Program Report

Asset Pricing

John Y. Campbell*

Asset pricing — the study of markets for financial assets including stocks, bonds, foreign currencies, and derivatives — is a field in which there is an intense and fruitful interaction between empirical and theoretical research. The work of economists associated with the NBER Asset Pricing Program illustrates this interaction particularly well. NBER economists have been studying many different phenomena, including the high rewards that investors have received for holding stocks in general and "value stocks" in particular, the apparent predictability of stock and bond returns at long horizons, and unusual patterns in option prices. In each area, empirical puzzles have stimulated new thinking about investor behavior and the functioning of capital markets.

Financial markets are, of course, changing rapidly. NBER economists have been following these developments, and in some cases have tried to anticipate or influence them. There has been much research on international capital markets and the opportunities they present for risk-sharing across countries; other work has discussed new types of securities, including inflation-indexed bonds, which were issued for the first time by the U.S. Treasury in January 1997.

Cross-Sectional Patterns in Stock Returns

Historically, investors have received handsome rewards for bearing the risk of investments in equity markets. Economists have found it difficult to rationalize the size of this "equity premium".

Recent research on individual U.S. stocks has uncovered facts that make this puzzle even more challenging. First, the average excess returns on value stocks — stocks whose prices are low relative to their book values, earnings,

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or dividends — are even higher than the average excess returns on stocks in general. Second, there seems to be a "momentum effect": stocks that have outperformed the market during the last few months tend to outperform the market during subsequent months.

There is an active debate about how to interpret these phenomena. Eugene Fama and Kenneth French have proposed that value stocks deliver higher average returns because they are riskier. Other NBER economists have challenged this view. Craig MacKinlay argues that it requires an implausibly high reward for bearing risk, while Rafael La Porta, Josef Lakonishok, Andrei Shleifer, and Robert Vishny suggest that investors underprice value stocks because they are too pessimistic about the earnings of these companies. They show that as much as one third of the excess return on value stocks occurs in the few days around earnings announcements, suggesting that investors are on average favorably surprised by the earnings of value stocks. Louis Chan, Narasimhan Jegadeesh, and Lakonishok document a similar tendency for the excess return on momentum stocks to occur near earnings announcements, suggesting that for these stocks also investors tend to have incorrect earnings expectations.

Nicholas Barberis, Shleifer, and Vishny have built an explicit model of investors' irrational expectations that can generate excess returns on both momentum stocks and value stocks. In their model, earnings growth cannot be forecast, so the best forecast of future earnings is just the current level of earnings. Investors normally expect earnings to revert to some long-run average level, which leads them to underprice stocks that have experienced recent earnings growth (momentum stocks). A series of positive or nega-
tive earnings surprises, however, can lead investors to expect continued positive or negative earnings growth; this leads them to underprice stocks that have performed extremely badly (value stocks). 6

**Time-Variation in the Reward for Risk**

Financial ratios of stock prices to book values, earnings, or dividends also are used in time-series studies of the stock market as a whole. These ratios, along with other variables including yield spreads between long- and short-term or between low- and high-quality bonds, have some ability to forecast aggregate stock and bond returns. 7

Shmuel Kandel and Robert Stambaugh have explored the implications of this evidence for optimal portfolio choice. Using a Bayesian framework to allow for uncertainty about the degree of predictability in returns, they show that an investor with constant risk aversion and a short investment horizon should try to “time the market,” adjusting the portfolio share in stocks in response to changes in the financial ratios that predict returns. In a similar spirit, Luis Viceira and I have derived the optimal market-timing portfolio strategy for an investor with constant risk aversion and a long horizon. 8

This work takes predictable variation in returns as given. Other NBER research asks where that variation comes from, and whether it can persist in the face of market-timing responses by investors. John Cochrane and I, building on the work of George Constantinides, have argued that typical investors do not have a constant aversion to risk; instead their risk aversion tends to fall when the economy is strong, because they judge their well-being by reference to recent standards of living and feel more comfortable taking risks when their consumption is well above recent average levels. This “habit-formation” model implies that investors do not try to profit from predictable variation in returns because it is during periods of unusually low stock returns that investors are unusually willing to take on risk. 9 Jiang Wang has explored the possibility that different investors have different levels of risk aversion; when they trade with one another, the equilibrium reward for bearing risk can vary over time. 10

Shleifer and Vishny have pointed out that even when there is no equilibrium justification for time-variation in stock returns, so that the time-variation represents mispricing of stocks, it may be difficult for rational speculators to trade aggressively enough to eliminate the mispricing. This is particularly true when an initial pricing error increases; then rational speculators who have bet on a correction of the error lose money and are forced to the sidelines. Thus stabilizing speculation tends to be weakest precisely when mispricing is most severe. 11

In a study of the foreign exchange market, Blake LeBaron has shown that intervention by monetary authorities is one possible source of mispricing. He finds that technical trading rules produce profits only in periods of intervention, when monetary authorities are trading to influence exchange rates and are willing to lose money in pursuit of their objectives. 12

**Option Prices, Changing Volatility, and Market Microstructure**

Option markets offer economists a fascinating look at investors’ expectations. By combining different options on a given underlying security, it is possible to construct a derivative security that pays off only if the underlying price is in a particular narrow range: for example, only if the S&P 500 index is between 800 and 801 on a particular date in the future. Thus option prices can reveal the probabilities (adjusted for risk) that investors place on each possible level of the S&P 500 index.

Yacine Ait-Sahalia and Andrew Lo have developed a nonparametric econometric method for estimating risk-adjusted probabilities. They show that recent prices for S&P 500 index options imply high risk-adjusted probabilities of a large decline in the S&P 500 index. 13 David Bates has compared two possible explanations for this finding. Investors could anticipate that a decline in stock prices would increase volatility, so that over several months a large decline in the market is more likely than an equally large increase; or they could fear a “crash,” an instantaneous large drop in the market. Because the risk-adjusted probabilities of a large decline in the index are high even for very short-term options, Bates concludes that investors do indeed fear a stock market crash. 14

Other researchers have studied changing volatility, a pervasive phenomenon in stock and bond markets that shifts the risk-adjusted probability distributions implied by option prices. Torben Andersen and Tim Bollerslev have argued that volatility follows a complex time-series process; there are short-lived bursts of volatility within the trading day, but there are also highly persistent movements in volatility that affect asset markets for several months. 15 Robert Engle and Joshua Rosenberg, and Bernard Dumas, Jeff Fleming, and Robert Whaley, have shown how models of changing volatility can be used to explain the behavior of option prices. 16

Studies of volatility within the trading day lead naturally to a new fron-
tier in financial economics, the study of transaction-level data. In recent years, data have become available on all trades and quotes for listed and some over-the-counter U.S. stocks. These data are stimulating the development of new econometric methods, and they make it possible to study the properties of alternative systems for trading stocks and other assets. A new "Market Microstructure Research Group" will meet for the first time at the 1997 NBER Summer Institute to provide a forum for empirical research in this area.

**Diversification, Risk-Sharing, and New Financial Markets**

A striking fact about international financial markets is that investors tend to concentrate heavily in the stocks and bonds of their own country. This "home bias" is diminishing only slowly, and it is costly because investors give up the opportunity to diversify internationally.

One factor that may contribute to home bias is that investors are better informed about assets in their own country than about foreign assets. Consistent with this explanation, Junko Kang and René Stulz have shown that foreign investors in Japan tend to concentrate in large stocks, which presumably are better known overseas; while Jeffrey Frankel and Sergio Schmukler have shown that Mexican stock prices declined more rapidly in the peso crisis of December 1994 than did prices of Mexican closed-end funds traded in the United States, suggesting that Mexican investors were better-informed than U.S. investors.

In a series of papers, Robert Shiller has argued that unexploited opportunities for diversification justify the establishment of new financial markets. Shiller and Stefano Athanassoula, Shiller and Ryan Schneider, and Shiller and Allan Weiss have proposed securities that could be used to trade international income risk, occupational income risk, and real estate price risk, respectively.

While these markets do not yet exist, the U.S. Treasury has recently created a potentially important new market by issuing inflation-indexed bonds. Shiller and I have summarized the arguments that many economists have made in favor of indexing bonds and other contracts to inflation, while David Barr and I have studied the U.K. experience with inflation-indexed bonds. Niko Canner, N. Gregory Mankiw, and David Weil have criticized the conventional wisdom that conservative investors should hold bonds rather than stocks; they point out that nominal bonds are risky in real terms. Inflation-indexed bonds offer stable real returns and thus should appeal to conservative investors with long horizons.

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Research Summaries

Economic Analysis of Law

Lucian A. Bebchuk*

My general interest is in using economics to analyze the effects of legal rules and institutions. In this article, I describe my current and recent work in the economics of four areas in which legal rules and institutions play a major role: corporate control and structure, bankruptcy, contracts, and litigation and settlement.

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Corporate Control and Structure

While much of my earlier work in corporate control focused on takeover bids for companies with dispersed shareholders, my more recent research has focused on companies in which there is a controlling shareholder. — In many public companies — both in the United States and (even more so) in other countries — a significant number of shares are concentrated in the hands of a controlling shareholder.1

One part of my research has focused on the decisions of controllers about selling their control blocks. In a recent article, I have shown that such decisions often might be distorted. The efficiency costs produced by these distortions should be regarded as arising from having a controlling shareholder structure.

A central feature of the model of control transfers that I have developed is that controllers may differ from each other in two respects: their ability to manage and produce value; and their ability to capture private benefits of control. My analysis shows that, under the existing regime in the United States, inefficient transfers may take place; this will happen when the potential new controller...