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Rational Exuberance?

Is There Method behind the Madness in Internet Stock Valuations?

Michael J. Mauboussin
1 212 325 3108
michael.mauboussin@csfb.com

Bob Hiler
1 212 325 4341
bob.hiler@csfb.com

- Some of the key value drivers to Internet stocks are neither obvious nor well understood.
- Many Internet-based companies have superior business models versus their land-based brethren.
- First-to-scale advantages are significant.
- Real options valuation shows that greater volatility may mean greater value.

Introduction

The valuations accorded some Internet-related technology companies are generating a broad range of reactions, from bewilderment and bemusement to disbelief and disgust. Most value investors are appalled, and many growth investors find themselves without calibration benchmarks. What is going on?

We are convinced that some recent Internet high fliers will fall back to earth. But fundamentally, we sense that greater forces are at work here than most people appreciate, and that these forces are not well understood by the average investor or media pundit.

The goal of this report is not to defend valuations in the marketplace. Rather, it is to offer some counterweight to the argument that current market values are completely unfounded. Indeed, we believe that some of the key value drivers in technology are not obvious and are, in some cases, counterintuitive.

Investment ideas

We highlight four central investment themes—business models, the network effect, first-to-scale advantages, and real options—in our attempt to account for current valuations. We worked on these ideas with our Internet/New Media analyst, Lise Buyer, who has used many of them in her analysis. Further we note that there is an investment strategy, based on portfolio theory, that makes sense to us. The ideas are as follows:

Business Models A business model explains how a company generates its economic returns. While there are many approaches to creating value, understanding any business model requires appreciation of both the income statement and balance sheet. We believe that the financial community—with its predominately income statement-centric view—is missing the power of some Internet business models.

The best way to illustrate this point is to turn to some standard finance theory. The value of any business is the present value of its stream of future free cash flows. Free cash flow, in turn, can be defined as the difference between cash earnings—derived from the income statement—and the investment in future growth—derived from the balance sheet. Investment in future growth typically incorporates changes in net working capital and growth in fixed capital.

Generally, earnings represent an *inflow* of cash, and investment in future growth represents an *outflow* of cash. Still, free cash flow is the all-important sum because it represents the pool of cash available for distribution to all the claimholders of the business.

As an exemplar of the New Economy, Internet companies have business models that highlight the risk of looking only at the income statement. There are two specific elements to note. First, the “investment” outflow is very often modest for New Economy companies because their primary source of competitive advantage is intellectual capital, not physical capital. More to the point, an investor should be willing to pay more for earnings of a New Economy company that has modest capital needs than for the earnings of an Old Economy business that requires lots of capital, all things being equal.

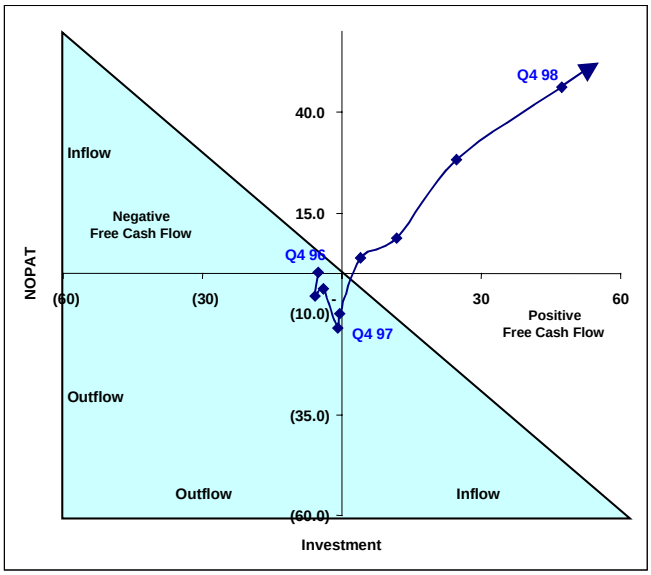
Second, a number of companies are realizing cash *inflows* from their “investments,” or balance sheet changes. This is because fixed capital requirements are negligible and there is a favorable “cash conversion cycle.” For example, if a customer purchases a book from Amazon.com, the company will charge the buyer’s credit card almost immediately. Furthermore, Amazon.com maintains only two weeks of inventory. At the same time, AMZN takes about 45 days to pay its suppliers. The result is that Amazon.com gets its cash roughly 30 days before it

pays its suppliers. This means that as the business grows, it actually generates cash from working capital.

So some New Economy companies have turned the model on its head: their cash earnings (losses) are an *outflow,* but their investment in future growth is an *inflow.* Other companies—such as Dell Computer—are realizing double benefits by generating cash both from operations and from the balance sheet. If Old Economy investors, accustomed to relying on earnings, are ignoring an important source of cash—and cash flow drives market value—it's no wonder that these investors perceive New Economy companies to be expensive.

Yahoo!—the leading Internet portal—offers another fascinating case study. In Figure 1, we charted YHOO's financial performance in what we call a "cash economics matrix." Over the past two years, Yahoo! has migrated from being a modest negative free cash flow generator, for which both cash earnings and investments were cash outflows, to becoming a super cash flow generator, whose cash earnings and investments are both cash inflows. Said differently, the earnings improvement at YHOO—while dramatic—actually belies the strength of the positive cash flow swing.

Figure 1
Cash Economics Matrix
Yahoo!, Inc.



Source: Company SEC filings and CSFB estimates.

Another example contrasts the capital needs of Amazon.com versus its main competitor in the book business, Barnes & Noble. Table 1 shows that AMZN essentially invested no net operating cash in its business to achieve a $1 billion revenue run rate (which the company achieved in fourth quarter 1998). Using Barnes & Noble's operating statistics, one can estimate that a traditional "bricks-and-mortar" retailer would have to *invest more than $400 million* to support the same $1 billion run rate.

Table 1
Business Model Battle: Amazon.com versus a Bricks-and-Mortar Retailer
In $ millions; assumes achievement of $1 billion revenue run rate

	Bricks and Mortar	Amazon.com
Inventories and receivables	$320	$35
Accounts payable	(165)	(90)
Fixed PP&E	260	50
Total	$415	$(5)

Source: CSFB estimates.

AMZN's model is *already* more attractive than its competition in the book business. Those onlookers that refuse to look beyond the income statement are missing the substance of the model. It is true that Amazon.com's market value anticipates earnings in the not-too-distant future, but it is starting with a better economic proposition than its more familiar competitors.

Network Effect[1] Positive feedback—the strong get stronger and the weak get weaker—has always existed. However, the *source* of positive feedback is fundamentally different, and inherently more powerful, in the New Economy than in the Old Economy.

In the Old Economy, positive feedback stems from economies of scale: the largest companies sustain the lowest unit costs. Importantly, economies of scale are driven by the "supply side," and consequently, run into natural limitations. In other words, positive feedback wanes at a point well below market dominance.

Positive feedback in the New Economy generally is driven from network economics—often called simply "the network effect." The fundamental principle is that a network becomes more valuable to each user as incremental users are added. More specifically, the value of the network grows exponentially as the number of members grows arithmetically.

A simple example underscores this point.[2] Assume that a company sells goods to 10 customers a day. If a new customer is added, sales rise 10%. Assuming that fixed costs can be spread, earnings might grow slightly faster but the relationship is basically linear.

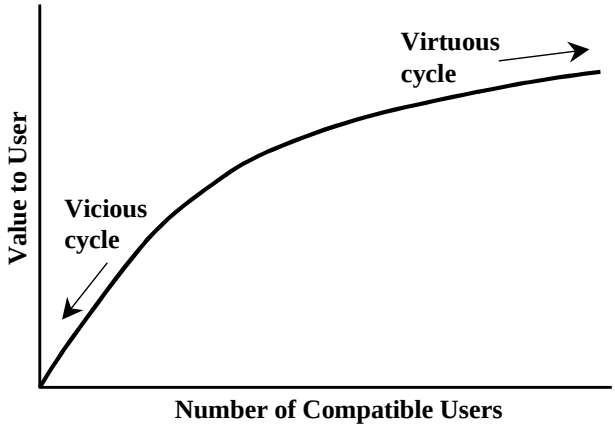
Now assume, say, this company is an online auction site with a network of 10 customers that sells goods to each other every day (10^2, or 100 interactions). Add a new customer, and the interactions grow by 21% (11^2, or 121 interactions).

In contrast to the Old Economy, the network effect is based on the "demand side." This is key because positive feedback does not dissipate when the market grows. More users translate into more value, thus attracting more users, and so on. This creates a virtuous cycle (see Figure 2).

[1] Many of these ideas come directly from *Information Rules,* by Carl Shapiro and Hal Varian (Harvard Business School Press, 1999), pp. 173-225.

[2] This example was inspired by Kevin Kelly of *Wired* magazine.

Figure 2
Popularity Adds Value in a Network Industry



Source: *Information Rules* , Carl Shapiro and Hal R. Varian.

The main point is that a network of users is very valuable, and becomes more so as it grows over time. As companies start to enjoy the virtuous cycle, their revenue growth often meaningfully outstrips their cost increases. Further, the increasing utility of the growing network *locks in* the customer base, enhancing the sustainability of excess returns. These phenomena in part explain the market's enthusiasm for businesses like America Online, Yahoo!, and, of course, Microsoft.

First-to-Scale Advantages First-to-scale advantages describe those companies that establish user bases large enough to launch them into the virtuous cycle. The best metric of success, then, is often the size of the amassed network. In fact, it often makes sense for companies to forego current profits in an effort to build their network of users.

Being first in a given space is important, as it offers the opportunity to establish a brand, set industry standards, and increase switching costs. However, an industry's first mover is not always the first to scale, for a couple of reasons. To start, some early entrants do not appreciate the importance of building a customer base, and thus, do not leverage the virtuous cycle. Prodigy and CompuServe are examples in the on-line services market.

Second, large incumbents in adjoining businesses are often able to "link-and-leverage" their established franchises into a new market once it becomes clear the new market is viable. Microsoft's foray into the Internet browser market pioneered by Netscape is a case in point.

In financial terms, first-to-scale businesses often enjoy meaningful valuation premiums versus their competitors. User bases are important. Accordingly, valuation metrics based on users may be a reasonable proxy for value creation.

Real Options Real options analysis extends financial option theory to options on real, or nonfinancial, assets. A financial option gives its owner the right—but not the obligation—to purchase or sell a security at a given price. Analogously, a company that owns a real option has the right—but not the obligation—to make a potentially value-accretive investment to enter a new market. For example, Amazon's e-commerce expertise and customer franchise in the book market gave it a "real option" to invest in the e-commerce markets for music, movies, and gift. Other examples include growth options—options to pursue follow-on projects as-

suming initial investments work well—and flexibility options—options to switch production—as needed.

Real options add an important dimension in thinking about New Economy businesses because they highlight the value of future opportunities. One interesting—and somewhat counterintuitive—aspect of real options is that the greater the uncertainty surrounding the development of the Internet, the *more* valuable these options may be.

Let's step back. Standard finance theory says that the greater the uncertainty, the higher the appropriate discount rate, and the lower the present value. Uncertainty, expressed as volatility, lowers value. Most analysts tend to use relatively high discount rates to calculate the present value of Internet companies.

Based on the widely used Black-Scholes model, option value is a function of the value of the underlying asset, a strike price, time, the risk-free rate, and volatility. As options have asymmetric payoff schemes, volatility *increases* value. So an Internet company with lots of real options will be much more valuable than a standard discounted cash flow analysis would suggest.

We believe it is reasonable to think of Internet companies as a combination of current, known businesses, and a portfolio of real options. The question then becomes: which companies have the most options and what are they worth? Market signals analysis—reading from stock prices what expectations are imbedded in shares—can be helpful in this appraisal.

The Gorilla Game Even if these ideas are given full weight, considerable risk obviously remains in investing in the Internet sector. How does an investor participate intelligently?

We liked the idea espoused in the book *The Gorilla Game*[3], which is based on portfolio theory. The authors advocate buying the stocks of all companies that have a chance of dominating a given sector. Then, as it becomes apparent that a company will not dominate, positions should be sold with the proceeds redeployed into the "gorilla." In many technology sectors, positive feedback creates a winner-take-all profit outcome. Hence, the valuation of the gorilla, while apparently expensive, may become even richer as the company extends its lead over its less-fortunate peers.

Conclusion

These are heady times in Internet investing. Only time will tell if the market's exuberance for many of these stocks is warranted. Our goal is not to suggest that the basics of finance and strategy are no longer valid. Rather, it is to make the case that the strategy and finance models driving current valuations are not widely understood or recognized.

[3] *The Gorilla Game,* by Geoffrey Moore, Paul Johnson, Tom Kippola (HarperBusiness, 1998).

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New York, NY 10010, U.S.A.
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Europe

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Three Exchange Square
8 Connaught Place
Central, Hong Kong
852 2101 6000

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