Anomalies and Liquidity

- <u>Anomalies (relative to the CAPM):</u>

- Small cap firms have higher average returns than predicted by the CAPM

- High E/P (low P/E) stocks have higher average returns than predicted by the CAPM (i.e., risk-adjusted)

- Arguably, these findings are what motivated Fama & French to develop their three factor model, except they use book/market (B/M) instead of E/P to define "value" stocks

Why Do Small Cap Stocks Out-perform?

- It is not the idea that these stocks are less followed by analysts (which is true), because the evidence says that all small cap stocks out-perform, not just the ones that look good to financial analysts
  - i.e., all you need to know to form your portfolio is the equity capitalization (price times shares outstanding), which is information that does not change fast, nor is it hard to obtain

- One thing that is true is that small cap stocks are less liquid than large cap stocks
  - i.e., the costs of trading are higher

Liquidity and Asset Pricing
Amihud & Mendelson *JFE* (1986)

- Investors are only concerned about end-of-period wealth

  – Some assets have higher transaction costs (lower liquidity)

  – So gross returns have to increase to provide equal net returns to investors

- Investors who have longer expected holding periods can afford to hold assets with higher transaction costs (because you only pay them when you trade)

  – They are the clientele for these assets

Liquidity and Asset Pricing
Amihud & Mendelson *JFE* (1986)

- Using portfolios of NYSE stocks from 1960-79 (which are generally all pretty liquid), they find that both beta and spread are important in explain average returns, but size is not

- $R(p) = .0082 + .006 \, b(p) + .158 \, S(p) + .0006 \, \ln(SIZE(p))$
  $\qquad\qquad (5.05) \qquad\quad (3.44) \qquad\qquad (1.56)$

Where b(p) is the portfolio's beta, S(p) is the portfolio's average percentage bid-ask spread, and SIZE(p) is the portfolios average equity capitalization

Liquidity and Asset Pricing: Implications

- Liquidity is an important non-risk dimension of asset pricing
  - Particularly important for many kinds of assets that are not standardized and traded on organized markets
    - E.g., commercial real estate, private equity, venture capital, human capital

- Higher expected returns for less liquid assets imply that the asset prices are lower than they would otherwise be
  - Implies that there may be corporate actions that would increase the value of the stock by making it more liquid
  - Perhaps explains the efforts of companies to encourage security analysts to follow their stock
  - Bear the costs of listing stock on exchanges, having ADRs traded in other countries, etc.

Liquidity and Asset Pricing: Implications

- **What kinds of investors are most likely to have a higher tolerance for illiquidity?**

    - Foundations and endowments presumably have infinite (or at least very long) horizons
        - Most big foundations and endowments have substantial investments in venture capital, private equity, and other kinds of "alternative" investments

    - Some hedge funds restrict how quickly investors can withdraw money from the fund
        - This allows the funds to invest in some positions that would be costly to unwind quickly
        - Many hedge funds that have had well-publicized problems in the past (e.g., Long-term Capital Management) failed because of illiquidity
            - The investors that inherited the assets of LTCM made substantial profits when the positions were finally unwound

Why Do Value Stocks Out-perform?

Simple valuation model for constant growth of future cash flows (earnings):

$$P(t) = E(t) / [R - g]$$

Where $P(t)$ and $E(t)$ are the current stock price and earnings (cash flow), R is the risk-adjusted discount rate, and g is the growth rate of future cash flows, implies:

$$E(t)/ P(t) = [R - g]$$

So E/P is high if expected returns are high relative to future growth rates of cash flows

- So E/P ratios provide an alternative model for expected returns

$$R = g + E(t)/ P(t)$$

Why Do Value Stocks Out-perform?

Fama and French also identify value stocks as having higher "distress" risk

- Which is the reason that B/M is high

- i.e., the market price of the stock is depressed relative to the book value because investors are concerned about future bad possibilities

Fama-French Questions

- Is this a new asset pricing model, or just formalizing the size and value anomalies we knew about before?

- Are the premiums for size and value risk (which are quite large) plausible?

- Or, are the strong results due to a subtle form of data-mining?

Performance Evaluation

- The market model regression in excess returns form (subtracting the risk-free interest rate from the asset return being studied) essentially uses the CAPM as the benchmark, so the intercept a(i) measures the average excess return (compared with the prediction of the CAPM):

$$[R(it) - R(ft)] = a(i) + b(i) [R(mt)-R(ft)] + e(it)$$

- If you want to use the F-F 3-factor model, just use SMB and HML as additional variables in the regression model

The Size Effect Before and After DFA Began Offering Its Small Cap Fund

	a(i)	t(a(i))	b(i)	t(b(i))	Rsq	S(e(i))
SMB						
1926-85	0.00151	1.327	0.203	10.406	0.131	0.030
1986-95	-0.00249	-1.133	0.093	1.862	0.020	0.024
1996-2005	0.00185	0.460	0.163	1.906	0.022	0.044
2006-16	0.00002	0.009	0.195	4.535	0.130	0.021

	a(i)	t(a(i))	b(i)	t(b(i)-1)	Rsq	S(e(i))
DFSCX						
1986-2017	-0.002	-0.810	1.057	1.361	0.629	0.036
1986-1995	-0.008	-2.217	0.913	-1.087	0.522	0.038
1996-2005	0.004	1.013	1.027	0.317	0.546	0.044
2006-17	-0.001	-0.536	1.222	4.862	0.843	0.023

Several Things to Note

- DFA funds are long-only, whereas the Fama-French factors are long-short hedge portfolios

    - So the DFA funds have market "betas" that are much larger than the hedge portfolios

        - they effectively measure the difference in beta for a small cap portfolio minus the beta of a large cap portfolio

- Neither the DFA small cap portfolio nor SMB seem to have significant risk-adjusted returns (measured by a(i))

The Value Effect Before and After DFA Began Offering Its Small Cap/Value Fund

	a(i)	t(a(i))	b(i)	t(b(i))	Rsq	S(e(i))
HML						
1963-92	0.00548	4.324	-0.203	-7.259	0.126	0.024
1993-2005	0.00747	3.063	-0.371	-6.514	0.211	0.030
2006-16	-0.00102	-0.450	0.194	3.765	0.091	0.026

DFSVX	a(i)	t(a(i))	b(i)	t(b(i)-1)	Rsq	S(e(i))
1993-2017	0.002	1.131	1.085	2.070	0.710	0.030
1996-2005	0.006	1.856	0.884	-1.705	0.585	0.035
2006-2017	-0.002	-0.775	1.318	6.599	0.849	0.024

Several Things to Note

- The HML portfolio earns about .5 to .7 percent per month higher returns than would be predicted by the CAPM (since a(i) is .05 from 1963-92 and .07 from 1993-2005

- The DFA portfolio did fairly well (compared with the CAPM) from 1993-2005, but the performance of value stocks since 2005 has been below what would be predicted by the CAPM

- Could be that the increase in interest in value strategies caused prices for those stocks to rise (and lowered future returns)?

Return to BRN 481 Home Page

Data used for these slides can be accessed at:

http:\\schwert.ssb.rochester.edu\brn481\brn481DFA.xlsx

http:\\schwert.ssb.rochester.edu\brn481\brn481DFA.zip

Home Page:

http:\\schwert.ssb.rochester.edu\brn481\