The Supply of Capital Market Returns

The supply of capital market returns is generated by the productivity of businesses in the real economy. The aggregate of market returns is then divided among various claimants, and is constrained by the amount supplied. GNP measures real economic performance, which determines the supply of returns, and is used in a simple model of the expected return on the aggregate of financial assets.

The supply side model can be used to forecast expected capital market returns. For instance, the real GNP growth rate over the two decades ending in 1982—2.6 per cent—may be projected forward and combined with current yield and new issue data to produce a forecast of 5.4 per cent per year for real return on the aggregate of financial assets.

The supply model places in perspective the various demand models that dominate thinking about investment returns. For instance, investors should not expect a much greater (or fear a much smaller) return than that provided by businesses in the real economy. Thus investors’ expectations should be guided at least in part by the supply of market returns.

In the January/February issue of Financial Analysts Journal, we posited a New Equilibrium Theory (NET) in which each investor’s demand schedule for a given asset is determined by the interaction of that investor’s needs and the characteristics of the asset. The cost of capital of an asset is determined as the aggregate of heterogeneous investor costs for holding that asset. These costs include both the cost of assuming various kinds of risk and non-risk costs related to taxes, marketability and information. Like the Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT), NET addresses the demand for capital market returns. NET, however, deliberately sacrifices some rigor in order to include both risk and non-risk characteristics in the determination of demand and to describe a wide variety of assets.

This article considers the supply of capital market returns to be the provision of potential future cash flows (or their analogue, investment returns) by businesses. Demand thus reflects investors’ desire to receive such cash flows, and their willingness to commit wealth to businesses with that expectation.

Our model of expected investment return uses a supply-side input—namely, macroeconomic performance. This approach rests on the idea that the supply of aggregate returns available for distribution among the various claimants is set by the productivity of businesses.
"aggregate" we mean the weighted sum of returns on stocks, bonds, cash, real estate and other financial instruments. This article suggests a model for the determination of aggregate return only; the relative expected returns on specific assets are determined on the demand side by the NET characteristics of each asset.

A Supply-Side Model of Expected Return
The idea behind a supply-side model of capital market expected returns is that returns are related to the productivity of both capital and labor, each of which gets a share of what is produced. We devise below a means of estimating the aggregate capital market return expectation justified (in this supply view) by a given level of macroeconomic performance. Specifically, we use a macroeconomic input—the rate of change in GNP—as one of the determinants of the aggregate capital market return.

Definitions and Assumptions
Let us posit a closed economy with variables defined as follows, using upper-case letters for macroeconomic variables and lower-case letters for financial market variables:

- \( W \) = wealth of society including human capital and all other intangibles,
- \( w \) = aggregate market value of financial or capital market assets (including stocks, bonds, cash equivalents and real estate), and
- \( GNP \) = Gross National Product of the economy.

Assume that \( W \) grows at a constant rate:

\[ G = \text{rate of growth of } W. \]

Assume also that \( (w/W) \) is a constant; that is, financial wealth is a fixed proportion of total wealth. This assumption (which we refer to as a constant factor share assumption) combines with the constant growth assumption for \( W \) to yield the conclusion that \( w \), too, grows at a constant rate:

\[ g = \text{rate of growth of } w. \]

The above set of definitions and assumptions combines to give us:

\[ g = G. \]  

Equation (1) merely says that the growth rate of wealth measured in the financial or portfolio accounting discipline, \( g \), should equal the growth rate of wealth measured in the national income and product account discipline, \( G \).

Finally, because \( W \) cannot be measured directly, we must posit an additional assumption—namely, that the ratio \( (GNP/W) \) is a constant. This assumption enables us to use the growth rate of GNP as the measure of \( G \).

Historical Justification
Figure A and Tables I and II offer some justification for our fairly broad constant growth and constant factor share assumptions.

Figure A examines the proposition that \( (w/W) \) is a constant, using the income shares of capital (financial assets, or \( w \)) and labor (the remainder, or \( W - w \)) as indicators of the underlying aggregate values. These data suggest a relatively constant wealth share for financial assets, with perhaps a slight upward drift for labor and a downward drift for financial assets. One may note that the factor shares of individual components of capital have varied widely, although the total has not; this is to be expected as inflation, taxes and other economic results affect different financial assets differently. A similar breakdown of the labor share into common laborers, factory workers, professionals and high-technology specialists would probably also show varying shares of a relatively constant labor total.

Table I examines the constant growth assumption for GNP, using decade-by-decade GNP and per capita GNP levels and growth rates stated in both nominal and real (inflation-adjusted) terms. Over the whole period 1889–1982, real GNP grew at a 3.1 per cent compound annual rate. The annual GNP growth rate was close to 3 per cent in most of the decades of the period; that is, the mean of the series is reasonably constant. Even the depression decade of the 1930s had positive real GNP and real per capita GNP growth. The very fact that any period of negative real GNP growth is officially labeled a recession suggests the extent to which expectations of stable GNP growth are built into our economic system. The historical data thus support a constant growth assumption for GNP, at least within the limited ambitions of this article.

The assumption that \( g \) equals \( G \) over reasonably long periods is evaluated in Table II. The rate of growth of market capitalization (not returns), \( g \), is measured directly as the \( n \)th root of the ratio of the ending to beginning aggregate
value of financial assets, where $n$ is the number of years in the period.\(^7\) We measured $G$ as the rate of constant-dollar GNP growth, taken over the same periods as $g$ so that the two could be directly compared. The results show that, despite the use of several strong assumptions and a variety of possible measurement errors, there is a close historical correspondence between $g$ and $G$ for all the periods studied. Of course, since our constant factor share assumption is not literally true, we would not expect a close correspondence between $g$ and $G$ over short (say, yearly) periods.

A Supply-Based Equation
We can now begin to formulate an expression for $r$—the supply-based estimate or forecast of aggregate capital market total return, using the following definitions:

\[ r = \text{the total return on the aggregate of financial assets}, \]
\[ d = \text{the income return on the aggregate of financial assets}, \]
\[ a = \text{the capital appreciation return on the aggregate of financial assets, and} \]
\[ n = \text{financial net new issues—i.e., new issues net of maturities, redemptions, bankruptcies, demolition, depreciation, etc.} \]

Two equations relate these variables to each other and to $g$:

\[ r = d + a \quad \text{(2)} \]
and

\[ n = g - a. \quad \text{(3)} \]

Combining Equations (2) and (3), we arrive at:

\[ r = d + (g - n), \quad \text{(4)} \]
the supply model of expected return. In Equa-
Table I Decade GNP and Per Capita GNP Data in Nominal and Real Terms (1889–1982)

<table>
<thead>
<tr>
<th>Decade</th>
<th>Nominal GNP (Current Dollars)</th>
<th>Real GNP (1982 Dollars)</th>
<th>Per Capita GNP (Current Dollars)</th>
<th>Per Capita Real GNP (1982 Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount at End of Decade (billions)</td>
<td>Compound Annual Percentage Change</td>
<td>Amount at End of Decade (billions)</td>
<td>Compound Annual Percentage Change</td>
</tr>
<tr>
<td>1889</td>
<td>$12.5</td>
<td>3.4%</td>
<td>$172.2</td>
<td>3.6%</td>
</tr>
<tr>
<td>1890–1899</td>
<td>17.4</td>
<td>6.7%</td>
<td>245.9</td>
<td>3.7%</td>
</tr>
<tr>
<td>1900–1909</td>
<td>33.4</td>
<td>7.7%</td>
<td>352.1</td>
<td>3.4%</td>
</tr>
<tr>
<td>1910–1919</td>
<td>84.2</td>
<td>9.7%</td>
<td>464.6</td>
<td>2.8%</td>
</tr>
<tr>
<td>1920–1929</td>
<td>103.4</td>
<td>2.1%</td>
<td>588.3</td>
<td>2.4%</td>
</tr>
<tr>
<td>1930–1939</td>
<td>90.9</td>
<td>−1.3%</td>
<td>636.0</td>
<td>0.8%</td>
</tr>
<tr>
<td>1940–1949</td>
<td>258.3</td>
<td>11.0%</td>
<td>1,066.8</td>
<td>5.3%</td>
</tr>
<tr>
<td>1950–1959</td>
<td>487.9</td>
<td>6.6%</td>
<td>1,621.1</td>
<td>2.2%</td>
</tr>
<tr>
<td>1960–1969</td>
<td>944.0</td>
<td>6.8%</td>
<td>2,444.8</td>
<td>4.2%</td>
</tr>
<tr>
<td>1970–1979</td>
<td>2,417.7</td>
<td>9.9%</td>
<td>3,075.0</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Summary Statistics:
1889–1982
Geometric Mean: 6.1% 3.1% 4.6% 1.7%
Arithmetic Mean: 6.5% 3.4% 5.0% 1.9%
Standard Deviation: 8.8% 6.5% 8.8% 6.5%
Correlation With:
Contemporaneous Stock Return: 0.17 0.24 0.17 0.23
Previous Year Stock Return: 0.38 0.35 0.37 0.34
Two Years' Previous Stock Return: −0.06 −0.11 −0.06 −0.11

Table II Capital Market Size Growth Rates (g) and GNP Growth Rates (G)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U. S. Capital Market Aggregate Value Growth (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stocks</td>
<td>3.8%</td>
<td>5.2%</td>
<td>1.3%</td>
<td>−1.8%</td>
</tr>
<tr>
<td>Bonds and Cash Equivalents</td>
<td>2.8%</td>
<td>0.5%</td>
<td>2.3%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>N/A</td>
<td>4.9%</td>
<td>3.8%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Market-Value-Weighted Total</td>
<td>3.5%</td>
<td>3.4%</td>
<td>2.9%</td>
<td>2.4%</td>
</tr>
<tr>
<td>U. S. Gross National Product (G)</td>
<td>3.3%</td>
<td>3.5%</td>
<td>3.2%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

To evaluate Equation (4), we need exogenous estimates of the variables d, g and n. We used current yields observed in the market as the measure of d, the rate of GNP growth (G) as a supply-side substitute for g, and a direct count of new issues as the measure of n.

Forecasting the Market

Given best estimates of the future values of the variables G, d and n, Equation (4) can be used to forecast the return on the aggregate of capital market assets. Table III illustrates a supply-based forecast based on historical and current data. For G, we used the real value over the 1963–82 period. We calculated the new issue forecast by averaging the ratios of net new issues to capital stocks over the 1970–81 period. Simple subtraction yielded a capital appreciation forecast, in real terms, of −2.1 per cent.

A negative real capital appreciation forecast is
Table III Sample Supply-Derived Forecast of Aggregate Real Return on U. S. Financial Assets

Real Capital Appreciation Return:
Real GNP Growth Forecast
(Based on 1963–1982):

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Market Weight</th>
<th>Forecast Yield</th>
<th>Weight × Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stocks</td>
<td>19.4%</td>
<td>4.2%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Bonds</td>
<td>15.6%</td>
<td>10.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Cash Eq.</td>
<td>5.3%</td>
<td>8.7%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Real Est.</td>
<td>99.7%</td>
<td>7.5%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Market-Value-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighted Yield</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Forecast Real Total Return on Aggregate of Stocks, Bonds, Cash Equivalents and Real Estate: 5.4%

Table IV What if Supply Changed: An Illustration

Constant Growth Model for Consumption
R = cost of capital for the economy
= (consumption/wealth) + consumption growth rate

Positive Growth Economy
R = ($2 trillion/$50 trillion) + 3% growth
= 4% + 3% = 7%

Zero Growth Economy
Supply View: R Set by Macroeconomic Performance
R = ($2 trillion/$50 trillion) + 0% growth
= 4% + 0% = 4%

Demand View: R Set by NET Characteristics of Holding the Wealth of the Economy
R = 7% thus
R = $2 trillion/$28.6 trillion, i.e.,
Wealth = $26.6 trillion
Equilibrium View
R is between 4% and 7%.
Wealth is between $28.6 trillion and $50 trillion.
One possibility:
R = ($2 trillion/$40 trillion) + 0% growth
= 5% + 0% = 5%

not surprising, because bonds make up a large share of the capital market. Newly issued bonds have a zero nominal expected capital appreciation return, so if inflation is positive, the real capital appreciation return is negative.

We forecast the income return, d, using current market yields. For bonds, we used the current yield (coupon divided by price), not the yield to maturity, which contains the anticipated capital gain or loss over the life of a discount or premium bond. Weighting the yield forecasts by market capitalization, we arrived at an income return forecast of 7.5 per cent. Adding this to the forecast real capital appreciation of –2.1 per cent gives a forecast total real return of 5.4 per cent.

Supply, Demand and Equilibrium Views of Return
We now have a supply and a demand view of the expected returns on assets. The supply view presented here prescribes an aggregate real total return on financial assets but does not suggest how the return will be distributed among the various assets. The demand view presented in our earlier article did not prescribe an aggregate return but suggested that the relative returns on different assets would be determined by the assets’ characteristics and investors’ preferences for, or aversions to, those characteristics.

Melding the supply and demand views gives us an equilibrium view of return. Historical returns over long periods tend to reveal the equilibrium return, as actual results in the market reflect both the aggregate payoff generated by business activity on the supply side and the relative attractiveness of various assets on the demand side. Thus the use of historical returns to formulate future expectations has support in equilibrium theory.

In addition to this equilibrium view of the market, we now have a supply-side guideline for estimating future real expected aggregate return. Specifically, Table III suggests 5.4 per cent as the supply-governed expected real re-
turn. Of course, this number may vary depending upon one's view of future growth or factor shares.

We have propounded an idea we call macro-consistency. Market returns must be governed by the productivity of businesses—i.e., by macroeconomic or supply forces. One must be careful, of course, of interpreting this "governance" too broadly. Inasmuch as supply is affected by demand and forms only half of the equilibrium pricing equation, it would be just as meaningful to say that demand governs. We have emphasized the supply side because it has traditionally been ignored both in the financial context and in the more general context of economic and policy discussion. Given the renewed academic and popular interest in the supply of economic goods, we find it apropos to address supply in the financial context too.

**What If Supply Changed?**

A supply-demand-equilibrium framework suggests some interesting speculative questions, some of which are sketched out in Table IV. This supposes that we live in an economy with $2 trillion of consumption in the current period and a total social wealth of $50 trillion, yielding an income return of 4 per cent on society's wealth. In addition, wealth and consumption both grow at 3 per cent forever. The cost of capital or rate of total return for society's wealth is thus 7 per cent (in real terms, ignoring inflation).

Because of an exogenous occurrence—such as a change in the political system or in the preference for leisure over work—growth stops; i.e., the consumption stream will remain at $2 trillion per year forever. The supply view in isolation suggests that the cost of capital for society's wealth will now be 4 per cent. Valuing the $2 trillion perpetuity income stream at 4 per cent, we find that wealth remains at $50 trillion. The demand view in isolation, on the other hand, suggests that the cost of capital will remain at 7 per cent, because the NET characteristics (other than return) of holding society's wealth have not changed. Valuing the $2 trillion perpetuity at 7 per cent, wealth will fall to $28.6 trillion.

Which of these two views is correct? We believe that both supply and demand factors set the equilibrium cost of capital, so that the answer will be somewhere in between those suggested by supply and by demand each in isolation. In other words, society's wealth will fall, but not as low as $28.6 trillion, and the cost of capital will fall, but not as low as 4 per cent. Table IV illustrates one possible result—wealth of $40 trillion and a cost of capital of 5 per cent. Of course, we have no idea what the answer would actually be and hope, in any case, that the scenario is pure fantasy.

**Future Work**

A supply-side approach to capital market returns offers a potentially useful screen for market forecasts. Doomsday or hypergrowth forecasts ("Dow 300; Dow 3000") clearly defy our supply-side assumptions of constant GNP growth and constant factor share. In general, one should be aware of the implicit assumptions contained in market forecasts and should reject a forecast if its underlying supply assumptions differ from one's own.

Of course, the ultimate goal of the supply and demand approaches is an integrated supply-demand theory of payoffs for asset characteristics, one that can specify expected returns for all assets once their characteristics are known. This result would amount to a prescriptive formula of the kind exemplified by the CAPM and APT, and it is a long way off at best; we do not even know that it is possible. We mention the possibility of a prescriptive formula incorporating both supply and demand in order to stimulate imaginations and to encourage researchers to examine the feasibility of such an undertaking.

---

**Footnotes**


3. Our usage contrasts with the more widely seen "supply of and demand for capital," in which investors are the suppliers and businesses the demanders. There is no substantive difference between the two; ours is intended to focus on cash flows (or their analogue, investment re-
turns) as the good being priced in the market.

4. We plotted data from U.S. Department of Commerce national income account statistics obtained from DRI-FACs, a service of Data Resources, Inc., Lexington, Mass.


Correlations with the stock market are based on the value-weighted index of all New York Stock Exchange stocks in Alfred Cowles, *Common Stock Indexes, 1871–1937* (Bloomington, Ind: Principia Press, 1938), adjusted for the reinvestment of dividends, for 1889–1925; and from the value-weighted NYSE total return index constructed by the Center for Research in Security Prices (CRSP), Graduate School of Business, University of Chicago, for 1926–82.

6. The 1930–39 compound annual per capita real GNP growth rate reported in Table I—0.0 per cent—represents the small positive number 0.032 per cent, rounded to one decimal place.

7. We collected aggregate market values of stocks, bonds, cash and real estate for the various starting and ending years shown in Table II and converted them to constant dollars using the CPI. The sources of the market value data are: Roger G. Ibbotson and Gary P. Brinson, "World Wealth: The History and Economics of Capital Markets" (work in progress); Roger G. Ibbotson and Carol L. Fall, "The U.S. Market Wealth Portfolio," *Journal of Portfolio Management*, Fall 1979; and Robert A. Stambaugh, "Missing Assets, Measuring the Market, and Testing the Capital Asset Pricing Model" (Ph.D. dissertation, University of Chicago, 1981).


By rearranging Equation (4) as \( r = (d - n) + g \), one can separate out \((d - n)\) to represent "net dividends"—i.e., dividends net of new issues, or that part of dividends that does not have to be reinvested in the financial markets in order to sustain constant growth at rate \( g \). In this context, \((d - n)\) is a measure of the consumption flowing from financial markets and \( g \) is the rate of growth of \((d - n)\). This concept is consistent with the idea that eventual consumption is the goal of investment.

9. Forecast yields are as of June 30, 1983 and consist of the S&P 500 stock index yield, the Salomon Brothers Inc long-term high-grade bond index average coupon divided by average price, the 30-day Treasury bill yield, and the authors' estimate of real estate net rental income. Market weights are from Figure 1 of Roger G. Ibbotson and Laurence B. Siegel, "The World Market Wealth Portfolio," *Journal of Portfolio Management*, Winter 1983.


11. This analysis is based on the Williams and Gordon-Shapiro constant growth model, applied to consumption. We have tried to make this example realistic for the U.S., at least in the order of magnitude sense. Fifty trillion dollars is a rounded estimate of the U.S. social wealth including human capital and other immeasurables. Since current GNP is about $3.0 trillion, we might suppose that consumption (after extracting savings and the government share) might be in the range of $2 trillion.