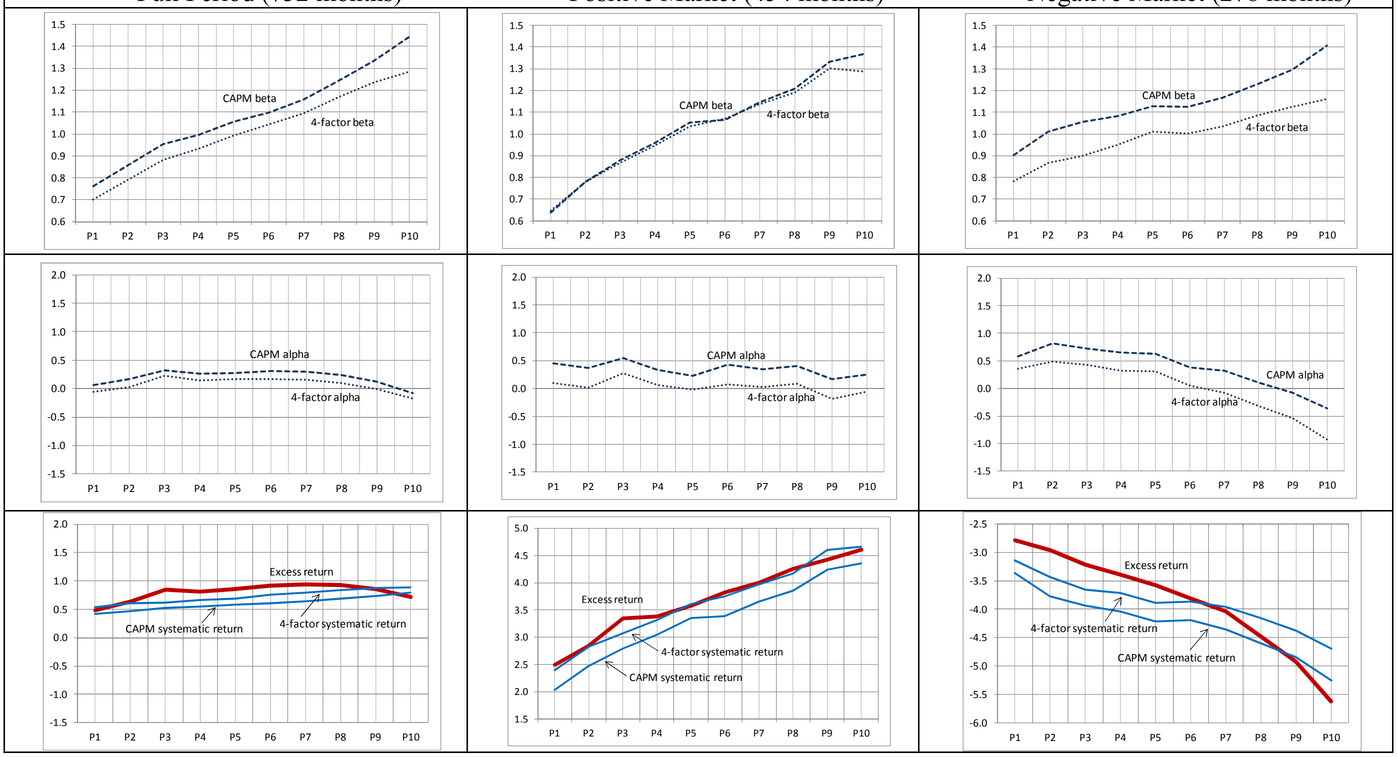


Figure 4
Monthly Returns and Betas of Turnover-sorted Portfolios

This figure presents the characteristics of stock portfolios sorted on the previous month's turnover (Panel A) and on the contemporaneous turnover (Panel B) reported in Table IV. The first rows plot the CAPM and 4-factor market betas, the second rows plot the CAPM and 4-factor alphas and the third rows plot the excess returns and the CAPM and 4-factor model systematic returns. The systematic return of a portfolio is the difference between its excess return and alpha.

Panel A: Lagged turnover Sort

Full Period (732 months) | Positive Market (454 months) | Negative Market (278 months)



Panel B: Contemporaneous turnover sort

Full Period (732 months) | Positive Market (454 months) | Negative Market (278 months)

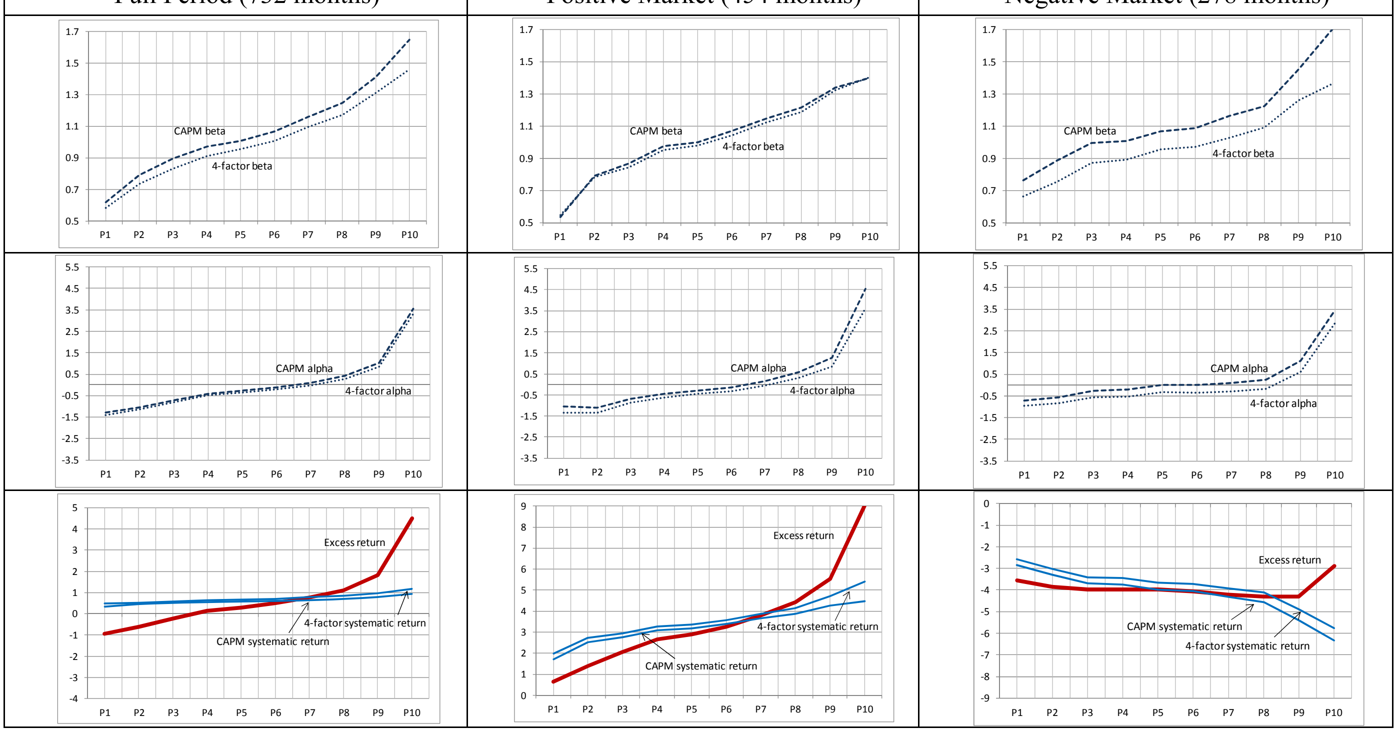
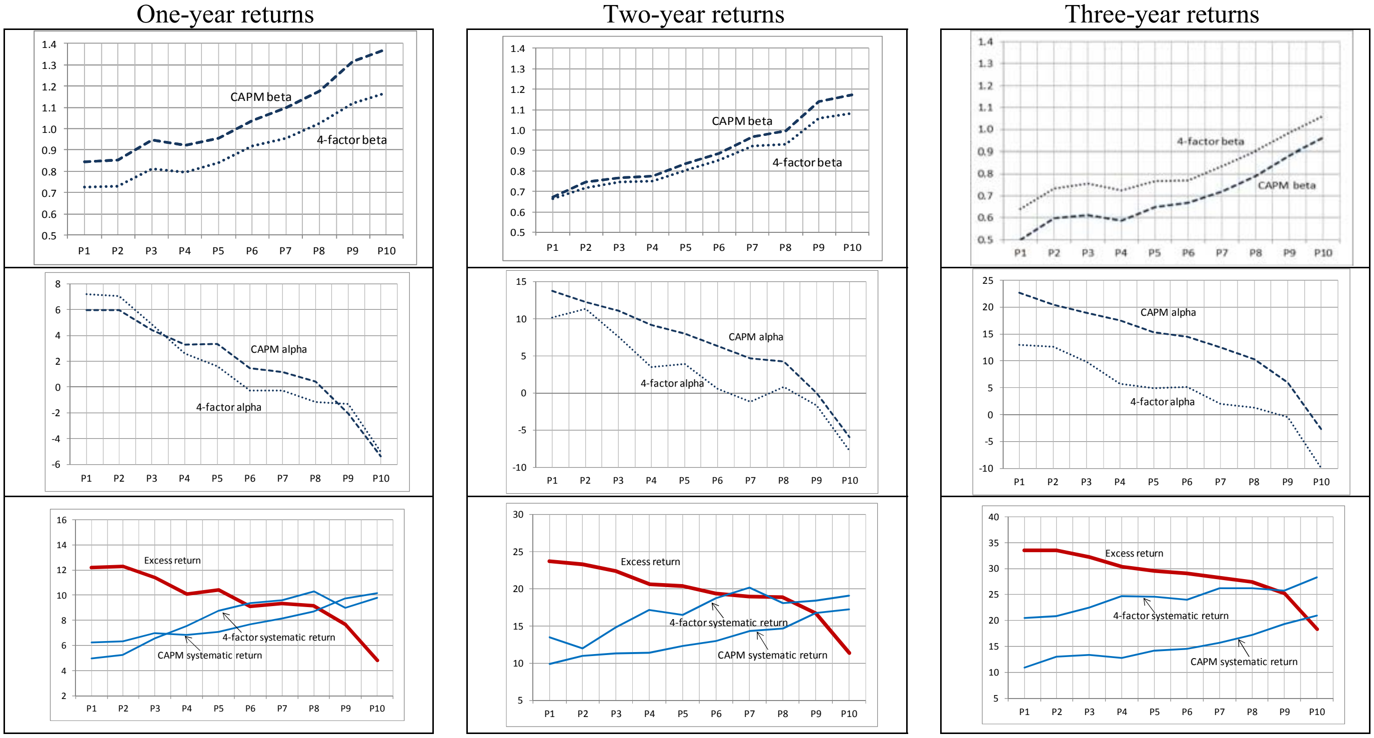


Figure 5
One-, Two- and Three-year Returns and Betas of Turnover-sorted Portfolios

This figure presents the characteristics of stock portfolios sorted on the previous year's turnover (Panel A) and on the contemporaneous turnover (Panel B) reported in Table V. The first rows plot the CAPM and 4-factor market betas, the second rows plot the CAPM and 4-factor model alphas and the third rows plot the excess returns and the CAPM and 4-factor systematic returns. The systematic return of a portfolio is the difference between its excess return and alpha.

Panel A1: Lagged turnover sort - One-year returns | Panel A2: Lagged turnover sort - Two-year returns | Panel A3: Lagged turnover sort - Three-year returns



Panel B1: Contemp.turnover sort - One-year returns | Panel B2: Contemp. turnover sort - Two-year returns | Panel B3: Contemp. turnover sort - Three-year returns

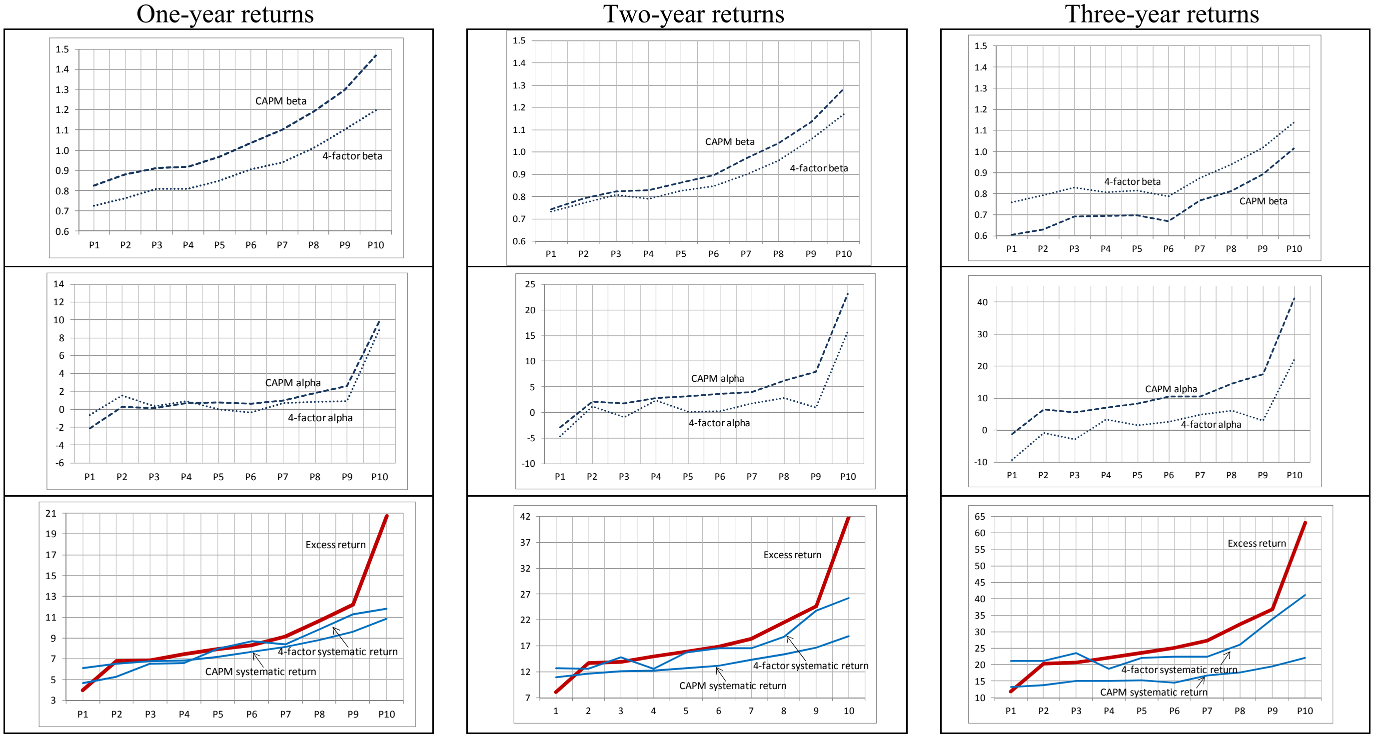


Figure 6
Summary of Patterns in Systematic and Non-systematic Return Components of Turnover-sorted Portfolios

This figure plots the estimates of monthly and yearly systematic (beta-driven) and non-systematic (alpha) return components of the turnover sorted portfolios reported in Tables IV and V.

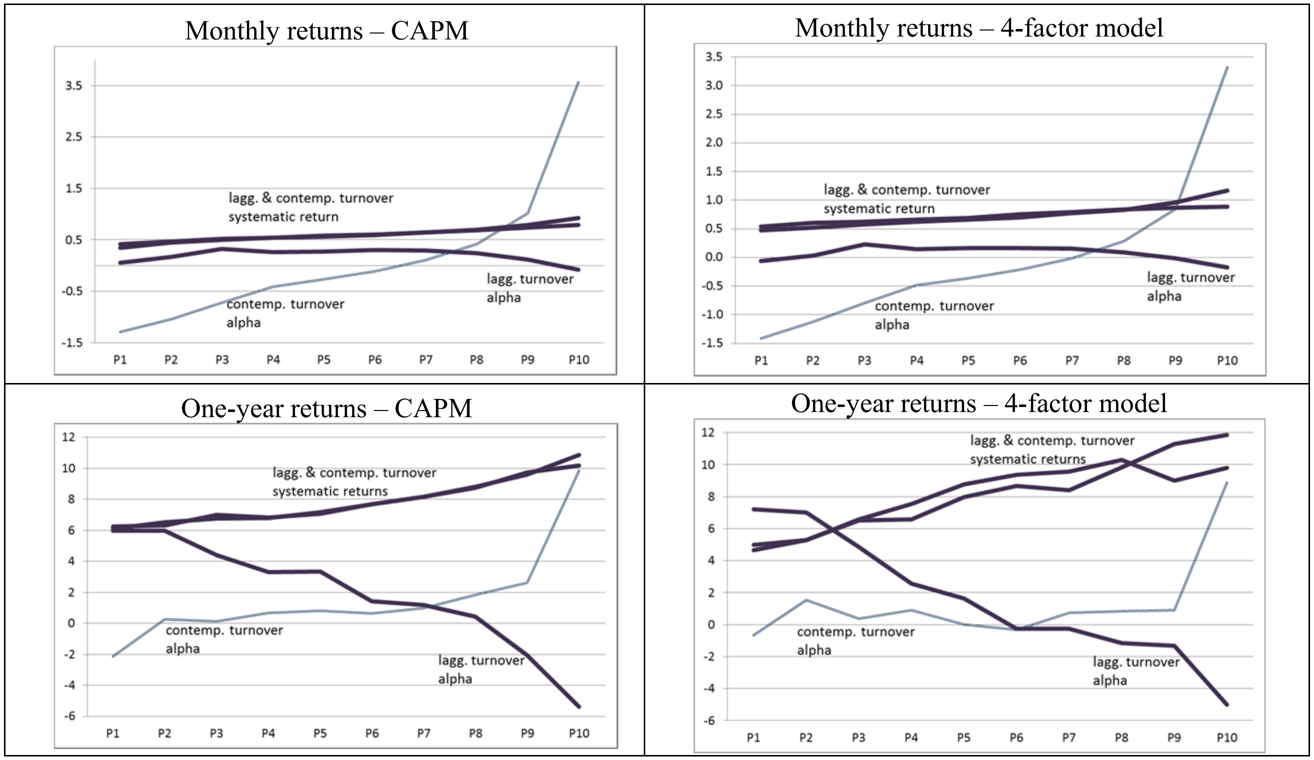


Table I
Relation between Stock Characteristics and Daily Dimson Betas over Time

This table presents the year-by-year estimates of coefficients of the following cross-sectional regressions:

$$Beta_{i,t} = \beta_0 + \beta_{turn} logTurn_{i,t-1(/t)} + \beta_{size} logSize_{i,t-1} + \beta_{bm} logBM_{i,t-1} + e_{i,t} \quad (1)$$

and

$$Beta_{i,t} = \beta_0 + \beta_{turn,l} LowTurn_{i,t-1(/t)} + \beta_{turn,h} HighTurn_{i,t-1(/t)} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1} + e_{i,t}, \quad (2)$$

in Panels A and B, respectively. $Beta_{i,t}$ is the Dimson beta of stock i in year t; $logTurn_{i,t}$ / $logSize_{i,t}$ / $logBM_{i,t}$ is the log of turnover / size / B/M of stock i in year t; $LowTurn_{i,t-1}$ $(HighTurn_{i,t-1})$ / $Small_{i,t-1}$ $(Big_{i,t-1})$ / $LowBM_{i,t-1}$ $(HighBM_{i,t-1})$ is a dummy variables equal to 1 if turnover / size / B/M of stock i n year t is in the bottom (top) tercile of the cross-sectional distribution of this characteristic. The table reports the estimates of the specifications with the lagged (year $t-1$) turnover and the specifications with the contemporaneous (year t) turnover. Heteroskedasticity-consistent t-statistics are in parentheses.

Panel A: Regression (1)

	Lagged Turnover			Contemporaneous Turnover		
Year	logTurn	logSize	logBM	logTurn	logSize	logBM
1951	**0.26** (6.9)	0.07 (2.7)	0.00 -(0.1)	**0.29** (8.0)	0.08 (3.1)	-0.04 -(0.5)
1952	**0.23** (4.5)	0.12 (4.9)	-0.09 -(1.4)	**0.26** (6.1)	0.12 (5.6)	-0.08 -(1.3)
1953	**0.32** (9.2)	0.06 (3.2)	-0.12 -(2.2)	**0.31** (8.7)	0.06 (2.8)	-0.13 -(2.6)
1954	**0.18** (3.8)	0.15 (6.1)	0.11 (1.8)	**0.14** (3.0)	0.15 (5.9)	0.10 (1.5)
1955	**0.17** (4.7)	0.14 (6.3)	-0.07 -(1.3)	**0.18** (4.6)	0.15 (6.4)	-0.09 -(1.6)
1956	**0.10** (3.6)	0.15 (6.8)	-0.18 -(3.1)	**0.14** (4.2)	0.15 (7.0)	-0.19 -(3.1)
1957	**0.22** (5.3)	0.11 (4.8)	-0.17 -(3.0)	**0.25** (6.0)	0.11 (5.0)	-0.16 -(2.9)
1958	**0.26** (4.2)	0.19 (5.5)	0.21 (2.2)	**0.26** (4.1)	0.20 (6.2)	0.18 (1.8)
1959	**0.22** (5.5)	0.11 (4.5)	-0.06 -(1.0)	**0.20** (4.8)	0.11 (4.8)	-0.08 -(1.4)
1960	**0.29** (8.8)	0.13 (6.5)	-0.21 -(4.7)	**0.28** (6.5)	0.11 (6.1)	-0.19 -(4.3)
1961	**0.22** (4.5)	0.03 (0.9)	0.04 (0.7)	**0.26** (5.7)	0.05 (1.9)	0.02 (0.3)
1962	**0.20** (9.0)	0.06 (4.2)	-0.15 -(5.2)	**0.23** (9.1)	0.04 (3.2)	-0.14 -(5.1)
1963	**0.39** (10.6)	0.11 (5.7)	0.10 (2.2)	**0.37** (9.3)	0.11 (5.9)	0.05 (1.0)
1964	**0.34** (8.1)	0.06 (2.1)	0.08 (1.2)	**0.42** (10.1)	0.08 (3.1)	0.06 (0.9)
1965	**0.35** (11.8)	0.03 (1.9)	-0.03 -(0.6)	**0.37** (13.0)	0.06 (3.4)	-0.07 -(1.5)
1966	**0.40** (21.9)	0.03 (2.8)	-0.21 -(6.5)	**0.45** (24.9)	0.04 (3.9)	-0.19 -(6.2)
1967	**0.29** (12.7)	0.03 (2.3)	0.02 (1.1)	**0.32** (14.8)	0.08 (5.3)	0.02 (1.3)
1968	**0.35** (18.0)	0.03 (2.8)	-0.17 -(6.1)	**0.43** (18.2)	0.09 (6.8)	-0.21 -(7.9)
1969	**0.36** (21.1)	-0.04 -(3.7)	-0.19 -(8.1)	**0.41** (20.5)	-0.07 -(6.6)	-0.17 -(7.4)
1970	**0.43** (24.8)	0.03 (2.9)	-0.13 -(7.4)	**0.37** (17.7)	-0.04 -(5.7)	-0.12 -(6.0)
1971	**0.37** (16.3)	-0.09 -(8.9)	0.06 (2.2)	**0.47** (20.2)	-0.07 -(6.7)	0.03 (1.3)
1972	**0.30** (11.0)	-0.06 -(4.9)	-0.14 -(4.5)	**0.39** (14.2)	-0.05 -(4.1)	-0.12 -(4.2)
1973	**0.47** (20.6)	-0.04 -(4.1)	-0.15 -(5.6)	**0.44** (17.9)	-0.10 -(10.4)	-0.16 -(5.9)
1974	**0.23** (14.8)	0.02 (2.5)	-0.10 -(4.8)	**0.22** (13.6)	0.01 (1.0)	-0.09 -(4.3)
1975	**0.27** (11.4)	-0.03 -(3.4)	0.19 (6.7)	**0.33** (15.8)	-0.04 -(4.3)	0.20 (7.1)
1976	**0.17** (6.2)	-0.13 -(9.9)	0.14 (3.8)	**0.30** (10.8)	-0.13 -(10.1)	0.12 (3.4)
1977	**0.37** (12.8)	0.01 (0.5)	-0.05 -(1.1)	**0.35** (11.0)	0.02 (1.5)	-0.05 -(1.1)
1978	**0.27** (14.2)	-0.11 -(13.9)	-0.09 -(3.2)	**0.37** (19.2)	-0.08 -(11.1)	-0.08 -(3.1)
1979	**0.41** (18.9)	-0.04 -(4.3)	-0.04 -(1.4)	**0.43** (18.3)	-0.05 -(5.8)	-0.08 -(2.7)
1980	**0.21** (13.4)	-0.04 -(5.1)	-0.15 -(7.0)	**0.28** (18.6)	-0.04 -(5.4)	-0.13 -(6.2)
1981	**0.32** (14.6)	-0.04 -(4.0)	-0.21 -(8.3)	**0.35** (15.8)	-0.04 -(4.4)	-0.26 -(10.3)
1982	**0.27** (15.1)	0.05 (6.1)	-0.23 -(9.3)	**0.26** (13.5)	0.03 (3.6)	-0.24 -(9.6)
1983	**0.22** (7.6)	-0.10 -(8.2)	-0.15 -(4.7)	**0.33** (11.5)	-0.08 -(7.5)	-0.15 -(4.7)
1984	**0.42** (15.0)	-0.03 -(2.5)	-0.30 -(8.8)	**0.36** (11.4)	-0.06 -(5.1)	-0.34 -(9.9)
1985	**0.23** (7.9)	-0.01 -(1.0)	-0.19 -(4.8)	**0.27** (9.0)	-0.02 -(1.8)	-0.18 -(4.7)
1986	**0.11** (4.3)	0.06 (6.8)	-0.17 -(4.8)	**0.14** (5.9)	0.06 (6.3)	-0.17 -(4.9)
1987	**0.23** (13.0)	-0.05 -(7.4)	-0.07 -(3.3)	**0.29** (16.8)	-0.07 -(9.4)	-0.07 -(3.3)
1988	**0.25** (9.2)	0.04 (3.1)	-0.10 -(2.7)	**0.22** (9.2)	0.03 (2.2)	-0.10 -(2.8)
1989	**0.23** (7.0)	0.00 (0.1)	0.02 (0.4)	**0.26** (8.6)	0.00 (0.3)	0.02 (0.5)
1990	**0.32** (11.1)	-0.01 -(0.7)	-0.06 -(1.4)	**0.37** (12.7)	-0.02 -(2.0)	-0.05 -(1.2)
1991	**0.38** (12.0)	-0.03 -(2.0)	0.18 (4.7)	**0.39** (12.7)	-0.02 -(1.2)	0.21 (5.1)
1992	**0.46** (12.5)	-0.07 -(3.5)	-0.09 -(1.8)	**0.47** (12.6)	-0.05 -(2.5)	-0.10 -(2.0)
1993	**0.32** (7.2)	0.03 (1.3)	-0.10 -(1.8)	**0.35** (7.4)	0.03 (1.5)	-0.10 -(1.7)
1994	**0.36** (12.5)	-0.05 -(4.0)	-0.13 -(3.8)	**0.36** (12.1)	-0.06 -(4.6)	-0.14 -(4.0)
1995	**0.40** (9.0)	-0.04 -(1.9)	-0.21 -(3.6)	**0.46** (10.0)	-0.04 -(2.0)	-0.18 -(3.2)
1996	**0.25** (9.5)	0.01 (1.3)	-0.19 -(6.4)	**0.28** (9.4)	0.02 (1.5)	-0.19 -(6.3)
1997	**0.17** (8.5)	0.01 (1.5)	-0.09 -(4.1)	**0.19** (9.0)	0.01 (1.1)	-0.09 -(4.0)
1998	**0.35** (14.8)	-0.04 -(4.0)	-0.12 -(3.8)	**0.38** (16.2)	-0.05 -(5.0)	-0.11 -(3.4)
1999	**0.25** (11.1)	0.04 (3.4)	-0.03 -(1.4)	**0.29** (11.8)	0.03 (2.7)	-0.01 -(0.6)
2000	**0.31** (12.5)	-0.11 -(8.4)	-0.16 -(5.5)	**0.36** (13.1)	-0.13 -(9.2)	-0.13 -(5.1)
2001	**0.33** (15.4)	-0.02 -(1.7)	0.04 (1.7)	**0.25** (12.5)	-0.02 -(1.4)	0.05 (2.1)
2002	**0.23** (12.7)	0.05 (5.7)	0.05 (2.1)	**0.23** (11.8)	0.05 (4.9)	0.05 (2.0)
2003	**0.26** (9.8)	0.00 (0.0)	0.10 (3.0)	**0.25** (8.7)	0.02 (1.3)	0.12 (3.4)
2004	**0.32** (11.6)	-0.11 -(7.9)	-0.07 -(2.2)	**0.36** (13.6)	-0.10 -(7.8)	-0.06 -(1.9)
2005	**0.29** (10.8)	-0.01 -(0.4)	0.04 (0.9)	**0.35** (13.5)	-0.02 -(1.2)	0.05 (1.2)
2006	**0.41** (13.1)	-0.15 -(9.1)	-0.16 -(4.1)	**0.45** (13.5)	-0.16 -(9.3)	-0.15 -(3.9)
2007	**0.26** (11.7)	0.00 -(0.2)	0.08 (2.5)	**0.32** (12.9)	-0.02 -(1.8)	0.07 (2.5)
2008	**0.30** (12.9)	-0.05 -(4.4)	0.07 (2.5)	**0.31** (15.0)	-0.09 -(7.7)	0.05 (2.0)
2009	**0.32** (12.5)	-0.06 -(4.2)	0.32 (10.5)	**0.38** (13.0)	-0.07 -(5.0)	0.32 (11.0)
2010	**0.31** (13.9)	-0.12 -(10.8)	0.07 (2.7)	**0.31** (12.9)	-0.10 -(9.3)	0.07 (3.0)
2011	**0.32** (12.1)	-0.08 -(7.3)	-0.02 -(0.7)	**0.34** (12.4)	-0.08 -(7.5)	0.00 (0.1)
Mean	**0.29** (11.3)	0.003 -(0.7)	-0.06 -(1.8)	**0.32** (11.9)	0.002 -(1.0)	-0.06 -(1.9)
> 0	**100%**	49%	31%	**100%**	39%	33%

Panel B: Regression (2)

Year	Lagged Turnover: LowTurn	HighTurn	Diff.	Small	Big	Diff.	LowBM	HighBM	Diff.	Contemporaneous Turnover: LowTurn	HighTurn	Diff.	Small	Big	Diff.	LowBM	HighBM	Diff.
1951	**-0.26** -(4.3)	**0.29** (3.6)	**0.55**	0.05 (0.5)	0.20 (3.1)	0.15	0.01 (0.2)	-0.02 -(0.2)	-0.03	**-0.13** -(2.2)	**0.50** (6.5)	**0.63**	0.02 (0.2)	0.24 (3.9)	0.22	-0.01 -(0.2)	-0.04 -(0.5)	-0.02
1952	**-0.23** -(3.8)	**0.21** (2.8)	**0.44**	-0.02 -(0.3)	0.26 (4.1)	0.28	-0.01 -(0.2)	-0.18 -(2.5)	-0.16	**-0.25** -(4.2)	**0.20** (2.4)	**0.45**	-0.06 -(0.8)	0.26 (4.2)	0.32	0.00 -(0.1)	-0.14 -(1.9)	-0.13
1953	**-0.27** -(4.9)	**0.30** (4.5)	**0.57**	0.00 (0.0)	0.09 (1.7)	0.09	0.02 (0.4)	-0.17 -(2.7)	-0.19	**-0.21** -(3.8)	**0.27** (3.8)	**0.48**	0.00 (0.0)	0.09 (1.5)	0.09	0.03 (0.5)	-0.14 -(2.3)	-0.17
1954	**-0.10** -(1.4)	**0.11** (1.2)	**0.21**	-0.20 -(1.9)	0.22 (3.3)	0.42	-0.03 -(0.5)	0.10 (1.3)	0.13	**-0.03** -(0.4)	**0.17** (1.9)	**0.20**	-0.22 -(2.0)	0.22 (3.3)	0.44	-0.05 -(0.6)	0.09 (1.2)	0.14
1955	**-0.16** -(2.7)	**0.11** (1.3)	**0.27**	-0.16 -(1.7)	0.20 (3.1)	0.36	0.08 (1.2)	-0.08 -(1.2)	-0.17	**-0.10** -(1.6)	**0.20** (2.4)	**0.30**	-0.19 -(2.1)	0.20 (3.1)	0.40	0.08 (1.1)	-0.09 -(1.3)	-0.17
1956	**-0.09** -(1.4)	**0.08** (1.3)	**0.17**	-0.31 -(4.7)	0.20 (3.3)	0.51	0.29 (4.1)	-0.09 -(1.5)	-0.37	**-0.17** -(2.9)	**0.05** (0.8)	**0.22**	-0.31 -(4.8)	0.20 (3.4)	0.51	0.29 (4.3)	-0.09 -(1.6)	-0.38
1957	**-0.22** -(3.8)	**0.15** (2.1)	**0.37**	-0.17 -(2.3)	0.09 (1.4)	0.26	0.15 (2.2)	-0.14 -(2.0)	-0.28	**-0.19** -(3.6)	**0.26** (3.4)	**0.45**	-0.17 -(2.5)	0.11 (1.6)	0.28	0.14 (2.1)	-0.12 -(1.9)	-0.26
1958	**-0.23** -(2.7)	**0.28** (2.4)	**0.51**	-0.27 -(2.1)	0.33 (3.5)	0.60	-0.19 -(1.9)	0.10 (1.0)	0.30	**-0.27** -(3.2)	**0.12** (0.9)	**0.38**	-0.32 -(2.4)	0.28 (2.8)	0.60	-0.19 -(1.8)	0.08 (0.8)	0.27
1959	**-0.24** -(3.3)	**0.13** (1.5)	**0.36**	-0.14 -(1.3)	0.17 (2.4)	0.31	0.08 (1.1)	-0.05 -(0.6)	-0.13	**-0.26** -(3.6)	**0.19** (2.2)	**0.45**	-0.15 -(1.4)	0.23 (3.1)	0.38	0.07 (1.0)	-0.07 -(0.9)	-0.14
1960	**-0.26** -(4.7)	**0.25** (4.0)	**0.52**	-0.27 -(3.5)	0.19 (3.2)	0.45	0.19 (3.0)	-0.07 -(1.1)	-0.26	**-0.26** -(5.0)	**0.20** (2.9)	**0.46**	-0.27 -(3.3)	0.14 (2.5)	0.41	0.18 (2.8)	-0.08 -(1.4)	-0.26
1961	**-0.29** -(4.2)	**0.14** (1.5)	**0.43**	-0.01 -(0.1)	-0.04 -(0.6)	-0.03	-0.02 -(0.2)	-0.07 -(0.8)	-0.05	**-0.24** -(3.1)	**0.29** (3.1)	**0.53**	-0.07 -(0.7)	0.00 (0.0)	0.08	0.01 (0.1)	-0.05 -(0.6)	-0.06
1962	**-0.13** -(3.3)	**0.29** (5.9)	**0.42**	-0.09 -(1.8)	0.11 (2.8)	0.20	0.12 (2.9)	-0.08 -(1.9)	-0.20	**-0.15** -(4.5)	**0.26** (5.1)	**0.41**	-0.05 -(0.9)	0.09 (2.4)	0.14	0.11 (2.7)	-0.10 -(2.5)	-0.21
1963	**-0.30** -(5.5)	**0.40** (5.7)	**0.69**	-0.30 -(3.8)	0.07 (1.3)	0.36	-0.01 -(0.1)	0.11 (1.8)	0.12	**-0.20** -(3.7)	**0.52** (7.2)	**0.73**	-0.33 -(4.2)	0.07 (1.4)	0.40	-0.02 -(0.4)	0.11 (1.7)	0.13
1964	**-0.32** -(4.3)	**0.36** (3.8)	**0.68**	-0.02 -(0.2)	0.06 (0.8)	0.08	-0.06 -(0.8)	0.03 (0.3)	0.09	**-0.28** -(4.0)	**0.58** (6.1)	**0.86**	-0.02 -(0.2)	0.11 (1.6)	0.14	-0.05 -(0.7)	0.03 (0.3)	0.08
1965	**-0.45** -(8.3)	**0.33** (4.9)	**0.78**	-0.07 -(0.7)	0.05 (1.1)	0.12	0.09 (1.6)	-0.02 -(0.3)	-0.11	**-0.44** -(8.1)	**0.42** (6.2)	**0.86**	-0.12 -(1.4)	0.07 (1.4)	0.19	0.08 (1.5)	-0.08 -(1.3)	-0.16
1966	**-0.46** -(13)	**0.46** (9.1)	**0.92**	0.02 (0.4)	0.07 (1.8)	0.04	0.21 (4.9)	-0.19 -(4.5)	-0.40	**-0.39** -(12)	**0.64** (12.6)	**1.04**	-0.05 -(1.0)	0.04 (1.2)	0.09	0.21 (5.1)	-0.16 -(3.9)	-0.37
1967	**-0.39** -(7.9)	**0.26** (4.4)	**0.65**	-0.17 -(2.5)	-0.08 -(2.0)	0.08	-0.01 -(0.2)	0.00 (0.0)	0.01	**-0.39** -(9.8)	**0.36** (5.6)	**0.75**	-0.25 -(3.7)	-0.01 -(0.1)	0.24	-0.02 -(0.4)	0.01 (0.3)	0.03
1968	**-0.52** -(14)	**0.35** (6.8)	**0.87**	-0.06 -(1.2)	0.02 (0.5)	0.08	0.24 (5.2)	-0.15 -(3.6)	-0.38	**-0.58** -(16)	**0.31** (5.6)	**0.90**	-0.17 -(3.2)	0.06 (1.6)	0.23	0.26 (5.5)	-0.20 -(4.9)	-0.45
1969	**-0.44** -(14)	**0.47** (11)	**0.91**	0.15 (3.6)	-0.06 -(1.9)	-0.21	0.19 (4.9)	-0.11 -(3.6)	-0.30	**-0.37** -(12)	**0.50** (12.0)	**0.86**	0.17 (4.2)	-0.12 -(3.9)	-0.29	0.14 (3.7)	-0.13 -(4.3)	-0.28
1970	**-0.43** -(15)	**0.47** (13)	**0.91**	-0.14 -(4.1)	-0.03 -(0.9)	0.11	0.19 (5.7)	-0.08 -(2.9)	-0.27	**-0.36** -(13)	**0.41** (11.9)	**0.77**	0.00 -(0.1)	-0.15 -(4.9)	-0.14	0.15 (4.5)	-0.09 -(2.9)	-0.24
1971	**-0.35** -(10)	**0.44** (11)	**0.79**	0.14 (3.4)	-0.20 -(6.0)	-0.35	-0.03 -(0.7)	0.10 (2.6)	0.13	**-0.40** -(12)	**0.52** (13.5)	**0.92**	0.15 (3.7)	-0.13 -(4.0)	-0.28	0.01 (0.3)	0.10 (2.8)	0.09
1972	**-0.26** -(6.1)	**0.35** (7.2)	**0.61**	0.22 (4.1)	-0.06 -(1.6)	-0.28	0.21 (4.7)	0.00 (0.0)	-0.21	**-0.27** -(6.9)	**0.48** (9.7)	**0.75**	0.22 (4.3)	-0.02 -(0.6)	-0.24	0.21 (4.7)	0.01 (0.3)	-0.19
1973	**-0.42** -(12)	**0.46** (11)	**0.88**	-0.02 -(0.4)	-0.14 -(3.9)	-0.12	0.27 (7.0)	-0.04 -(1.1)	-0.31	**-0.43** -(13)	**0.39** (9.9)	**0.82**	0.06 (1.5)	-0.28 -(7.9)	-0.34	0.23 (6.1)	-0.07 -(1.8)	-0.30
1974	**-0.24** -(9.4)	**0.17** (6.1)	**0.41**	0.00 -(0.1)	0.08 (3.2)	0.08	0.24 (9.1)	0.06 (2.1)	-0.18	**-0.19** -(7.2)	**0.19** (6.9)	**0.38**	0.01 (0.2)	0.04 (1.4)	0.03	0.24 (8.9)	0.08 (2.8)	-0.16
1975	**-0.22** -(5.8)	**0.25** (6.8)	**0.48**	-0.01 -(0.2)	-0.16 -(4.7)	-0.15	-0.07 -(2.0)	0.27 (6.3)	0.34	**-0.31** -(8.2)	**0.33** (8.8)	**0.64**	0.04 (1.0)	-0.15 -(4.6)	-0.20	-0.10 -(2.7)	0.27 (6.6)	0.37
1976	**-0.14** -(3.1)	**0.19** (4.7)	**0.34**	0.31 (5.9)	-0.23 -(6.0)	-0.54	-0.01 -(0.2)	0.27 (5.3)	0.28	**-0.20** -(4.7)	**0.34** (7.9)	**0.54**	0.33 (6.2)	-0.22 -(6.0)	-0.54	0.01 (0.1)	0.25 (5.1)	0.25
1977	**-0.24** -(5.2)	**0.35** (7.4)	**0.59**	-0.11 -(2.0)	-0.05 -(1.4)	0.06	0.16 (3.8)	0.14 (2.6)	-0.02	**-0.31** -(6.7)	**0.33** (7.1)	**0.64**	-0.14 -(2.6)	-0.05 -(1.3)	0.09	0.15 (3.6)	0.13 (2.5)	-0.02
1978	**-0.17** -(4.9)	**0.32** (9.8)	**0.49**	0.19 (4.7)	-0.29 -(10)	-0.48	0.18 (5.5)	0.02 (0.6)	-0.15	**-0.40** -(14)	**0.37** (11.2)	**0.77**	0.17 (4.7)	-0.20 -(7.3)	-0.37	0.15 (5.1)	0.00 -(0.1)	-0.15
1979	**-0.31** -(9.2)	**0.50** (13)	**0.81**	-0.05 -(1.2)	-0.19 -(6.2)	-0.14	0.05 (1.5)	0.00 (0.0)	-0.05	**-0.34** -(11)	**0.45** (11.7)	**0.79**	-0.05 -(1.1)	-0.25 -(8.3)	-0.20	0.07 (2.0)	-0.03 -(0.8)	-0.10
1980	**-0.19** -(6.9)	**0.21** (7.1)	**0.40**	0.06 (2.0)	-0.10 -(3.7)	-0.16	0.10 (3.5)	-0.17 -(6.0)	-0.27	**-0.23** -(9.1)	**0.28** (9.3)	**0.51**	0.06 (1.9)	-0.11 -(4.2)	-0.16	0.09 (3.3)	-0.15 -(5.5)	-0.24
1981	**-0.25** -(7.3)	**0.32** (8.4)	**0.57**	0.05 (1.2)	-0.07 -(2.2)	-0.12	0.24 (6.4)	-0.15 -(4.2)	-0.39	**-0.25** -(7.3)	**0.36** (9.6)	**0.61**	0.04 (0.9)	-0.09 -(3.1)	-0.13	0.25 (6.7)	-0.18 -(5.1)	-0.43
1982	**-0.21** -(7.2)	**0.26** (8.2)	**0.48**	-0.18 -(5.6)	0.03 (0.9)	0.21	0.19 (5.8)	-0.17 -(5.7)	-0.35	**-0.21** -(6.6)	**0.24** (7.4)	**0.45**	-0.16 -(4.8)	-0.04 -(1.2)	0.12	0.21 (6.3)	-0.19 -(6.6)	-0.40
1983	**-0.19** -(3.8)	**0.16** (3.7)	**0.36**	0.13 (2.4)	-0.27 -(6.6)	-0.39	0.22 (4.7)	-0.05 -(1.0)	-0.26	**-0.28** -(6.1)	**0.27** (5.9)	**0.55**	0.09 (1.7)	-0.26 -(6.5)	-0.35	0.21 (4.6)	-0.04 -(0.9)	-0.25
1984	**-0.26** -(6.6)	**0.43** (9.6)	**0.69**	-0.04 -(1.0)	-0.10 -(2.7)	-0.06	0.26 (6.0)	-0.22 -(5.5)	-0.48	**-0.35** -(7.9)	**0.28** (6.5)	**0.63**	0.04 (0.8)	-0.18 -(4.6)	-0.22	0.26 (5.7)	-0.28 -(6.9)	-0.53
1985	**-0.24** -(5.1)	**0.16** (3.6)	**0.40**	-0.09 -(1.7)	-0.13 -(3.2)	-0.04	0.15 (3.3)	-0.17 -(3.9)	-0.32	**-0.29** -(6.4)	**0.15** (3.4)	**0.45**	-0.07 -(1.3)	-0.14 -(3.4)	-0.07	0.15 (3.4)	-0.16 -(3.7)	-0.31
1986	**-0.15** -(3.9)	**0.06** (1.5)	**0.20**	-0.14 -(3.4)	0.15 (4.4)	0.29	0.10 (2.7)	-0.21 -(5.7)	-0.31	**-0.13** -(3.4)	**0.10** (2.8)	**0.23**	-0.15 -(3.5)	0.14 (4.2)	0.29	0.11 (2.8)	-0.21 -(5.8)	-0.31
1987	**-0.17** -(6.0)	**0.23** (7.8)	**0.40**	0.00 (0.1)	-0.22 -(7.9)	-0.22	0.10 (3.6)	-0.04 -(1.5)	-0.14	**-0.25** -(9.3)	**0.28** (9.9)	**0.53**	0.04 (1.5)	-0.25 -(9.0)	-0.29	0.10 (3.6)	-0.06 -(2.2)	-0.16
1988	**-0.17** -(4.1)	**0.25** (5.9)	**0.42**	-0.11 -(2.3)	0.11 (3.1)	0.23	0.12 (2.9)	-0.06 -(1.5)	-0.18	**-0.20** -(4.6)	**0.22** (5.5)	**0.42**	-0.09 -(1.8)	0.09 (2.4)	0.18	0.14 (3.3)	-0.05 -(1.3)	-0.19
1989	**-0.31** -(5.5)	**0.22** (4.2)	**0.53**	0.10 (1.5)	0.01 (0.2)	-0.09	0.07 (1.4)	-0.05 -(0.9)	-0.12	**-0.29** -(5.4)	**0.27** (5.0)	**0.56**	0.10 (1.5)	0.04 (0.8)	-0.06	0.07 (1.4)	-0.03 -(0.6)	-0.10
1990	**-0.34** -(7.1)	**0.33** (7.1)	**0.67**	-0.06 -(1.0)	-0.10 -(2.4)	-0.04	0.07 (1.5)	-0.08 -(1.8)	-0.15	**-0.35** -(7.1)	**0.39** (9.1)	**0.75**	-0.02 -(0.3)	-0.12 -(3.0)	-0.10	0.08 (1.8)	-0.07 -(1.6)	-0.15
1991	**-0.36** -(6.5)	**0.38** (7.3)	**0.74**	-0.16 -(2.4)	-0.24 -(5.3)	-0.07	0.00 (0.0)	0.38 (6.2)	0.38	**-0.36** -(6.5)	**0.43** (8.3)	**0.78**	-0.17 -(2.5)	-0.19 -(4.4)	-0.02	-0.02 -(0.5)	0.40 (6.5)	0.42
1992	**-0.40** -(5.3)	**0.56** (8.6)	**0.96**	0.14 (1.6)	-0.22 -(3.9)	-0.36	0.22 (3.0)	-0.03 -(0.4)	-0.25	**-0.40** -(5.9)	**0.61** (8.5)	**1.02**	0.06 (0.7)	-0.21 -(3.9)	-0.27	0.21 (3.0)	-0.03 -(0.5)	-0.24
1993	**-0.39** -(4.8)	**0.35** (4.6)	**0.74**	-0.21 -(2.2)	-0.11 -(1.7)	0.10	0.18 (2.3)	-0.03 -(0.3)	-0.21	**-0.39** -(5.1)	**0.40** (4.8)	**0.79**	-0.23 -(2.4)	-0.10 -(1.5)	0.14	0.16 (2.1)	-0.03 -(0.4)	-0.20
1994	**-0.28** -(6.0)	**0.39** (7.9)	**0.68**	0.03 (0.6)	-0.12 -(2.9)	-0.15	0.22 (4.5)	0.04 (0.8)	-0.18	**-0.30** -(6.0)	**0.40** (8.1)	**0.70**	0.04 (0.6)	-0.17 -(4.2)	-0.21	0.19 (3.9)	0.01 (0.2)	-0.18
1995	**-0.33** -(4.0)	**0.63** (8.2)	**0.96**	0.13 (1.4)	-0.09 -(1.4)	-0.22	0.08 (1.0)	-0.31 -(3.7)	-0.38	**-0.31** -(4.0)	**0.69** (8.4)	**1.01**	0.13 (1.3)	-0.09 -(1.4)	-0.22	0.07 (0.9)	-0.29 -(3.6)	-0.37
1996	**-0.18** -(4.4)	**0.34** (7.6)	**0.52**	-0.03 -(0.7)	0.06 (1.6)	0.09	0.22 (4.7)	-0.19 -(4.9)	-0.41	**-0.16** -(4.0)	**0.38** (8.2)	**0.54**	-0.04 -(0.8)	0.08 (2.1)	0.12	0.20 (4.4)	-0.19 -(5.0)	-0.40
1997	**-0.14** -(4.0)	**0.20** (5.7)	**0.33**	0.03 (0.8)	0.10 (3.4)	0.07	0.11 (3.2)	-0.09 -(2.7)	-0.20	**-0.22** -(6.3)	**0.17** (4.8)	**0.39**	0.06 (1.4)	0.09 (2.9)	0.03	0.10 (3.0)	-0.11 -(3.2)	-0.21
1998	**-0.21** -(5.4)	**0.44** (11)	**0.65**	-0.09 -(2.1)	-0.28 -(7.1)	-0.19	0.07 (1.5)	-0.26 -(6.9)	-0.33	**-0.22** -(5.8)	**0.54** (12.5)	**0.76**	-0.04 -(1.0)	-0.30 -(7.9)	-0.26	0.06 (1.4)	-0.26 -(6.8)	-0.32
1999	**-0.25** -(5.8)	**0.25** (6.0)	**0.49**	-0.16 -(3.4)	0.00 (0.1)	0.17	0.03 (0.8)	-0.07 -(1.7)	-0.10	**-0.26** -(6.1)	**0.35** (8.1)	**0.60**	-0.13 -(2.8)	-0.02 -(0.5)	0.12	0.02 (0.6)	-0.06 -(1.4)	-0.08
2000	**-0.23** -(4.7)	**0.36** (7.5)	**0.59**	0.39 (6.7)	-0.07 -(1.6)	-0.46	0.21 (4.3)	-0.06 -(1.3)	-0.27	**-0.37** -(7.6)	**0.40** (7.9)	**0.77**	0.43 (7.4)	-0.12 -(2.7)	-0.55	0.19 (4.0)	-0.03 -(0.6)	-0.22
2001	**-0.23** -(5.6)	**0.45** (11)	**0.68**	-0.10 -(2.2)	-0.11 -(2.9)	-0.01	-0.02 -(0.6)	0.11 (2.6)	0.13	**-0.22** -(4.8)	**0.31** (7.6)	**0.53**	-0.10 -(1.9)	-0.09 -(2.2)	0.01	-0.01 -(0.2)	0.13 (3.0)	0.14
2002	**-0.27** -(6.0)	**0.29** (7.2)	**0.56**	-0.17 -(3.3)	0.17 (4.3)	0.33	-0.03 -(0.8)	0.06 (1.4)	0.09	**-0.23** -(5.1)	**0.30** (7.4)	**0.53**	-0.18 -(3.6)	0.17 (4.4)	0.35	-0.02 -(0.5)	0.06 (1.5)	0.08
2003	**-0.32** -(5.1)	**0.19** (4.0)	**0.51**	-0.16 -(2.3)	-0.11 -(2.6)	0.05	-0.01 -(0.3)	0.17 (3.3)	0.19	**-0.29** -(4.7)	**0.24** (4.6)	**0.53**	-0.19 -(2.6)	-0.08 -(1.9)	0.11	-0.04 -(0.8)	0.17 (3.4)	0.21
2004	**-0.27** -(4.3)	**0.34** (6.7)	**0.61**	0.00 -(0.1)	-0.46 -(11)	-0.46	0.11 (2.0)	-0.03 -(0.7)	-0.14	**-0.41** -(7.7)	**0.32** (6.3)	**0.73**	0.05 (0.7)	-0.40 -(9.7)	-0.45	0.11 (2.1)	-0.01 -(0.3)	-0.12
2005	**-0.26** -(4.2)	**0.33** (6.8)	**0.59**	-0.23 -(3.2)	-0.24 -(6.3)	-0.01	-0.11 -(2.1)	-0.08 -(1.8)	0.03	**-0.38** -(6.3)	**0.40** (8.4)	**0.78**	-0.14 -(2.0)	-0.21 -(5.6)	-0.07	-0.11 -(2.0)	-0.07 -(1.4)	0.04
2006	**-0.39** -(5.3)	**0.46** (7.3)	**0.85**	0.34 (3.9)	-0.36 -(7.0)	-0.71	0.17 (2.4)	-0.19 -(3.1)	-0.36	**-0.56** -(7.3)	**0.53** (8.2)	**1.09**	0.49 (5.2)	-0.31 -(5.9)	-0.80	0.16 (2.4)	-0.19 -(3.2)	-0.35
2007	**-0.31** -(5.9)	**0.30** (6.8)	**0.61**	0.08 (1.5)	0.09 (2.3)	0.00	-0.09 -(1.9)	0.01 (0.2)	0.10	**-0.29** -(4.9)	**0.41** (9.4)	**0.70**	0.14 (2.2)	0.08 (2.1)	-0.06	-0.09 -(2.0)	0.00 -(0.1)	0.08
2008	**-0.26** -(5.2)	**0.40** (8.5)	**0.66**	0.06 (1.1)	-0.11 -(2.4)	-0.17	-0.01 -(0.3)	0.08 (1.6)	0.10	**-0.24** -(4.1)	**0.46** (10.0)	**0.70**	0.11 (1.7)	-0.18 -(4.0)	-0.29	-0.01 -(0.1)	0.06 (1.3)	0.07
2009	**-0.38** -(5.9)	**0.40** (7.4)	**0.77**	0.11 (1.5)	-0.24 -(5.0)	-0.35	-0.19 -(4.3)	0.47 (7.4)	0.66	**-0.35** -(5.4)	**0.46** (8.3)	**0.80**	0.09 (1.3)	-0.32 -(6.7)	-0.41	-0.20 -(4.3)	0.45 (7.2)	0.64
2010	**-0.32** -(6.7)	**0.36** (9.5)	**0.68**	0.31 (5.8)	-0.30 -(9.0)	-0.61	0.03 (0.7)	0.02 (0.5)	0.00	**-0.31** -(6.7)	**0.37** (9.1)	**0.67**	0.27 (5.1)	-0.30 -(9.0)	-0.57	0.01 (0.3)	0.01 (0.3)	0.00
2011	**-0.35** -(7.8)	**0.41** (10)	**0.76**	0.09 (1.8)	-0.35 -(9.9)	-0.44	0.01 (0.4)	-0.16 -(4.1)	-0.17	**-0.35** -(7.0)	**0.46** (11.6)	**0.80**	0.13 (2.4)	-0.31 -(9.0)	-0.43	0.00 (0.0)	-0.16 -(4.1)	-0.16
Mean	**-0.27** -(6.0)	**0.31** (6.5)	**0.58**	-0.02 -(0.3)	-0.05 -(1.5)	-0.02	0.09 (2.0)	-0.03 -(0.8)	-0.12	**-0.29** -(6.4)	**0.35** (7.1)	**0.64**	-0.02 -(0.1)	-0.05 -(1.7)	-0.03	0.08 (2.0)	-0.03 -(1.0)	-0.12
> 0	**0%**	**100%**	**100%**	38%	43%	49%	72%	33%	26%	**0%**	**100%**	**100%**	46%	41%	49%	74%	31%	28%

Table II
Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Different Return Horizons

This table reports the estimates of the following panel regression:

$$\begin{aligned} R_{i,t} = {} & \alpha_0 + \alpha_{turn,l} LowTurn_{i,t-1[/t]} + \alpha_{turn,h} HighTurn_{i,t-1[/t]} + \alpha_{size,l} Small_{i,t-1} + \alpha_{size,h} Big_{i,t-1} + \alpha_{bm,l} LowBM_{i,t-1} + \alpha_{bm,h} HighBM_{i,t-1} \\ & + R_{M,t}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t-1[/t]} + \beta_{turn,h} HighTurn_{i,t-1[/t]} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1}\right) \\ & + R_{M,t-1}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t-1[/t]} + \gamma_{turn,h} HighTurn_{i,t-1[/t]} + \gamma_{size,l} Small_{i,t-1} + \gamma_{size,h} Big_{i,t-1} + \gamma_{bm,l} LowBM_{i,t-1} + \gamma_{bm,h} HighBM_{i,t-1}\right) + \varepsilon_{i,t}, \end{aligned}$$

where the $LowTurn_{i,t-1}$ ($HighTurn_{i,t-1}$) / $Small_{i,t-1}$ ($Big_{i,t-1}$) / $LowBM_{i,t-1}$ ($HighBM_{i,t-1}$) dummy is equal to 1 if turnover / size / B/M of a stock *i* in *t-1* is in the bottom (top) tercile of the cross-sectional distribution of this variable, and zero otherwise. For the specifications based on the monthly returns, index *t* refers to monthly observations, while for the specifications based on the longer return horizons index *t* refers to yearly observations. Tthe specifications estimated for the two- and three-year returns are shown in the table. The B/M dummies for the monthly specification are based on B/M in the calendar year preceding the year of month *t*. Standard errors are clustered by period. t-statistics are in parentheses.

Monthly data			Yearly data								
Monthly returns: R(i,t)			One-year returns: R(i,t)			Two-year returns: R(i,[t;t+1])			Three-year returns: R(i,[t;t+2])		
						α					
Constant	0.002	-0.001	Constant	0.06	0.05	Constant	0.19	0.17	Constant	0.30	0.25
	(2.7)	-(1.6)		(3.2)	(2.6)		(5.1)	(4.6)		(5.1)	(4.2)
LowTurn(i,t-1)	**-0.0003**		LowTurn(i,t-1)	**0.03**		LowTurn(i,t-1)	**0.04**		LowTurn(i,t-1)	**0.05**	
	-(0.8)			**(2.9)**			**(2.2)**			**(1.9)**	
HighTurn(i,t-1)	**-0.002**		HighTurn(i,t-1)	**-0.04**		HighTurn(i,t-1)	**-0.05**		HighTurn(i,t-1)	**-0.07**	
	-(4.4)			**-(3.8)**			**-(2.2)**			**-(2.4)**	
LowTurn(i,t)		**-0.01**	LowTurn(i,t)		**-0.03**	LowTurn(i,[t;t+1])		**-0.04**	LowTurn(i,[t;t+2])		**-0.02**
		-(16.4)			**-(3.5)**			**-(2.1)**			**-(0.7)**
HighTurn(i,t)		**0.01**	HighTurn(i,t)		**0.04**	HighTurn(i,[t;t+1])		**0.06**	HighTurn(i,[t;t+2])		**0.11**
		(30.1)			**(4.1)**			**(2.8)**			**(4.0)**
Small(i,t-1)	-0.0002	0.003	Small(i,t-1)	0.01	0.03	Small(i,t-1)	0.06	0.09	Small(i,t-1)	0.08	0.11
	-(0.3)	(3.7)		(0.8)	(2.5)		(2.3)	(3.1)		(1.9)	(2.6)
Big(i,t-1)	0.001	0.001	Big(i,t-1)	-0.02	-0.01	Big(i,t-1)	-0.08	-0.05	Big(i,t-1)	-0.14	-0.09
	(1.1)	(2.3)		-(1.3)	-(0.6)		-(3.3)	-(2.2)		-(3.5)	-(2.3)
LowBM(i,t-1)	-0.004	-0.01	LowBM(i,t-1)	-0.04	-0.05	LowBM(i,t-1)	-0.09	-0.10	LowBM(i,t-1)	-0.14	-0.16
	-(8.9)	-(11.5)		-(3.8)	-(4.6)		-(3.9)	-(4.5)		-(4.3)	-(4.9)
HighBM(i,t-1)	0.003	0.00	HighBM(i,t-1)	0.06	0.06	HighBM(i,t-1)	0.13	0.13	HighBM(i,t-1)	0.19	0.19
	(6.9)	(7.5)		(4.9)	(5.0)		(5.0)	(5.0)		(5.5)	(5.4)
						β					
R(M,t)	1.06	1.03	R(M,t)	0.92	0.92	R(M,[t;t+1])	0.76	0.76	R(M,[t;t+2])	0.67	0.70
	(54.7)	(53.3)		(12.0)	(11.9)		(8.5)	(8.3)		(6.5)	(6.8)
R(M,t)*LowTurn(i,t-1)	**-0.24**		R(M,t)*LowTurn(i,t-1)	**-0.19**		R(M,[t;t+1])*LowTurn(i,t-1)	**-0.16**		R(M,[t;t+2])*LowTurn(i,t-1)	**-0.14**	
	-(23.2)			**-(4.9)**			**-(3.6)**			**-(3.1)**	
R(M,t)*HighTurn(i,t-1)	**0.26**		R(M,t)*HighTurn(i,t-1)	**0.27**		R(M,[t;t+1])*HighTurn(i,t-1)	**0.18**		R(M,[t;t+2])*HighTurn(i,t-1)	**0.17**	
	(25.2)			**(6.5)**			**(3.6)**			**(3.1)**	
R(M,t)*LowTurn(i,t)		**-0.27**	R(M,t)*LowTurn(i,t)		**-0.20**	R(M,[t;t+1])*LowTurn(i,[t;t+1])		**-0.16**	R(M,[t;t+2])*LowTurn(i,[t;t+2])		**-0.18**
		-(25.0)			**-(4.7)**			**-(3.5)**			**-(3.7)**
R(M,t)*HighTurn(i,t)		**0.37**	R(M,t)*HighTurn(i,t)		**0.32**	R(M,[t;t+1])*HighTurn(i,[t;t+1])		**0.21**	R(M,[t;t+2])*HighTurn(i,[t;t+2])		**0.13**
		(36.4)			**(8.2)**			**(4.3)**			**(2.4)**
R(M,t)*Small(i,t-1)	0.11	0.14	R(M,t)*Small(i,t-1)	0.31	0.33	R(M,[t;t+1])*Small(i,t-1)	0.15	0.17	R(M,[t;t+2])*Small(i,t-1)	0.12	0.12
	(6.1)	(7.6)		(5.8)	(5.9)		(2.5)	(2.5)		(1.7)	(1.7)
R(M,t)*Big(i,t-1)	-0.17	-0.17	R(M,t)*Big(i,t-1)	-0.08	-0.11	R(M,[t;t+1])*Big(i,t-1)	0.04	-0.01	R(M,[t;t+2])*Big(i,t-1)	0.07	0.01
	-(11.5)	-(11.8)		-(1.6)	-(2.1)		(0.6)	-(0.1)		(1.0)	(0.2)
R(M,t)*LowBM(i,t-1)	0.11	0.10	R(M,t)*LowBM(i,t-1)	0.11	0.11	R(M,[t;t+1])*LowBM(i,t-1)	0.09	0.10	R(M,[t;t+2])*LowBM(i,t-1)	0.07	0.09
	(10.3)	(9.5)		(2.3)	(2.3)		(1.7)	(1.9)		(1.2)	(1.5)
R(M,t)*HighBM(i,t-1)	0.01	0.01	R(M,t)*HighBM(i,t-1)	0.06	0.06	R(M,[t;t+1])*HighBM(i,t-1)	-0.03	-0.04	R(M,[t;t+2])*HighBM(i,t-1)	-0.03	-0.05
	(0.5)	(0.9)		(1.2)	(1.1)		-(0.5)	-(0.7)		-(0.5)	-(0.7)
						γ					
R(M,t-1)	0.11	0.08	R(M,t-1)	-0.17	-0.21	R(M,[t-2;t-1])	-0.36	-0.37	R(M,[t-3;t-1])	-0.26	-0.23
	(5.6)	(4.0)		-(2.2)	-(2.7)		-(4.0)	-(4.1)		-(2.5)	-(2.1)
R(M,t-1)*LowTurn(i,t-1)	**0.02**		R(M,t-1)*LowTurn(i,t-1)	**0.01**		R(M,[t-2;t-1])*LowTurn(i,t-1)	**0.01**		R(M,[t-3;t-1])*LowTurn(i,t-1)	**0.01**	
	(2.0)			**(0.2)**			**(0.3)**			**(0.3)**	
R(M,t-1)*HighTurn(i,t-1)	**-0.001**		R(M,t-1)*HighTurn(i,t-1)	**-0.14**		R(M,[t-2;t-1])*HighTurn(i,t-1)	**-0.09**		R(M,[t-3;t-1])*HighTurn(i,t-1)	**-0.05**	
	-(0.1)			**-(3.3)**			**-(1.7)**			**-(1.0)**	
R(M,t-1)*LowTurn(i,t)		**-0.05**	R(M,t-1)*LowTurn(i,t)		**0.08**	R(M,[t-2;t-1])*LowTurn(i,[t;t+1])		**0.02**	R(M,[t-3;t-1])*LowTurn(i,[t;t+2])		**0.003**
		-(4.9)			**(2.1)**			**(0.6)**			**(0.1)**
R(M,t-1)*HighTurn(i,t)		**0.15**	R(M,t-1)*HighTurn(i,t)		**-0.08**	R(M,[t-2;t-1])*HighTurn(i,[t;t+1])		**-0.05**	R(M,[t-3;t-1])*HighTurn(i,[t;t+2])		**-0.11**
		(14.3)			**-(1.9)**			**-(1.0)**			**-(2.1)**
R(M,t-1)*Small(i,t-1)	0.18	0.21	R(M,t-1)*Small(i,t-1)	-0.15	-0.18	R(M,[t-2;t-1])*Small(i,t-1)	-0.18	-0.19	R(M,[t-3;t-1])*Small(i,t-1)	-0.09	-0.11
	(9.9)	(11.3)		-(2.8)	-(3.1)		-(2.8)	-(2.8)		-(1.3)	-(1.5)
R(M,t-1)*Big(i,t-1)	-0.11	-0.11	R(M,t-1)*Big(i,t-1)	0.09	0.10	R(M,[t-2;t-1])*Big(i,t-1)	0.20	0.18	R(M,[t-3;t-1])*Big(i,t-1)	0.20	0.15
	-(7.6)	-(7.3)		(1.8)	(1.9)		(3.4)	(3.1)		(2.8)	(2.2)
R(M,t-1)*LowBM(i,t-1)	0.01	0.00	R(M,t-1)*LowBM(i,t-1)	0.06	0.06	R(M,[t-2;t-1])*LowBM(i,t-1)	0.07	0.08	R(M,[t-3;t-1])*LowBM(i,t-1)	0.13	0.14
	(1.3)	(0.3)		(1.3)	(1.3)		(1.3)	(1.4)		(2.2)	(2.3)
R(M,t-1)*HighBM(i,t-1)	0.06	0.06	R(M,t-1)*HighBM(i,t-1)	-0.25	-0.24	R(M,[t-2;t-1])*HighBM(i,t-1)	-0.18	-0.17	R(M,[t-3;t-1])*HighBM(i,t-1)	-0.20	-0.19
	(5.8)	(5.7)		-(4.0)	-(3.8)		-(2.8)	-(2.6)		-(3.1)	-(2.9)
R-squared	15%	16%	R-squared	19%	20%	R-squared	17%	18%	R-squared	11%	12%
N		1060718	N		84180	N		77990	N		72186

Table III
Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Monthly returns – Sub-period Analysis

This table reports the estimates of the following panel regression:

$$\begin{aligned} R_{i,t} &= \alpha_0 + \alpha_{turn,l} LowTurn_{i,t\text{-}1[/t]} + \alpha_{turn,h} HighTurn_{i,t\text{-}1[/t]} + \alpha_{size,l} Small_{i,t\text{-}1} + \alpha_{size,h} Big_{i,t\text{-}1} + \alpha_{bm,l} LowBM_{i,t\text{-}1} + \alpha_{bm,h} HighBM_{i,t\text{-}1} \\ &+ R_{M,t}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t\text{-}1[/t]} + \beta_{turn,h} HighTurn_{i,t\text{-}1[/t]} + \beta_{size,l} Small_{i,t\text{-}1} + \beta_{size,h} Big_{i,t\text{-}1} + \beta_{bm,l} LowBM_{i,t\text{-}1} + \beta_{bm,h} HighBM_{i,t\text{-}1}\right) \\ &+ R_{M,t\text{-}1}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t\text{-}1[/t]} + \gamma_{turn,h} HighTurn_{i,t\text{-}1[/t]} + \gamma_{size,l} Small_{i,t\text{-}1} + \gamma_{size,h} Big_{i,t\text{-}1} + \gamma_{bm,l} LowBM_{i,t\text{-}1} + \gamma_{bm,h} HighBM_{i,t\text{-}1}\right) + \varepsilon_{i,t}, \end{aligned}$$

where the $LowTurn_{i,t\text{-}1}$ ($HighTurn_{i,t\text{-}1}$) / $Small_{i,t\text{-}1}$ ($Big_{i,t\text{-}1}$) dummy is equal to 1 if turnover/size of a stock i in month $t\text{-}1$ is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. The $LowBM_{i,t\text{-}1}$ ($HighBM_{i,t\text{-}1}$) dummy is equal to 1 if B/M in the calendar year preceding the year of month t is in the bottom (top) tercile of the cross-sectional distribution of this variable, and zero otherwise. Standard errors are clustered by period. t-statistics are in parentheses.

	1951-1956		1957-1961		1962-1966		1967-1971		1972-1976		1977-1981		1982-1986		1987-1991		1992-1996		1997-2001		2002-2006		2007-2011	
α																								
Constant	0.002	-0.003	0.001	-0.003	0.003	-0.006	0.000	-0.008	0.003	-0.003	0.008	-0.002	-0.001	-0.004	-0.003	-0.005	0.001	-0.001	0.005	0.005	0.006	0.008	0.004	0.004
	(0.9)	-(1.7)	(0.3)	-(1.4)	(1.3)	-(2.9)	(0.1)	-(2.9)	(0.5)	-(0.7)	(2.9)	-(0.5)	-(0.3)	-(1.8)	-(1.2)	-(2.0)	(0.5)	-(0.2)	(1.1)	(1.0)	(2.2)	(2.7)	(1.2)	(1.2)
LowTurn(i,t-1)	**0.002**		**0.004**		**-0.001**		**0.0003**		**-0.001**		**0.001**		**0.001**		**0.001**		**0.0004**		**-0.005**		**0.003**		**-0.002**	
	(1.8)		**(2.9)**		**-(0.9)**		**(0.2)**		**-(0.6)**		**(0.6)**		**(1.1)**		**(0.7)**		**(0.3)**		**-(2.7)**		**(2.0)**		**-(1.0)**	
HighTurn(i,t-1)	**0.00**		**0.00**		**0.00**		**-0.01**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**	
	-(1.8)		**-(1.5)**		**-(0.3)**		**-(2.4)**		**-(0.5)**		**-(1.5)**		**-(0.9)**		**-(2.1)**		**-(1.4)**		**-(0.2)**		**-(1.1)**		**-(0.9)**	
LowTurn(i,t)		**0.00**		**0.00**		**0.00**		**0.00**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.02**
		-(0.2)		**(1.2)**		**-(1.6)**		**-(2.5)**		**-(3.2)**		**-(4.8)**		**-(4.7)**		**-(6.6)**		**-(5.2)**		**-(6.7)**		**-(7.2)**		**-(6.8)**
HighTurn(i,t)		**0.01**		**0.01**		**0.02**		**0.02**		**0.02**		**0.03**		**0.02**		**0.01**		**0.01**		**0.01**		**0.00**		**0.00**
		(6.3)		**(5.2)**		**(10.4)**		**(10.8)**		**(10.3)**		**(16.5)**		**(9.7)**		**(7.6)**		**(5.4)**		**(3.3)**		**(1.3)**		**(1.7)**
Small(i,t-1)	-0.001	-0.002	0.002	0.000	0.005	0.004	0.004	0.002	0.002	0.006	0.003	0.008	-0.003	0.000	-0.006	-0.001	-0.002	0.000	-0.004	-0.001	0.0005	0.009	0.001	0.009
	-(0.7)	-(1.3)	(1.1)	(0.1)	(2.1)	(2.0)	(1.4)	(0.5)	(0.7)	(1.8)	(1.3)	(3.5)	-(1.1)	(0.1)	-(2.8)	-(0.6)	-(0.8)	(0.1)	-(0.8)	-(0.1)	(0.2)	(3.1)	(0.3)	(2.4)
Big(i,t-1)	-0.001	0.003	-0.002	0.001	-0.0005	0.005	-0.001	0.006	0.002	0.005	-0.006	-0.002	0.003	0.0001	0.004	0.001	0.004	0.002	0.001	-0.001	-0.002	-0.002	-0.001	-0.002
	-(0.4)	(2.0)	-(1.4)	(0.5)	-(0.3)	(3.3)	-(0.5)	(3.0)	(0.7)	(1.4)	-(2.8)	-(1.0)	(1.6)	(0.1)	(1.9)	(0.4)	(1.6)	(1.0)	(0.2)	-(0.4)	-(0.8)	-(0.9)	-(0.5)	-(0.9)
LowBM(i,t-1)	-0.002	-0.0003	-0.00001	0.001	-0.001	-0.001	-0.001	-0.005	-0.008	-0.010	-0.001	-0.006	-0.008	-0.009	-0.002	-0.002	-0.007	-0.009	-0.005	-0.006	-0.005	-0.007	-0.003	-0.003
	-(1.4)	-(0.2)	-(0.01)	(0.4)	-(1.0)	-(0.7)	-(0.6)	-(2.2)	-(3.1)	-(4.1)	-(0.7)	-(3.6)	-(4.3)	-(4.8)	-(1.5)	-(1.8)	-(3.8)	-(4.6)	-(2.2)	-(2.7)	-(3.4)	-(4.1)	-(1.6)	-(1.8)
HighBM(i,t-1)	-0.001	-0.001	0.0001	-0.001	0.002	0.002	0.005	0.006	0.007	0.007	0.004	0.004	0.007	0.009	0.003	0.002	0.001	0.002	0.003	0.004	0.003	0.003	0.004	0.004
	-(0.6)	-(0.9)	(0.1)	-(0.6)	(1.5)	(1.2)	(2.8)	(3.6)	(3.2)	(3.3)	(2.1)	(2.2)	(4.4)	(5.3)	(1.5)	(1.3)	(0.9)	(1.4)	(1.4)	(1.5)	(1.8)	(2.0)	(1.5)	(1.5)
β																								
R(M,t)	0.91	0.88	1.06	1.04	1.05	1.01	1.33	1.28	1.22	1.17	1.11	1.08	1.05	1.03	1.07	1.06	0.92	0.89	0.67	0.65	0.97	0.93	1.26	1.22
	(20.9)	(20.3)	(15.6)	(15.4)	(17.9)	(17.3)	(21.5)	(20.8)	(11.8)	(11.4)	(17.6)	(17.3)	(24.5)	(24.5)	(24.1)	(24.0)	(12.1)	(11.8)	(8.2)	(7.9)	(12.2)	(11.6)	(20.7)	(20.1)
R(M,t)*LowTurn(i,t-1)	**-0.17**		**-0.21**		**-0.22**		**-0.32**		**-0.17**		**-0.24**		**-0.17**		**-0.19**		**-0.18**		**-0.22**		**-0.39**		**-0.42**	
	-(5.4)		**-(5.0)**		**-(4.7)**		**-(9.5)**		**-(6.1)**		**-(9.4)**		**-(6.4)**		**-(7.6)**		**-(4.5)**		**-(7.0)**		**-(9.0)**		**-(8.3)**	
R(M,t)*HighTurn(i,t-1)	**0.21**		**0.29**		**0.28**		**0.30**		**0.16**		**0.33**		**0.09**		**0.17**		**0.27**		**0.34**		**0.37**		**0.28**	
	(4.7)		**(4.6)**		**(4.1)**		**(6.8)**		**(5.1)**		**(7.9)**		**(3.1)**		**(5.7)**		**(4.2)**		**(7.8)**		**(8.8)**		**(5.2)**	
R(M,t)*LowTurn(i,t)		**-0.20**		**-0.29**		**-0.23**		**-0.35**		**-0.22**		**-0.32**		**-0.29**		**-0.25**		**-0.25**		**-0.17**		**-0.38**		**-0.49**
		-(5.7)		**-(6.2)**		**-(4.8)**		**-(9.9)**		**-(5.9)**		**-(9.8)**		**-(8.3)**		**-(7.9)**		**-(4.4)**		**-(4.6)**		**-(7.3)**		**-(9.7)**
R(M,t)*HighTurn(i,t)		**0.33**		**0.41**		**0.35**		**0.48**		**0.32**		**0.48**		**0.23**		**0.24**		**0.40**		**0.34**		**0.50**		**0.45**
		(7.4)		**(6.3)**		**(5.2)**		**(10.0)**		**(8.9)**		**(11.2)**		**(6.5)**		**(7.3)**		**(6.2)**		**(7.7)**		**(12.2)**		**(9.1)**
R(M,t)*Small(i,t-1)	-0.13	-0.13	-0.10	-0.12	-0.004	0.02	0.07	0.07	0.19	0.25	0.13	0.16	0.03	0.07	-0.02	0.01	0.12	0.14	0.12	0.10	0.21	0.24	0.31	0.40
	-(3.0)	-(3.2)	-(1.6)	-(1.9)	-(0.1)	(0.3)	(1.0)	(1.0)	(3.0)	(3.9)	(2.7)	(3.3)	(0.6)	(1.2)	-(0.4)	(0.2)	(1.2)	(1.3)	(1.4)	(1.2)	(2.7)	(3.0)	(4.4)	(5.6)
R(M,t)*Big(i,t-1)	0.16	0.20	0.02	0.06	0.002	0.02	-0.17	-0.12	-0.19	-0.20	-0.21	-0.19	-0.08	-0.10	-0.14	-0.16	-0.07	-0.09	-0.14	-0.13	-0.19	-0.20	-0.30	-0.32
	(4.7)	(5.7)	(0.3)	(1.2)	(0.05)	(0.4)	-(3.3)	-(2.6)	-(3.1)	-(3.1)	-(4.4)	-(4.1)	-(1.9)	-(2.3)	-(3.4)	-(3.7)	-(0.9)	-(1.1)	-(2.2)	-(2.0)	-(3.5)	-(3.5)	-(5.9)	-(6.3)
R(M,t)*LowBM(i,t-1)	0.04	0.06	0.08	0.09	0.05	0.06	0.11	0.08	0.12	0.10	0.21	0.17	0.19	0.18	0.11	0.10	0.14	0.13	0.11	0.12	0.04	0.03	0.00	-0.01
	(1.2)	(1.7)	(1.4)	(1.6)	(1.2)	(1.5)	(2.1)	(1.7)	(2.2)	(1.9)	(5.7)	(4.7)	(5.0)	(4.8)	(4.4)	(4.2)	(2.3)	(2.1)	(3.0)	(3.1)	(0.9)	(0.6)	-(0.1)	-(0.2)
R(M,t)*HighBM(i,t-1)	0.003	-0.02	-0.03	-0.05	0.01	0.00	-0.04	-0.03	0.17	0.18	-0.08	-0.07	-0.16	-0.14	0.02	0.02	-0.08	-0.06	-0.05	-0.04	0.03	0.03	0.11	0.10
	(0.1)	-(0.5)	-(0.5)	-(0.9)	(0.3)	(0.1)	-(1.1)	-(0.9)	(3.5)	(3.6)	-(2.3)	-(2.1)	-(4.7)	-(4.2)	(0.5)	(0.6)	-(1.5)	-(1.1)	-(1.0)	-(1.0)	(0.7)	(0.7)	(2.0)	(1.9)
γ																								
R(M,t-1)	0.06	0.04	0.09	0.05	0.10	0.04	0.25	0.18	0.14	0.11	0.00	-0.04	0.11	0.11	0.11	0.08	0.14	0.12	0.07	0.04	0.28	0.24	-0.01	-0.02
	(1.4)	(0.9)	(1.3)	(0.7)	(1.6)	(0.8)	(3.9)	(2.9)	(1.4)	(1.1)	(0.1)	-(0.6)	(2.7)	(2.6)	(2.4)	(1.7)	(2.0)	(1.8)	(0.8)	(0.5)	(3.5)	(2.9)	-(0.1)	-(0.4)
R(M,t-1)*LowTurn(i,t-1)	**-0.02**		**-0.02**		**-0.01**		**0.02**		**0.07**		**0.04**		**0.06**		**-0.05**		**0.00**		**0.01**		**-0.13**		**0.05**	
	-(0.6)		**-(0.5)**		**-(0.2)**		**(0.7)**		**(2.3)**		**(1.7)**		**(2.4)**		**-(1.7)**		**(0.1)**		**(0.2)**		**-(2.9)**		**(0.9)**	
R(M,t-1)*HighTurn(i,t-1)	**0.05**		**-0.02**		**-0.01**		**-0.06**		**0.03**		**-0.05**		**-0.02**		**-0.01**		**0.02**		**-0.03**		**0.05**		**0.07**	
	(1.1)		**-(0.3)**		**-(0.1)**		**-(1.3)**		**(1.0)**		**-(1.3)**		**-(0.8)**		**-(0.3)**		**(0.4)**		**-(0.7)**		**(1.3)**		**(1.3)**	
R(M,t-1)*LowTurn(i,t)		**-0.09**		**-0.06**		**-0.04**		**-0.04**		**-0.10**		**-0.01**		**-0.06**		**-0.08**		**-0.05**		**-0.01**		**-0.22**		**-0.08**
		-(2.5)		**-(1.3)**		**-(0.9)**		**-(1.0)**		**-(2.9)**		**-(0.3)**		**-(1.7)**		**-(2.3)**		**-(0.9)**		**-(0.3)**		**-(4.3)**		**-(1.6)**
R(M,t-1)*HighTurn(i,t)		**0.17**		**0.15**		**0.15**		**0.17**		**0.22**		**0.10**		**0.08**		**0.11**		**0.14**		**0.09**		**0.23**		**0.19**
		(3.8)		**(2.4)**		**(2.3)**		**(3.4)**		**(5.9)**		**(2.3)**		**(2.2)**		**(3.4)**		**(2.3)**		**(1.9)**		**(5.7)**		**(3.9)**
R(M,t-1)*Small(i,t-1)	0.15	0.12	0.11	0.08	0.10	0.11	0.23	0.20	0.20	0.23	0.10	0.12	0.16	0.18	0.18	0.21	0.42	0.44	0.23	0.24	0.27	0.35	0.15	0.23
	(3.5)	(3.1)	(1.7)	(1.3)	(1.5)	(1.6)	(3.0)	(2.7)	(3.3)	(3.7)	(2.1)	(2.3)	(3.0)	(3.4)	(4.1)	(4.6)	(4.3)	(4.4)	(2.6)	(2.7)	(3.4)	(4.4)	(2.1)	(3.4)
R(M,t-1)*Big(i,t-1)	-0.07	-0.03	-0.07	-0.03	-0.07	-0.03	-0.22	-0.15	-0.17	-0.14	-0.02	0.01	-0.14	-0.15	-0.12	-0.13	-0.22	-0.22	-0.04	-0.06	-0.19	-0.20	-0.05	-0.07
	-(2.0)	-(0.9)	-(1.5)	-(0.6)	-(1.7)	-(0.6)	-(4.3)	-(3.1)	-(2.7)	-(2.2)	-(0.5)	(0.3)	-(3.2)	-(3.5)	-(2.5)	-(2.9)	-(3.0)	-(3.2)	-(0.7)	-(0.9)	-(3.4)	-(3.5)	-(1.0)	-(1.3)
R(M,t-1)*LowBM(i,t-1)	-0.003	0.03	-0.07	-0.06	0.05	0.06	0.02	-0.01	0.04	0.01	0.03	0.001	0.02	0.01	-0.01	-0.01	0.02	0.01	0.01	0.003	-0.01	-0.03	0.04	0.03
	-(0.1)	(0.7)	-(1.3)	-(1.1)	(1.4)	(1.7)	(0.4)	-(0.2)	(0.7)	(0.2)	(0.8)	(0.0)	(0.4)	(0.3)	-(0.4)	-(0.3)	(0.3)	(0.1)	(0.3)	(0.1)	-(0.2)	-(0.7)	(1.1)	(1.0)
R(M,t-1)*HighBM(i,t-1)	0.05	0.03	0.03	0.01	-0.01	-0.03	0.02	0.03	-0.02	-0.03	-0.01	-0.004	-0.01	-0.002	0.02	0.02	0.14	0.16	0.11	0.11	0.12	0.12	0.18	0.17
	(1.3)	(0.9)	(0.5)	(0.1)	-(0.3)	-(0.7)	(0.5)	(0.8)	-(0.5)	-(0.6)	-(0.2)	-(0.1)	-(0.3)	-(0.1)	(0.8)	(0.7)	(2.6)	(2.9)	(2.4)	(2.5)	(2.9)	(2.9)	(3.3)	(3.2)
R-squared	26%	28%	20%	22%	17%	20%	26%	28%	24%	25%	21%	24%	15%	17%	18%	19%	5%	6%	7%	7%	10%	10%	18%	19%
N		21583		19879		52576		97398		118177		112905		103545		99257		114206		121928		105289		93972

Table IV
Monthly Returns and Betas of Turnover-Sorted Portfolios

This table reports the monthly excess returns, the CAPM and 4-factor model alphas and betas, and the systematic returns of the monthly-rebalanced turnover portfolios. The systematic return of a portfolio is the difference between its excess return and alpha. In Panel A the stocks are sorted on the previous month's turnover, while in Panel B on the current month's turnover. The table reports the estimates for the full sample, as well as separately for the months with positive market return and for the months with negative market return. The stocks in the portfolios are equally-weighted. Heteroskedasticity-consistent t-statistics are in parentheses.

Panel A: Lagged turnover sort

	Full Period (732 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	0.48	0.64	0.85	0.80	0.85	0.91	0.94	0.93	0.86	0.71
	(2.0)	(2.8)	(3.8)	(3.7)	(3.8)	(4.0)	(3.9)	(3.7)	(3.1)	(2.5)
CAPM alpha	0.06	0.17	0.32	0.26	0.27	0.31	0.30	0.24	0.12	-0.08
	(0.4)	(1.3)	(2.8)	(2.4)	(2.4)	(2.7)	(2.3)	(1.8)	(0.8)	-(0.5)
CAPM beta	0.76	0.86	0.95	1.00	1.06	1.10	1.16	1.24	1.34	1.44
	(18.3)	(19.8)	(23.7)	(25.1)	(25.3)	(29.3)	(28.4)	(28.4)	(28.0)	(30.9)
4f. alpha	-0.06	0.03	0.23	0.14	0.16	0.16	0.15	0.09	-0.01	-0.17
	-(0.4)	(0.3)	(2.8)	(2.3)	(2.5)	(2.4)	(2.1)	(1.1)	-(0.1)	-(1.5)
4f. MKT beta	0.70	0.79	0.88	0.93	0.99	1.04	1.09	1.17	1.24	1.28
	(22.7)	(28.8)	(42.5)	(49.7)	(52.2)	(41.8)	(48.6)	(44.2)	(44.5)	(44.2)
CAPM sys.ret.	0.42	0.47	0.52	0.54	0.58	0.61	0.64	0.69	0.74	0.79
4f. sys.ret.	0.54	0.61	0.62	0.66	0.69	0.75	0.79	0.84	0.87	0.89

	Positive Market Returns (454 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	2.49	2.85	3.35	3.39	3.58	3.83	4.00	4.26	4.42	4.61
	(9.9)	(12.8)	(15.4)	(16.2)	(16.3)	(18.2)	(17.6)	(17.9)	(16.3)	(15.7)
CAPM alpha	0.45	0.37	0.55	0.34	0.23	0.43	0.34	0.40	0.17	0.26
	(1.7)	(1.7)	(2.6)	(1.6)	(1.0)	(1.9)	(1.4)	(1.5)	(0.6)	(0.8)
CAPM beta	0.64	0.78	0.88	0.96	1.05	1.06	1.14	1.21	1.33	1.37
	(7.4)	(8.9)	(10.3)	(11.9)	(12.6)	(13.5)	(13.8)	(14.3)	(13.3)	(14.0)
4f. alpha	0.09	0.02	0.28	0.07	-0.02	0.07	0.03	0.08	-0.18	-0.05
	(0.4)	(0.1)	(2.0)	(0.5)	-(0.2)	(0.5)	(0.2)	(0.5)	-(1.0)	-(0.3)
4f. MKT beta	0.65	0.78	0.87	0.95	1.04	1.07	1.14	1.19	1.30	1.29
	(11.2)	(16.6)	(25.0)	(28.3)	(30.4)	(25.7)	(31.8)	(30.0)	(27.5)	(26.9)
CAPM sys.ret.	2.04	2.48	2.80	3.05	3.35	3.39	3.66	3.86	4.25	4.36
4f. sys.ret.	2.40	2.83	3.07	3.32	3.61	3.75	3.98	4.17	4.60	4.66

	Negative Market Returns (278 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	-2.79	-2.96	-3.22	-3.40	-3.58	-3.82	-4.04	-4.48	-4.93	-5.63
	-(9.7)	-(9.7)	-(11.0)	-(11.3)	-(11.5)	-(12.5)	-(12.4)	-(13.1)	-(13.7)	-(14.7)
CAPM alpha	0.58	0.82	0.72	0.65	0.63	0.38	0.32	0.11	-0.08	-0.37
	(2.2)	(2.6)	(2.5)	(2.4)	(2.4)	(1.5)	(1.3)	(0.4)	-(0.3)	-(1.1)
CAPM beta	0.90	1.01	1.05	1.08	1.13	1.12	1.17	1.23	1.30	1.41
	(13.7)	(12.8)	(15.2)	(16.2)	(15.7)	(16.3)	(15.9)	(14.2)	(15.0)	(15.9)
4f. alpha	0.35	0.48	0.43	0.32	0.31	0.05	-0.08	-0.32	-0.54	-0.93
	(1.6)	(2.2)	(2.3)	(2.1)	(2.0)	(0.3)	-(0.5)	-(1.9)	-(3.1)	-(4.6)
4f. MKT beta	0.78	0.87	0.90	0.95	1.01	1.00	1.03	1.09	1.12	1.16
	(13.5)	(14.8)	(19.4)	(25.9)	(24.8)	(26.8)	(31.1)	(30.0)	(23.0)	(21.7)
CAPM sys.ret.	-3.37	-3.78	-3.94	-4.04	-4.21	-4.20	-4.36	-4.60	-4.85	-5.26
4f. sys.ret.	-3.14	-3.44	-3.65	-3.72	-3.89	-3.86	-3.96	-4.16	-4.39	-4.70

Panel B: Contemporaneous turnover sort

	Full Period (732 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	-0.94	-0.60	-0.22	0.14	0.29	0.48	0.76	1.11	1.81	4.49
	-(5.9)	-(3.2)	-(1.1)	(0.7)	(1.4)	(2.2)	(3.1)	(4.2)	(5.8)	(9.9)
CAPM alpha	-1.29	-1.04	-0.72	-0.41	-0.27	-0.11	0.11	0.42	1.02	3.56
	-(12.7)	-(9.8)	-(6.9)	-(4.1)	-(2.5)	-(1.0)	(0.8)	(3.0)	(6.1)	(11.7)
CAPM beta	0.62	0.79	0.90	0.97	1.01	1.07	1.16	1.25	1.41	1.65
	(15.5)	(19.4)	(22.2)	(25.5)	(25.9)	(28.7)	(29.1)	(29.3)	(28.3)	(28.0)
4f. alpha	-1.42	-1.12	-0.80	-0.49	-0.36	-0.21	-0.01	0.28	0.84	3.32
	-(14.6)	-(11.6)	-(9.8)	-(7.4)	-(5.2)	-(2.6)	-(0.2)	(3.4)	(8.0)	(14.8)
4f. MKT beta	0.58	0.74	0.83	0.91	0.96	1.01	1.10	1.17	1.31	1.46
	(18.4)	(30.1)	(35.4)	(44.0)	(48.4)	(39.6)	(41.7)	(49.4)	(47.3)	(36.8)
CAPM sys.ret.	0.35	0.44	0.50	0.54	0.56	0.60	0.65	0.70	0.79	0.93
4f. sys.ret.	0.47	0.52	0.57	0.62	0.66	0.70	0.77	0.83	0.96	1.17

	Positive Market Returns (454 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	0.64	1.40	2.07	2.64	2.90	3.26	3.81	4.43	5.54	9.00
	(4.1)	(7.3)	(10.1)	(13.5)	(14.1)	(15.5)	(16.4)	(18.0)	(18.7)	(20.8)
CAPM alpha	-1.06	-1.12	-0.69	-0.45	-0.28	-0.15	0.16	0.56	1.27	4.54
	-(4.3)	-(4.3)	-(2.8)	-(2.0)	-(1.2)	-(0.7)	(0.7)	(2.4)	(4.1)	(9.1)
CAPM beta	0.54	0.79	0.87	0.97	1.00	1.07	1.15	1.22	1.34	1.40
	(5.9)	(7.8)	(9.3)	(11.4)	(12.0)	(15.8)	(14.9)	(16.2)	(13.9)	(11.3)
4f. alpha	-1.33	-1.33	-0.87	-0.63	-0.46	-0.32	-0.06	0.30	0.84	3.61
	-(5.8)	-(5.6)	-(4.0)	-(4.0)	-(2.9)	-(2.4)	-(0.4)	(2.0)	(4.3)	(9.1)
4f. MKT beta	0.55	0.78	0.84	0.95	0.98	1.04	1.12	1.19	1.32	1.41
	(8.0)	(12.2)	(14.6)	(22.7)	(25.6)	(36.1)	(33.2)	(35.8)	(31.2)	(16.6)
CAPM sys.ret.	1.70	2.52	2.75	3.10	3.18	3.41	3.65	3.87	4.27	4.46
4f. sys.ret.	1.98	2.73	2.94	3.28	3.36	3.59	3.87	4.13	4.70	5.39

	Negative Market Returns (278 months)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	-3.54	-3.86	-3.97	-3.96	-3.96	-4.05	-4.23	-4.30	-4.29	-2.88
	-(15.2)	-(14.7)	-(14.7)	-(14.5)	-(14.0)	-(13.9)	-(13.3)	-(12.3)	-(10.7)	-(5.2)
CAPM alpha	-0.70	-0.57	-0.27	-0.21	0.01	0.01	0.10	0.26	1.10	3.45
	-(2.4)	-(2.1)	-(1.1)	-(0.8)	(0.0)	(0.0)	(0.4)	(0.9)	(3.4)	(6.2)
CAPM beta	0.76	0.89	0.99	1.01	1.07	1.09	1.16	1.22	1.45	1.70
	(9.4)	(13.3)	(15.2)	(14.4)	(15.9)	(15.0)	(15.2)	(15.3)	(16.6)	(15.6)
4f. alpha	-0.96	-0.83	-0.55	-0.52	-0.32	-0.35	-0.30	-0.18	0.60	2.87
	-(4.0)	-(4.2)	-(3.3)	-(3.1)	-(2.1)	-(2.1)	-(1.8)	-(1.1)	(3.3)	(7.6)
4f. MKT beta	0.66	0.76	0.87	0.89	0.95	0.97	1.03	1.09	1.26	1.36
	(10.4)	(16.3)	(19.7)	(19.8)	(28.7)	(21.5)	(25.3)	(28.8)	(30.8)	(18.5)
CAPM sys.ret.	-2.84	-3.29	-3.70	-3.75	-3.97	-4.05	-4.33	-4.56	-5.40	-6.33
4f. sys.ret.	-2.57	-3.03	-3.41	-3.44	-3.64	-3.70	-3.93	-4.12	-4.89	-5.75

Table V
One-, Two- and Three-year Returns and Betas of Turnover Portfolios

This table reports the one-, two- and three-year excess returns, the CAPM and 4-factor model alphas and betas, and the systematic returns of the yearly-rebalanced turnover portfolios. The systematic return of a portfolio is the difference between its excess return and alpha. In Panel A the stocks are sorted on the average monthly turnover in the year preceding the period in which we measure the reported variables. In Panel B the stocks are sorted on the average monthly turnover in the period in which we measure the reported variables. The stocks in the portfolios are equally-weighted. Heteroskedasticity-consistent t-statistics are in parentheses.

Panel A1: Lagged turnover sort - One-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	12.21	12.30	11.42	10.11	10.41	9.13	9.32	9.15	7.68	4.79
	(5.8)	(5.8)	(5.5)	(5.4)	(5.3)	(4.3)	(4.0)	(3.6)	(2.6)	(1.5)
CAPM alpha	5.96	5.97	4.41	3.29	3.33	1.44	1.18	0.42	-2.06	-5.37
	(2.3)	(2.7)	(2.1)	(1.9)	(1.7)	(0.7)	(0.5)	(0.2)	-(0.8)	-(1.8)
CAPM beta	0.84	0.85	0.95	0.92	0.96	1.04	1.10	1.18	1.31	1.37
	(5.0)	(6.6)	(7.2)	(9.5)	(7.5)	(8.2)	(8.1)	(7.7)	(8.4)	(9.2)
4f. alpha	7.21	7.02	4.85	2.58	1.63	-0.25	-0.26	-1.15	-1.33	-5.02
	(4.4)	(5.4)	(4.3)	(4.5)	(2.1)	-(0.3)	-(0.2)	-(0.8)	-(0.6)	-(2.0)
4f. MKT beta	0.73	0.73	0.81	0.79	0.84	0.92	0.95	1.03	1.12	1.17
	(5.1)	(8.2)	(8.7)	(17.7)	(12.0)	(17.7)	(16.4)	(13.2)	(14.1)	(12.2)
CAPM sys.ret.	6.25	6.32	7.01	6.83	7.08	7.69	8.14	8.73	9.74	10.17
4f. sys.ret.	5.00	5.28	6.56	7.54	8.78	9.38	9.58	10.30	9.01	9.81

Panel A2: Lagged turnover sort - Two-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	23.66	23.29	22.36	20.59	20.35	19.35	18.97	18.90	16.73	11.33
	(6.8)	(6.6)	(6.3)	(5.8)	(5.6)	(5.0)	(4.5)	(4.4)	(3.4)	(2.2)
CAPM alpha	13.77	12.28	11.05	9.20	8.00	6.32	4.69	4.24	-0.03	-5.92
	(6.0)	(6.5)	(6.3)	(5.8)	(5.6)	(4.8)	(4.2)	(3.9)	(2.9)	(1.5)
CAPM beta	0.67	0.75	0.77	0.77	0.84	0.88	0.97	0.99	1.14	1.17
	(3.1)	(3.8)	(4.0)	(4.8)	(4.9)	(5.0)	(5.0)	(4.6)	(5.6)	(5.1)
4f. alpha	10.16	11.30	7.56	3.45	3.88	0.60	-1.16	0.80	-1.71	-7.76
	(10.4)	(10.0)	(8.1)	(7.7)	(6.5)	(5.9)	(5.1)	(4.6)	(4.0)	(2.5)
4f. MKT beta	0.66	0.72	0.74	0.75	0.80	0.85	0.92	0.93	1.06	1.08
	(2.6)	(3.3)	(3.5)	(4.5)	(4.4)	(4.9)	(4.5)	(3.8)	(4.1)	(3.4)
CAPM sys.ret.	9.89	11.02	11.31	11.39	12.35	13.03	14.28	14.66	16.76	17.25
4f. sys.ret.	13.50	11.99	14.79	17.14	16.47	18.75	20.13	18.10	18.44	19.09

Panel A3: Lagged turnover sort - Three-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	33.51	33.50	32.28	30.41	29.53	29.07	28.25	27.46	25.28	18.33
	(9.6)	(9.1)	(8.9)	(8.1)	(7.9)	(7.6)	(6.7)	(6.0)	(5.1)	(3.4)
CAPM alpha	22.64	20.45	18.92	17.58	15.34	14.50	12.55	10.24	5.98	-2.64
	(8.2)	(8.5)	(8.7)	(7.7)	(7.4)	(6.9)	(6.3)	(5.6)	(4.8)	(3.2)
CAPM beta	0.50	0.60	0.61	0.59	0.65	0.67	0.72	0.79	0.88	0.96
	(1.8)	(1.9)	(2.6)	(2.7)	(2.9)	(3.5)	(3.6)	(2.8)	(4.1)	(3.6)
4f. alpha	12.99	12.59	9.79	5.74	4.96	5.12	2.00	1.24	-0.46	-9.94
	(11.1)	(10.1)	(9.3)	(8.5)	(7.5)	(7.4)	(6.3)	(5.2)	(4.8)	(3.3)
4f. MKT beta	0.64	0.73	0.76	0.72	0.77	0.77	0.84	0.90	0.98	1.06
	(0.8)	(0.5)	(1.0)	(0.9)	(1.1)	(1.2)	(1.3)	(1.1)	(1.6)	(1.2)
CAPM sys.ret.	10.87	13.05	13.36	12.84	14.19	14.57	15.70	17.22	19.30	20.97
4f. sys.ret.	20.52	20.91	22.49	24.68	24.57	23.95	26.25	26.22	25.74	28.27

Panel B1: Contemporaneous turnover sort - One-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	3.98	6.79	6.89	7.48	7.96	8.32	9.13	10.65	12.21	20.71
	(1.9)	(3.3)	(3.6)	(4.0)	(4.0)	(3.9)	(3.8)	(4.1)	(4.0)	(5.2)
CAPM alpha	-2.13	0.26	0.13	0.68	0.80	0.64	0.98	1.83	2.61	9.84
	-(0.9)	(0.1)	(0.1)	(0.4)	(0.4)	(0.3)	(0.4)	(0.7)	(0.8)	(2.6)
CAPM beta	0.83	0.88	0.91	0.92	0.97	1.04	1.10	1.19	1.30	1.47
	(5.3)	(6.6)	(7.6)	(9.2)	(8.1)	(8.0)	(8.1)	(8.3)	(7.4)	(8.5)
4f. alpha	-0.66	1.52	0.36	0.91	-0.01	-0.35	0.73	0.83	0.91	8.87
	-(0.3)	(0.9)	(0.3)	(0.9)	(0.0)	-(0.3)	(0.4)	(0.4)	(0.5)	(4.1)
4f. MKT beta	0.72	0.76	0.81	0.81	0.85	0.90	0.94	1.01	1.10	1.20
	(5.9)	(7.2)	(8.9)	(14.7)	(13.8)	(13.8)	(14.1)	(16.5)	(11.9)	(11.4)
CAPM sys.ret.	6.12	6.53	6.75	6.81	7.16	7.68	8.15	8.82	9.60	10.87
4f. sys.ret.	4.64	5.28	6.52	6.58	7.97	8.66	8.40	9.82	11.30	11.84

Panel B2: Contemporaneous turnover sort - Two-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	8.08	13.72	13.88	14.99	15.89	16.79	18.32	21.56	24.68	42.08
	(2.2)	(3.7)	(3.9)	(4.4)	(4.3)	(4.2)	(4.3)	(4.6)	(4.6)	(6.6)
CAPM alpha	-2.85	2.06	1.73	2.76	3.19	3.58	3.99	6.24	7.97	23.17
	(2.3)	(3.6)	(3.9)	(4.5)	(4.2)	(3.9)	(3.6)	(3.9)	(3.7)	(5.2)
CAPM beta	0.74	0.79	0.82	0.83	0.86	0.90	0.97	1.04	1.13	1.28
	(3.2)	(3.5)	(4.2)	(4.9)	(4.5)	(4.1)	(4.4)	(4.3)	(4.6)	(4.5)
4f. alpha	-4.60	1.15	-0.94	2.37	0.12	0.28	1.79	2.84	0.92	15.79
	(3.3)	(5.0)	(4.7)	(6.0)	(5.8)	(5.6)	(5.1)	(5.1)	(4.5)	(6.7)
4f. MKT beta	0.73	0.77	0.81	0.79	0.83	0.85	0.90	0.96	1.06	1.17
	(2.7)	(2.7)	(3.8)	(4.0)	(3.9)	(3.2)	(3.5)	(3.0)	(3.7)	(2.6)
CAPM sys.ret.	10.93	11.66	12.15	12.23	12.70	13.20	14.32	15.33	16.72	18.91
4f. sys.ret.	12.68	12.57	14.82	12.62	15.77	16.51	16.52	18.73	23.77	26.29

Panel B3: Contemporaneous turnover sort - Three-year returns

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
	low turnover									high turnover
Excess return	11.88	20.23	20.61	22.13	23.57	25.05	27.24	32.24	36.86	63.16
	(3.0)	(5.1)	(5.5)	(6.2)	(6.2)	(6.1)	(5.9)	(6.3)	(6.3)	(8.6)
CAPM alpha	-1.32	6.47	5.55	6.96	8.36	10.42	10.48	14.54	17.45	41.08
	(4.1)	(5.5)	(5.8)	(6.5)	(6.2)	(5.8)	(5.2)	(5.5)	(5.1)	(6.2)
CAPM beta	0.61	0.63	0.69	0.70	0.70	0.67	0.77	0.81	0.89	1.01
	(1.2)	(1.1)	(2.0)	(2.6)	(2.8)	(1.9)	(2.3)	(2.2)	(2.8)	(2.7)
4f. alpha	-9.34	-0.88	-2.93	3.33	1.57	2.52	4.75	6.05	3.04	22.07
	(4.3)	(6.0)	(5.9)	(6.1)	(6.1)	(5.9)	(5.3)	(5.5)	(5.3)	(7.4)
4f. MKT beta	0.76	0.79	0.83	0.81	0.81	0.79	0.87	0.94	1.02	1.14
	(0.1)	-(0.1)	(0.7)	(0.7)	(0.8)	(0.2)	(0.4)	(0.3)	(0.7)	(0.5)
CAPM sys.ret.	13.20	13.76	15.07	15.17	15.21	14.62	16.76	17.69	19.41	22.08
4f. sys.ret.	21.22	21.11	23.54	18.80	22.00	22.52	22.49	26.19	33.83	41.09

Appendix

“Systematic Risk and Share Turnover”

Figure A.1
Relation between Turnover and Beta in 12 Industry Groups:
Different Return Frequencies

This figure plots the differences between the coefficients on the interaction terms of high and low turnover dummies with the market return R(M,t), $\beta_{turn,h}$ - $\beta_{turn,l}$, reported in Tables A.II, A.III, A.IV and A.V for the monthly, one-, two- and three-year returns, respectively. The light color indicates the estimates associated with the contemporaneous turnover.

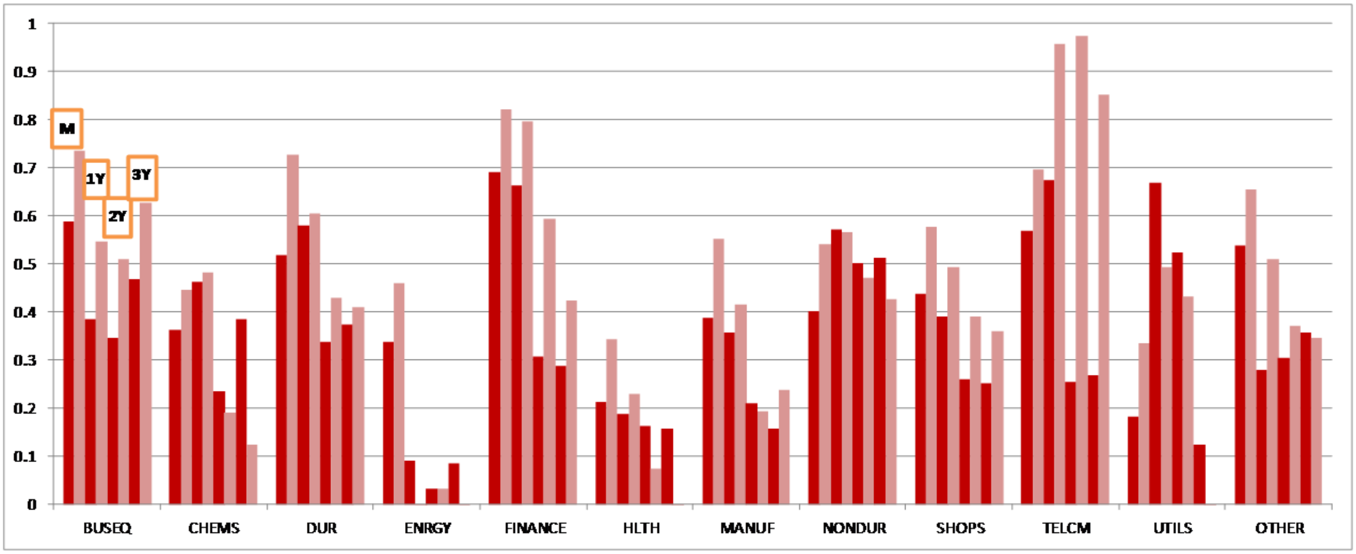


Table A.I
Persistence of Cross-sectional Dispersion of Share Turnover

This table reports the estimates of the year-by-year cross-sectional regressions of the log turnover in year *t* on the log turnover in year *t-1*:

$$logTurn_{i,t} = \alpha + \rho logTurn_{i,t-1} + \varepsilon_{it}.$$

Year	ρ	Year	ρ	Year	ρ
1951	0.89	1971	0.75	1991	0.85
1952	0.82	1972	0.84	1992	0.84
1953	0.89	1973	0.76	1993	0.82
1954	0.97	1974	0.80	1994	0.86
1955	0.95	1975	0.91	1995	0.90
1956	0.83	1976	0.76	1996	0.82
1957	0.85	1977	0.83	1997	0.86
1958	0.93	1978	0.85	1998	0.92
1959	0.95	1979	0.80	1999	0.88
1960	0.82	1980	0.85	2000	0.93
1961	0.89	1981	0.78	2001	0.95
1962	0.77	1982	0.81	2002	0.93
1963	0.95	1983	0.77	2003	0.83
1964	0.87	1984	0.84	2004	0.88
1965	0.96	1985	0.86	2005	0.91
1966	0.90	1986	0.84	2006	0.93
1967	0.91	1987	0.88	2007	0.88
1968	0.81	1988	0.93	2008	1.02
1969	0.79	1989	0.87	2009	0.88
1970	0.71	1990	0.86	2010	0.87
				2011	0.92
Mean	0.86				

Table A.II

Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Monthly Returns – within Industry Analysis

This table reports the estimates of the following panel regression for the stocks in each of 12 Fama and French broad industry groups:

$$R_{i,t} = \alpha_0 + \alpha_{turn,l} LowTurn_{i,t-1[/t]} + \alpha_{turn,h} HighTurn_{i,t-1[/t]} + \alpha_{size,l} Small_{i,t-1} + \alpha_{size,h} Big_{i,t-1} + \alpha_{bm,l} LowBM_{i,t-1} + \alpha_{bm,h} HighBM_{i,t-1}$$
$$+ R_{M,t}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t-1[/t]} + \beta_{turn,h} HighTurn_{i,t-1[/t]} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1}\right)$$
$$+ R_{M,t-1}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t-1[/t]} + \gamma_{turn,h} HighTurn_{i,t-1[/t]} + \gamma_{size,l} Small_{i,t-1} + \gamma_{size,h} Big_{i,t-1} + \gamma_{bm,l} LowBM_{i,t-1} + \gamma_{bm,h} HighBM_{i,t-1}\right) + \varepsilon_{i,t},$$

where the $LowTurn_{i,t-1}$ ($HighTurn_{i,t-1}$) / $Small_{i,t-1}$ ($Big_{i,t-1}$) dummy is equal to 1 if turnover / size of a stock i in month t-1 is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. The $LowBM_{i,t-1}$ ($HighBM_{i,t-1}$) dummy is equal to 1 if the B/M in the calendar year preceding the year of month t is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. Standard errors are clustered by period. t-statistics are in parentheses.

	BUSEQ		CHEMS		DUR		ENRGY		FINANCE		HLTH		MANUF		NONDUR		SHOPS		TELCM		UTILS		OTHER	
											α													
Constant	0.000	-0.009	0.005	0.001	0.002	-0.003	0.007	0.000	0.001	0.002	0.005	-0.001	0.001	-0.004	0.001	-0.003	0.002	-0.002	0.002	0.002	0.008	0.009	0.001	-0.002
	(0.2)	-(6.0)	(3.9)	(0.9)	(1.2)	-(2.1)	(3.1)	(0.0)	(0.7)	(1.1)	(2.6)	-(0.5)	(0.7)	-(3.4)	(1.1)	-(2.5)	(1.1)	-(1.7)	(0.8)	(0.9)	(6.7)	(7.3)	(0.8)	-(1.2)
LowTurn(i,t-1)	**0.001**		**-0.0004**		**0.001**		**-0.001**		**0.003**		**0.001**		**0.000**		**0.000**		**-0.001**		**-0.001**		**-0.005**		**0.000**	
	(0.4)		**-(0.3)**		**(0.4)**		**-(0.6)**		**(2.3)**		**(0.4)**		**(0.4)**		**-(0.3)**		**-(1.0)**		**-(0.3)**		**-(4.3)**		**(0.2)**	
HighTurn(i,t-1)	**-0.001**		**-0.001**		**-0.0001**		**0.001**		**-0.005**		**-0.002**		**-0.001**		**-0.004**		**-0.003**		**0.001**		**-0.004**		**-0.002**	
	-(0.9)		**-(0.9)**		**-(0.1)**		**(0.8)**		**-(3.8)**		**-(1.4)**		**-(1.4)**		**-(3.6)**		**-(2.6)**		**(0.4)**		**-(3.0)**		**-(1.9)**	
LowTurn(i,t)		**-0.01**		**0.00**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.01**		**-0.02**
		-(6.8)		**-(3.4)**		**-(3.4)**		**-(5.3)**		**-(6.1)**		**-(5.5)**		**-(10.1)**		**-(6.4)**		**-(9.9)**		**-(2.9)**		**-(5.9)**		**-(10.1)**
HighTurn(i,t)		**0.02**		**0.02**		**0.02**		**0.02**		**0.01**		**0.01**		**0.02**		**0.02**		**0.01**		**0.01**		**0.00**		**0.01**
		(16.0)		**(12.3)**		**(13.6)**		**(10.9)**		**(4.9)**		**(8.3)**		**(26.1)**		**(16.8)**		**(11.7)**		**(2.9)**		**(0.3)**		**(9.0)**
Small(i,t-1)	0.0004	0.008	0.0001	0.002	-0.002	0.001	-0.002	0.005	-0.001	0.003	-0.007	0.001	0.002	0.004	0.0004	0.002	0.000	0.004	0.000	0.002	0.002	0.002	-0.001	0.006
	(0.2)	(4.8)	(0.1)	(1.3)	-(1.4)	(0.3)	-(0.5)	(1.8)	-(0.3)	(2.1)	-(2.7)	(0.5)	(1.4)	(4.3)	(0.3)	(1.8)	-(0.1)	(2.8)	(0.1)	(0.4)	(1.0)	(1.3)	-(0.5)	(3.6)
Big(i,t-1)	0.001	0.001	-0.002	-0.001	-0.002	-0.001	-0.001	0.002	0.002	0.000	0.002	0.006	0.000	0.000	0.004	0.006	0.003	0.003	-0.001	0.000	-0.003	-0.004	0.000	-0.001
	(0.8)	(0.6)	-(1.3)	-(0.9)	-(1.1)	-(0.6)	-(0.7)	(1.4)	(1.4)	(0.1)	(1.4)	(3.3)	-(0.3)	-(0.2)	(3.8)	(6.4)	(2.3)	(3.1)	-(0.3)	-(0.1)	-(4.4)	-(4.9)	(0.4)	-(0.8)
LowBM(i,t-1)	-0.005	-0.006	-0.004	-0.003	-0.007	-0.008	-0.008	-0.010	-0.001	-0.001	-0.005	-0.005	-0.004	-0.004	-0.004	-0.005	-0.004	-0.005	-0.002	-0.003	-0.002	-0.002	-0.003	-0.004
	-(3.4)	-(4.4)	-(3.0)	-(2.7)	-(4.5)	-(5.6)	-(4.1)	-(5.2)	-(0.8)	-(0.9)	-(2.8)	-(2.8)	-(5.7)	-(6.4)	-(4.4)	-(4.8)	-(3.5)	-(4.5)	-(0.9)	-(1.4)	-(1.1)	-(0.9)	-(2.6)	-(3.1)
HighBM(i,t-1)	0.006	0.008	-0.002	-0.002	0.003	0.002	-0.001	-0.001	0.002	0.001	0.010	0.011	0.004	0.004	0.004	0.005	0.007	0.007	0.003	0.003	0.004	0.003	0.006	0.007
	(3.5)	(4.9)	-(1.4)	-(1.4)	(1.8)	(1.6)	-(0.8)	-(0.4)	(1.5)	(0.6)	(3.6)	(4.0)	(5.0)	(5.0)	(4.3)	(4.5)	(5.7)	(6.1)	(1.0)	(0.9)	(3.3)	(2.8)	(3.5)	(4.5)
											β													
R(M,t)	1.28	1.22	1.13	1.11	1.16	1.17	1.03	1.00	1.03	0.98	1.11	1.07	1.14	1.10	1.02	1.00	1.12	1.10	0.99	0.94	0.52	0.53	1.16	1.09
	(37.8)	(36.0)	(37.0)	(36.5)	(33.0)	(33.9)	(20.4)	(19.5)	(31.0)	(29.7)	(24.1)	(23.6)	(49.4)	(48.0)	(38.0)	(37.9)	(38.6)	(37.9)	(18.0)	(17.4)	(20.2)	(20.4)	(34.0)	(31.9)
R(M,t)*LowTurn(i,t-1)	**-0.29**		**-0.21**		**-0.24**		**-0.16**		**-0.37**		**-0.09**		**-0.21**		**-0.16**		**-0.24**		**-0.25**		**-0.02**		**-0.32**	
	-(7.3)		**-(7.4)**		**-(7.2)**		**-(3.1)**		**-(15.0)**		**-(1.8)**		**-(13.4)**		**-(8.4)**		**-(10.4)**		**-(4.4)**		**-(0.6)**		**-(9.5)**	
R(M,t)*HighTurn(i,t-1)	**0.30**		**0.15**		**0.28**		**0.17**		**0.32**		**0.13**		**0.18**		**0.24**		**0.20**		**0.32**		**0.17**		**0.22**	
	(11.2)		**(5.7)**		**(9.1)**		**(3.9)**		**(12.0)**		**(3.7)**		**(12.4)**		**(10.8)**		**(8.6)**		**(4.8)**		**(6.9)**		**(7.7)**	
R(M,t)*LowTurn(i,t)		**-0.32**		**-0.21**		**-0.40**		**-0.20**		**-0.35**		**-0.14**		**-0.24**		**-0.21**		**-0.29**		**-0.25**		**-0.04**		**-0.27**
		-(7.8)		**-(7.6)**		**-(12.0)**		**-(3.9)**		**-(14.0)**		**-(2.8)**		**-(15.1)**		**-(10.6)**		**-(12.1)**		**-(4.1)**		**-(1.7)**		**-(7.9)**
R(M,t)*HighTurn(i,t)		**0.42**		**0.23**		**0.33**		**0.26**		**0.47**		**0.20**		**0.31**		**0.33**		**0.29**		**0.45**		**0.29**		**0.39**
		(15.4)		**(8.7)**		**(10.9)**		**(6.5)**		**(18.3)**		**(6.0)**		**(21.6)**		**(14.8)**		**(12.5)**		**(7.5)**		**(12.0)**		**(13.7)**
R(M,t)*Small(i,t-1)	0.10	0.14	-0.07	-0.06	0.07	0.12	0.11	0.14	0.03	0.05	0.08	0.12	-0.01	0.02	0.14	0.16	0.11	0.14	0.43	0.47	0.03	0.04	0.02	0.04
	(2.9)	(4.1)	-(1.8)	-(1.4)	(1.8)	(3.1)	(1.4)	(2.0)	(0.8)	(1.5)	(1.5)	(2.1)	-(0.5)	(0.7)	(4.9)	(5.8)	(3.5)	(4.5)	(3.3)	(3.7)	(0.8)	(1.1)	(0.5)	(1.1)
R(M,t)*Big(i,t-1)	-0.14	-0.15	-0.14	-0.15	-0.16	-0.17	-0.13	-0.12	-0.11	-0.12	-0.35	-0.35	-0.08	-0.09	-0.20	-0.19	-0.19	-0.19	-0.19	-0.17	0.03	0.01	-0.15	-0.16
	-(4.8)	-(5.1)	-(5.3)	-(5.8)	-(5.3)	-(5.6)	-(4.0)	-(3.7)	-(3.8)	-(4.2)	-(9.4)	-(9.2)	-(4.2)	-(4.8)	-(8.8)	-(8.8)	-(7.9)	-(7.9)	-(3.9)	-(3.5)	(1.9)	(0.9)	-(5.3)	-(5.8)
R(M,t)*LowBM(i,t-1)	0.04	0.03	-0.04	-0.03	0.19	0.17	0.15	0.13	0.04	0.03	0.06	0.06	0.06	0.05	0.05	0.05	0.06	0.06	0.22	0.20	0.26	0.25	0.06	0.05
	(1.2)	(1.0)	-(1.4)	-(1.3)	(5.7)	(5.3)	(3.4)	(3.1)	(1.5)	(1.4)	(1.5)	(1.5)	(3.8)	(3.7)	(2.2)	(2.4)	(2.8)	(2.4)	(3.8)	(3.5)	(6.8)	(6.8)	(2.0)	(1.7)
R(M,t)*HighBM(i,t-1)	-0.09	-0.08	0.07	0.07	0.11	0.10	0.06	0.07	0.13	0.13	-0.04	-0.03	0.02	0.02	0.00	0.00	-0.02	-0.01	0.18	0.17	-0.08	-0.09	0.08	0.09
	-(2.5)	-(2.1)	(2.0)	(1.9)	(3.0)	(3.0)	(1.5)	(1.5)	(4.9)	(4.9)	-(0.6)	-(0.5)	(1.1)	(1.2)	-(0.1)	(0.2)	-(0.8)	-(0.5)	(3.1)	(3.0)	-(3.1)	-(3.4)	(2.2)	(2.4)
											γ													
R(M,t-1)	0.17	0.04	0.06	0.05	0.17	0.15	-0.01	-0.01	0.07	0.06	0.20	0.14	0.15	0.12	0.13	0.11	0.14	0.10	0.10	0.00	-0.02	-0.02	0.15	0.09
	(4.9)	(1.1)	(1.9)	(1.5)	(4.8)	(4.3)	-(0.3)	-(0.2)	(2.2)	(1.7)	(4.4)	(3.0)	(6.4)	(5.4)	(5.0)	(4.3)	(4.7)	(3.5)	(1.7)	(0.1)	-(0.8)	-(1.0)	(4.2)	(2.8)
R(M,t-1)*LowTurn(i,t-1)	**0.07**		**0.03**		**0.05**		**0.08**		**0.01**		**-0.07**		**0.02**		**0.03**		**0.07**		**-0.01**		**-0.03**		**0.01**	
	(1.8)		**(1.2)**		**(1.5)**		**(1.6)**		**(0.4)**		**-(1.4)**		**(1.6)**		**(1.5)**		**(3.0)**		**-(0.2)**		**-(1.3)**		**(0.4)**	
R(M,t-1)*HighTurn(i,t-1)	**-0.13**		**-0.02**		**-0.01**		**0.07**		**0.06**		**-0.02**		**-0.03**		**0.01**		**0.03**		**-0.08**		**0.06**		**0.002**	
	-(4.7)		**-(0.8)**		**-(0.4)**		**(1.9)**		**(2.1)**		**-(0.7)**		**-(2.0)**		**(0.4)**		**(1.1)**		**-(1.3)**		**(2.4)**		**(0.1)**	
R(M,t-1)*LowTurn(i,t)		**-0.03**		**-0.05**		**-0.07**		**0.01**		**-0.04**		**-0.15**		**-0.06**		**-0.06**		**-0.04**		**-0.02**		**-0.03**		**-0.12**
		-(0.7)		**-(1.7)**		**-(2.0)**		**(0.3)**		**-(1.8)**		**-(3.0)**		**-(3.9)**		**-(2.9)**		**-(1.6)**		**-(0.3)**		**-(1.3)**		**-(3.6)**
R(M,t-1)*HighTurn(i,t)		**0.15**		**0.09**		**0.12**		**0.10**		**0.20**		**0.12**		**0.12**		**0.17**		**0.18**		**0.23**		**0.12**		**0.20**
		(5.5)		**(3.5)**		**(3.9)**		**(2.6)**		**(7.6)**		**(3.4)**		**(8.5)**		**(7.7)**		**(7.7)**		**(3.4)**		**(4.9)**		**(7.0)**
R(M,t-1)*Small(i,t-1)	0.16	0.24	0.17	0.19	0.09	0.13	0.13	0.15	0.21	0.24	0.12	0.18	0.16	0.19	0.20	0.22	0.13	0.17	0.37	0.40	0.09	0.09	0.19	0.25
	(4.7)	(6.8)	(4.1)	(4.7)	(2.2)	(3.2)	(1.8)	(2.1)	(6.4)	(7.3)	(2.2)	(3.3)	(7.1)	(8.3)	(7.0)	(7.7)	(4.2)	(5.5)	(2.8)	(3.0)	(2.4)	(2.4)	(5.1)	(6.8)
R(M,t-1)*Big(i,t-1)	-0.10	-0.11	-0.07	-0.08	-0.06	-0.06	-0.08	-0.07	-0.08	-0.10	-0.17	-0.14	-0.12	-0.12	-0.12	-0.11	-0.09	-0.08	-0.14	-0.12	-0.04	-0.04	-0.13	-0.15
	-(3.4)	-(3.7)	-(2.7)	-(2.9)	-(2.1)	-(1.9)	-(2.5)	-(2.0)	-(3.0)	-(3.7)	-(4.6)	-(3.8)	-(6.4)	-(6.6)	-(5.5)	-(4.8)	-(3.8)	-(3.5)	-(2.9)	-(2.5)	-(2.5)	-(2.6)	-(4.5)	-(5.5)
R(M,t-1)*LowBM(i,t-1)	0.05	0.03	0.01	0.01	0.01	0.00	-0.04	-0.04	0.00	0.01	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	0.09	0.08	-0.02	-0.02	0.02	0.02
	(1.7)	(1.0)	(0.2)	(0.5)	(0.3)	(0.0)	-(0.9)	-(1.0)	(0.1)	(0.3)	-(0.1)	-(0.2)	-(0.3)	-(0.6)	-(0.3)	-(0.3)	-(0.9)	-(1.0)	(1.5)	(1.4)	-(0.5)	-(0.5)	(0.8)	(0.7)
R(M,t-1)*HighBM(i,t-1)	0.14	0.17	0.10	0.10	0.07	0.06	0.15	0.14	0.09	0.07	0.08	0.08	0.03	0.02	0.00	0.00	0.04	0.04	0.15	0.15	0.02	0.01	0.21	0.22
	(3.9)	(4.6)	(3.0)	(3.0)	(2.0)	(1.8)	(3.4)	(3.4)	(3.3)	(2.6)	(1.3)	(1.4)	(1.7)	(1.3)	(0.2)	(0.1)	(1.5)	(1.6)	(2.6)	(2.5)	(0.7)	(0.5)	(5.9)	(6.2)
R-squared	16%	17%	19%	20%	19%	21%	11%	12%	13%	14%	11%	11%	19%	20%	15%	16%	15%	16%	15%	16%	14%	14%	12%	13%
N		89375		44413		46477		60826		107049		47734		217372		109923		114226		16723		74995		91320

Table A.III
Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Yearly Returns – within Industry Analysis

This table reports the estimates of the following panel regression for the stocks in each of 12 Fama and French broad industry groups:

$$R_{i,t} = \alpha_0 + \alpha_{turn,l} LowTurn_{i,t-1[/t]} + \alpha_{turn,h} HighTurn_{i,t-1[/t]} + \alpha_{size,l} Small_{i,t-1} + \alpha_{size,h} Big_{i,t-1} + \alpha_{bm,l} LowBM_{i,t-1} + \alpha_{bm,h} HighBM_{i,t-1}$$
$$+ R_{M,t}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t-1[/t]} + \beta_{turn,h} HighTurn_{i,t-1[/t]} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1}\right)$$
$$+ R_{M,t-1}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t-1[/t]} + \gamma_{turn,h} HighTurn_{i,t-1[/t]} + \gamma_{size,l} Small_{i,t-1} + \gamma_{size,h} Big_{i,t-1} + \gamma_{bm,l} LowBM_{i,t-1} + \gamma_{bm,h} HighBM_{i,t-1}\right) + \varepsilon_{i,t},$$

where the $LowTurn_{i,t-1}$ ($HighTurn_{i,t-1}$) / $Small_{i,t-1}$ ($Big_{i,t-1}$) / $LowBM_{i,t-1}$ ($HighBM_{i,t-1}$) dummy is equal to 1 if turnover / size / B/M of a stock *i* in year *t*-1 is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. Standard errors are clustered by period. t-statistics are in parentheses.

	BUSEQ		CHEMS		DUR		ENRGY		FINANCE		HLTH		MANUF		NONDUR		SHOPS		TELCM		UTILS		OTHER	
											α													
Constant	0.05	0.00	0.08	0.07	0.07	0.03	0.10	0.04	0.05	0.08	0.13	0.09	0.05	0.04	0.03	0.00	0.04	0.03	0.04	0.09	0.06	0.08	0.08	0.06
	(1.9)	(0.2)	(3.9)	(3.3)	(2.3)	(1.0)	(2.7)	(1.1)	(1.5)	(2.5)	(3.2)	(2.3)	(2.4)	(1.8)	(1.4)	(0.2)	(1.6)	(1.3)	(1.0)	(2.1)	(3.0)	(3.6)	(2.9)	(2.3)
LowTurn(i,t-1)	**0.03**		**0.03**		**0.04**		**0.01**		**0.06**		**0.04**		**0.02**		**0.03**		**0.04**		**0.06**		**-0.03**		**0.01**	
	(1.0)		**(1.5)**		**(1.9)**		**(0.2)**		**(2.9)**		**(1.2)**		**(1.7)**		**(2.0)**		**(2.0)**		**(1.8)**		**-(1.3)**		**(0.5)**	
HighTurn(i,t-1)	**-0.04**		**-0.03**		**-0.06**		**0.00**		**-0.05**		**-0.01**		**-0.03**		**-0.09**		**-0.04**		**0.02**		**-0.10**		**-0.05**	
	-(2.1)		**-(1.3)**		**-(2.6)**		**-(0.1)**		**-(2.1)**		**-(0.2)**		**-(2.3)**		**-(4.9)**		**-(2.0)**		**(0.6)**		**-(3.3)**		**-(2.1)**	
LowTurn(i,t)		**-0.05**		**-0.02**		**-0.01**		**-0.06**		**-0.02**		**-0.06**		**-0.03**		**0.00**		**-0.04**		**-0.03**		**-0.05**		**-0.08**
		-(1.5)		**-(1.3)**		**-(0.2)**		**-(2.2)**		**-(0.8)**		**-(1.9)**		**-(2.6)**		**-(0.3)**		**-(2.3)**		**-(1.1)**		**-(2.2)**		**-(2.9)**
HighTurn(i,t)		**0.06**		**0.04**		**0.08**		**0.11**		**-0.04**		**0.08**		**0.05**		**0.04**		**0.03**		**-0.02**		**-0.10**		**0.03**
		(2.8)		**(1.7)**		**(3.2)**		**(4.0)**		**-(1.9)**		**(2.4)**		**(4.3)**		**(2.4)**		**(1.6)**		**-(0.6)**		**-(4.0)**		**(1.2)**
Small(i,t-1)	0.01	0.06	0.02	0.04	-0.09	-0.07	0.08	0.12	0.01	0.03	0.00	0.06	0.02	0.03	0.01	0.02	0.00	0.03	0.01	0.02	0.02	0.03	0.00	0.05
	(0.6)	(2.4)	(0.7)	(1.4)	-(3.3)	-(2.5)	(2.0)	(3.2)	(0.3)	(1.2)	-(0.1)	(1.5)	(1.0)	(1.8)	(0.3)	(1.0)	(0.0)	(1.2)	(0.2)	(0.3)	(0.9)	(1.3)	(0.1)	(2.0)
Big(i,t-1)	0.00	0.00	0.00	0.01	-0.05	-0.03	-0.01	0.02	-0.03	-0.04	-0.02	0.02	-0.01	-0.01	0.03	0.05	0.03	0.04	-0.06	-0.06	-0.03	-0.03	-0.04	-0.05
	-(0.2)	-(0.1)	(0.0)	(0.5)	-(2.0)	-(1.4)	-(0.5)	(0.7)	-(1.2)	-(1.7)	-(0.5)	(0.6)	-(1.0)	-(0.7)	(1.7)	(3.1)	(1.6)	(2.0)	-(1.6)	-(1.7)	-(2.7)	-(2.4)	-(2.0)	-(2.2)
LowBM(i,t-1)	-0.04	-0.05	-0.07	-0.06	-0.06	-0.07	-0.12	-0.13	0.00	-0.01	-0.08	-0.08	-0.05	-0.05	-0.03	-0.03	-0.04	-0.05	-0.03	-0.04	-0.01	-0.02	-0.01	-0.02
	-(1.9)	-(2.1)	-(3.1)	-(3.0)	-(2.1)	-(2.6)	-(3.4)	-(3.8)	(0.0)	-(0.4)	-(2.4)	-(2.4)	-(3.4)	-(3.8)	-(1.8)	-(1.9)	-(2.0)	-(2.4)	-(0.7)	-(1.1)	-(0.5)	-(0.6)	-(0.7)	-(1.0)
HighBM(i,t-1)	0.07	0.09	0.00	0.00	0.07	0.07	0.09	0.10	0.07	0.07	0.11	0.12	0.05	0.05	0.08	0.08	0.10	0.10	0.01	0.00	0.06	0.06	0.08	0.08
	(2.7)	(3.3)	(0.1)	(0.2)	(2.6)	(2.7)	(2.7)	(2.9)	(2.7)	(2.5)	(2.1)	(2.2)	(3.4)	(3.5)	(4.3)	(4.2)	(4.2)	(4.6)	(0.2)	(0.0)	(2.9)	(2.6)	(2.7)	(2.9)
											β													
R(M,t)	1.06	1.09	0.91	0.87	1.15	1.19	0.76	0.78	0.80	0.68	0.86	0.78	0.95	0.95	1.11	1.15	1.05	1.11	1.16	1.05	0.61	0.60	0.87	0.86
	(9.1)	(9.6)	(10.4)	(9.4)	(9.3)	(9.4)	(5.0)	(4.6)	(5.9)	(5.0)	(5.0)	(4.9)	(11.2)	(11.1)	(10.8)	(11.4)	(9.7)	(10.6)	(6.5)	(5.7)	(6.7)	(6.5)	(7.8)	(8.0)
R(M,t)*LowTurn(i,t-1)	**-0.17**		**-0.25**		**-0.24**		**-0.05**		**-0.32**		**-0.18**		**-0.15**		**-0.16**		**-0.11**		**-0.42**		**-0.04**		**-0.08**	
	-(1.3)		**-(3.3)**		**-(2.3)**		**-(0.4)**		**-(4.0)**		**-(1.4)**		**-(3.0)**		**-(2.6)**		**-(1.4)**		**-(3.2)**		**-(0.4)**		**-(0.7)**	
R(M,t)*HighTurn(i,t-1)	**0.22**		**0.21**		**0.34**		**0.04**		**0.34**		**0.01**		**0.21**		**0.41**		**0.28**		**0.26**		**0.63**		**0.20**	
	(2.5)		**(2.1)**		**(3.4)**		**(0.3)**		**(3.4)**		**(0.0)**		**(4.0)**		**(4.9)**		**(3.4)**		**(1.6)**		**(4.9)**		**(2.2)**	
R(M,t)*LowTurn(i,t)		**-0.34**		**-0.17**		**-0.28**		**0.08**		**-0.23**		**-0.10**		**-0.18**		**-0.21**		**-0.23**		**-0.31**		**-0.01**		**-0.19**
		-(2.5)		**-(2.1)**		**-(2.7)**		**(0.6)**		**-(2.8)**		**-(0.7)**		**-(3.5)**		**-(3.3)**		**-(3.0)**		**-(2.4)**		**-(0.1)**		**-(1.8)**
R(M,t)*HighTurn(i,t)		**0.21**		**0.31**		**0.32**		**0.05**		**0.57**		**0.13**		**0.23**		**0.36**		**0.26**		**0.65**		**0.49**		**0.32**
		(2.3)		**(3.3)**		**(3.1)**		**(0.4)**		**(6.5)**		**(0.9)**		**(4.6)**		**(4.7)**		**(3.2)**		**(4.5)**		**(5.1)**		**(3.0)**
R(M,t)*Small(i,t-1)	0.36	0.40	0.26	0.25	0.42	0.47	0.00	-0.06	0.15	0.20	0.36	0.32	0.17	0.19	0.27	0.28	0.35	0.39	1.15	1.19	-0.03	-0.06	0.37	0.42
	(3.7)	(3.9)	(2.3)	(2.1)	(3.5)	(3.9)	(0.0)	-(0.4)	(1.5)	(1.9)	(2.1)	(1.8)	(2.2)	(2.5)	(3.2)	(3.3)	(3.9)	(4.1)	(4.6)	(4.8)	-(0.3)	-(0.6)	(3.8)	(4.2)
R(M,t)*Big(i,t-1)	-0.11	-0.12	-0.13	-0.16	-0.03	-0.06	-0.02	-0.06	0.13	0.08	-0.14	-0.15	-0.02	-0.05	-0.25	-0.30	-0.25	-0.28	-0.16	-0.16	0.03	0.02	0.04	-0.03
	-(1.2)	-(1.3)	-(1.6)	-(1.9)	-(0.4)	-(0.7)	-(0.2)	-(0.5)	(1.4)	(0.9)	-(1.1)	-(1.3)	-(0.3)	-(0.7)	-(3.6)	-(4.3)	-(3.1)	-(3.4)	-(1.1)	-(1.1)	(0.6)	(0.4)	(0.4)	-(0.3)
R(M,t)*LowBM(i,t-1)	0.20	0.18	0.14	0.14	0.10	0.12	0.27	0.26	-0.04	0.02	0.08	0.09	0.10	0.11	-0.01	0.01	0.06	0.05	0.18	0.14	-0.04	-0.01	0.08	0.07
	(1.9)	(1.8)	(1.5)	(1.5)	(0.9)	(1.0)	(1.8)	(1.8)	-(0.4)	(0.2)	(0.5)	(0.6)	(1.7)	(1.7)	-(0.1)	(0.1)	(0.7)	(0.6)	(1.0)	(0.8)	-(0.4)	-(0.1)	(0.8)	(0.8)
R(M,t)*HighBM(i,t-1)	0.22	0.22	0.20	0.19	0.06	0.00	-0.10	-0.09	0.19	0.17	-0.10	-0.06	0.07	0.05	-0.07	-0.06	-0.13	-0.14	0.53	0.47	-0.06	-0.04	0.31	0.33
	(1.8)	(1.8)	(1.8)	(1.7)	(0.5)	(0.0)	-(0.7)	-(0.6)	(1.6)	(1.5)	-(0.5)	-(0.3)	(1.1)	(0.8)	-(0.9)	-(0.8)	-(1.3)	-(1.4)	(2.9)	(2.5)	-(0.7)	-(0.4)	(2.6)	(2.8)
											γ													
R(M,t-1)	-0.17	-0.26	-0.21	-0.17	-0.18	-0.22	0.10	0.01	-0.15	-0.09	-0.35	-0.31	-0.14	-0.19	-0.34	-0.29	-0.28	-0.31	-0.11	-0.27	-0.03	-0.02	-0.17	-0.27
	-(1.4)	-(2.3)	-(2.2)	-(1.8)	-(1.5)	-(1.9)	(0.6)	(0.1)	-(1.1)	-(0.6)	-(2.2)	-(2.1)	-(1.6)	-(2.3)	-(3.4)	-(3.0)	-(2.6)	-(3.0)	-(0.6)	-(1.5)	-(0.3)	-(0.3)	-(1.6)	-(2.5)
R(M,t-1)*LowTurn(i,t-1)	**-0.10**		**0.15**		**-0.05**		**-0.05**		**0.05**		**-0.10**		**-0.01**		**0.10**		**0.00**		**-0.02**		**0.10**		**-0.02**	
	-(0.8)		**(1.9)**		**-(0.5)**		**-(0.5)**		**(0.6)**		**-(0.7)**		**-(0.2)**		**(1.7)**		**(0.0)**		**-(0.1)**		**(1.1)**		**-(0.2)**	
R(M,t-1)*HighTurn(i,t-1)	**-0.09**		**-0.06**		**-0.19**		**-0.08**		**-0.13**		**-0.18**		**-0.10**		**-0.03**		**-0.19**		**-0.21**		**0.12**		**-0.27**	
	-(1.0)		**-(0.6)**		**-(1.8)**		**-(0.7)**		**-(1.4)**		**-(1.2)**		**-(1.9)**		**-(0.4)**		**-(2.3)**		**-(1.4)**		**(1.2)**		**-(2.5)**	
R(M,t-1)*LowTurn(i,t)		**0.03**		**0.13**		**-0.07**		**-0.07**		**-0.03**		**0.03**		**0.11**		**0.09**		**0.07**		**0.23**		**0.08**		**0.08**
		(0.2)		**(1.7)**		**-(0.7)**		**-(0.7)**		**-(0.4)**		**(0.2)**		**(2.3)**		**(1.4)**		**(0.9)**		**(1.7)**		**(0.9)**		**(0.7)**
R(M,t-1)*HighTurn(i,t)		**0.06**		**-0.12**		**-0.06**		**0.11**		**-0.25**		**-0.26**		**-0.03**		**-0.13**		**-0.14**		**-0.10**		**0.14**		**-0.10**
		(0.6)		**-(1.3)**		**-(0.6)**		**(0.9)**		**-(2.8)**		**-(1.9)**		**-(0.6)**		**-(1.7)**		**-(1.8)**		**-(0.6)**		**(1.5)**		**-(1.0)**
R(M,t-1)*Small(i,t-1)	-0.14	-0.18	-0.16	-0.17	0.25	0.25	-0.24	-0.20	-0.11	-0.13	-0.42	-0.53	-0.11	-0.12	-0.07	-0.09	0.00	-0.02	-0.60	-0.64	-0.05	-0.05	-0.23	-0.26
	-(1.3)	-(1.6)	-(1.3)	-(1.3)	(2.1)	(2.0)	-(1.3)	-(1.1)	-(1.2)	-(1.3)	-(2.4)	-(3.0)	-(1.4)	-(1.6)	-(0.8)	-(1.1)	(0.0)	-(0.2)	-(1.8)	-(1.9)	-(0.4)	-(0.5)	-(2.2)	-(2.3)
R(M,t-1)*Big(i,t-1)	0.03	0.05	-0.01	-0.02	0.04	0.06	-0.05	-0.01	0.15	0.16	0.20	0.15	-0.01	0.00	0.04	0.02	0.09	0.10	0.33	0.37	0.00	-0.03	0.14	0.15
	(0.4)	(0.5)	-(0.1)	-(0.2)	(0.4)	(0.6)	-(0.5)	-(0.1)	(1.6)	(1.8)	(1.7)	(1.3)	-(0.2)	(0.0)	(0.5)	(0.3)	(1.1)	(1.2)	(2.1)	(2.4)	-(0.1)	-(0.5)	(1.5)	(1.7)
R(M,t-1)*LowBM(i,t-1)	0.02	0.01	0.06	0.06	0.04	0.02	0.18	0.14	0.04	0.03	0.19	0.20	0.14	0.15	0.15	0.14	0.04	0.06	-0.03	0.04	0.08	0.11	-0.04	-0.03
	(0.2)	(0.1)	(0.6)	(0.6)	(0.3)	(0.2)	(1.2)	(0.9)	(0.5)	(0.4)	(1.5)	(1.5)	(2.3)	(2.4)	(2.1)	(1.9)	(0.5)	(0.8)	-(0.2)	(0.3)	(0.7)	(0.9)	-(0.4)	-(0.3)
R(M,t-1)*HighBM(i,t-1)	-0.31	-0.27	-0.22	-0.21	-0.44	-0.42	-0.59	-0.56	-0.37	-0.35	-0.25	-0.26	-0.08	-0.07	-0.19	-0.19	-0.36	-0.36	-0.32	-0.28	-0.08	-0.08	-0.31	-0.30
	-(2.4)	-(2.2)	-(1.7)	-(1.7)	-(3.3)	-(3.2)	-(3.6)	-(3.5)	-(3.0)	-(2.9)	-(1.1)	-(1.1)	-(1.2)	-(1.1)	-(2.3)	-(2.2)	-(3.8)	-(3.8)	-(2.0)	-(1.8)	-(0.8)	-(0.8)	-(2.2)	-(2.2)
R-squared	21%	23%	24%	24%	28%	29%	12%	15%	14%	15%	15%	16%	20%	22%	24%	24%	21%	22%	42%	43%	24%	24%	19%	20%
N		6818		3548		3717		4651		8114		3496		17524		8948		9006		1234		6083		6576

Table A.IV

Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Two-year Returns – within Industry Analysis

This table reports the estimates of the following panel regression for the stocks in each of 12 Fama and French broad industry groups:

$$R_{i,[t;t+1]} = \alpha_0 + \alpha_{turn,l} LowTurn_{i,t\text{-}1(/[t;t+1])} + \alpha_{turn,h} HighTurn_{i,t\text{-}1(/[t;t+1])} + \alpha_{size,l} Small_{i,t\text{-}1} + \alpha_{size,h} Big_{i,t\text{-}1} + \alpha_{bm,l} LowBM_{i,t\text{-}1} + \alpha_{bm,h} HighBM_{i,t\text{-}1}$$
$$+ R_{M,[t;t+1]}\left(\beta_0 + \beta_{turn,l} LowTurn_{i,t\text{-}1(/[t;t+1])} + \beta_{turn,h} HighTurn_{i,t\text{-}1(/[t;t+1])} + \beta_{size,l} Small_{i,t\text{-}1} + \beta_{size,h} Big_{i,t\text{-}1} + \beta_{bm,l} LowBM_{i,t\text{-}1} + \beta_{bm,h} HighBM_{i,t\text{-}1}\right)$$
$$+ R_{M,[t\text{-}2;t\text{-}1]}\left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t\text{-}1(/[t;t+1])} + \gamma_{turn,h} HighTurn_{i,t\text{-}1(/[t;t+1])} + \gamma_{size,l} Small_{i,t\text{-}1} + \gamma_{size,h} Big_{i,t\text{-}1} + \gamma_{bm,l} LowBM_{i,t\text{-}1} + \gamma_{bm,h} HighBM_{i,t\text{-}1}\right) + \varepsilon_{i,t},$$

where the $LowTurn_{i,t\text{-}1}$ ($HighTurn_{i,t\text{-}1}$) / $Small_{i,t\text{-}1}$ ($Big_{i,t\text{-}1}$) / $LowBM_{i,t\text{-}1}$ ($HighBM_{i,t\text{-}1}$) dummy is equal to 1 if turnover / size / B/M of a stock *i* in year *t*-1 is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. Standard errors are clustered by period. t-statistics are in parentheses.

	BUSEQ		CHEMS		DUR		ENRGY		FINANCE		HLTH		MANUF		NONDUR		SHOPS		TELCM		UTILS		OTHER	
											α													
Constant	0.21	0.13	0.24	0.21	0.27	0.18	0.42	0.30	0.18	0.19	0.27	0.25	0.19	0.15	0.12	0.08	0.10	0.12	0.03	0.14	0.18	0.19	0.19	0.19
	(3.5)	(2.3)	(5.9)	(5.1)	(4.8)	(3.1)	(6.2)	(4.3)	(3.0)	(3.3)	(3.5)	(3.4)	(4.6)	(3.6)	(2.2)	(1.6)	(1.9)	(2.2)	(0.3)	(1.5)	(5.2)	(5.4)	(3.6)	(3.7)
LowTurn(i,t-1)	**0.08**		**0.05**		**0.02**		**0.00**		**0.01**		**0.13**		**0.00**		**0.07**		**0.09**		**0.07**		**-0.09**		**0.11**	
	(1.3)		**(1.5)**		**(0.5)**		**-(0.1)**		**(0.3)**		**(2.3)**		**(0.1)**		**(2.4)**		**(2.5)**		**(1.1)**		**-(2.7)**		**(2.6)**	
HighTurn(i,t-1)	**-0.12**		**-0.01**		**-0.15**		**-0.04**		**-0.04**		**-0.03**		**-0.04**		**-0.15**		**-0.01**		**0.14**		**-0.12**		**-0.03**	
	-(3.0)		**-(0.2)**		**-(3.3)**		**-(0.7)**		**-(1.0)**		**-(0.5)**		**-(1.4)**		**-(3.8)**		**-(0.2)**		**(1.9)**		**-(2.2)**		**-(0.7)**	
LowTurn(i,[t;t+1])		**-0.06**		**0.01**		**0.02**		**-0.08**		**-0.01**		**-0.11**		**-0.05**		**0.00**		**-0.05**		**-0.05**		**-0.10**		**-0.12**
		-(1.0)		**(0.4)**		**(0.4)**		**-(1.6)**		**-(0.4)**		**-(1.9)**		**-(2.0)**		**-(0.1)**		**-(1.4)**		**-(0.6)**		**-(2.8)**		**-(2.4)**
HighTurn(i,[t;t+1])		**0.03**		**0.12**		**0.11**		**0.17**		**-0.03**		**0.03**		**0.11**		**0.0004**		**0.02**		**-0.06**		**-0.17**		**0.04**
		(0.7)		**(3.1)**		**(2.3)**		**(3.5)**		**-(0.6)**		**(0.5)**		**(4.3)**		**(0.01)**		**(0.5)**		**-(0.9)**		**-(3.5)**		**(0.7)**
Small(i,t-1)	0.04	0.12	0.04	0.06	-0.17	-0.16	0.09	0.18	0.14	0.14	-0.04	0.10	0.08	0.09	0.07	0.08	0.03	0.05	0.27	0.28	0.07	0.06	0.01	0.12
	(0.9)	(2.2)	(0.8)	(1.1)	-(3.0)	-(2.8)	(1.2)	(2.5)	(3.0)	(3.0)	-(0.5)	(1.2)	(2.1)	(2.4)	(1.8)	(2.0)	(0.6)	(1.1)	(2.0)	(2.1)	(1.4)	(1.4)	(0.2)	(2.7)
Big(i,t-1)	-0.04	-0.03	-0.01	0.01	-0.12	-0.09	-0.14	-0.08	-0.13	-0.12	-0.17	-0.10	-0.04	-0.03	-0.01	0.04	0.03	0.05	-0.07	-0.08	-0.05	-0.04	-0.10	-0.10
	-(0.8)	-(0.6)	-(0.2)	(0.4)	-(2.6)	-(1.9)	-(3.0)	-(1.6)	-(3.4)	-(3.3)	-(3.2)	-(2.0)	-(1.4)	-(0.8)	-(0.3)	(1.2)	(0.8)	(1.2)	-(0.9)	-(1.0)	-(2.5)	-(2.1)	-(2.5)	-(2.7)
LowBM(i,t-1)	-0.12	-0.12	-0.14	-0.14	-0.16	-0.19	-0.13	-0.14	-0.04	-0.04	-0.10	-0.11	-0.09	-0.11	-0.07	-0.09	-0.10	-0.11	-0.08	-0.10	0.02	0.01	-0.07	-0.08
	-(2.4)	-(2.4)	-(3.7)	-(3.7)	-(3.0)	-(3.6)	-(2.2)	-(2.5)	-(1.1)	-(1.1)	-(1.8)	-(1.8)	-(3.2)	-(3.7)	-(2.2)	-(2.4)	-(2.7)	-(3.0)	-(1.1)	-(1.4)	(0.4)	(0.3)	-(1.8)	-(2.0)
HighBM(i,t-1)	0.18	0.20	0.03	0.03	0.15	0.16	0.15	0.15	0.08	0.07	0.37	0.39	0.13	0.14	0.17	0.18	0.24	0.25	-0.02	-0.06	0.04	0.04	0.19	0.20
	(3.4)	(3.8)	(0.5)	(0.6)	(2.5)	(2.7)	(2.5)	(2.4)	(1.7)	(1.5)	(3.6)	(3.7)	(4.6)	(4.9)	(4.3)	(4.6)	(5.1)	(5.5)	-(0.3)	-(0.8)	(1.2)	(1.3)	(3.7)	(4.0)
											β													
R(M,[t;t+1])	0.85	0.93	0.75	0.79	0.80	0.95	0.45	0.46	0.64	0.65	0.48	0.44	0.85	0.84	0.95	0.94	0.93	0.93	1.48	1.28	0.53	0.55	0.71	0.74
	(5.6)	(6.2)	(7.4)	(7.9)	(5.9)	(6.9)	(2.6)	(2.8)	(4.2)	(4.4)	(2.6)	(2.4)	(8.9)	(8.4)	(7.4)	(7.0)	(7.3)	(7.3)	(7.6)	(6.4)	(6.2)	(6.3)	(5.0)	(5.5)
R(M,[t;t+1])*LowTurn(i,t-1)	**-0.03**		**-0.14**		**-0.08**		**0.01**		**-0.12**		**-0.13**		**-0.12**		**-0.16**		**-0.17**		**-0.45**		**0.07**		**-0.17**	
	-(0.2)		**-(1.8)**		**-(0.7)**		**(0.1)**		**-(1.3)**		**-(0.9)**		**-(2.1)**		**-(2.6)**		**-(2.0)**		**-(2.9)**		**(0.8)**		**-(1.5)**	
R(M,[t;t+1])*HighTurn(i,t-1)	**0.31**		**0.09**		**0.26**		**0.04**		**0.19**		**0.03**		**0.09**		**0.34**		**0.09**		**-0.20**		**0.59**		**0.14**	
	(3.2)		**(0.9)**		**(2.6)**		**(0.3)**		**(1.7)**		**(0.2)**		**(1.5)**		**(3.5)**		**(1.0)**		**-(1.1)**		**(4.4)**		**(1.3)**	
R(M,[t;t+1])*LowTurn(i,[t;t+1])		**-0.26**		**-0.19**		**-0.38**		**0.08**		**-0.26**		**0.05**		**-0.06**		**-0.06**		**-0.20**		**-0.50**		**0.06**		**-0.23**
		-(1.8)		**-(2.1)**		**-(3.4)**		**(0.6)**		**-(3.1)**		**(0.3)**		**-(1.1)**		**-(0.8)**		**-(2.3)**		**-(3.0)**		**(0.7)**		**-(1.7)**
R(M,[t;t+1])*HighTurn(i,[t;t+1])		**0.25**		**0.002**		**0.05**		**0.11**		**0.33**		**0.12**		**0.13**		**0.41**		**0.19**		**0.48**		**0.49**		**0.14**
		(2.4)		**(0.02)**		**(0.5)**		**(0.8)**		**(3.2)**		**(0.9)**		**(2.1)**		**(4.7)**		**(1.9)**		**(2.7)**		**(4.7)**		**(1.2)**
R(M,[t;t+1])*Small(i,t-1)	0.18	0.20	0.16	0.18	0.50	0.60	0.00	-0.02	-0.19	-0.10	0.25	0.13	0.06	0.07	0.05	0.06	0.28	0.34	0.44	0.55	-0.15	-0.16	0.25	0.23
	(1.8)	(1.8)	(1.3)	(1.4)	(3.5)	(4.2)	(0.0)	-(0.1)	-(1.6)	-(0.8)	(1.3)	(0.6)	(0.7)	(0.8)	(0.5)	(0.7)	(2.7)	(3.1)	(1.4)	(1.8)	-(1.5)	-(1.6)	(2.7)	(2.4)
R(M,[t;t+1])*Big(i,t-1)	-0.06	-0.09	-0.09	-0.14	0.09	0.03	0.12	0.09	0.33	0.25	0.19	0.12	-0.03	-0.07	-0.12	-0.21	-0.11	-0.15	-0.25	-0.21	0.02	-0.01	0.05	-0.01
	-(0.6)	-(0.9)	-(1.0)	-(1.5)	(0.9)	(0.2)	(1.0)	(0.7)	(3.4)	(2.6)	(1.4)	(0.9)	-(0.4)	-(0.9)	-(1.5)	-(2.4)	-(1.2)	-(1.5)	-(1.4)	-(1.2)	(0.4)	-(0.1)	(0.4)	-(0.1)
R(M,[t;t+1])*LowBM(i,t-1)	0.11	0.08	0.05	0.07	0.24	0.31	0.06	0.04	-0.01	0.00	0.20	0.21	0.04	0.06	0.03	0.07	0.08	0.09	0.10	0.08	-0.14	-0.13	0.15	0.13
	(0.9)	(0.7)	(0.6)	(0.8)	(2.0)	(2.5)	(0.4)	(0.3)	-(0.1)	(0.0)	(1.5)	(1.6)	(0.6)	(0.9)	(0.4)	(0.8)	(0.9)	(1.0)	(0.6)	(0.5)	-(0.9)	-(0.8)	(1.5)	(1.3)
R(M,[t;t+1])*HighBM(i,t-1)	-0.08	-0.07	0.15	0.13	0.00	-0.05	-0.23	-0.21	0.23	0.21	-0.15	-0.15	-0.08	-0.11	-0.13	-0.16	-0.31	-0.34	0.29	0.33	-0.01	-0.01	0.07	0.06
	-(0.6)	-(0.5)	(1.2)	(1.0)	(0.0)	-(0.4)	-(1.5)	-(1.4)	(2.0)	(1.8)	-(0.6)	-(0.6)	-(1.2)	-(1.7)	-(1.4)	-(1.8)	-(2.8)	-(3.1)	(1.4)	(1.6)	-(0.1)	-(0.1)	(0.6)	(0.5)
											γ													
R(M,[t-2;t-1])	-0.42	-0.43	-0.44	-0.43	-0.53	-0.49	-0.71	-0.63	-0.32	-0.25	-0.05	-0.15	-0.44	-0.42	-0.39	-0.34	-0.22	-0.29	0.14	-0.08	-0.26	-0.24	-0.14	-0.31
	-(3.0)	-(3.2)	-(4.3)	-(4.2)	-(4.0)	-(3.6)	-(3.9)	-(3.6)	-(2.1)	-(1.7)	-(0.3)	-(0.8)	-(4.7)	-(4.4)	-(3.2)	-(2.8)	-(1.7)	-(2.3)	(0.6)	-(0.4)	-(2.9)	-(2.7)	-(1.1)	-(2.5)
R(M,[t-2;t-1])*LowTurn(i,t-1)	**-0.06**		**-0.02**		**0.00**		**-0.05**		**0.13**		**-0.32**		**0.09**		**0.10**		**-0.08**		**-0.05**		**0.18**		**-0.31**	
	-(0.4)		**-(0.2)**		**(0.0)**		**-(0.4)**		**(1.5)**		**-(2.0)**		**(1.7)**		**(1.4)**		**-(1.0)**		**-(0.3)**		**(2.4)**		**-(2.6)**	
R(M,[t-2;t-1])*HighTurn(i,t-1)	**0.10**		**-0.15**		**0.06**		**0.03**		**-0.17**		**0.01**		**-0.05**		**0.05**		**-0.24**		**-0.32**		**-0.08**		**-0.31**	
	(1.0)		**-(1.5)**		**(0.5)**		**(0.2)**		**-(1.6)**		**(0.1)**		**-(0.8)**		**(0.5)**		**-(2.4)**		**-(1.9)**		**-(0.8)**		**-(2.6)**	
R(M,[t-2;t-1])*LowTurn(i,[t;t+1])		**-0.13**		**0.03**		**-0.05**		**0.00**		**-0.03**		**-0.12**		**0.07**		**0.03**		**-0.03**		**0.20**		**0.11**		**-0.03**
		-(0.9)		**(0.3)**		**-(0.4)**		**(0.0)**		**-(0.4)**		**-(0.7)**		**(1.1)**		**(0.5)**		**-(0.3)**		**(1.3)**		**(1.4)**		**-(0.2)**
R(M,[t-2;t-1])*HighTurn(i,[t;t+1])		**0.14**		**-0.18**		**0.02**		**-0.02**		**-0.19**		**0.17**		**-0.10**		**0.01**		**-0.06**		**-0.03**		**0.05**		**-0.01**
		(1.3)		**-(1.8)**		**(0.2)**		**-(0.1)**		**-(2.1)**		**(1.4)**		**-(1.7)**		**(0.1)**		**-(0.7)**		**-(0.2)**		**(0.4)**		**-(0.1)**
R(M,[t-2;t-1])*Small(i,t-1)	-0.08	-0.11	-0.07	-0.08	0.17	0.19	0.03	-0.08	-0.19	-0.15	-0.19	-0.30	-0.20	-0.18	-0.20	-0.20	-0.21	-0.19	-1.16	-1.23	0.05	0.07	-0.20	-0.28
	-(0.6)	-(0.8)	-(0.5)	-(0.6)	(1.2)	(1.4)	(0.1)	-(0.4)	-(1.8)	-(1.4)	-(1.0)	-(1.5)	-(2.3)	-(2.1)	-(2.1)	-(2.1)	-(2.0)	-(1.7)	-(3.1)	-(3.4)	(0.5)	(0.8)	-(1.8)	-(2.3)
R(M,[t-2;t-1])*Big(i,t-1)	0.15	0.14	0.08	0.06	0.21	0.19	0.39	0.35	0.32	0.29	0.40	0.36	0.13	0.11	0.14	0.09	0.09	0.09	0.03	0.08	-0.02	-0.04	0.18	0.18
	(1.5)	(1.4)	(0.9)	(0.6)	(1.9)	(1.6)	(3.2)	(2.9)	(3.3)	(3.1)	(3.0)	(2.7)	(1.7)	(1.4)	(1.7)	(1.1)	(0.9)	(0.9)	(0.2)	(0.4)	-(0.3)	-(0.9)	(1.7)	(1.8)
R(M,[t-2;t-1])*LowBM(i,t-1)	0.09	0.06	0.15	0.15	0.13	0.16	-0.11	-0.14	0.09	0.07	-0.06	-0.04	0.11	0.13	0.14	0.15	0.05	0.06	0.11	0.18	-0.12	-0.09	0.02	0.02
	(0.7)	(0.5)	(1.6)	(1.6)	(1.0)	(1.2)	-(0.6)	-(0.8)	(1.0)	(0.8)	-(0.4)	-(0.3)	(1.5)	(1.8)	(1.7)	(1.8)	(0.6)	(0.6)	(0.7)	(1.2)	-(0.9)	-(0.7)	(0.2)	(0.2)
R(M,[t-2;t-1])*HighBM(i,t-1)	-0.20	-0.16	-0.12	-0.14	-0.32	-0.33	-0.23	-0.20	-0.17	-0.16	-0.62	-0.62	-0.16	-0.17	-0.22	-0.24	-0.23	-0.24	-0.15	-0.07	0.22	0.20	-0.19	-0.19
	-(1.4)	-(1.1)	-(0.9)	-(1.0)	-(2.1)	-(2.1)	-(1.4)	-(1.2)	-(1.5)	-(1.4)	-(2.5)	-(2.5)	-(2.2)	-(2.4)	-(2.2)	-(2.3)	-(2.2)	-(2.2)	-(0.8)	-(0.4)	(2.3)	(2.2)	-(1.4)	-(1.4)
R-squared	17%	19%	22%	22%	25%	26%	12%	15%	13%	13%	12%	13%	20%	21%	22%	21%	18%	18%	36%	38%	27%	27%	15%	16%
N	6259		3348		3473		4286		7256		3159		16515		8339		8322		1141		5849		5818	

Table A.V
Decomposition of Return-Characteristics Relation into Systematic and Non-systematic Components: Three-year Returns – within Industry Analysis

This table reports the estimates of the following panel regression for the stocks in each of 12 Fama and French broad industry groups:

$$R_{i,[t;t+2]} = \alpha_0 + \alpha_{turn,l} LowTurn_{i,t-1(/[t;t+2])} + \alpha_{turn,h} HighTurn_{i,t-1(/[t;t+2])} + \alpha_{size,l} Small_{i,t-1} + \alpha_{size,h} Big_{i,t-1} + \alpha_{bm,l} LowBM_{i,t-1} + \alpha_{bm,h} HighBM_{i,t-1}$$
$$+ R_{M,[t;t+2]} \left(\beta_0 + \beta_{turn,l} LowTurn_{i,t-1(/[t;t+2])} + \beta_{turn,h} HighTurn_{i,t-1(/[t;t+2])} + \beta_{size,l} Small_{i,t-1} + \beta_{size,h} Big_{i,t-1} + \beta_{bm,l} LowBM_{i,t-1} + \beta_{bm,h} HighBM_{i,t-1} \right)$$
$$+ R_{M,[t-3;t-1]} \left(\gamma_0 + \gamma_{turn,l} LowTurn_{i,t-1(/[t;t+2])} + \gamma_{turn,h} HighTurn_{i,t-1(/[t;t+2])} + \gamma_{size,l} Small_{i,t-1} + \gamma_{size,h} Big_{i,t-1} + \gamma_{bm,l} LowBM_{i,t-1} + \gamma_{bm,h} HighBM_{i,t-1} \right) + \varepsilon_{i,t},$$

where the $LowTurn_{i,t-1}$ ($HighTurn_{i,t-1}$) / $Small_{i,t-1}$ ($Big_{i,t-1}$) / $LowBM_{i,t-1}$ ($HighBM_{i,t-1}$) dummy is equal to 1 if turnover / size / B/M of a stock *i* in year *t*-1 is in the bottom (top) tercile of the cross-sectional distribution of this characteristic, and zero otherwise. Standard errors are clustered by period. t-statistics are in parentheses.

	BUSEQ		CHEMS		DUR		ENRGY		FINANCE		HLTH		MANUF		NONDUR		SHOPS		TELCM		UTILS		OTHER	
α																								
Constant	0.35	0.22	0.35	0.27	0.28	0.16	0.75	0.60	0.28	0.27	0.36	0.29	0.29	0.22	0.16	0.13	0.17	0.22	0.00	0.08	0.29	0.27	0.35	0.25
	(3.7)	(2.3)	(5.4)	(4.2)	(3.2)	(1.7)	(8.0)	(6.3)	(3.1)	(3.0)	(3.2)	(2.7)	(4.5)	(3.4)	(2.1)	(1.7)	(2.2)	(2.8)	(0.0)	(0.7)	(6.1)	(5.7)	(3.8)	(2.7)
LowTurn(i,t-1)	0.14		0.06		0.05		-0.06		0.01		0.15		0.01		0.16		0.17		0.10		-0.16		0.13	
	(1.6)		**(1.2)**		**(0.8)**		**-(0.9)**		**(0.2)**		**(1.9)**		**(0.3)**		**(3.9)**		**(3.8)**		**(1.1)**		**-(3.5)**		**(2.0)**	
HighTurn(i,t-1)	**-0.20**		**-0.11**		**-0.23**		**-0.13**		**-0.06**		**-0.03**		**-0.02**		**-0.24**		**0.04**		**0.18**		**0.01**		**-0.10**	
	-(3.5)		**-(1.8)**		**-(3.6)**		**-(1.7)**		**-(0.9)**		**-(0.4)**		**-(0.5)**		**-(4.6)**		**(0.8)**		**(1.7)**		**(0.1)**		**-(1.5)**	
LowTurn(i,[t;t+2])		**0.06**		**0.01**		**0.04**		**-0.17**		**0.00**		**-0.08**		**-0.02**		**0.04**		**-0.01**		**0.03**		**-0.13**		**-0.04**
		(0.6)		**(0.2)**		**(0.6)**		**-(2.6)**		**(0.0)**		**-(1.0)**		**-(0.7)**		**(0.9)**		**-(0.3)**		**(0.3)**		**-(3.0)**		**-(0.6)**
HighTurn(i,[t;t+2])		**0.04**		**0.18**		**0.11**		**0.14**		**0.02**		**0.09**		**0.21**		**-0.04**		**0.00**		**0.08**		**0.01**		**0.14**
		(0.6)		**(3.0)**		**(1.5)**		**(2.1)**		**(0.4)**		**(1.4)**		**(6.0)**		**-(0.8)**		**(0.1)**		**(0.8)**		**(0.2)**		**(2.2)**
Small(i,t-1)	0.03	0.12	0.05	0.08	-0.10	-0.07	0.23	0.33	0.13	0.15	0.08	0.27	0.11	0.12	0.08	0.08	-0.01	0.01	0.51	0.52	0.05	0.04	0.06	0.21
	(0.4)	(1.6)	(0.7)	(1.0)	-(1.3)	-(0.9)	(2.2)	(3.3)	(2.0)	(2.3)	(0.8)	(2.5)	(2.1)	(2.4)	(1.3)	(1.3)	-(0.1)	(0.1)	(2.2)	(2.3)	(0.9)	(0.6)	(1.0)	(3.1)
Big(i,t-1)	-0.08	-0.04	-0.08	-0.03	-0.19	-0.14	-0.30	-0.19	-0.23	-0.21	-0.25	-0.14	-0.11	-0.07	-0.07	0.01	0.00	0.02	0.00	0.00	-0.08	-0.06	-0.12	-0.09
	-(1.2)	-(0.6)	-(1.3)	-(0.5)	-(3.0)	-(2.1)	-(4.6)	-(2.9)	-(3.9)	-(3.6)	-(3.3)	-(1.7)	-(2.3)	-(1.4)	-(1.4)	(0.2)	(0.0)	(0.3)	(0.0)	(0.0)	-(2.8)	-(2.4)	-(1.7)	-(1.3)
LowBM(i,t-1)	-0.17	-0.19	-0.18	-0.19	-0.11	-0.16	-0.17	-0.20	-0.10	-0.10	-0.13	-0.13	-0.13	-0.15	-0.13	-0.15	-0.20	-0.20	-0.17	-0.20	-0.13	-0.14	-0.19	-0.19
	-(2.4)	-(2.6)	-(3.1)	-(3.2)	-(1.6)	-(2.2)	-(2.3)	-(2.7)	-(1.7)	-(1.7)	-(1.6)	-(1.5)	-(3.0)	-(3.4)	-(2.7)	-(3.1)	-(3.8)	-(3.9)	-(1.7)	-(2.0)	-(1.6)	-(1.7)	-(3.4)	-(3.4)
HighBM(i,t-1)	0.24	0.24	0.05	0.07	0.24	0.25	0.29	0.28	0.19	0.18	0.57	0.59	0.18	0.18	0.22	0.23	0.27	0.30	-0.10	-0.15	0.06	0.08	0.28	0.32
	(3.3)	(3.3)	(0.7)	(1.0)	(3.0)	(2.9)	(3.7)	(3.6)	(2.8)	(2.7)	(4.0)	(4.2)	(4.1)	(4.1)	(4.0)	(4.1)	(4.6)	(5.0)	-(0.8)	-(1.3)	(1.3)	(1.7)	(3.6)	(4.0)
β																								
R(M,[t;t+2])	0.71	0.69	0.59	0.72	0.77	0.86	0.22	0.27	0.61	0.68	0.27	0.39	0.78	0.81	0.87	0.90	0.82	0.78	1.53	1.51	0.40	0.44	0.60	0.79
	(4.0)	(3.9)	(5.3)	(6.4)	(5.1)	(5.4)	(1.3)	(1.7)	(3.9)	(4.3)	(1.3)	(1.9)	(7.0)	(7.1)	(6.0)	(6.2)	(5.9)	(5.5)	(7.8)	(8.0)	(4.7)	(5.1)	(3.7)	(5.0)
R(M,[t;t+2])*LowTurn(i,t-1)	**-0.22**		**-0.08**		**-0.15**		**0.00**		**-0.10**		**-0.01**		**-0.09**		**-0.18**		**-0.20**		**-0.40**		**0.16**		**-0.19**	
	-(1.6)		**-(0.9)**		**-(1.3)**		**(0.0)**		**-(1.0)**		**-(0.1)**		**-(1.4)**		**-(2.6)**		**-(2.4)**		**-(2.5)**		**(2.1)**		**-(1.7)**	
R(M,[t;t+2])*HighTurn(i,t-1)	**0.25**		**0.31**		**0.22**		**0.09**		**0.19**		**0.14**		**0.06**		**0.33**		**0.05**		**-0.14**		**0.29**		**0.17**	
	(2.3)		**(2.9)**		**(2.0)**		**(0.7)**		**(1.7)**		**(1.1)**		**(1.0)**		**(3.3)**		**(0.5)**		**-(0.7)**		**(2.1)**		**(1.6)**	
R(M,[t;t+2])*LowTurn(i,[t;t+2])		**-0.31**		**-0.21**		**-0.32**		**0.11**		**-0.27**		**0.00**		**-0.17**		**-0.12**		**-0.17**		**-0.69**		**0.19**		**-0.41**
		-(1.9)		**-(2.1)**		**-(2.7)**		**(0.9)**		**-(2.8)**		**(0.0)**		**-(2.8)**		**-(1.5)**		**-(1.9)**		**-(3.6)**		**(2.3)**		**-(3.1)**
R(M,[t;t+2])*HighTurn(i,[t;t+2])		**0.32**		**-0.09**		**0.09**		**0.07**		**0.15**		**-0.01**		**0.06**		**0.31**		**0.19**		**0.17**		**0.17**		**-0.07**
		(2.8)		**-(0.8)**		**(0.7)**		**(0.6)**		**(1.4)**		**(0.0)**		**(1.0)**		**(3.2)**		**(1.9)**		**(0.9)**		**(1.4)**		**-(0.6)**
R(M,[t;t+2])*Small(i,t-1)	0.21	0.23	0.19	0.22	0.29	0.35	-0.19	-0.24	-0.16	-0.12	0.01	-0.17	0.09	0.12	-0.08	-0.03	0.29	0.32	0.16	0.31	-0.15	-0.19	0.24	0.19
	(1.9)	(1.8)	(1.3)	(1.4)	(2.0)	(2.5)	-(1.1)	-(1.5)	-(1.3)	-(1.0)	(0.0)	-(0.9)	(1.0)	(1.4)	-(0.7)	-(0.2)	(2.8)	(3.0)	(0.4)	(0.8)	-(1.6)	-(1.8)	(2.2)	(1.7)
R(M,[t;t+2])*Big(i,t-1)	0.02	-0.03	-0.06	-0.13	0.12	0.05	0.23	0.16	0.37	0.30	0.32	0.18	-0.04	-0.10	-0.02	-0.12	-0.07	-0.09	-0.38	-0.41	0.10	0.10	0.01	-0.09
	(0.2)	-(0.3)	-(0.6)	-(1.3)	(1.0)	(0.4)	(1.9)	(1.3)	(3.5)	(2.8)	(2.1)	(1.1)	-(0.5)	-(1.1)	-(0.2)	-(1.3)	-(0.6)	-(0.9)	-(2.0)	-(2.2)	(2.0)	(2.0)	(0.0)	-(0.7)
R(M,[t;t+2])*LowBM(i,t-1)	0.08	0.07	0.08	0.11	0.01	0.07	0.19	0.21	-0.05	-0.04	0.24	0.23	0.03	0.04	-0.04	0.00	0.11	0.12	0.22	0.20	0.20	0.21	0.17	0.15
	(0.6)	(0.5)	(0.8)	(1.1)	(0.1)	(0.6)	(1.3)	(1.5)	-(0.5)	-(0.4)	(1.6)	(1.5)	(0.4)	(0.6)	-(0.4)	-(0.1)	(1.2)	(1.2)	(1.2)	(1.1)	(1.0)	(1.0)	(1.7)	(1.4)
R(M,[t;t+2])*HighBM(i,t-1)	-0.04	0.00	0.11	0.07	0.11	0.07	-0.20	-0.17	0.06	0.05	0.06	0.05	-0.04	-0.07	0.00	-0.05	-0.21	-0.23	0.21	0.25	-0.02	-0.04	-0.04	-0.09
	-(0.3)	(0.0)	(0.8)	(0.5)	(0.7)	(0.4)	-(1.4)	-(1.3)	(0.5)	(0.5)	(0.2)	(0.2)	-(0.5)	-(0.9)	(0.0)	-(0.5)	-(1.7)	-(2.0)	(0.9)	(1.1)	-(0.2)	-(0.5)	-(0.3)	-(0.7)
γ																								
R(M,[t-3;t-1])	-0.25	-0.22	-0.21	-0.20	-0.12	-0.03	-0.83	-0.77	-0.27	-0.17	0.36	0.30	-0.37	-0.30	-0.22	-0.24	-0.11	-0.20	0.16	-0.01	-0.20	-0.13	-0.11	-0.08
	-(1.5)	-(1.3)	-(1.7)	-(1.6)	-(0.7)	-(0.2)	-(4.7)	-(4.4)	-(1.6)	-(1.1)	(1.8)	(1.5)	-(3.3)	-(2.6)	-(1.5)	-(1.7)	-(0.8)	-(1.4)	(0.7)	(0.0)	-(2.2)	-(1.5)	-(0.7)	-(0.5)
R(M,[t-3;t-1])*LowTurn(i,t-1)	**0.11**		**-0.01**		**0.05**		**0.05**		**0.16**		**-0.32**		**0.07**		**-0.10**		**-0.18**		**-0.15**		**0.19**		**-0.11**	
	(0.7)		**-(0.1)**		**(0.4)**		**(0.3)**		**(1.7)**		**-(1.8)**		**(1.1)**		**-(1.2)**		**-(2.2)**		**-(0.9)**		**(2.3)**		**-(0.8)**	
R(M,[t-3;t-1])*HighTurn(i,t-1)	**0.16**		**-0.07**		**0.12**		**0.20**		**-0.09**		**-0.08**		**-0.11**		**0.15**		**-0.25**		**-0.46**		**-0.26**		**-0.17**	
	(1.4)		**-(0.7)**		**(0.9)**		**(1.5)**		**-(0.8)**		**-(0.6)**		**-(1.7)**		**(1.4)**		**-(2.5)**		**-(2.5)**		**-(2.8)**		**-(1.4)**	
R(M,[t-3;t-1])*LowTurn(i,[t;t+2])		**-0.06**		**0.11**		**-0.07**		**0.11**		**-0.03**		**-0.26**		**0.05**		**0.02**		**-0.14**		**0.14**		**0.01**		**-0.07**
		-(0.4)		**(1.0)**		**-(0.5)**		**(0.8)**		**-(0.3)**		**-(1.4)**		**(0.8)**		**(0.3)**		**-(1.5)**		**(0.8)**		**(0.2)**		**-(0.5)**
R(M,[t-3;t-1])*HighTurn(i,[t;t+2])		**0.12**		**-0.11**		**0.01**		**0.18**		**-0.16**		**0.03**		**-0.28**		**0.17**		**-0.02**		**-0.47**		**-0.28**		**-0.17**
		(0.9)		**-(1.0)**		**(0.1)**		**(1.3)**		**-(1.6)**		**(0.3)**		**-(4.3)**		**(1.7)**		**-(0.2)**		**-(2.4)**		**-(2.1)**		**-(1.5)**
R(M,[t-3;t-1])*Small(i,t-1)	-0.05	-0.07	-0.06	-0.11	-0.11	-0.11	-0.07	-0.09	-0.01	0.00	-0.34	-0.40	-0.21	-0.23	0.03	0.01	-0.15	-0.11	-0.91	-1.04	0.19	0.27	-0.28	-0.36
	-(0.4)	-(0.4)	-(0.4)	-(0.6)	-(0.7)	-(0.7)	-(0.3)	-(0.4)	-(0.1)	(0.0)	-(1.8)	-(2.1)	-(2.5)	-(2.7)	(0.3)	(0.0)	-(1.4)	-(1.0)	-(2.2)	-(2.5)	(1.6)	(2.2)	-(2.4)	-(2.9)
R(M,[t-3;t-1])*Big(i,t-1)	0.12	0.07	0.16	0.12	0.17	0.11	0.45	0.40	0.36	0.29	0.22	0.18	0.25	0.21	0.17	0.13	0.12	0.11	-0.10	-0.05	-0.08	-0.11	0.11	0.06
	(1.1)	(0.6)	(1.4)	(1.1)	(1.4)	(0.8)	(3.7)	(3.2)	(3.2)	(2.7)	(1.6)	(1.2)	(2.9)	(2.4)	(1.7)	(1.4)	(1.1)	(1.0)	-(0.5)	-(0.3)	-(1.4)	-(2.0)	(0.9)	(0.5)
R(M,[t-3;t-1])*LowBM(i,t-1)	0.00	0.02	0.11	0.12	0.10	0.13	-0.18	-0.21	0.19	0.18	-0.18	-0.17	0.11	0.13	0.25	0.27	0.23	0.22	0.33	0.41	-0.04	-0.01	0.19	0.17
	(0.0)	(0.1)	(1.0)	(1.1)	(0.7)	(1.0)	-(1.1)	-(1.2)	(2.1)	(2.0)	-(1.1)	-(1.1)	(1.4)	(1.6)	(2.8)	(3.0)	(2.3)	(2.2)	(1.8)	(2.3)	-(0.3)	(0.0)	(1.8)	(1.6)
R(M,[t-3;t-1])*HighBM(i,t-1)	-0.28	-0.20	-0.13	-0.15	-0.41	-0.41	-0.43	-0.40	-0.21	-0.21	-0.75	-0.72	-0.15	-0.14	-0.27	-0.26	-0.07	-0.09	0.19	0.26	0.18	0.15	-0.24	-0.27
	-(1.8)	-(1.3)	-(0.9)	-(1.0)	-(2.5)	-(2.4)	-(2.6)	-(2.5)	-(1.9)	-(1.9)	-(2.8)	-(2.7)	-(1.8)	-(1.7)	-(2.6)	-(2.3)	-(0.6)	-(0.8)	(1.1)	(1.5)	(1.9)	(1.7)	-(1.6)	-(1.7)
R-squared	12%	13%	13%	13%	15%	16%	11%	14%	11%	11%	11%	12%	13%	15%	14%	14%	12%	13%	30%	32%	25%	25%	12%	12%
N		5733		3158		3236		3961		6464		2848		15547		7765		7658		1053		5618		5142