THE ACCOUNTING VARIABLE AND STOCK PRICE DETERMINATION

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ABSTRACT

Several tests have been conducted to determine which valuation model best fits stock price data. Given very little success, those studies suggest the need for a clear understanding of the market process of stock price determination. This paper advances the concepts of product costing and product pricing, which pertain to financial accounting valuation and the stock market price determination, respectively. This research effort presents a workable hypothesis of stock price determination.

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INTRODUCTION

The most popular stock valuation models are the dividend model and the stock-returns model. Tests of stock pricing using these models are not found to be satisfactory [Scott, 1985; Kleidon, 1986; Shiller, 1990]. Theoretically, the variables used in these models to test for fit with stock price determination are inadequate descriptions of the variable which is the locus of stock price determination. Last, but not least, among the popular valuation models is the price/earnings model [Phillips and Ritchie 1983,160-161], which is primarily the inverse of a price yield model. While yields have to be compared with yields of similar risks, there is no inherent measure of risk implicit in the price/earnings model, thus this model lacks the theoretical base needed for an intrinsic valuation model. It is essentially a rule of thumb approach to stock valuation. While these models have contributed to our knowledge, more work is necessary to deal with the shortcomings of those models.

The works of Kleidon [1986], Kormendi and Lipe [1987], and Campbell and Shiller [1988] have strongly suggested that the accounting earnings variable represents fundamental value, and this variable has few competitors for this role. The findings of Kormendi and Lipe [1987] and Campbell and Shiller [1988] are reinforced by the findings of Guo and Chang [1993], who found that: (1) accounting based returns were measures at the ordinal level which enabled ranking of firms by their security returns, and (2) the usefulness of such accounting information increased over the twenty years that were covered by the study. From both

empirical and intuitive viewpoints, the studies cited above implicitly recognize the use of accounting information as a fundamental variable in stock price determination; presumably accounting information underlies the fundamental valuation approach employed in the capital market.[1] Nevertheless, the cited studies suggest that a more comprehensive theory is needed to explain the stock pricing mechanism. Accordingly, this research is motivated by the desire to provide a working hypothesis based upon the accounting variable that would enable a better understanding of the stock price mechanism.

The Accounting Variable

The accounting variable, which is presented in this paper, is based upon the works of Salvary [1985,1989,1992,1997]. Those works have rejected historical cost and have established "estimated recoverable cost" (ERC) as the measurement property/attribute of financial accounting. Those studies have demonstrated by logical analysis and have provided a rigorous proof that ERC is based upon: (a) the essential characteristics of accounting phenomena (investments as a set) and (b) the measurement/valuation rules of financial accounting which have evolved up to the early part of the twentieth century. ERC, which is linked to investments and explicated by the capital budgeting model, provides the logic which explains the apparent diverse valuation rules of financial accounting [Salvary 1992,236].

ERC, which is a decision oriented property, is the amount of resource outlay that is justified by the rate of return which guides the investment decision; it is a measure of what money commitments would have been made, given current market conditions [Salvary 1992,266]. The accounting valuation rules, which have been identified, produce such a measure. With ERC as the measurement property, the term book value can now be appropriately replaced with the proper measurement term: residual cash commitment/residual value of committed finance. While some accounting rules have been identified as being incompatible with the ERC [Salvary 1985,1992,1997], it is the inadvertent failure to recognize the proper measurement property and the derivation of the emergent valuation rules which has resulted in the elimination of the use of the "lower of cost and market" valuation for marketable equity securities with *Statement of Financial Accounting Standards (SFAS) 115: Accounting for Certain Investments in Debt and Equity Securities* [FASB,1993].

In this paper, a strong theoretical link is established between financial accounting valuation and stock price determination. The financial accounting measurement process--the generation of financial accounting information--is depicted as a *financial product costing process* related to the production plans of firms operating in the commodity market. The *financial product costing process* is the measurement of current cash flows generated by a firm's production plan. It is accounting earnings (i.e., estimates of future earnings) and accounting residual value (i.e., current residual cash commitments--the estimated recoverable cost) as a unit that is priced in the capital market; hence, capital market valuation is a *financial product pricing process.* The *financial product pricing process* is the valuation of estimated future cash flows expected to be generated by a firm's production plan and any expected residual cash value. Thus, it is quite clear why the pricing process is distinguished from the costing process.

Working Hypothesis: *Financial accounting valuation (with its underlying rationale the capital budgeting model) is the costing of a financial product (periodic returns generated by and residual resources committed to a production plan) in the commodity market. Capital market valuation (current value of an equity security - stock price determination) is the pricing of a financial product--the capitalization of expected market returns on and the terminal value of the equity security in the capital market. A difference exists between the two valuations and the magnitude of the difference is further influenced by changes in the interest rate and the effect of uncertainty on the surrogate variables used in the pricing model.*

RESEARCH ISSUE

For a firm whose shares are traded in the securities market, the value (**K**) of its net assets (stockholders' equity) as reflected in its financial statements invariably differs from the aggregate current market value (**S**) of its equity securities as reflected by the market price in the securities market. Also, the value of that firm's net assets (**K**) presented in its financial statements differs from the aggregate replacement cost (**RC**) of that firm's assets. These values - market value and replacement cost - are signals which act as guides to actions for entry, use and exit decisions for an operating system; viz. the firm in its implementation of the production

plan.[2] For example, the ratio of firms' net assets at current market value and net assets at replacement costs provides a meaningful decision variable: Tobin's q ratio. In this setting, financial accounting valuation would constitute information from an operating system; while, current market value and replacement cost are signals from a signaling system based upon expectations.[3]

In the static case for the initial commitment of money, Turnovsky [1970] has termed the difference, between capital market valuation (**S**) and financial accounting valuation (**K**), the 'net present value'--an all encompassing term, which is not limited to, but includes, monopoly rents. Turnovsky [1970] maintains that the market value of the firm's equity (**S**) is described by the following equation:

$$\mathbf{S = (\pi - rD)(i)^{-1},}$$

and the net present value (**N**) is captured by equation (1):

$$\mathbf{(1)} \qquad \mathbf{N = (\pi - rD)(i)^{-1} - K = S - K}$$

K = Equity Book Value or Equity Money Capital Invested in the Firm
i = Stockholders' Required Rate of Return on Equity
r = Market Rate of Interest on Debt
π = Expected Operating Income Stream Generated by the Firm
D = Book Value of the Firm's Debt

Vickers [1970;1968] has stressed that the underlying value of financial assets (**VFA**) in the capital market is dependent upon the "intensity in the use of money capital" (**x**): **VFA = h**(**x**); whereas, the value of real assets (**VRA**) in the commodity market depends upon "taste, technology and employment conditions" (**u**): **VRA = j**(**u**). This situation establishes a clear basis for two distinct valuations which are necessary for an efficient functioning of the interdependent capital and commodities markets: the market for financial assets and the market for real assets. The importance of the interdependence is stressed by Greenberg, et al [1978,241]. Arzac [1975], in advancing the work of Vickers and Turnovsky, maintained that the net present value of equity is independent of the financial structure of the firm. Though intuitively appealing, no explicit reason is given why the difference between market value of an equity security (**S**) and financial accounting value (**K**) should be the net present value (**N**), and

not simply as monopoly rents. One reason is that the excess of market value over replacement cost is already termed monopoly rent, and this difference would be less than the difference between **S** and **K**.

In this paper, the model for stock price (**S**) determination as developed is based upon: (1) **ERC**--the measurement property of financial accounting, which provides for periodic earnings (**Ep**) and the residual cash commitment/residual value of committed finance (**K**) of the investment, and (2) an investment horizon (**n**) and a risk adjusted discount rate (**i**). The model is described below:

$$S_t = K_t + \Sigma E_{p*}(1+i)^{-n},$$

where K_t is a residual value stated at present value, and E_{p*} is expected future earnings which will be discounted by the appropriate discount rate. While it is clear from this perspective that $S_t \neq K_t$ except when $E_p = 0$, the analysis which follows will provide the full particulars for non-equivalence of S_t and K_t. This paper attempts to demonstrate that financial accounting valuation and capital market (finance) valuation differ in the magnitudes they produce because they are derived from/represent two different and distinct processes; these two valuations serve two distinct but interdependent markets (the commodity and capital markets). The difference between these two valuations is occasioned by: *(a) the inter-temporal inseparability in the commodity market of an investment base from its earnings stream, and (b) the inter-temporal separability of market prices of the earnings stream (for the inter-temporal transfer of savings) from the investment base due to continuous changes in the opportunity costs in the capital market*.

Contribution to the Literature

In this two markets setting, the nature of each market, the roles of the participants in these markets, and the valuations necessary for the efficient functioning of these separate but interdependent markets are explored. The valuations are shown to be time dependent and participant oriented. Financial accounting valuation (measurement of current cash flows and current residual cash commitments) and capital market valuation (pricing of future cash flows and future residual cash commitments) are shown to be two different but interrelated processes. This finding provides a sufficient reason for the difference between **S** and **K** to be termed net

present value (**N**) and not monopoly rents. In stock price formation, both **N** and **K** are components of **S**, where **N** is the earnings component and **K** is a residual (terminal) component. Changes in the interest rate (**r**) have a systematic effect on **S** and uncertainty affects expectations of the value of **K**, these factors prevent the difference between **S** and **K** from being arbitraged or insured. The analysis in this study shows that what is true for the static model is also true for the dynamic model. Essentially, this study complements the studies cited above.

RESEARCH METHODOLOGY

This paper is an analytical paper, which focuses on the time perspective and uncertainty facing the production/operating decision as differentiated from those of the savings decision. It establishes the validity of the distinction and the interdependence between the commodity and capital markets. The latter, which provides for liquidity of claims against future earnings, is shown to be a necessary adjunct of the former. A proof of one theorem, which is developed around the concepts of present value and net present value necessitated by the production (investment) decision, demonstrates that the capital market is a by-product of the commodity market.

This work examines the source of the difference between the two valuations: the net present value (**N**). To simplify the analysis, the firm: (1) has no debt; (2) operates by paying cash immediately for all goods and services; and (3) declares no dividends. In the absence of debt, Total Assets ($\mathbf{C}^*$) = Total Stockholders' Equity (**K**). Given $\mathbf{C}^* = \mathbf{K}$, then equation (1) can be restated as:

(1a) $\mathbf{N_{st} = S_t - C^*_{st}}$ (s = per share, t = index)

In an analysis which includes liabilities, $\mathbf{C^* - D = K}$ would be used in place of $\mathbf{C^* = K}$.

THEORETICAL FRAMEWORK

Any discussion of values and valuation models must not confuse the world of uncertainty with a world of certainty. The former gives rise to interrelationships--relationships among committed finance, market value, and replacement cost--but not identical existences. The differences among these items are necessary consequences of an uncertain world and *the*

concept of the amount at risk would be equated with committed finance. Since the difference in interest rates is a reflection of difference in risk, then in the absence of risk there would be one rate. Thus, in a world of certainty, the risk-free rate of interest would be meaningless since the term risk would not exist.

In a world of certainty, while concepts such as replacement cost and market value would not exist, the concept of committed finance to a cash flow plan would exist. Having perfect knowledge, the world would experience steady state growth and the trading in risk would not be a factor. The capital market would not be a place for interpersonal trading of risk/return preferences. In reality, however, the world is an uncertain world characterized by limited and imperfect knowledge in which risk trading and the commodity and capital markets exist. To demonstrate the interdependence of the commodity and capital markets, two models are used: (a) production without a capital market; and (b) production with a capital market.

Production Without a Capital Market (The Producer's Present Value Model)

In a surplus oriented economy, production by the individual is in excess of personal requirements; the excess production is to enable the augmentation of one's wealth. This augmentation process is accomplished by selecting a specified combination of factors of production (an input value) to generate a certain amount of tradable items (an output value) which would maximize the net value--profit. The basic assumptions of the model are: (a) two producers - Producer A and Producer B; (b) two goods and services are produced - Good A (consumable goods) and Good B (all other goods and services); (c) two production periods; (d) the individual producer finances production; and (e) money serves only one function that of a unit of account. Each producer's output is distributed to the employees of that producer. The goods are then exchanged in a general trading store for the other producer's output. (Although the transactions will be undertaken by means of physical exchanges, reference is made to money prices to facilitate the exposition.) Exchange ratios constitute relative money prices which are determined by market demand and supply conditions. The rate of exchange for one unit of an individual's output is based on the prevailing money prices which have been established from the exchange ratios for the commodities produced in this economic community.

Each producer's decision is based upon the expected price of his/her output at time of trading. Given that production extends over two time periods, the decision to commit resources to production is guided by a decision model as depicted in equation (2.0):

(2.0) $\mathbf{C \leq C^* = \Sigma E_p(1+r^*)^{-2}}$

C = Resources to be Committed (Outlay Required)
C^* = Present Value of Investment (Discounted Benefits)/Total Assets
E_p = Profit/Earnings (Benefits from Disposal of Output)
r* = A Hurdle Discount Rate (Desired Minimum Rate)

The commitment of resources (e.g., resources to be exchanged for the productive equipment) is based upon the recoverability of such resources. The stream of net benefits (**E**) is the difference between the resource outflows (excluding the cost of the productive equipment) and the resource inflows. While **C** (the "investment cost") is the actual outlay required to undertake the investment, $\mathbf{C^*}$ (the discounted stream of benefits) is an estimate of the recoverable amount of investment cost. ($\mathbf{C^*}$ = the estimated recoverable cost/total assets.) Therefore, **C** can be less than, equal to or greater than $\mathbf{C^*}$. The decision rule (guiding the capital budgeting decision) states that if the sum of the discounted stream of benefits ($\mathbf{C^*}$) is equal to or greater than the actual outlay required to undertake the investment (the resources to be committed - **C**), then undertake the investment.[4]

In equation (2.1), unlike equation (2.0) in which $\mathbf{C^*}$ is determined from the **PV** model, the internal rate of return (**R**) is the variable to be determined and the **DCF** model is used :

(2.1) $\mathbf{C = \Sigma E_p(1+R)^{-2}}$

The result **R** (internal rate of return) is compared to **r*** (hurdle discount-rate). If $\mathbf{R \geq r^*}$, then the investment is to be undertaken. However, when $\mathbf{R > r^*}$, then $\mathbf{C < C^*}$ and the internal rate of return (**R**) is substituted for the desired return (**r***) in the PV model. Thus, in the new calculation, the investment cost (**C**) is equal to the investment base ($\mathbf{C^*}$).

In this setting, there is no intermediary; the producer and the financier are one. The planning horizon of the financier and the investment duration of the producer are identical. There exists only one market: the commodity market. Accordingly, there is only one valuation

(**C*** - financial accounting valuation). This valuation serves both the financing and the producing decisions. (As indicated earlier **C* = K**; thus from this point on, **K** will be used and not **C***.) The foregoing discussion provides the necessary outline of the first model - the producer's present value model.

Production With A Capital Market (The Financier's Present Value Model)

In a money economy (an economy in which generally all goods and services are exchanged for money), a measure of nominal money input and of nominal money output provides an unambiguous measure of the change in money holdings. In this setting, money serves as a medium of exchange and as a store of uncertain value. What emerges now is the concept of capitalized value--the valuation of a sum or sums of money to be received at some future point in time, based upon demand and supply conditions for money reflecting changes in the risk-free interest rate and the inherent risk in the existing supply alternatives of future cash flows/earnings. *Individuals who hoard money (a store of uncertain value) are now suppliers of money capital - financiers.* Thus, the financier's role is explicit and distinct from that of the producer.

Now producers can sell, for immediate cash, a financial product--the future earnings from production and any residual value--to financiers. A new market comes into existence - the capital market. This market provides for the interpersonal transfer of cash for claims against future earnings. To accommodate this new process of inter-temporal transfer--trading in the capital market, capital market valuation emerges as an adjunct to financial accounting valuation. Financial instruments (financial assets) are used to represent the claims to future earnings. The values of the financial instruments (assets) will and do differ over time from the initial valuation because of changes in the interest rates and relevant risks. This new valuation model captures the financier's discounting process; it is the financier's present value model: **S**.

Two distinct valuation models (a costing model and a pricing model) have emerged to serve the two interdependent (commodity and capital) markets. *The Costing Model* provides measures of: (a) the resources committed to the production plan (**K**), and (b) the effect of actual inputs and actual outputs--profit/earnings ($\mathbf{E_p}$) generated in the past period. The valuation, which focuses on firm's production plans over time, serves the commodity market. *The Pricing*

Model places a value on the future prospects of each firm's production and distribution plan for several years into the future. The value (**S**) in the capital market is placed on an aggregate of expected annual earnings ($\mathbf{E_f}$ which is a proxy for $\mathbf{E_p}$) and a terminal nominal value (**S***). This valuation process, which is a projection of possible effects of changes in financiers' beliefs about risks and liquidity, facilitates interpersonal and intertemporal transfers of current cash.

Financial Product Costing - Financial Accounting Measurement

Financial accounting measurement is the costing of units of each of several money flows. Such a unit of money-flow (output money-value less input money-value) generated in the commodity market emerges as a financial product--profit/earnings ($\mathbf{E_p}$)[5] plus the residual value (**K** - the estimated recoverable cost) for sale in the capital market. In financial accounting, $\mathbf{E_p}$ is measured for a fiscal year (t) and **K** is measured at the end of the fiscal year. Hence, the combination of $\mathbf{E_p}$ (a periodic measure of a firm's performance) plus **K** (the residual value of committed finance) is a *financial product* whose cost is a function of the commodity market. $\mathbf{E_{pt} = P_t - TC_t}$; where, **P** = Sales and **TC** = Total Cost. Since there are alternative uses of money and a cost (interest) for the use of money, decisions in the commodity market are based on the concept of the rate of return ($\mathbf{R^*}$) on money invested. $\mathbf{R^*}$ is a relative magnitude of a purely nominal money dimension which serves as a means to an efficient capital market. It is a guide to action in production and distribution decisions; for each and every year, the amount of profit/earnings ($\mathbf{E_p}$) is translated into $\mathbf{R^*}$ as follows: $\mathbf{R^*_t = E_{pt}/K_{t-1}}$. However, $\mathbf{E_{pt} = (K_{t-1} \times R^*_t)}$ is a tautology.

Intertemporal Inseparability of Investment Base and Earnings.

In equation (2.0) the hurdle discount rate (**r***) reflects the desired minimum rate of return (e.g., the cost of capital), and hence provision is made for earnings - the means of augmenting the initial resource input. Each investment is undertaken to generate an earnings stream. Each investment has an "investment cost" which is the outlay that is required to undertake the investment and an "investment base" which is the estimated recoverable amount of invested money - the estimated recoverable cost. (In this analysis, the terms "investment

base", "money in use", "committed finance" and "estimated recoverable cost" are used interchangeably.) The "investment base" is the amount of resource outlay that is justified by the rate of return which guides the investment decision. If actual returns are less than expected returns for the given risk, then there has been an error in the planning stage, and the investment base has to be reduced to reflect the planning loss. However, the converse does not hold. If actual returns exceed expected returns, then the internal rate of return (**R**) was underestimated. In this case, there is no change in the investment base, only a note to the effect that a higher internal rate of return (**R**) exists. Accordingly, *over the life of an investment, the earnings stream is inseparable from the investment base.*

Financial Product Pricing - Capital Market Valuation

The market value (**S**) of an equity security (a financial asset) is based upon the sum of: (i) an estimate of expected return of investment ($\mathbf{K_{st}}$), and (ii) an estimate of future earnings ($\mathbf{E_p^*}$) relating to that financial asset. This price formation process is the pricing of a firm's financial product in the capital market. The measures provided by financial accounting for $\mathbf{K_s}$ and $\mathbf{E_{ps}}$ (which is modified for anticipated future conditions in order to estimate future earnings ($\mathbf{E}^*$)) become informational input which enable a value to be assigned to accommodate personal inter-temporal transfers of money capital. Equation (3) [Salvary 1982] is offered as a plausible stock valuation model which characterizes the price formation process:

$$(3) \qquad \mathbf{S_t} = \sum_{n=1}^{k} \mathbf{E'_s}\boldsymbol{\lambda}^{\mathbf{n}} + \mathbf{K_{stn}}\boldsymbol{\lambda}^{\mathbf{n}}$$

where:
- $\mathbf{S}$ = Present Value of Expected Future Cash Flows (Price of An Equity Security in the Capital Market)
- $\mathbf{K}$ = Estimated Recoverable Cost of Investment attributable to Shareholders (Equity Book Value or Equity Money Capital Invested in the Firm)
- $\mathbf{E'}$ = N-Year Moving Average of Earnings ($\mathbf{E_p}$)
- $\boldsymbol{\lambda}$ = $(\mathbf{1+R'})(\mathbf{1+i})^{\mathbf{-1}}$
- $\mathbf{R'}$ = Firm's N-Year Moving Average of Rate of Return ($\mathbf{R^*}$)
- $\mathbf{i}$ = Risk Adjusted Discount Rate
- $\mathbf{n}$ = Financier's Planning Horizon - Number of Periods (n=1, 2, 3, ...k)
- $\mathbf{t}$ = Index/Date (t, t+1, t+2, ...)
- $\mathbf{s}$ = Per Share
- $\mathbf{K_{stn}}\boldsymbol{\lambda}^{\mathbf{n}}$ = Residual value

The investor buys into the production plan by: (a) purchasing future earnings ($\Sigma E^{*}\lambda^{n}$) and (b) making a deposit of the per share value of the investment base's residual value ($K_{stn}\lambda^{n}$). The deposit is refundable subject to the inherent operating risk, in which case the amount can be greater or larger at the termination date of the investor's participation in the plan.

Another plausible model is the finite horizon valuation model (FHVM) [Phillips and Ritchie 1983,157]. A modified version of that model (with symbols modified to be comparable with those of equation (3)) is presented in equation (4):

$$(4) \qquad S_0 = E_0 I \sum_{t=1}^{T}(1+ g)^{t}(1+ i)^{-t} + E_0 M_c(1+ g)^{T}(1+ i)^{-T}$$

E_0 = Current earnings per share
I = the dividend payout ratio in each holding period
g = anticipated compound annual growth rate of earnings per share
M_c = multiplier applied to earnings per share in the terminal year to determine the selling price

The differences between the two models (equations 3 and 4) are to be found in: (a) the use of a single period earnings as opposed to an n-period average earnings, (b) the use of the dividend payout ratio, and (c) the manner of determining the terminal value (stock price) at time of ownership discontinuation.

The FHVM model, which differs from the model presented in equation (3), is theoretically problematic due to the ad hoc treatment of M_c. Equation 3 is a sequential expectations adjustment model (**SEAM**); it reflects periodic adjustments based upon expectations related to the sequential release of accounting information.[6] This position obtains because the values of equity securities are tied to the multi-year production plans of the many firms that are operating in the commodity market. Invariably, each firm's product costs (K and E_p) are measured annually--on a period by period basis. At the end of each period, with the release of accounting information on each period, a sequential adjustment begins--the number of earnings period is reduced by one year, and the initial value of the investment (K_{to}) is adjusted to reflect a new value K_{t+1}:

$$K_{t+1} = K_{to} + E_p - D.$$

Intertemporal Separability of Market Price from Investment Base.

In the capital market, a surrogate ($\mathbf{E_f}$) is used for $\mathbf{E_p}$ in the estimation of future earnings. $\mathbf{E_f}$ is the average (weighted by the probabilities in the probability distribution of $\mathbf{E_f}$ given heterogeneous expectations) of the individual estimates of future cash dividends ($\mathbf{D_c}$) plus the change in the price of the equity security ($\mathbf{\Delta S}$)--$\mathbf{E_f = D_c + \Delta S}$. However, the variables used to define $\mathbf{E_f}$ are inextricably linked to $\mathbf{E_p}$, since dividend (**D**) is a function of $\mathbf{E_p}$ and $\mathbf{\Delta S}$ is influenced by: (a) changes in retained earnings ($\mathbf{E_p - D_c}$), (b) the interest rate (**r**), and (c) the level of liquidity (**L***). Thus, $\mathbf{Dc = f(E_p)}$ and $\mathbf{\Delta S = f^*(\{E_p - D_c\}, r, L^*)}$. This surrogation renders the price of an equity security (**S**) inter-temporally separable from the investment base (**K**).

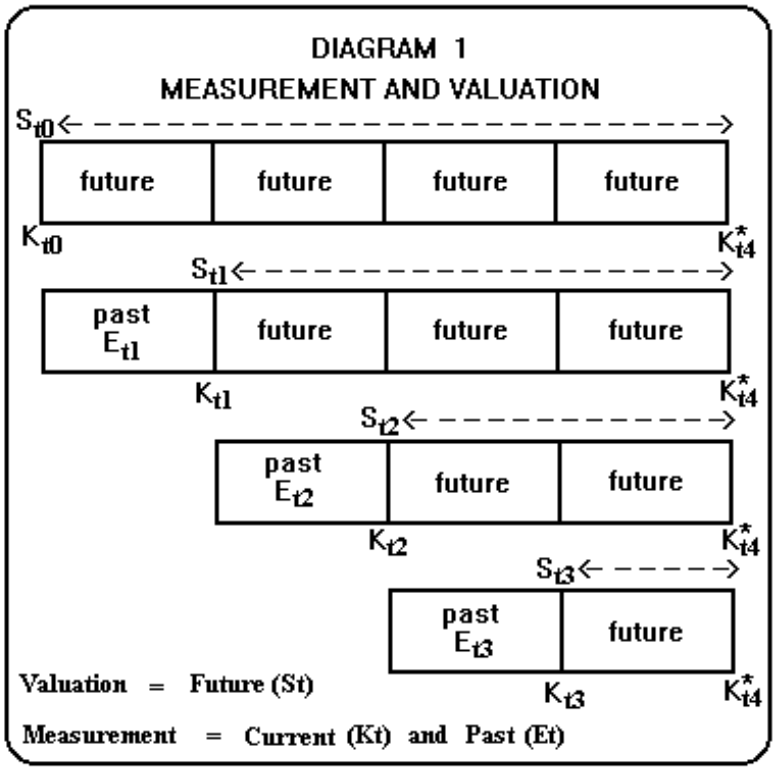
To illustrate the foregoing point, assume that a production plan is for a three-year period. In the case of the costing/measurement model, the following holds:

$\mathbf{K_{to} = S_{to}}$,
$\mathbf{K_{t1} = K_{to} + E_{p1}}$,
$\mathbf{K_{t2} = K_{t1} + E_{p2}}$, and
$\mathbf{K_{t3} = K_{t2} + E_{p3}}$.

However, $\mathbf{S_{t1}}$, $\mathbf{S_{t2}}$, and $\mathbf{S_{t3}}$ cannot be defined in the same fashion as given for $\mathbf{K_{t1}}$, $\mathbf{K_{t2}}$, and $\mathbf{K_{t3}}$, because **S** is some function of **i**, **n**, $\mathbf{E_f}$, and **K**. In the case of the pricing/valuation model, the following holds for $\mathbf{S_{t1}}$, $\mathbf{S_{t2}}$, and $\mathbf{S_{t3}}$:

$\mathbf{S_{t1} = \Sigma E_f(1+i)^{-3} + S^*_{t4'}(1+i)^{-3}}$,
$\mathbf{S_{t2} = \Sigma E_f(1+i)^{-2} + S^*_{t4''}(1+i)^{-2}}$, and
$\mathbf{S_{t3} = \Sigma E_f(1+i)^{-1} + S^*_{t4'''}(1+i)^{-1}}$.

In Diagram 1 ($\mathbf{S^*_t}$ above is an approximation of $\mathbf{K^*_t}$), an insight is provided into the differences between the costing/measurement and the pricing/valuation models. The costing model focuses on measuring past performance and the residual value - committed finance; whereas, the pricing model places a value on expected future earnings and expected residual value but it depends on the information from the costing model to arrive at the estimates of future performance and residual value.



While the financial product costs (**K** and $\mathbf{E_p}$) are relatively constant, the financial product's price (**S**) is highly variable. This condition holds since two elements (**i** and **n**) of the pricing/valuation model are highly sensitive to money market conditions and to personal expectations (the planning horizons of individuals - **n**). The discount rate, **i**, is highly sensitive to changes in the interest rate (**r**) which reflect the availability of money; and n, the financier's planning horizon, is highly sensitive to liquidity (**L***) considerations.

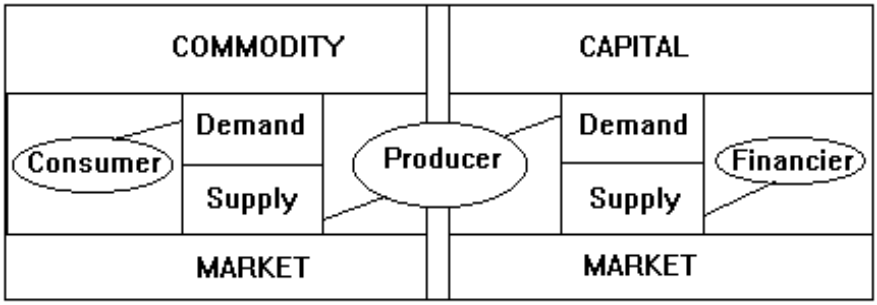
ANALYSIS

In the foregoing framework a link has been provided between the commodity market and the capital market and two separate but related functions are identified as being served by financial accounting and capital market valuations. Accounting information disseminated periodically reflects risk-return combinations of firms' financial products, which are priced in the capital market based upon the existing demand and supply conditions and liquidity conditions.

Interdependence of the Two Markets

In the two markets there are three participants (producers, financiers and consumers) - all of whom may not be involved in both markets (Diagram 2). The producer is confronted with two interdependent decisions: a production decision and a financing decision. In the capital market, the producer is on the demand side and the financier is on the supply side. In Diagram 2 *market roles are identified; however, nothing prevents a consumer from being a financier or a producer, or any of the other related combinations*.

Diagram 2
Interdependency of the Two Markets



The producer-financier relationship is motivated by the cost of capital consideration (the availability of capital); this condition is true even if the producer is also the financier. In the commodity market, the producer is on the supply side and the consumer is on the demand side. The consumer in great part determines what commodities will be produced. The financier is faced with selecting the preferred risk-return combination among financial assets. The consumer is faced with maximizing consumption (utility) given a budget constraint. Though all financiers are consumers, only some consumers are also financiers

Axioms

The following four *axioms* are introduced for a money economy from which a *theorem* is derived. The emerging theorem (**N = S - K**) will be discussed later on.

(1) Producers incur the cost of (commit finance for) producing and distributing goods and services for the sake of profit. (Cost of producing and distributing includes the cost of financing the output up to the time of sale.)

(2) Profit is the gain from an undertaking. It is a function of uncertainty since it is conditioned by the ability to acquire (produce) goods and/or services at a total cost which is lower than the price anticipated to be derived from the subsequent delivery of the goods and/or services at some future point in time.

(3) Financiers supply money capital at a cost. This process gives rise to claims against the producers.

(4) The cost-of-capital is the cost for the use of money or credit, which is based solely on the length of time and the risk to which money or credit is made available.

Financing Production

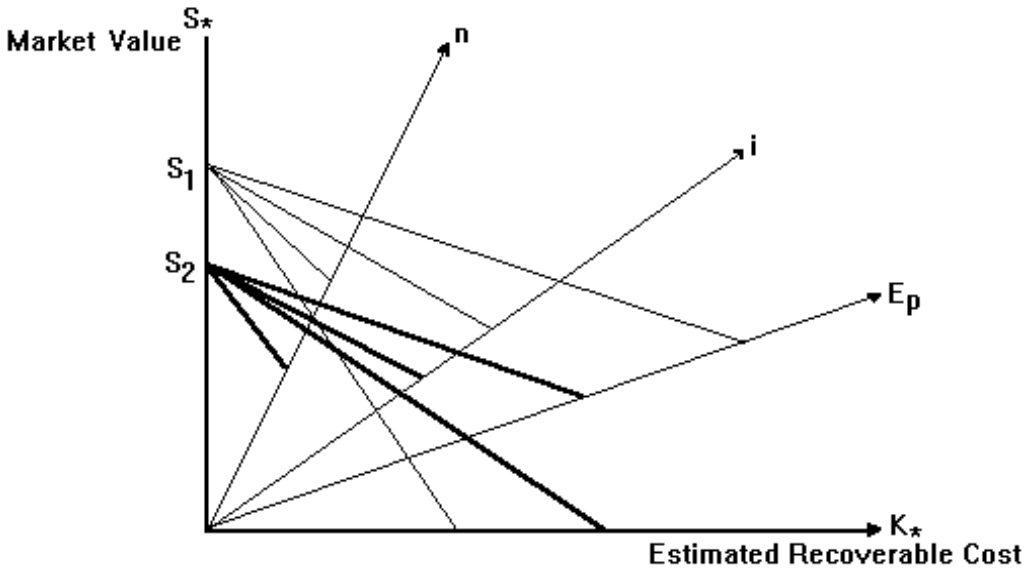
Money in use (money committed to a plan) comes into existence because production, which is characterized as a process over time, has to be financed. If production was timeless (instantaneous), then production would not have to be financed; there would be only one market--the commodity market--and only one set of values--the measures ($\mathbf{E_p}$ and **K**) arrived at by financial accounting. However, production takes place over time, and to finance production the firm issues titles to claims (financial assets) against the firm which are traded in the capital market. The transfer of rights to future earnings and residual value from the firm's production plan is made possible by the capital market; accordingly, the liquidity of financial assets is ensured. Thus, the commodity market coordinates production; while the capital market coordinates finance.

Markets and Valuations: Coordinates and Momenta

It is postulated (Diagram 3) that **S** in the capital market and **K** in the commodity market constitute paired symbols, which are coordinates and momenta; each coordinate having a momentum paired with it. The coordinates and momenta emerge from the process of investment, which involves: (a) raising money-capital in the capital market by issuing financial instruments (the creation of financial assets); then (b) acquiring in the commodity market the necessary factors of production (real and strategic assets). Diagram 3 illustrates investments in a market economy as a manifold of four dimensions, which includes a time dimension (n - the

financier's planning horizon). The investment consequences to the firm are captured by the financial accounting (product costing) model, which measures E_p and K as discrete values in one year time sequences. Essentially Diagram 3 is indicative of a field of attraction in economic space related to K, in which S_* represents all the points in the field.

Diagram 3
Markets and Valuation: Coordinates and Momenta



Deducible from the diagram is a value function. Point events emerge representing the pricing process in the capital market (e.g., $\mathbf{S_1}$, $\mathbf{S_2}$). Line $\mathbf{S_*}$ epitomizes the market value model (financial product pricing). Equation (3) provides the model - the basis of the pricing mechanism - in which $\mathbf{S_t = g(K,E_p,i,n)_t}$. However, in the capital market an operating proxy is used for equation (3): $\mathbf{S_t = \Sigma E_f(1+i)^{-n} + S^*_{tn}(1+i)^{-n}}$. By the definition given earlier, $\mathbf{E_f}$ for any value of **n**, when $\mathbf{0 < n < \infty}$ will not be equal to $\mathbf{E_p}$.

Production and its financing create a field of attraction in economic space analogous to a gravitational or magnetic field in physical space. This field consists of money in use (**K**) as the core, and current market value of title to claims (**S**) as the outer region of the field.[7] Once a production and distribution plan is started a particular stream of cash flows is set in motion, and this cash flow stream is always subject to valuation at the margin.

Periodic Measure vs Cumulative Valuation

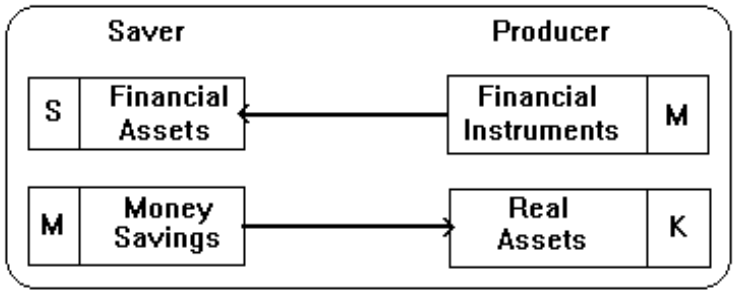
As illustrated in Diagram 1, the capital market valuation is a cumulative valuation process, based upon the expectation of remaining future earnings, the risk adjusted discount rate for the same risk class, and the residual value of the investment. Since entrepreneurial undertaking is under conditions of uncertainty, it is rather rare that actual annual earnings will coincide with expected annual earnings. This condition is an inherent risk under conditions of uncertainty. However, with the issuance of the firm's annual financial report, the financier becomes knowledgeable of his/her model's prediction error.

While firms engage in continuous multi-project financing rather than discrete single-project financing, the several individual investment plans are viewed as a single investment package. Accordingly, financial assets are bought and sold at any point in time based upon the information available at the particular time pertaining to the firms' cash flows. Of necessity, the *basis for measuring cash flows* as they occur in stages is totally independent from the *pricing of those cash flows*. That is, *ex post* measurement is concerned with: how much is the *current* cash flow?[8] This question is independent of the question of *ex ante* pricing: How much is the *future* cash flows from the given money commitment worth given current and anticipated conditions?

At this juncture, the investment process is used to further reinforce what has been established above--the interdependence between the valuation of claims (**S**) and the measurement of estimated recoverable money commitments (**K**). Diagram 4 illustrates the investment process. The investment process is depicted in part as a money transfer function in which: (1) savers exchange money (**M**) in the capital market for the present value (**S**) of future cash flows, and (2) savings (money received - **M**) becomes money in use (**K**) in the commodity market.

As stated earlier, this analysis is limited to equity capital. The amount of money changing hands in this process is **M**, which is interchanged with **S** and then converted to **K**. $\mathbf{M} = \mathbf{S}$; $\mathbf{M} = \mathbf{K}$; hence, $\mathbf{S_t} = \mathbf{K_t}$. If $\mathbf{S_t} = \mathbf{K_t}$, then how is it that they do diverge in subsequent periods, in which case one of two conditions would obtain: (i) $\mathbf{S_{t+1}} > \mathbf{K_{t+1}}$, or (ii) $\mathbf{S_{t+1}} < \mathbf{K_{t+1}}$? The reason for this divergence is that immediately upon the transfer of **M**, uncertainty enters the picture and the psychology of the capital market takes over.

Diagram 4
Money Transfer Function



The financier participates in the capital market to adjust his/her liquidity requirements. Exchanges in the secondary market occur to meet the liquidity needs of the financier.

Integration of Concepts and Emerging Theorem

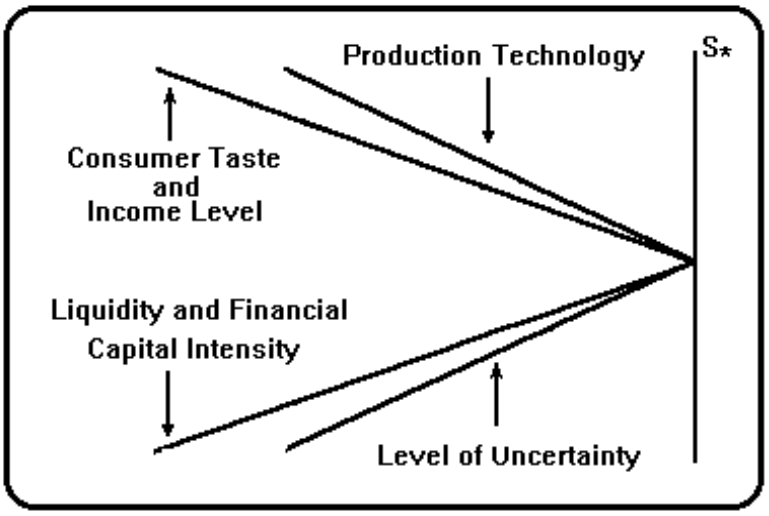
In Diagram 3, a static instantaneous discounting process is represented by the points along $\mathbf{S}_*$, where $\mathbf{S}_*$ is a connection of an infinite number of point events because security price formation (**S**) is instantaneous and continuous. Savings (money) flow into the capital market in exchange for the present value ($\mathbf{S_1}$, $\mathbf{S_2}$, etc.) of financial assets. For example, $\mathbf{S_1}$ is the assessed present value of a specific equity security at a particular point in time. Hence, all points, which form the line $\mathbf{S}_*$, represent current market values ($\mathbf{\Sigma E}^*$ discounted at risk adjusted rate **i** for **n** periods). High liquidity requirements among financiers would depress the present values of future money flows in the secondary capital market. The reverse is true. The effect, of savers' desire for high liquidity, in the primary capital market would be the scarcity of the availability of money (capital), accompanied by a higher than usual cost for the then available money (capital).

Financial accounting valuation begins with the receipt and use of money by the firm. Line $\mathbf{K}_*$ (the finance committed to a production plan) in Diagram 4 represents financial accounting valuation as an extemporaneous compounding process. A change in **K** occurs over time ($t \mid t = 0,1,2,3.... \infty$). Each year when **K** is measured, $\mathbf{E_p}$ realized by the firm from its investment plan is measured. Capital market forces (i.e., interest rates and liquidity

requirements) dictate returns on financial assets, whereas, the commodity market forces (and the capital market via cost of capital) dictate profits derived from real assets.

Diagram 5 illustrates the fact that the commodity market is affected by consumer demand, production technology, money-capital availability and the interest rate, and environmental uncertainty. To locate any point, in this field of attraction in economic space, a four coordinate system is used.

Diagram 5
Investment Field: A Four Coordinate System

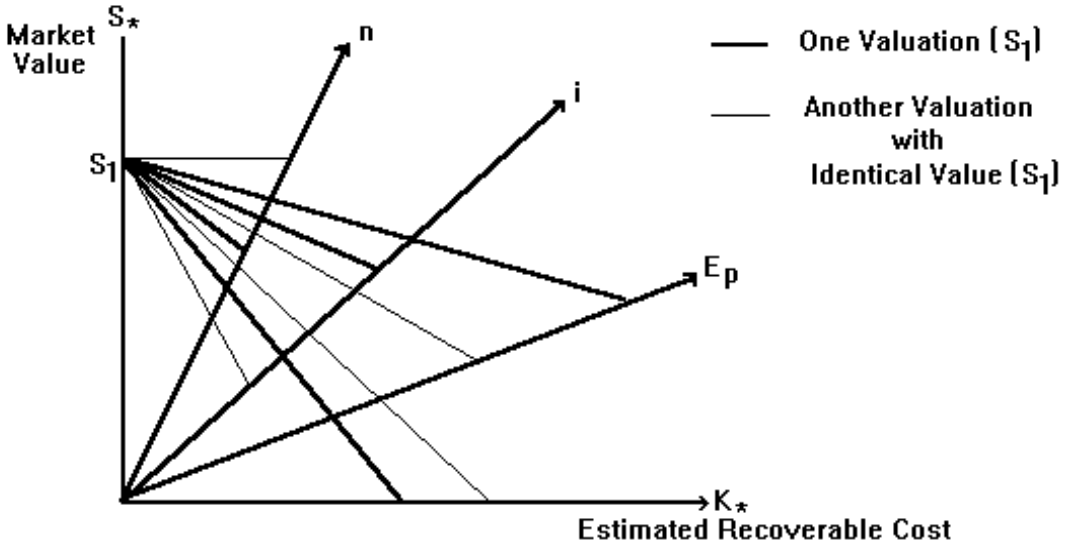


In Diagram 5, **K**, $\mathbf{E_p}$, **i**, and **n** are four spatial directions and distances from the common origin. These variables are affected respectively by the *production technology* plane, the *consumer taste and income level* plane, the *liquidity and financial capital intensity* plane, and the *level of uncertainty* plane. These interactive forces produce the earlier-mentioned field of attraction in economic space, which is investment. This environmental setting leads to the determination of value within the field. Thus, in a money economy, *the market price of an equity security cannot have meaning in the absence of money committed to a production plan.* This condition holds since earnings ($\mathbf{E_p}$) and residual value (**K**), the critical items being valued, are derived from the money commitment to the production plan.

Value Determinacy

As argued earlier, **K**, $\mathbf{E_p}$, **i**, and **n** in Diagram 4 constitute a manifold of four dimensions, and the line $\mathbf{S_*}$ is a mapping function. As illustrated in Diagram 6, *there is a unique point in line* $\boldsymbol{S_*}$ *for a given set of values for* **K**, $\mathbf{E_p}$, **i**, and **n**. However, *an infinite number of combinations of values for* **K**, $\mathbf{E_p}$, **i**, and **n** will produce $\mathbf{S_1}$, $\mathbf{S_2}$ or any point along $\mathbf{S_*}$**.** Thus, $\mathbf{\Sigma n(K_1E_{p1})\alpha = \Sigma n'(K_1E_{p1})\alpha' = \Sigma n''(K_1E_{p1})\alpha'' = \ldots}$; where $\boldsymbol{\alpha = (1+i)^{-n}}$. Evidently, *heterogeneous expectations can and do produce price consensus* (i.e., the same $\mathbf{S_1}$ is arrived at for different values of **K**, $\mathbf{E_p}$, **i**, and **n** given differing beliefs about the future). While, **i** and **n** (some factors which influence security prices) are investor specific, **K** and $\mathbf{E_p}$, which are shaped by commodity market forces, are firm specific.

Diagram 6
Value: Combinatory Possibilities



While there is no absolutely true $\mathbf{E_p}$, there are comparable $\mathbf{E_p s}$, and comparability is all that is necessary for proper security price formation. Despite the misuse of existing accounting methods which are incorrectly construed as alternatives, mandatory disclosure of significant

accounting policies enables the financier to compare $\mathbf{E_p s}$ across firms. Since it is expected earnings ($\mathbf{E^*}$), which is past experience as modified by future expectations that underlies current market value, then *in the absence of **K**, **S** is indeterminate.*

Interdependency of Valuations

Given investment as a field of attraction in economic space as analogous to a gravitational or magnetic field, when projections of market returns ($\mathbf{E_f}$) are further away from the measurement of earnings from actual production ($\mathbf{E_p}$), the field's intensity decreases as an exponential function of time (given the number of years in advance of the actual production). Invariably, the intensity of the field's attraction (the relationship between financial accounting value and current market value) will be reduced but it can never be terminated, even when $\mathbf{E_f}$ is significantly different from $\mathbf{E_p}$ and the time period (number of years) is very long. No matter how tenuous the link between market returns ($\mathbf{E_f}$) and corporate profits ($\mathbf{E_p}$) becomes in periods of capital market booms (highly speculative markets), they nevertheless are linked together.

What has been established is that $\mathbf{S_j}$, the market price of firm **j's** equity security, is based upon: (1) specific **K** and $\mathbf{E_p}$ values, and (2) a multiplicity of **i** and **n** values. This latter condition is so, since **i** (a risky discount rate) as well as **n** (the planning horizon) are highly personalized due to heterogeneous beliefs about risk and time horizons among equity investors. Accordingly, a change in market price ($\mathbf{\Delta S}$) is determined by the change in the point of intersection of two intersecting planes: $\mathbf{R^*}$ - the rate of return duo-plane (**K**, $\mathbf{E_p}$) in the commodity market, and **d** - the discount duo-plane (**i**, **n**) in the capital market. Line $\mathbf{S_*}$ is the intersection of the two duo-planes; therefore, $\mathbf{S_*}$ is the locus of all points in both planes. For any given moment in time the individual change in a firm's security's price varies with $\mathbf{\Delta E_p}$; $\mathbf{\Delta S}$ obeys the relation:

(5) $\mathbf{\Delta S} = f(\mathbf{R^*})/\mathbf{d} = \text{constant}$

Also, for a given $\mathbf{E_p}$, $\mathbf{\Delta S}$ varies with the planning horizon (**n**), and the discount rate (**i**); accordingly, equation (6) holds:

(6) $\mathbf{\Delta S} = f(\mathbf{d})/\mathbf{R^*} = \text{constant}$

Theorem and Proof

In this section, the intertemporal separability of capital market transfer-prices from the commodity market investment-base is developed fully. As stated earlier, the two markets are functionally connected by the producer (see Diagram 2) and, hence, are interdependent. This interdependence provides the rationale for the two valuations **S** and **K** in equation (1), since they relate not to one market but to two distinct markets. This condition leads not to one discounting process but to two discounting processes: (a) that of the financier (**S**) and (b) that of the producer (**K**).

Emergent Theorem

The emerging theorem (the net present value as defined by Turnovsky [1970]: **N = S - K**) can be inferred from Tobin's [1978,423] position: the divergence of the discount rate [**i**], implicit in the market valuation of securities, from the marginal efficiency of capital (**MEC**) regulates investments by producers. This theorem links the valuation in the capital market with the valuation in the commodity market, and explains the difference between capital market value and committed finance.

When the firm uses the cost of capital approach for evaluating projects, the Net Present Value of the Investment (**N**) emerges. **N** serves as an initial screening device; only projects with positive **N**s are considered. However, the firm's management uses its internal rate of return (**R**) as the discount rate to arrive at the money (**K**) it intends to commit to a production and distribution plan. The amount of money the financier (equity investor) transfers in exchange for a share of common equity is that financier's estimate of the present value of the future money flows from the security. The financier (equity investor) uses his/her risk adjusted discount rate (**i**) which provides for a return commensurate with the risk inherent in the firm. The financier's discounting process--pricing of the financial product - equation (3) as modified--is as follows:

$$(7) \qquad S_t = \sum_{n=1}^{k} (E_{fn})\alpha + S^*_{tn}\alpha$$

Financiers' planning horizon (**n**) underlying S_t are relatively small. In general, the equity financiers are looking for satisfactory returns (E_f) among competing alternatives and buying

into a firm for a short period. This condition necessitates a terminal value/deposit ($S^*_{tn}\alpha$) on the part of the financiers; and in those situations where the firm is terminated $S^*_{tn}\alpha = K^*_{tn}$.

Firms are continually selling their plans in divisible shares in the capital markets at a value (**S**). As stated earlier, in the initial stage, $S_t = K_t$, when $t = 0$ and $i = R$. Also, in the long run, when the firm is terminated ($t = \infty$ and $R = i$), then $S_t = K_t$. Thus, in the two extreme situations $N = 0$. In the absence of these two situations, then $N =$ or > 0; and in a liquidity crisis period, **N** can be negative: $N < 0$. In the intervening periods, as long as $R > i$, $S > K$; in the reverse situation, then $S < K$. Also, the two differing views of earnings (E_f and E_p) provide the main reason why in periods of stock market booms S_t would be significantly larger than K_t. However, even when by chance $E_f = E_p$, the different discount rates (**R** versus **i**), which are used in the firm's and financier's models, would create a difference in valuation.

R (the firm's internal rate of return) is firm specific. It is different from **i** (the financier's rate of discount) because the financier's risk assessment is different from the firm's operating risk. The financier has to deal with the systematic risk inherent in the capital market. Thus, the financier uses **r** (interest rate) as the frame of reference to arrive at **i** to compensate for the level of risk associated with the market returns and the risk associated with the firm's operation. However, **R** includes **r** because **r** is an opportunity cost. If the firm is to maximize its profits, then **R** must be greater than **r**. The firm's (producer's) discounting process, in which case $R > r$, is as follows:

$$(8) \qquad K_t = \sum_{w=1}^{z} E_{pw}(1+R)^{-w}$$

Given that that K_t is the committed finance expected to be recovered in equation (8), it is clear that the difference between the two discounting processes would necessitate that $S_t \neq K_t$. As explained, E_f can be greater than, equal to, or less than E_p; therefore, the following properties (which are not exhaustive) hold in time periods $t > 0$ and $t < \infty$:

Property 1: $S>K$ for $(i, n)_f = (R, w)_p$, if $E_f > E_p$ for all E_f
Property 2: $S<K$ for $(i, n)_f = (R, w)_p$, if $E_f < E_p$ for all E_f
Property 3: $S>K$ for $(E, n)_f = (E, w)_p$, if $R>i$ for all **R**.
(When $i > R$ no investment will take place.)

In equations (7) and (8), for a firm with a short life span and no change in equity owners, where **R** and **i** would be equal, $\mathbf{E_f}$ and $\mathbf{E_p}$ would be identical; **n** and **w** also would be identical. However, in that case there is no trading of equity interest. In the absence of intertemporal trading of savings, while financial accounting valuation would persist, market value would have no significance. However, intertemporal trading of savings is a reality. Given an unlimited life of the firm, a firm's policy of retaining a portion of annual profit, and equity owner's search for better risk/return opportunities, the variables **n** and $\mathbf{E_f}$ in equation (7) will differ from **w** and $\mathbf{E_p}$ in equation (8) even though **i** and **R** may be equal. Due to differences in $\mathbf{E_f}$ and $\mathbf{E_p}$ ($\mathbf{E_f} \neq \mathbf{E_p}$), there will be a difference in the expected earnings. When $\mathbf{E_f} > \mathbf{E_p}$, a prospective gain ($\delta$) usually exists, where: $\delta = \mathbf{E_f} - \mathbf{E_p}$. Now, equation (7) can be restated as (9):

$$(9) \qquad \mathbf{S_t} = (\mathbf{K_{tn}})\alpha + \sum_{n=1}^{k} (\mathbf{E_{pn}} + \delta_n)\alpha$$

Since price appreciation (a component of $\mathbf{E_f}$) is affected by the liquidity requirements of financiers, then the discounted value of the prospective gain (δ) is the factor which the financier uses as the basis of comparison when alternative forms of savings with the same risks exist. Naturally, the financier selects the alternative in the same risk class with the highest δ.

Evidently **N**, the *difference* between $\mathbf{S_t}$ (the sum of: a refundable deposit plus discounted future dividends plus equity security price appreciation) and $\mathbf{K_{st}}$ (the estimated recoverable cost from operations in the commodity market), which can be *positive, negative or zero*, would not exist in the absence of the two distinct markets. Accordingly, the origin and the relevance of financial accounting valuation as *financial product costing* and capital market valuation as *financial product pricing* are unequivocally established. As outlined, **N** is readily explainable as consisting of a monopoly power component (**S** - **RC**) based upon the earnings dichotomy ($\mathbf{E_f}$ vs $\mathbf{E_p}$) and a valuation model earnings component (**RC** - **K**) based upon the rate of return/discount dichotomy (**R** vs **i**).

CONCLUSION

Motivated by that implicit recognition of accounting information as a fundamental variable in stock price determination, this paper has explained how accounting information

becomes part of the fundamental valuation approach employed in the capital market and offers a more comprehensive theory of the stock pricing mechanism. This research has provided: (1) a workable hypothesis of stock price determination amply supported by analysis, (2) a theoretical framework for understanding the issues raised by the empirical findings in the studies cited [Scott 1985; Kormendi and Lipe 1987; Campbell and Shiller 1988; Guo and Chang 1993], and (3) support for the intuitively appealing propositions of Turnovsky [1970] and Arzac [1975].

In this paper, a strong theoretical link is established between financial accounting valuation and stock price determination. In this process, the interdependence of the commodity and capital markets was established via the properties of investment (a field of attraction in economic space analogous to a gravitational or magnetic field in physical space). The field approach enabled a mapping function. The derivation and proof of one theorem enabled a linking of the valuations (financial accounting and capital market) in the two markets and established the validity of the difference between the two valuations (**S** and **K**) as being appropriately termed net present value. The extent to which **S** and **K** will converge or diverge is dependent on the differences in: (1) expectations of accounting earnings ($\mathbf{E_p}$) and market returns ($\mathbf{E_f}$), and (2) the internal rate of return (**R**) and the market rate of discount (**i**). Future empirical tests should focus on the degree of convergence and divergence between **S** and **K** arising from those two factors.

The combination of the estimated recoverable amount of an invested sum of money in the business enterprise's productive assets and earnings of the business enterprise, which are measured in financial accounting, constitute a financial product having its origin in the commodity market. The empirical findings cited in this paper do support a strong relationship between accounting earnings and stock prices but solely based upon statistical goodness of fit. The explanation for this stalwart finding is due to the fact that the estimated recoverable cost is a sound measure of the residual cash commitment/residual value of committed finance, as long as proper accounting methods are used to measure the activities of the organization. Certain accounting methods (e.g., *LIFO inventory valuation, bad debts estimates based on sales, and current value for marketable securities*) merely introduce noise into the resulting accounting

information and prevent the accounting measurement from being a proper measure of the estimated recoverable cost; those methods produce a distortion of the residual value of committed finance. The added drawback is that the data generated by those methods do not lend themselves to good forecasts.

Financial analysts have always appreciated appropriate disclosures and continue to show great concern for the quality of accounting measurements. Yet, it remains to be seen whether the accountants will make a more serious effort to ensure the quality of accounting measurements by selecting accounting methods which best depict the earnings process and residual value of committed finance. One can only hope that they will not continue to be indifferent in the selection of accounting methods.

ENDNOTES

[1] There is quite an extensive body of research in support of the information content of financial accounting information (e.g., Ball and Brown [1968]; Beaver [1968]; Brown and Kennelly [1972]; Beaver, Clarke, and Wright [1979]; Patell and Wolfson [1984]; Beaver, Lambert, and Ryan [1986]). Also, Ohlson [1992], in an elegant mathematical work, has related earnings and unexpected earnings to market returns.

[2] For a discussion of this topic, see Salvary [1989,52]

[3] Lindenberg and Ross [1981] compare accounting data and market data to determine the extent, distribution, and history of monopoly rents in one sector (industrial) of the economy. Lindenberg and Ross [1981,3] maintain that the excess of q over 1 is attributed to monopoly rents, and it is maintained that the "q value of the firm will provide an upper bound to its monopoly rents." While this line of reasoning is implicitly accepted, the focus in this paper is on an explanation of stock price which is conditioned by interperiod uncertainty on rates of return which produce interperiod variation of expectations by the suppliers of capital as implied by Thomadakis [1976,161]. According to Thomadakis [1976,161], "the random character of market rates of return will result from differentiated stochastic mechanisms whose relative weight will depend on the firm's monopoly power." The perceptions of monopoly rents on the part of the suppliers of finance affect the market returns which is accountable for the difference between **S** and **RC** - the firm's monopoly power.

[4] In financial accounting, if $\mathbf{C} > \mathbf{C}^*$, then the estimated unrecoverable amount ($\mathbf{C} - \mathbf{C}^*$), which is tantamount to the cost of an expired option, is written off so that only the estimated recoverable cost ($\mathbf{C}^*$) remains as the investment base - money in use. While this loss ($\mathbf{C} - \mathbf{C}^*$) can be insured, there is no benefit since the cost of the insurance would be essentially the amount of the loss. Concerning the recoverable cost as the measurement property observed in financial accounting measurement, see Salvary [1992;1989;1985].

[5] $\mathbf{E_p}$ consists of two components [Salvary 1992,241]: (1) *a current cash flow component (**Ccf**)* (earnings realized in the form of cash - current cash returns) plus (2) *a future cash flow component (**Cff**)* (earnings realized in the form of credit - an accrual of estimated discounted future cash returns): $\mathbf{E_p = C_{cf} + C_{ff}}$.

[6] Since n and i are investor specific, this valuation model can only provide insights on either the average planning horizon or the average discount rate for a particular stock. Given assumptions about the average discount rate, the average planning horizon is determinable and vice versa.)

[7] For an analogy with physics whereby the recoverable cost (money committed to the production plan) is viewed as the nucleus and other valuations as electrons, see Salvary [1989,50-52].

[8] A proxy for cash flow is the accounting measure of profit plus depreciation as reported in the income statement.

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