The Demand for Capital Market Returns: A New Equilibrium Theory

Investors demand more of an asset, the more desirable the asset’s characteristics. The most important characteristic is its price, or expected return. By varying price, any and all assets become desirable enough for the capital market to clear.

Asset characteristics other than price include both risk and non-risk characteristics. The Capital Asset Pricing Model and Arbitrage Pricing Theory have described the risk characteristics. The non-risk characteristics are not as well understood. They include taxation, marketability and information costs. For many assets, these non-risk characteristics affect price, or expected return, even more than the risk characteristics.

Investors regard asset characteristics as positive or negative costs, and investors evaluate expected returns net of these costs. The New Equilibrium Theory (NET) framework applies to all assets—including stocks and bonds, real estate, venture capital, durables and intangibles such as human capital—and incorporates all asset characteristics.

Prices in capital markets are set by the interaction of demand and supply. This relationship is commonly expressed in terms of the “supply of and demand for capital.” But viewing it from the opposite perspective—that is, in terms of the demand for and supply of capital market returns—has the advantage of focusing our attention on returns as the goods being priced in the marketplace. This article provides a framework for analyzing the demand for capital market returns, which we define as the compensation each investor requires for holding assets with various characteristics. A companion article will consider the supply of returns generated by the productivity of businesses in the real economy, outside the capital market.  

The basics of the demand for capital market returns can be explained in a few sentences. Investors regard each asset as a bundle of characteristics for which they have various preferences and aversions. Investors translate each characteristic into a cost, and require compensation in the form of expected returns for bearing these costs. Thus, although all investors are assumed to perceive the same before-cost expected return for any given asset, each has individually determined costs he must pay to hold that asset. On the basis of perceived expected returns net of these individually determined costs, investors choose to hold differing amounts of each asset. The cost of capital for an asset is the aggregation of all investors’ capital costs on the margin, and represents the market expected return on the asset.

Formal demand-side theories such as the Capital Asset Pricing Model (CAPM) and Arbi-

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trage Pricing Theory (APT) have prescribed useful mathematical formulations for deriving assets' expected returns. Both these theories, however, assume perfect capital markets in which all costs are due specifically to risk. The CAPM specifies the payoff demanded by investors for bearing one cost—beta, or market, risk; APT treats multiple risk factors. Other research has addressed non-risk factors, but in isolation.

Our framework, which we term New Equilibrium Theory (NET), integrates costs arising from all sources—including various risks, as well as taxability, marketability and information costs—and affecting all assets in an investor's opportunity set—stocks, bonds, real estate, human capital, venture capital, tangibles and intangibles. NET theory does not provide a detailed analysis of each particular cost, nor does it specify a mathematical asset pricing equation. The NET model is useful, however, in explaining observed investor behavior.

**The New Equilibrium Theory**

The objective of the NET framework is to determine the equilibrium cost of capital, \( r_j \), for each asset \( j \) in the market, given the characteristics of asset \( j \) and the utility functions of all the investors in the market. Conceptually, the cost of capital is the sum of all capital costs at the margin across all holders of all claims on asset \( j \); it is typically expressed as a per year percentage of value. This cost of capital can also be interpreted as an expected return to investors or as a discount rate used in valuation.

Unlike most models in finance, which deal specifically with time and uncertainty, the NET model makes use of the simpler, classical instantaneous supply and demand setting. The instantaneous setting incorporates perceived uncertainties, investment horizon, taxation, entry and exit costs, and other factors that affect an investor's perception of an asset's cost, as decrements to the present value of the asset. The instantaneous setting is suitable as long as all costs can be expressed as present values.\(^3\)

**The Supply of Assets**

Investors view all assets as bundles of characteristics. The NET framework, in its most general form, makes no assertion that there are complete markets for each characteristic. There is not necessarily a separate market for each characteristic, nor any way that an investor could construct his \( a \) \( priori \) optimum bundle of characteristics, even if there were \( shadow \) prices for these characteristics. Thus pricing characteristics are translated and aggregated into investor costs at the individual investor level for each asset. It is the asset, rather than each of its characteristics, that is being priced by the market.\(^4\)

NET assumes the existence of a characteristic-free asset, analogous to the risk-free asset in other models, earning the pure time value of money. Investors can invest in, or lend out, unlimited quantities of this asset at the market rate, \( r_f \). Investors are restricted in their borrowing, however, by the inclusion of an investor-specific borrowing cost function, \( c_f, \) which rises as the amount borrowed increases. Thus investors are divided into lenders and borrowers, with the net quantity of the characteristic-free asset assumed equal to zero in the economy.\(^5\)

Borrowing costs are paid to intermediaries to cover their various costs.

Although the NET framework technically allows short selling, the cost of shorting a specific asset is ordinarily too high to make short selling worthwhile. Short selling is thus restricted to the characteristic-free asset, and even this borrowing is limited by increasing costs. The assumption of a characteristic-free return, \( r_f \), provides a homogeneous benchmark for all investors, while the assumption that it is (increasingly) costly to short the characteristic-free asset restricts the market impact of low-wealth investors who might otherwise borrow in infinite quantities.

**The Investor Demand for Assets**

To focus on the composite market's cost of capital for asset \( j \), we assume that investors have homogeneous expectations concerning \( r_j \), the asset's expected return before investors' costs, as well as \( r_f \), the rate of return on the characteristic-free asset.\(^6\) Our second key assumption is that investors have heterogeneous, or individually determined, costs associated with the holding of asset \( j \). These differing costs are a natural consequence of the fact that investors differ in regard to wealth, risk aversion, access to information, tax bracket and numerous other traits. The individual investor may evaluate an asset's characteristics according to his own classification scheme, and he may measure an asset's characteristics according to his own judgment. Thus each investor will have his own particular utility function, according to
Figure A  INDIVIDUAL
Supply ($s_i$) and Demand ($d_{ij}$) for an Asset ($j$) as seen by the Individual ($i$)
Given the Homogeneous Before-Cost Expected Return ($r_j$)

which he translates all asset characteristics, including all risks, into costs.7

The costs associated with holding each incremental unit of asset $j$ may fall at first because of economies of scale in information, transaction or other costs. At some point, however, the costs of holding additional units of asset $j$ will begin to rise. The major cause of this rise is the increasing lack of diversification in the investor's portfolio.

A Graphical Description of NET Equilibrium

Figure A diagrams the individual's demand and supply equilibrium. The expected return on asset $j$, viewed homogeneously by all investors, is denoted by the horizontal line $r_j$. The expected return on the characteristic-free asset is the horizontal line $r_f$. The latter also represents an opportunity cost curve, $c_f$, in this context. The cost to investor $i$ of holding asset $j$ will be the sum of this opportunity cost plus all the other costs he associates with holding the asset, $c_{ij}$.8 This sum, $c_f + c_{ij}$, equals the individual's demand curve, $d_{ij}$, which is upward sloping because it is presented in return-quantity space.9 The investor stops buying the asset when his marginal costs rise to equal the return on asset $j$, $r_j$. Thus the before-cost expected return, $r_j$, serves as the individual supply curve, $s_j$.

Alternatively, we can view the investor as demanding a return net of his costs, $r_j - c_{ij}$. This return net of costs may also be labeled investor surplus, analogous to the consumer surplus in the classical economic framework. The investor purchases asset $j$ until his return net of costs equals the return on the characteristic-free asset, $r_f$, that is, he invests in asset $j$ until $r_j$ minus $c_{ij}$ equals $r_f$.

The individual investor demand curve from
Figure B  MARKET
Aggregation of Individual Demand Curves (d_{ij}) to form Market Demand Curve (D_j)
and Determine Asset Price and Return (r_j)

Figure A, d_{ij}, is also displayed in Figure B. Here, individual demand curves, d_{ij}, are summed horizontally to form the aggregate demand curve for security j, D_j. The aggregate supply of shares of security j is perfectly inelastic, and is represented by the vertical line, S_j (= Q_j). The intersection of D_j and S_j forms the market return, r_j. This return is the same as the individual supply curve, r_j, shown in Figure A.

Figure C restates Figure B in conventional price-quantity (rather than return-quantity) space. In Figure C, both the individual (d_{ij}) and aggregate (D_j) demand curves for asset j are downward sloping. As in Figure B, the supply curve (S_j) for asset j is vertical. The market price (P_j) and individual and aggregate quantities of asset j demanded (q_{ij} and Q_j, respectively) are determined by the intersection of the supply and demand curves.

Figure D shows what happens when the individual investor is offered the opportunity either to invest in (lend) or short (borrow) the characteristic-free asset. If he lends, he gets the homogeneous return, r_f, offered to all investors. If he borrows, he pays heterogeneous borrowing costs, c_{ij}, and consequently borrows at rate r_f + c_{ij}. The individual investor’s wealth constraint, and the continuously rising cost functions depicted in Figures A and D, require that the investor either borrow or lend, which avoids any corner solutions. The investor borrows his optimum quantity of the characteristic-free asset; the cost of borrowing is included in his asset costs in Figure A, so that c_{ij} includes a constant c_{ij} for each asset j.

Figure E depicts the aggregate demand curve for the characteristic-free asset, D_f. This aggregate demand curve is the horizontal sum of
individual demand curves, \( d_{ij} \). The net supply curve for the characteristic-free asset is zero, and is depicted as \( S_f \) at a quantity \( Q_f \) of zero. The characteristic-free asset earns rate \( r_f \) in equilibrium, where the demand curve, \( D_f \), intersects with the supply curve, \( S_f \).

Each investor holds a different portfolio, based on his own particular heterogeneous costs. Nevertheless, each investor is relatively diversified, because he has calculated diversifiable risk as one of his costs. By holding a positive, zero or negative position, each investor’s marginal cost equals his return for every asset in the market. This means that each investor would change his position in an asset in response to any change in the asset price—i.e., before-cost expected return on the asset—or in response to any change in the aggregate costs he incurs by holding that asset. For a given asset, all investors have equal costs on the margin, constituting the cost of capital for each investor and for the market.\(^{11}\) Prices are thus set in aggregate by all investors. In sum, both investors and issuers treat the asset characteristics as marginal investor costs that, in the aggregate, sum to the cost of capital.

**The Role of Financial Intermediaries**

The NET framework can readily be expanded to include repackaging opportunities on the part of issuing firms or financial intermediaries. The role of the financial intermediary is to repackage the pricing characteristics so as to reduce investor costs. One way intermediaries accomplish their task is by making the markets for pricing characteristics more complete. By unbundling asset characteristics, for example, they increase the likelihood that those investors
with lower costs for a particular characteristic will hold that characteristic in their portfolios. Another way intermediaries reduce investor costs is by optimal bundling of asset characteristics to take advantage of economies of scale.

Investors perceive financial intermediaries as additional asset offerings, whereas issuers perceive them as additional investors. Assuming perfect competition, intermediaries act to maximize aggregate investor surplus by minimizing the sum of all investor costs (not just marginal costs) across all assets for all the pricing characteristics.

**The Pricing Characteristics of Assets**
We have developed a framework in which investors view assets as bundles of characteristics that investors then translate into their own heterogeneous costs. Thus far, these pricing characteristics—those attributes of an asset that affect an investor’s *ex ante* costs—have remained in the background. As the opportunity set of investor assets is worldwide in scope and includes stocks, bonds, real estate, human capital, venture capital, tangible and intangible goods, we may expect a wide range of pricing characteristics to exist. We delineate below some of the more important pricing characteristics, and suggest informally how they are bundled into familiar assets, how they might be priced, who their investor clienteles are likely to be, and how financial intermediaries might reduce their costs. We consider both risk and non-risk characteristics, the latter including taxation, marketability and miscellaneous pricing factors.

**Risk Characteristics**
The CAPM states that only one risk pricing characteristic exists—namely, market risk. APT provides for multiple risk pricing characteristics, and treats each risk as orthogonal to all of the others, so that the market payoffs are additive. The NET framework does not directly take sides in this controversy, but does allow for multiple pricing characteristics. We focus here on four of the most intuitive types of risk—beta (market), inflation, real interest rate and residual risk.

*Market, or beta, risk* is the risk that the return of an asset will fluctuate with the market portfolio.
According to CAPM, beta risk is the only risk that affects expected return. It is assumed that the rational investor will diversify away (at no cost) all other risks. In the NET framework, as noted, each investor translates risks into costs by assigning a price at which he is indifferent between buying and not buying more of the risk.

Inflation risk is the risk that an asset’s real value will fluctuate because of unanticipated changes in the inflation rate. This risk is best exemplified by a long-term government bond, which is relatively free of most other pricing characteristics. The bond is a nominal contract, and its yield to maturity consists of three components—the expected inflation rate, the expected real interest rate and the risk premium (if any) associated with inflation and real interest rates. Although the market anticipates all three components over the bond’s life, unanticipated changes in current and expected inflation rates cause variations in the bond’s real return.

Inflation risk arises when one side explicitly or implicitly contracts in nominal, instead of real, terms. For this pricing characteristic to be nonzero, at least one side must have negative inflation risk costs and be willing to pay the other side to create these risks. The inflation risk premium may be positive for investors in the stock market and for holders of short-term, and possibly long-term, bonds. Other assets likely to contain a nonzero amount of inflation risk include real estate, gold and any other assets whose real returns are correlated (positively or negatively) with unanticipated changes in the inflation rate.

The real interest rate is the difference between the instantaneous nominal interest rate (on a characteristic-free bond) and the instantaneous inflation rate. Since real interest rate changes
are unanticipated, the investor who rolls over a series of short-term bonds receives an uncertain return in real terms. The investor in long-term bonds can lock in the real rate over the bond’s life, but incurs inflation risk in the process. It is, of course, possible to construct a long-term contract in real terms and avoid both inflation and real interest rate risk for any given time horizon. Since these contracts are not commonly seen, we have to presume either that issuers and investors have differing time horizons, or that issuers and/or investors believe that the costs of writing contracts in nominal terms, including the costs of inflation and real interest rate risk, are less than the costs of writing contracts in real terms.16

_Residual risk_ is the risk resulting from lack of diversification in a portfolio. Assuming that the risks already described account for an asset’s undiversifiable risk, residual risk is the one remaining risk factor. We propose that residual risk, like the other risk factors, may be an _ex ante_ pricing factor.

In CAPM, the rational investor perfectly diversifies so as to eliminate entirely all residual risk. NET assumes that it is costly to diversify. The factors that make perfect diversification either impossible or suboptimal are related to non-risk pricing characteristics. For example, many investors wish to own their residences outright. The large unit size of other real estate investments, along with the high cost of creating divisibility mechanisms such as condominiums and limited partnerships, imposes high costs on investors seeking diversification. Thus most investors do not hold a diversified real estate portfolio—that is, one that is spread over various geographical locations and types of land and structures.

Human capital is subject to even more extreme constraints on diversification. Once acquired, human capital cannot readily be sold, and is usually rented out for wages in the labor market. It follows that one cannot easily buy a portion of another person’s human capital in order to diversify within the asset class.

**Taxability**

Taxability often has a substantial impact on an asset’s cost of capital. The taxability characteristic is inherently complex because of the intricacies of the U.S. (and other countries’) taxation systems. This complexity consists of (1) the stepwise (“tax bracket”) and multiplicative attributes of the tax function; (2) the fact that taxes on a given asset are contingent on the performance (effect on income) of other assets in one’s portfolio; (3) the differential treatment of ordinary income and capital gains; (4) special tax laws, such as those allowing depreciation much faster than the useful life of certain assets; and (5) multiple taxing authorities. These attributes cause the tax costs for the same asset to differ across individuals. The general principle is that highly taxable assets are lower priced—i.e., have a higher before-tax expected return—than less highly taxed assets.

For example, municipal bonds, whose coupons are free of U.S. federal income taxes, yield 20 to 50 per cent less than fully taxable corporate bonds of comparable risk. A similar relationship has been suggested for high dividend versus low dividend stocks.17 Constantinides provides a personal tax equilibrium that includes the timing option for the realization of capital losses and the deferral of capital gains.18 Most of these and other tax-related theoretical results can be introduced into the general NET framework, because NET does not specify actual investor costs.

Real estate, venture capital, hedging portfolios and leasing arrangements provide special opportunities for financial intermediaries to separate out tax characteristics and repackage them for the appropriate clienteles. After repackaging, many investments may be tax shelters having negative tax rates.19

In summary, an asset may generate taxes (positive or negative) on income, expenses or capital appreciation. The investor includes these tax costs in his pricing process. The complexity of the taxation system and the interaction of taxes with other pricing characteristics make it difficult to specify this pricing characteristic. Nevertheless, the magnitude of taxes is sufficiently large that it must be included in any exposition of the NET framework.

**Marketability Costs**

We group all the entry and exit costs associated with buying or selling an asset into the category of marketability costs. The NET framework is instantaneous, so that it provides no description of how an investor came to hold his particular portfolio or when or how he may rebalance his portfolio. For the NET equilibrium to be descriptive, each investor must reduce the value of his assets by a present value amount to
cover these costs. These marketability costs include information, search and transaction, and divisibility costs.

*Information costs* are the costs that an investor must pay to learn the value of an asset. Since the NET model assumes homogeneous expectations, we have already in some sense assumed these costs away. Nevertheless, we can informally apply the NET model by suggesting that investors must pay some costs to learn what the homogeneous expectations are. In such a world, investors with comparatively lower information costs for a particular asset would tend to own that asset. For example, U.S. investors own stocks and bonds of U.S. corporations in disproportionately large quantities because of the cost of acquiring information across national boundaries. Moreover, assets that are difficult to learn about, such as stocks of small or new companies, should have higher before-cost expected returns than assets that are easier to learn about, such as large company stocks. Finally, information costs tend to favor the large investor, since there are economies of scale in information use.

*Search and transaction costs* include the costs of looking for the other side of the transaction, as well as the costs of actually closing the transaction. The costs may include the bid-ask spread, the waiting time beyond the investor’s desired horizon, the possibility of having to take a price concession, the paperwork and legal costs accompanying a transaction, the cost of advertising or other efforts to locate the other party to the transaction, and the cost of any brokers or agents used to effect the transaction. These costs are treated in search and bargaining theory literature. In the NET framework, these costs are merely estimated by the investor as their present value equivalent costs.

*Divisibility costs* arise from the large and discrete scale of some investments, such as real estate, venture capital, large-denomination certificates of indebtedness, and certain discrete human capital decisions. Divisibility interacts with many of the other pricing characteristics. Indivisibility’s chief burden to investors may be that it forces them to take substantial residual risk. It also causes some investors to hold a suboptimal quantity of a particular investment.

Human capital, once acquired, is often considered nonmarketable as well as indivisible. It can be rented, and to some extent, it can be put up as collateral for loans. When invested in a business, portions of it can sometimes be sold. In the NET framework, we can regard these as high, but not insurmountable, divisibility costs.

In some models, an equilibrium is arrived at in which human capital is literally treated as nonmarketable.

One of the principal roles of financial intermediaries is to repackaged securities in such a way as to reduce divisibility costs. A saver (small lender) would have great difficulty in finding a borrower with whom to transact and still maintain the liquidity of his savings. By pooling the savings of many persons, a bank can do exactly that. Money market funds reduce the minimum investment amount for cash instruments from $10,000 to very little. Real estate investment trusts and limited partnerships lower the size barrier for investing in large properties from the range of millions of dollars to the range of thousands or less. Each of these mechanisms for reducing divisibility costs is itself costly. For many investors, however, paying the costs of investing through a financial intermediary increases their investor surplus.

*Other miscellaneous factors* may affect the price of a capital market asset. These include nonpecuniary costs or benefits, all of which we would treat as positive or negative costs. In addition, certain expenses such as management, maintenance and storage costs are best treated as costs of capital, rather than as decrements to cash flow. This is because they differ across investors. Because investors seek to maximize returns net of all costs and benefits, these factors should be included in the set of NET pricing factors.

**Application of the NET Framework**

In NET, we go back to economic basics. We apply the classical supply and demand model to the pricing of assets. Individual investors have homogeneous expected returns but heterogeneous costs associated with multiple risks, various forms of market imperfections and other pricing characteristics. These characteristics are priced at the individual level and treated as present value equivalents in the instantaneous time setting. This simple equilibrium framework cannot provide a pricing equation. It can, however, describe investor portfolios and asset expected returns in broad realistic terms.

Each individual investor maximizes his own investor surplus. He does so by investing in each asset until his own unique costs equal the
asset's expected return on the margin. Thus no one holds the market portfolio. Rather, each investor selects his asset holdings according to his comparative cost advantage. Clientele arise because groups of investors have similar costs.

Assets are treated as bundles of pricing characteristics. The cost of capital for a given asset is the sum of the costs of all its characteristics and is equal to the asset's expected return. Given continuous cost curves, all investors face the same cost on the margin for a given asset. However, the cost for each characteristic of the asset is not the same for each investor.

Financial intermediaries act to maximize the aggregate sum of investor surplus across all investors by repackaging assets to take advantage of pricing characteristics that are less costly to some investors. They bundle and unbundle characteristics to move toward complete markets and produce investor economies of scale.

The NET framework can readily be adapted to include heterogeneous expectations. In fact, doing so may shed further light on the mechanisms by which investors price assets. We have kept the homogeneous expectation assumption so that we could relate expected returns to the cost of capital.

As a practical matter, it may be useful to make additional assumptions in order to estimate the market cost of capital for an asset. If we assume that there exists a "representative" investor whose cost functions mimic those of all investors in the aggregate, and who perceives all characteristics except tax costs as orthogonal, we can sum the characteristic costs for the representative investor to obtain the after-tax market cost of capital. We may assume that the tax cost, unlike other costs, is multiplicative; thus we divide the after-tax cost of capital by one minus the representative investor's tax rate to arrive at the before-tax cost of capital.

Table I presents a heuristic summary of selected assets matched with pricing characteristics. The investor must make his own judgments about the quantity of each characteristic embedded in each asset and about the costs he associates with the characteristic. Although NET cannot make these judgments for the investor, NET provides a framework within which an investor can analyze the wide range of assets and characteristics available.

NET as it presently stands is a characterization of the way investment practitioners view the world, to some extent explicitly and in large part implicitly or intuitively. NET theory serves to draw all pricing factors into a unified framework. Investors need to know what affects pricing, with or without an algebraic pricing equation. Consideration of all pricing characteristics may be more important to them than a

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<td>Foreign securities</td>
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<td>Human capital</td>
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Note: Low, medium, high, etc. refer to positive coefficients unless indicated to be negative.

*Financial intermediaries are likely to be important in reducing these costs.
rigorous partial equilibrium treatment of one or a few characteristics. Our hope is that the integrated view of asset characteristics and investor costs presented in this article will be given more explicit consideration by both practitioners and researchers.

Footnotes
3. Since there is only one instant of time in the model (the present), the investor is assumed to select his optimal portfolio in a tatonnement process, given the prices (before-cost expected returns) of all the assets in the economy. The tatonnement process is described in Alfred Marshall, Principles of Economics, 8th edition (London: Macmillan and Co., 1920).

Although the Law of One Price holds for each asset in the economy, other market imperfections are expressed as some of the pricing characteristics.
5. The net quantity of the characteristic-free asset may be assumed to be other than zero without affecting the analysis. For example, an exogenous government may issue this asset in some quantity, similar to the money supply.
6. As we shall see later, the NET model is robust with respect to forming an equilibrium (i.e., a single market price for an asset) given heterogeneous expectations. The concept of cost of capital, however, has very little meaning when related to the diverse expectations of investors. Heterogeneous expectations are better treated in the specific context of information costs and in debating market efficiency, rather than here where we seek to determine an equilibrium cost of capital.
7. To take the most familiar example, that of mapping beta risk into a cost in the CAPM context, each investor’s cost function rises as he takes on incremental beta risk. The investor then assigns a price at which he is indifferent between buying and not buying more of the risk. Given complete markets and homogeneous expectations, the market provides one clearing price for beta risk. Each investor buys beta risk until his increasing risk costs equal the market risk payoff. The mildly risk-averse investor has a lower cost for a given amount of beta risk than the highly risk-averse investor, and therefore holds a higher beta portfolio.
8. These costs, c_i, include the borrowing costs, c_b, if the investor is a borrower. Borrowing costs are described in Figures D and E.
9. In Figure A, return is on the vertical axis and quantity on the horizontal axis. Since return is related to the reciprocal of price, supply and demand curves are “upside down” relative to the more familiar price-quantity diagrams. This return-quantity space was made familiar by Merton H. Miller in “Debt and Taxes,” Journal of Finance, May 1977.
10. In the instantaneous framework presented here, the investor finds his optimum borrowing quantity of the characteristic-free asset and makes his choice of other assets (based on their returns net of perceived costs) simultaneously, using the tatonnement process referred to in footnote 3.
11. In practice, the utility function that translates characteristics to costs may generate a discontinuous cost curve because of indivisibility of assets or restrictions on short selling. Thus, for many assets, investors will hold only zero or whole number positions. For these assets, there may exist heterogeneous costs on the margin.
12. Although we have noted that NET does not postulate complete markets for these characteristics, which are priced at the individual level, we might have alternatively assumed that complete markets existed for each pricing characteristic, so that the characteristics could be priced at the market level. The assets would then also be priced at the market level and represented as combinations of characteristics. We deliberately avoid making this assumption, because many of the characteristics we are about to discuss are inseparable, complex, and contradict the complete markets assumption by their very nature.
13. Nai-fu Chen, Richard Roll and Stephen A. Ross, in “Stock Markets, Factors, and the Macroeconomy” (working paper, 1982) have isolated five risk factors—(1) beta risk, (2) the return differen-
tial between low and high grade bonds (related to the return differential between small and large capitalization stocks), (3) the return differential between short and long-term bonds, (4) anticipated inflation, and (5) unanticipated inflation.

14. Jeffrey F. Jaffe, in “Corporate Taxes, Inflation, the Rate of Interest, and the Return to Equity,” *Journal of Financial and Quantitative Analysis*, March 1978, shows that inflation risk is not readily separable from taxation costs. Thus it may be impossible to contract totally in real terms.


16. In high-inflation countries such as Brazil and Israel, bonds with price-level-indexed principal have existed for years. The United Kingdom and France now issue them also. Bertrand Jacquillat and Richard Roll, in “French Index-Linked Bonds for U.S. Investors?” *Journal of Portfolio Management*, Spring 1979, have found French price-level-indexed bonds to have high historical returns to a U.S. investor.


19. Merton H. Miller (“Debt and Taxes,” *op cit.*) shows that the taxation issue cannot be fully analyzed on the investor demand side alone. Corporations (like intermediaries) may react to any pricing characteristic by attempting to offer the type of issues that have the lowest costs in the market.

20. A problem with applying the NET framework to marketability costs is determining the investor’s starting portfolio. For example, if the investor holds all cash, then he must pay entry costs on each asset to obtain his optimum portfolio. On the other hand, the investor may already hold his optimum portfolio, so that he has no entry costs.

21. The NET framework cannot directly include results from the variety of information models found in the financial literature. To apply NET here, we have to assert that the investor knows in advance both that he will use the information to buy the appropriate quantity of the asset, and that the purchase of the information is worthwhile.

22. The NET framework as presented in Figure A uses continuous cost curves, $c_i$. When divisibility is a problem, cost curves will be discontinuous, and it will no longer be true that the marginal cost of capital of an asset is the same for all investors.