# Commentary: Technology, Information Production, and Market Efficiency

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Andre Shleifer's paper makes the case that while the information and communications revolution has had important salutary effects on financial markets, it has also increased the incentives for information producers to distort their information. He also states that the advances in information and communication technologies have created a new marginal investor who may be particularly vulnerable to distorted market information. My comments will focus on the information distortion part of the argument.

Andre is too careful a social scientist to suggest that information distortions may have caused the bubble. As Robert Schiller states in his study of irrational exuberance, it is extremely difficult to identify and isolate the factors that might explain a speculative market. Schiller identifies twelve factors, as well as a number of "amplifying mechanisms," as having had an effect on the market that is not warranted by rational analysis of economic fundamentals.[1]

Despite the obvious methodological difficulty of identifying precipitating factors of a bubble, I find myself—not as a social scientist or a policymaker but as a market practitioner—strongly drawn to Andre's account of the role of distorted information and suspect that it may have a bigger impact on the pricing and, more importantly, the mispricing of financial assets than we might be able to induce from formal economic models.

The question I struggle with a great deal since first reading Andre's paper, however, is whether we should readily ascribe the problem of distorted information solely to technological progress or whether there are deeper structural or, perhaps, even cultural forces at work that have amplified the consequences of the information revolution, as outlined in Andre's paper.

To address this question, we need to ask what is revolutionary about the information revolution. In *Information Rules*, Carl Shapiro and Hal Varian show that the true value of the Web is not in the amount of information it makes available. In fact, they conclude that "the meaningful amount of information content on the Web is actually quite modest compared to a superbookstore, let alone a major university library.[2] The real value of the information revolution is that it has made it easier and dramatically less costly to access and to disseminate information. Perhaps more importantly, it has provided the means to manipulate information.[3] The information age is, therefore, marked neither by quantity nor by quality but by something that might be described as dynamic or manipulative ubiquity.

This brings us to the first proposition in Andre's paper, namely that the effect of technological advancement is to make information available faster, in greater quantity, and to more people without necessarily improving its quality. From that follows that the marginal recipient of ubiquitous information is less able to process it correctly. This is what Herbert Simon had in mind when he talked about a wealth of information creating a poverty of attention. Given this state of confusion, Andre suggests that the producers of information have a natural incentive to distort information (proposition 4), that the quality of information will gradually deteriorate (proposition 5) and that there is, therefore, a role for new regulation to safeguard the quality of the information transmitted (proposition 6).

These propositions hold, and I sympathize with Andre's call for possible regulatory initiatives. Nonetheless, as I pointed out earlier, I suspect that there is a piece missing in the underlying explanation of the origins of distorted information. This piece, in my opinion, has to do with what might be labeled a new capitalistic spirit, which dramatically came to dominate the U.S. economy and, more broadly, American culture during the 1990s.

Over the years, I have been told on a number of occasions by European policymakers that when asked privately to explain the strength of the U.S. economy, the then Deputy-Secretary and later Secretary of the Treasury Larry Summers would not make reference to the strong dollar or fiscal prudence or even monetary policy but to the fact that it is possible for a young entrepreneur in America to raise his first one hundred million dollars of capital before he is able to purchase his first suit. Andre's paper might benefit from trying to incorporate a dynamic, which is deeply rooted in the story of the entrepreneur with a hundred million dollars but no suit. The full impact of the information revolution—positive as well as negative—is closely connected to a fundamental and commonly shared perception of and a psychological and cultural positioning toward the role of capital and capitalism.

From this common capitalistic positioning follows much of what Andre and his colleagues identify as having been at the root of the information distortion problem. Think of stock option compensation, the desire of young college graduates to be entrepreneurs, the lure of quick IPOs, the fascination of the broad public with various television money and market programs, and, not least, the importance of defined contribution plans for the average American worker. In short, I would suggest that the information distortions Andre identifies in his paper may have as much to do with the "new capital markets" as with the new "information superhighways."

I am aware of the risks of tautology here. A feedback mechanism obviously exists between the information revolution itself and this common popular perception of the role of capital and capitalism itself. To some extent, the new capital markets and the new information superhighways clearly go hand in hand. Nevertheless, it seems to me that an important part of the story behind the information distortions and their impact on financial markets is the notion that American capitalism of the 1990s was an incredibly fertile environment for the information revolution to occur in. The question for Andre, then, is: Is it possible that the problems he identifies in his paper are rooted as much on the capital side as on the information side?

A mere perfunctory examination of the post-bubble situation in Europe reveals ample evidence that the impact of the information revolution has been of a different scale compared with what can be observed on this side of the Atlantic. While such an observation does not constitute proof that something more than information advances are at work in creating information distortions, it should at least cause us to pause and think about whether we have the story right.

It is important to get the story right. After all, Andre and his colleagues conclude their paper with a call for new regulatory initiatives. What I have been able to witness as a practitioner leads me to support this call, albeit with considerable caution. Before we look for regulatory solutions, we must be sure we understand fully what lies behind the information distortion. If we don't, we are bound to misfire our legislative bullets and, more importantly, risk making things worse.

Drawing on practical experience, I see three areas where new regulatory initiatives could play a useful role in limiting the distortion of information made available to investors. Two of these are discussed in great detail in Andre's paper.

1. The first lies somewhat outside the treatment of Andre's paper but strikes me as particularly relevant. It regards the conflict of interest that comprehensive financial institutions face between their investment banking, brokerage, and asset management operations. Imagine the following scenario. A bank acquires a mandate to advise a start-up company. The bank's private equity fund helps the company raise capital. It then urges the entrepreneurs to aim for an early initial public offering. The bank's brokerage and research arm dispatches its analysts who write glowing reviews about the company's prospects for their clients and for the media. One of the bank's senior managers accepts a seat on the company's board. Finally, the asset management branch of the bank allocates stock holdings of the company to its

clients' discretionary wealth management account. Surely, there is role here for a sensible regulatory framework to prevent flagrant conflicts of interest. It is, of course, conceivable that the existing regulatory void in this area gets filled by self-regulating private-sector practices. An example would be the new internal guidelines at Goldman Sachs, which require equity analysts to fully disclose their personal holdings. Similarly, Merrill Lynch and CSFB have recently adopted rules forbidding analysts and their families from owning shares they cover.

2. The second area regards the use and the accounting of stock options. Stock options occupy a central place in Andre's paper. He shows convincingly, in my opinion, how the granting of stock options raises the benefit of a high current stock price, thus creating incentives for the corporate information producers to distort the information flow. In the spring of 1999, Mary Meeker, one of the then star equity analysts, suggested with terrifying honesty that "this is a time to be rationally reckless." Surely compensation is a good place to begin an effort to alter incentives to curtail the kind of recklessness openly advocated by the Morgan Stanley equity strategist. The aim of regulatory initiatives in this area should not be to eliminate the granting of stock options but to draw up a set of rules that govern the use of stock options and safeguard appropriate incentives for the recipients of stock options.

3. Andre's detailed discussion of the relevance of accounting rules is excellent. Particularly, his call for new rules to accurately expense stock options strikes me as long overdue, even if the valuation problem is a complex one. As Chairman Greenspan pointed out last night, the only thing we have to keep us ahead of the curve of ever-evolving complexity is knowledge. This is a case where we need to put our knowledge to work to find a sensible solution. As the paper suggests, credit should go to Andrew Smithers who has persistently called for a remedy to this accounting anomaly.[4] In addition to yielding more meaningful company earnings figures, more accurate expensing of stock options in the national income and product accounts ought to improve our ability to measure and understand productivity gains in our economy. While the BEA's most recent productivity revisions did

not entail any changes in the accounting methodology, it is seen by some market participants as an initial signal of a new focus on stock options.

4. A new FASB merger-accounting rule may go some way in eliminating another accounting incentive identified in the paper to distort information in order to keep stock prices artificially high. Under the new rules, the distinction between mergers treated as purchases and mergers treated as poolings of interest will disappear. Firms will, therefore, no longer need to amortize goodwill acquired in an acquisition. The new FASB regulation should, therefore, lessen the need for a company to maintain a high stock price as an acquisition currency.

Let me conclude with a word of caution. Much of what we have heard this morning validates the notion that regulators will have an important role to play in the information economy. Andre Shleifer's call for improved disclosure standards should be welcomed. Disclosure is the obvious place to start in the effort to alter the incentive misalignments, which the bursting of the technology bubble has brought to light. As the paper points out, the concrete task will be a difficult one. We must proceed with caution so as not to undermine the market's ability to exercise its arbitrage function.

In a recent book, Andre Shleifer has presented some of the central ideas of behavioral finance "around the themes of limited arbitrage and investor sentiment."[5] In his paper here, he expands on the theme of limited arbitrage and concludes, "there is no theoretical reason to believe that earnings manipulation will be undone through arbitrage." I am not qualified to take issue with the theoretical underpinning of the limited arbitrage argument. As a practitioner, I find myself rather in favor of the argument that financial markets are not always efficient. I do worry a great deal, however, that misdirected regulatory attempts may render markets even more inefficient. Many of us in the financial markets had considerable concerns along these lines at the time of the Asian crisis, when another bout of market volatility inspired regulatory discussions about the role of highly-leveraged institutions, many of which—incidentally—are no longer particularly leveraged. Some of them, in fact, are simply no longer around. It seems to me that the current discussion on how to adopt financial markets to the information economy contains similar risks of excessive and inappropriate market interference, only to recognize later that the ability of financial markets to arbitrage the mispricing of financial assets has been further compromised.

Finally, we should be open to the possibility that in this post-bubble environment, investor sentiment and investment behavior may undergo a significant transformation. It is conceivable that the common understanding of and positioning toward capital and capitalism, which I have tried to describe earlier, may be in the process of being altered as a result of the bursting of the tech bubble and a pronounced deterioration in the outlook for global economic growth. In the event of such far-reaching changes in market psychology, some of the issues that have been singled out in Andre's paper as requiring regulatory attention may no longer prove to be of such pressing relevance. This should not serve as an excuse not to address the policy and regulatory requirements of the information economy. It should merely encourage us to proceed with caution. The role for government in the information economy is bound to be a limited but an important one.

## Endnotes

[1] Robert J. Schiller. *Irrational Exuberance*, Princeton University Press, 2000, p. 18.

[2] Carl Shapiro and Hal R. Varian. *Information Rules*, Boston, Harvard Business School Press, 1999, p. 8.

[3] Shapiro and Varian, p.9.

[4] Smithers and Co., LTD, Murray, D., 2000. *Employee Stock Options. The Fed Joins In*, Report 142.

[5] Andre Shleifer. *Inefficient Markets. An Introduction to Behavioral Finance*, p. 25.