ABSTRACT

Three-factor capital asset pricing model (CAPM)-beta, size, and book-to-market equity appears to dominate most other variables in the empirical explanation of cross-sectional returns. This study attempts to find a link between the prominent three-factor CAPM and the dynamic feature of inter-temporal CAPM by searching a simple ex-ante economic state variable. Using data from Jakarta Stock Exchange, this study finds that the three-factor CAPM holds in the full sample. After separating the samples into stable and unstable economic conditions, the result indicates that the risk premiums associated with the three-factor CAPM do vary, but the magnitudes of the variation cannot be observed due to some statistical problems. However, an ex-ante economic state variable, growth of change in money supply, proposed in this study fails to capture the time varying risk premiums attached in the three-factor CAPM.
I. INTRODUCTION

The relationship between risk and return has been the focus of recent capital market research. Numerous papers have derived various versions of the capital asset pricing model (CAPM), ranging from *single-factor CAPM* (Sharpe-Lintner and Black versions), *conditional CAPM* (Engle, 1982 and Bollerslev, 1986), *Arbitrage Pricing Theory* (Ross, 1976, Huberman, 1982, Chamberlain and Rothschild, 1983, Lehman and Modest, 1988), *three-factor CAPM* (Fama and French, 1992, 1995; Chan, Jagadeesh, and Lakonishok, 1995), *intertemporal CAPM* (Merton, 1973, and Breeden’s, 1979), to *international CAPM* (Solnik, 1974, Korajczyk and Viallet, 1989). The role of beta in explaining the cross-sectional variation in stock returns are well documented. In fact, beta has a rich theoretical foundation but lacks empirical support. Two variables found to be prominent in explaining the cross-sectional variation of return are size, as measured by market value of equity, and book-to-market equity. These two variables combined with beta (three-factor CAPM) appear to dominate most other variables in the empirical explanation of cross-sectional returns.

The purpose of this study is to find a link between the prominent three-factor CAPM and the dynamic feature of inter-temporal CAPM. In a dynamic economy, it is often believed that if an investor anticipate information shifts, he will adjust his portfolio to hedge these shifts. To capture the dynamic hedging effect, Merton (1973) develops a continuous-time asset pricing model which explicitly takes into account hedging demand. In contrast to the APT framework (employing undefined numbers of state variables), there are only two factors which are theoretically derived from Merton’s model (1973): a market factor and a hedging factor. However, an empirical investigation is not easy to implement for the continuous-time model.

This study is intended to determine whether the premiums attached to the three-factor CAPM vary in a predictable manner as the concern of investors shifts due to the availability of anticipated information. Like Merton’s (1973), Breeden’s (1979), and Jensen and Mercer (2002) efforts, approach of this study is to search the macroeconomic state variables for inter-temporal asset pricing. Using three-factor CAPM and employing the stock return of companies listed in Jakarta Stock Exchange from the years of 1991 to 2000, this study will firstly, test the three-factor CAPM.
whether the premiums attached to the factors vary overtime across different economic conditions. The observable different ex-post economic conditions are used. The sample of the Indonesian data from the periods of 1991 to 2000 make the separation of the different economic conditions possible. Indonesia experienced a stable economic condition from the periods of 1991 to 1997, while the rest is an unstable condition, following the economic crisis in 1998. If an inter-temporal variation occurs, it means that the attached premiums vary across different observable economic conditions. Finding an anticipated economic state variable is required. Secondly, find a common anticipated economic state variable to link business conditions and market participants’ expectations about future market conditions. The state variable proposed is growth of change in money supply (M2). Positive (negative) growth of change in money supply represents an expansive (a restrictive) economic condition.

The perception that lack of information about the price behavior and characteristics of emerging equity market hinders the foreign investments, has motivated this study to find an economic state variable that can explain the time varying expected behavior of asset pricing. In general, the finding of an anticipated state economic variable can expectantly provide an important piece of contributions to the puzzle surrounding the search for economic state variables in asset pricing model. Specifically, this study will provide empirical evidence on a relevant state variable of asset pricing from Jakarta Stock Exchange as one of the potential emerging markets in the world.

II. THEORETICAL BACKGROUND

For the past three decades mean variance capital asset pricing model of Sharpe-Lintner and Black have served as the corner stone of financial theory. The model has a long history of theoretical and empirical investigation. The followings present a theoretical review of the model and its developments.

A. Single Factor CAPM

The single factor CAPM of Sharpe-Lintner model is the extension of one period mean-variance portfolio models of Markowitz (1959) and Tobin (1958), which in turn are built on the expected utility model of Von Neumann and Morgenstern (1953). The
Sharpe-Lintner asset pricing model then uses the characteristics of the consumer wealth allocation decision to derive the equilibrium relationship between risk and expected return for assets and portfolios. Making a number of assumptions, Sharpe-Lintner extends Markowitz’s mean variance framework to develop a relation for expected return, which can be written as:

$$E(R_i) = R_f + \beta_i((E(R_m) - R_f))$$

where $E(R_i)$ is expected return on ith security, $R_f$ is risk-free rate, $E(R_m)$ is expected return of market portfolio, and $\beta_i$ is the measure of risk or definition of market sensitivity parameter defined as $\text{cov}(R_i, R_m)/\text{var}(R_m)$.

Intuitively, in a rational and competitive market investors diversify all unsystematic risk away and thus price assets according to a single factor, namely, systematic or non-diversifiable risk. The single factor CAPM, which describes stock return solely on $\beta$ measure, is based on the assumption that all market participants share identical subjective expectations of mean and variance of return distribution, called constant expected returns. Thus, a single-factor CAPM is classified as static asset pricing model.

B. Inter-temporal CAPM

Unlike constant expected return assumed in single-factor CAPM, it has been observed that return distribution varies over time (Engle, 1982 and Bollerslev, 1986). In other words, the stock return distribution is time variant in nature and hence, the subjective expectations of moment differ from one period to another. This implies that the investors expectations of moments behave like random variables rather than constant as assumed in the single-factor CAPM.

Since Merton (1973) finding of inter-temporal CAPM, the single-period CAPM has been empirically challenged. There are ample evidence on time varying risk premium, such as Keim and Stambaugh (1986), Fama and French (1988), French, Schwert, and Stambaugh (1987). They claim that the concept of time-varying risk premium cannot be properly explored within a static model such as single-factor CAPM.
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or even static Arbitrage Pricing Theory (APT). In contrast to the APT framework (employing undefined numbers of state variables), there are two factors which are theoretically derived from Merton’s inter-temporal CAPM (1973): a market factor and a hedging factor. The state variables are used to identify a hedging factor. In a dynamic economy, if an investor anticipates information shifts, he will adjust his portfolio to hedge these shifts.

Nielsen and Vassalou (2001) specified two relevant variables for inter-temporal CAPM, namely, instantaneous Sharpe ratio represented a market factor and real interest rate represented a hedging factor. They demonstrated that investors hedge only against stochastic changes in the slope and the intercept of the instantaneous capital market line, which implied that only variables that forecast the real interest rate and the Sharpe ratio will be priced.

C. Three-Factor CAPM

Recent researches show that single-factor specification of asset pricing model is inappropriate (Fama and French, 1992, 1995, 1996, Jagannathan and Wang, 1996). Fama’s and French’s three-factor CAPM uses beta, market equity, and book-to-market equity as variables determining factor loadings in asset pricing. The three-factor model is stated as follows:

\[ E(R_i) - R_f = \beta_i((E(R_m) - R_f) + s_iE(SMB) + h_iE(HML)) \]

where \( E(R_i) - R_f \), \( E(SMB) \), and \( E(HML) \) are expected risk premiums. Fama and French suggest that inter-temporal CAPM is one possible reason for the risk premiums that they find to be associated with loadings on SMB and HML hedge portfolios. Fama and French (1995) argue that the premiums are consistent with a multi-factor version of Merton’s (1973) inter-temporal CAPM in which market equity and book-to-market equity proxy for sensitivity to risk factors in returns.

Liew and Vassalou (2000) report that annual returns on the SMB and HML portfolios predict GDP growth in several countries. Vassalou (2002) shows that a

\[ ^2 \text{SMB is the difference between small market equity return and big market equity return portfolios.} \]

\[ ^3 \text{HML is the difference between high BE/ME return and low BE/ME return portfolios.} \]
portfolio designed to track news about future GDP growth captures much of the explanatory power of the Fama and French portfolios.

This study will reexamine the three-factor CAPM, whether the premiums attached to the factors vary with the change in the anticipated economic state variable. If the premiums vary, it means that three-factor CAPM has not captured the state variable being examined.

D. Economic Indicators
There are two economic indicators, ex-post economic condition and anticipated economic condition, used in this study. The ex-post economic conditions are the stable condition of Indonesian economy during the periods of 1991 to 1997, while the unstable condition occurs during the periods 1997-2001. The ex-post economic condition is used to test whether the premiums attached in three-factor CAPM still vary across different conditions. Should the premiums vary across different ex-post economic conditions, it is worth to find an anticipated economic state factor that will be useful to predict an ex-ante market condition.

The proposed economic state variable is the growth of changes in money supply (M2). The primary advantages of relying on the growth of changes in the money supply as the economic indicator are that (i) the rate of changes is perceived to be an exogenous signal that is easily interpreted; (ii) the rate of changes is widely reported; and (iii) the rate of changes is regarded as signaling or conforming monetary developments and possibly real output developments. This economic variable was used in Marwan Asri’s (2002) study to observe stock return behavior under the expansive and restrictive economic phases. Expansive monetary policy is used to encourage the future economic growth, while restrictive monetary policy is used to slow down the rate of inflation. The expansive (restrictive) phase is represented by positive (negative) growth in the change of money supply.

III. HYPOTHESIS DEVELOPMENT
The three-factor CAPM is used to develop the hypothesis. The three factors are beta, size measured as market equity, and book-to market equity. Beta is a measure of systematic risk that is expected to have a positive relationship with stock returns. Size
is related to profitability. Fama and French (1995) demonstrates that controlling for book-to-market ratio, small stocks tend to have lower earnings on book equity than do big stocks. Thus, it is expected that size measured as market equity has a negative relationship with stock returns. Penman (1991) finds that stocks with low book-to-market ratios are more profitable than those of high book-to-market ratios for at least five years after the portfolio formations. Thus, book-to-market ratios has a positive relationship with stock returns.

The relationships of beta, size, and book-to-market ratios with stock returns under the three-factor model are reexamined in this study. The relationships are tested under two different economic condition, to determine whether the premiums attached to the three factors vary in a predictable manner. The state variable of ex-post economic condition, under stable and unstable economic conditions, is used to observed the time variation behavior of stock return related to the three factors. Following Merton’s (1973) and Breeden’s (1979) studies stating the existence of time varying expected returns and other recent studies (Jensen, Mercer, and Johnson, 1996; Patelis, 1997; Thorbecke, 1997; and Jensen and Mercer, 2002) demonstrating the link between the economic conditions and expected stock returns, the following hypothesis is stated:

H1: The relationships of beta, size, and book-to-market equity with stock returns are different under stable and unstable economic conditions.

Should the relationships of the three factors vary under the ex-post economic conditions, the search of ex-ante economic state variable to predict the time varying behavior of stock returns become an essential effort. The economic state variable being proposed is the growth of change in money supply in which the expansive (restrictive) phase is represented by positive (negative) growth in the change of money supply.

Following the relation stated in H1, the H2 is stated as follows:

H2: The relationships of beta, size, and book-to-market equity with stock returns are different under expansive and restrictive economic conditions.
IV. RESEARCH METHODS

A. Data

The companies used as sample in this study are public companies listed in Jakarta Stock Exchange from the year of 1991 to the year of 2001. The periods being included in the sample are based on the availability of the capital market data from Accounting Development Center of Gadjah Mada University, and financial data from Indonesian Capital Market Directory. Following the standard practice, companies’ data from utilities and financial industry are excluded. The purposive sampling procedures are used to determine the companies being included in the sample. The criteria used are as follows:

- The companies’ financial statements and the data required to compute all the operational variables must be available.
- The companies being selected has a positive book-to-market equity ratio.

The observation used in this study is not individual company data. The companies are put into portfolios formed each year on the basis of beta, market equity (ME), and book-to-market equity (BM).

One year companies data is formed into 8 portfolios (discussed later). Since 10 year periods of monthly data are used, the number of observations available is 960 (8 portfolios x 120 months). After excluding the missing values and outliers, the number of observations remained is 923. Thus, 923 observations are used in each full sample regression.

The information used to categorize the observations to fall under stable or unstable economic conditions, is the periods of observations. Periods between June 1991 and June 1997 are classified into stable economic conditions, while periods following June 1997 are unstable conditions. Out of 923 observations, 511 monthly observations fall in the stable periods and the rest are in unstable periods.

Money supply data is obtained from the Bank Indonesia monthly report. The growth of changes in money supply is computed each month during the observation periods from 1991 to 2001. The positive (negative) growth of the change in money supply represents expansive (restrictive) economic condition. Out of 923 observations,
529 monthly observations fall in the expansive category and the rest are in restrictive category.

B. Portfolio Formation

As in Jensen’s and Mercer’s (2002) study, portfolios are formed using a triple-sort procedures based on individual firms’ pre-ranking beta, market equity, and book-to-market equity. The triple sorts can isolate return patterns associated with an individual variable by controlling for return variation driven by both of the other measures. At the end of every June all stocks are ranked on their pre-ranking betas and form 2 beta-ranked portfolios. Stocks within each beta-ranked portfolios are then ranked and sorted into 2 ME-ranked portfolios, providing 4 beta:ME-ranked portfolios. Finally, each of the 4 beta:ME-ranked portfolios are subdivided into 2 BM-ranked portfolios, creating 8 beta:ME:BM-ranked portfolios. Equally weighted monthly portfolio returns are computed as geometric mean for the following 12 months (July of year t through June of year t+1), and portfolios are reformed at the end of every June. Since 10 year periods of observations are used and the portfolio formation is conducted every June each year, the number of different portfolios obtained is 80 portfolios.

The process used to form portfolios serves several purposes. First, it helps alleviate the errors-in-variables problem that plagues betas on individual firms (Blume, 1971, 1975). Second, the triple sort creates dispersion in each of the portfolio characteristics while controlling for variations in both the second and the third characteristics. Third, the techniques tends to orthogonalize the three independent variables and thus reduces the effect of multicollinearity in the regression analysis.

C. Operational Definition of Variables

Portfolio returns are obtained from one year monthly geometric mean of portfolios formed on the basis of beta, ME, and BM. Equally weighted monthly portfolio returns are computed for the following 12 months (July of year t through June of year t+1), and portfolios are reformed at the end of every June.
Pre-ranking beta is corrected beta in the end of each month for each stock\(^4\), and post-ranking beta is the equally weighted average of companies’ beta within each of 8 portfolios formed on the basis of beta, ME, and BM at the end of each month. ME is market capitalization of stock obtained from the stock price at the end of each month multiplied by the number of shares outstanding. BM is a ratio between book value of equity at the end of year t-1 and market value of equity at the end of each month in year t.

The independent variables are the post-ranking portfolio beta, the portfolio ME, and the portfolio BM. All of them are the average of the corresponding variables (beta, ME, and BM) of the companies within each of 8 portfolios formed on the basis of beta, ME, and BM at the end of each month.

D. Model and Hypothesis Test
The following models are used to test the hypothesis:

Model I:

\[
R_{pt} = \alpha + \gamma_1 \ln(BETA)_{pt} + \lambda_2 (ME)_{pt} + \gamma_3 \ln(BM)_{pt} + \epsilon_{pt}
\]

where:
- R\(_{pt}\): portfolio return
- (BETA)\(_{pt}\): portfolio beta
- (ME)\(_{pt}\): portfolio market equity
- (BM)\(_{pt}\): portfolio book-to-market equity

Model I is used to confirm that the three-factor CAPM holds. To test the hypothesis, the sample are split into two different economic conditions, then model I is run for each condition. The coefficients are observed whether they are different under 2 different economic conditions.

To demonstrate whether the differences between coefficients are significant, and to see the magnitudes of the differences, the following model is employed:

\(^4\) The Fowler and Rorke corrected beta is obtained from the capital market database of Accounting Development Center of Gadjah Mada University. Market model is used to estimate beta by employing one year estimation period of stock daily return.
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Model II:

\[ R_{pt} = \alpha + \gamma_1 (BETA)_{pt} + \gamma_2 \ln(ME)_{pt} + \gamma_3 \ln(BM)_{pt} + \gamma_4 D_t + \gamma_5 (D_t * BETA)_{pt} + \gamma_7 (D_t * \ln(ME))_{pt} + \gamma_8 (D_t * \ln(BM))_{pt}) + \epsilon_{pt} \]

where:

- \( D_t \): dummy variable that takes 1 under stable economic condition and zero otherwise.
- \( D_t \): dummy variable that takes 1 under expansive economic condition and zero otherwise.

The interaction coefficients between dummy and the corresponding variables show the magnitude of the differences of the corresponding variable effect on portfolio return under two different economic conditions. Model II is run for each variable in isolation and all variables together.

V. RESULTS and DISCUSSIONS

Table 1 presents the ordinary least squares (OLS) estimation results from model I over the full sample periods. The inferences on the roles of the three variables are consistent with the three-factor CAPM. The regression coefficients of beta and \( \ln(BM) \) have a positive and significant relationship with portfolio returns, while \( \ln(ME) \) coefficient is negative and significant as expected. All of the three variables are significant whether they are run together or individually. Thus, the three-factor CAPM holds in this case.

Table 2 presents the OLS estimation results from model I when the data are split into stable and unstable economic conditions. The results show substantial differences in the coefficient estimates across two different economic conditions. The signs and significance of the coefficient estimates are consistent under both isolation and full models. Beta has a positive and stronger relation under unstable condition. ME has a negative relation under stable condition but it has a positive relation under unstable condition. BM has a positive and stronger relation under stable condition. Overall, the
three risk premium variables behave differently under stable and unstable conditions. This result supports H1, that is, the economic conditions (stable and unstable) influence the relationships of beta, ME, and BM with portfolio returns.

Under stable condition, in both isolation or full model, beta has no significant relation, ME has a negative and significant relation, and BM has a positive and significant relation with portfolio return. Except beta, ME and BM have a relation consistent with three-factor CAPM. ME and BM seem to dominate in explaining the cross-sectional variation in portfolio returns. Under unstable condition, beta has a positive and significant relation, ME has positive and significant relation, and BM has positive and significant relation with portfolio returns. Except ME, beta and BM have a relation consistent with three-factor CAPM.

Table 3 provides statistical evidence on the differences in the slope estimates. In isolation, the interaction terms of D*beta and D*ln(ME) confirm the results shown in Table 2. Beta has a weaker relation under stable condition, and ME coefficient is significantly lower under stable condition. However, the interaction term of D*lnBM does not confirm the differences shown in Table 2.

The full model shows that all three variables (beta, ME, and BM) are significantly related to stock returns. However, the interaction terms of the full model show different results, none of them are significant. The inconsistent results may be due to existence of multicollinearity between interaction terms. Multiple steps of full model regressions has to be done to avoid the multicollinearity between interaction terms. All the reported coefficient estimates correspond to the variable that is the latest entered in the model. Thus, there is a great possibility that the interaction term would no longer be significant. The full model with interaction terms may not be the best model in this case. Consequently, the magnitudes of the differences cannot be statistically tested even though through observations from Table 2, there is an indication of
differences. Therefore, the results of this study confirm that the relation of beta, ME, and BM with portfolio returns are different under stable and unstable economic conditions but the magnitudes of the differences cannot be observed.

Table 4 presents the OLS estimation results from model I when the data are split into expansive and restrictive economic conditions. The signs and significance of the coefficient estimates are consistent under isolation or full model. Unlike the results presented under stable and unstable economic conditions, the regressions of the sample separated using expansive and restrictive economic conditions do not show substantial differences in the coefficient estimates. In isolation, in both condition beta has no significant relation, ME has a negative relation, and BM has a positive relation with portfolio returns. The similar relations hold in the full model under both conditions.

Some points are worth to note that, firstly, the three-factor CAPM more strongly hold in the restrictive condition, that all the three variables have relations and signs as predicted by the three-factor CAPM. Secondly, under restrictive economic condition, variables ME and BM seem to dominate in explaining the variation of portfolio returns.

Table 5 provides statistical evidence on the differences in the slope estimates. However, the results shown in Table 5 are inconsistent with those of shown in Table 4. The results of the regression for the interaction term of each variable under isolation do not conform with the results presented in Table 4. The same problem found for the regression under the full model that a multicollinearity exists between interaction terms. Multiple steps of full model regressions has to be done to avoid the multicollinearity between interaction terms. All the reported coefficient estimates correspond to the variable that is the latest entered in the model. The full model shows that all three variables (beta, ME, and BM) are significantly related to stock returns, but none of the interaction terms is significant. Therefore, the results of this study cannot provide a
sufficient evidence to support H2, that is, the economic conditions (expansive and restrictive) influence the relationships of beta, ME, and BM with portfolio returns.

Of the results, it is shown that the proposed economic state variable that can separate the economic condition into expansive and restrictive conditions, cannot robustly be used to identify the time varying risk premium of the three-factor CAPM. However, the time varying of risk premiums attached in three-factor CAPM is indicated by the regression results using stable and unstable economic condition separation. Fama’s and French’s (1995) claim that ME and BM variables in three-factor CAPM can capture the economic state variables may not be true. Thus, the search of the state variables for inter-temporal CAPM has not come to an end.

VI. CONCLUSIONS and LIMITATIONS
This study re-examine the relations between the cross-section returns and three-factor CAPM - beta, size, and book-to-market equity. The test result using the full sample confirms that the three-factor CAPM holds in this case. In fact, the primary interest of this study is to link the three-factor CAPM with the dynamic feature of inter-temporal CAPM. The risk premiums associated with the three-factor CAPM are observed, whether they behave differently under different economic conditions.

The use of common ex-post economic condition for separating the sample into two different conditions enable us to observe different behavior of the risk premiums associated with the three-factor CAPM. The use of Indonesian data from the periods of 1991 to 2001 make the partition of the sample into two different economic conditions possible, namely, stable condition from the periods 1991 to 1997 and unstable conditions from the rest of the periods. The result indicates that the risk premiums associated with the three-factor CAPM do vary in stable and unstable economic conditions, but the magnitudes cannot be observed in this study due to some statistical problems. Thus, Fama’ and French’ (1995) claim that the ME and BM variables can capture the macro economic state variables may not be true in this case.

The economic state variable, the growth of change in money supply, proposed in this study fails to capture the time varying risk premiums attached in three-factor CAPM. However, the ex-post economic state variable used in this study, stable and
unstable economic conditions, can capture the time varying risk premiums represented by the differences in relation of beta, ME, and BM with the cross-sectional variation in portfolio returns under stable and unstable economic conditions. Thus, the search of the state economic variables that ties the time varying risk premiums attached in three-factor CAPM and Merton’s (1973) inter-temporal CAPM is worth to continue for future studies. Overall, the evidence supports the link between three factor CAPM and inter-temporal CAPM. A simple ex-ante measure of state variable should be found to capture inter-temporal variation in expected stock returns.
REFERENCES


Table 1

<table>
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<tr>
<th></th>
<th>Beta</th>
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<td></td>
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* Significance at alpha level of 10%
** Significance at alpha level of 5%
*** Significance at alpha level of 1%

Note: Slope estimates and t-statistics are presented from ordinary least squares estimation using pooled cross-sectional, time-series data on 8 Beta:ME:BM-sorted portfolios over 120 months (923 observations in each regression). The dependent variable is the equally weighted monthly portfolio return, and the independent variables are the post-ranking portfolio beta, the portfolio ln(ME), and the portfolio ln(BM).
Table 2

<table>
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* Significance at alpha level of 10%
** Significance at alpha level of 5%
*** Significance at alpha level of 1%

Note: Slope estimates and t-statistics are presented from ordinary least squares estimation using pooled cross-sectional, time-series data on 8 Beta:ME:BM-sorted portfolios over 511 monthly observations of unstable economic condition, and separately over all 412 monthly observations of unstable economic condition.
Table 3

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* Significance at alpha level of 10%
** Significance at alpha level of 5%
*** Significance at alpha level of 1%

Note: Slope estimates and t-statistics are presented from ordinary least squares estimation using pooled cross-sectional, time-series data on 8 Beta:ME:BM-sorted portfolios over 120 months (i.e. n=923 observations in each regression). The dependent variable is the equally weighted monthly portfolio return, and the independent variables are the post-ranking portfolio beta, the portfolio ln(ME), the portfolio ln(BM) a stable versus unstable economic condition dummy that takes a value of 1 (0) in stable (unstable) economic condition, and interaction term.
Table 4

<table>
<thead>
<tr>
<th></th>
<th>Expansive Condition</th>
<th></th>
<th>Restricted Condition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta (1)</td>
<td>ln(ME) (2)</td>
<td>ln(BM) (3)</td>
<td>Beta (4)</td>
</tr>
<tr>
<td>(1)</td>
<td>0.059</td>
<td></td>
<td></td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td>(1.372)</td>
<td></td>
<td></td>
<td>(1.630)</td>
</tr>
<tr>
<td>(2)</td>
<td>-0.071</td>
<td>(1.658) *</td>
<td></td>
<td>-0.118</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td>0.146</td>
<td></td>
<td>0.157</td>
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<tr>
<td></td>
<td></td>
<td>(3.427) ***</td>
<td></td>
<td>(3.162) ***</td>
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<tr>
<td>(4)</td>
<td>0.070</td>
<td>-0.048</td>
<td>0.144</td>
<td>0.093</td>
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<tr>
<td></td>
<td>(1.611)</td>
<td>(-1.093)</td>
<td>(3.267) ***</td>
<td>(1.871) *</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(-2.203) **</td>
</tr>
</tbody>
</table>

* Significance at alpha level of 10%
** Significance at alpha level of 5%
*** Significance at alpha level of 1%

Note: Slope estimates and t-statistics are presented from ordinary least squares estimation using pooled cross-sectional, time-series data on 8 Beta:ME:BM-sorted portfolios over 529 monthly observations of expansive economic condition, and separately over all 394 monthly observations of restrictive economic condition.
### Table 5

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>D*Beta</th>
<th>ln(ME)</th>
<th>D*ln(ME)</th>
<th>ln(BM)</th>
<th>D*ln(BM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.084</td>
<td>-0.062</td>
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<tr>
<td></td>
<td>(2.582)</td>
<td>**</td>
<td>(-1.926)</td>
<td>*</td>
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<tr>
<td>(2)</td>
<td></td>
<td>-0.075</td>
<td>-0.065</td>
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<tr>
<td></td>
<td></td>
<td>(-2.301)</td>
<td></td>
<td>(-1.973)</td>
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<tr>
<td>(3)</td>
<td>0.090</td>
<td>-0.004</td>
<td>-0.072</td>
<td>0.001</td>
<td>0.117</td>
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<tr>
<td></td>
<td>(2.743)</td>
<td>***</td>
<td>(-0.121)</td>
<td></td>
<td>(3.407)</td>
<td>***</td>
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<tr>
<td></td>
<td></td>
<td>(-2.187)</td>
<td>**</td>
<td>(0.016)</td>
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<td>(-0.173)</td>
</tr>
</tbody>
</table>

* Significance at alpha level of 10%
** Significance at alpha level of 5%
*** Significance at alpha level of 1%

Note: Slope estimates and t-statistics are presented from ordinary least squares estimation using pooled cross-sectional, time-series data on 8 Beta:ME:BM-sorted portfolios over 120 months (i.e. n=923 observations in each regression). The dependent variable is the equally weighted monthly portfolio return, and the independent variables are the post-ranking portfolio beta, the portfolio ln(ME), the portfolio ln(BM) an expansive versus restrictive economic condition dummy that takes a value of 1 (0) in expansive (restrictive) economic condition, and interaction term.