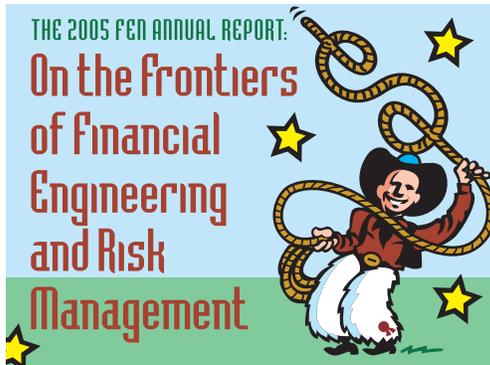


# FINANCIAL ENGINEERING NEWS

Universal Coverage of Financial Innovation

[www.fenews.com](http://www.fenews.com)



*Perry Mehrling is professor of economics at Columbia University's Barnard College. He is the author of several books, the latest of which is Fischer Black and the Revolutionary Idea of Finance, published this summer by Wiley.*

## What Would Fischer Say?

*Reprinted with permission from the Nov./Dec. 2005 issue of Financial Engineering News  
© Cusp Communications Group, Inc.*

Fischer Black saw the economy as divided into billions of different sectors along many dimensions. As the economy grows, so does this sectoral splintering and differentiation, resulting in a corresponding increase in hedgeable risks – as well as the challenge of designing mechanisms to make these potential hedges a reality. In Fischer's view, the frontiers of financial engineering will thus continue to expand in front of us for the foreseeable future.

Notwithstanding the near-limitless possibilities hinted at in this view of financial engineering, the near-term challenges are more prosaic.

Fischer Black saw financial engineering as a tool for creating the world of CAPM. The capital asset pricing model (CAPM) envisions a world of debt and equity only, and the debt in that world is both short-term and risk-free. In such a world, everyone holds the fully diversified market portfolio of equity and then adjusts risk exposure by

borrowing or lending in the market for risk-free debt. As equity values fluctuate, so too does outstanding debt as people adjust their portfolios in order to maintain desired risk exposure.

The world we live in is not that CAPM world. But it could be, and financial engineering can help. Interest rate derivatives can convert long-term debt into short-term debt, and credit derivatives can convert risky debt into risk-free debt. Indeed, both of these possibilities are now well on their way to full-fledged reality, but more work remains to be done. Fischer Black saw a future in which corporations buy enough put options on their own stock to make their bonds completely risk-free. And he saw a future in which household mortgages would have floating rates or other contractual mechanisms for automatic rewriting as rates change.

In a CAPM world, investment decisions take account of market risk exposure, and pay no attention to insurable idiosyncratic risk. But real world managers find it difficult to ignore risks that affect themselves, even if the ultimate stock investors can hedge by diversification. Here again finan-

cial engineering can help by providing the instruments needed to make potential insurance a reality. Fischer saw a future in which corporations hedge out all business risk. For him, this was the next great frontier for risk management.

It is significant that Fischer rarely talked about the problem of hedging human capital risk, even though he considered human capital much more important quantitatively than physical capital. He saw production as inherently involving teams of people, each bringing their own human capital to bear. So he thought that the problem of hedging individual human capital risk should first be addressed within the production team by means of its internal compensation mechanisms. Internal compensation is thus fundamentally a problem of financial engineering. And the risk that remains after these internal mechanisms have done their work can then be treated simply as business risk that affects the team as a whole, and business risk should be hedged by external trading. This too is a problem of financial engineering.

For Fischer Black, the whole reason for trying to create a CAPM world is economic

growth. In a society with limited tolerance for risk, we'll get more growth on average if we find ways to eliminate risks that don't pay by hedging them, in order to focus our limited tolerance on risks that do pay.

**“Fischer thought that financial engineering could go further by devising additional derivative contracts to implement desirable dynamic trading strategies.”**

The CAPM world of equity and debt is supported principally by index mutual funds and a banking system that stands ready to lend or borrow at the risk-free rate in order to facilitate dynamic risk control as equity prices fluctuate. Financial engineering can help by devising algorithms for efficient operation of these key institutions. Portfolio insurance, for example, already offers the possibility of reducing trading costs by directly linking up agents with differing risk tolerance, those who want to sell as price rises with those who want to buy. Fischer thought that financial engineering could go further by devising additional derivative contracts to implement desirable dynamic trading strategies.

One additional institution, the exchange itself, is also central in a CAPM world.

Electronic computing and telecommunications offer the potential to improve the efficiency of exchange, but only if they are embedded in good engineering. So, for example, it seems to be the nature of markets that liquidity focuses on only a narrow subset of instruments. The engineering challenge is to devise mechanisms for linking up the myriad mostly illiquid contracts that firms need to issue in order to hedge business risk with the relatively few liquid markets where risk can be readily bought and sold.

The world of CAPM is a world without speculation, and that is emphatically not the world we live in. Says Fischer, “Most of the risks we worry about are man-made.” As a consequence, much of the job of financial engineering has been to undo what the human urge to speculate has done. Better of course if it had never been done in the first place. The important point is that financial engineering, by undoing the speculation inherent in a long-term fixed rate mortgage contract, brings the speculation out into the open and allows us to see it for what it is (as well as to price it appropriately). Financial engineering thus helps us to learn the zero-sum character of our primitive speculative urges.

Finally, the world of CAPM is a world without the systematic distortions caused by government involvement in the tax system, in accounting practice, and in securities regulation. Hitherto, much of the job of financial engineering has been to undo what inept government intervention has done. Again, better if it had never been done in the first place. The point of finan-

cial engineering is not to make money by outsmarting the regulators, but rather to begin setting up the CAPM world of the future where the role of government as the ultimate backstop for social risk can be attenuated. Financial engineering can best help by devising alternative mechanisms of risk control, and by demonstrating in practice that they work better. ■

## REFERENCES

Black, Fischer. 1997. Fischer Black's Brave New World. *Risk*. 10(11): 44-45.

Black, Fischer. 1995. The Many Faces of Derivatives. Foreword to *Handbook of Equity Derivatives*, edited by Jack Francis, William Toy and J. Gregg Whittaker. New York: John Wiley & Sons.

Black, Fischer. 1995. Hedging, Speculation and Systemic Risk. *Journal of Derivatives* (Summer): 6-8.

Black, Fischer. 1995. *Exploring General Equilibrium*. Cambridge, Massachusetts: MIT Press.

Mehrling, Perry. 2005. *Fischer Black and the Revolutionary Idea of Finance*. Hoboken, New Jersey: John Wiley & Sons.

---

*From the November/December 2005 Special Report in Financial Engineering News, "On the Frontiers of Financial Engineering and Risk Management." See <http://www.fenews.com/fen46/front-sr/> for the complete Special Report. © Copyright 2005 Financial Engineering News, all rights reserved.*

**FOR A FREE SUBSCRIPTION TO FINANCIAL ENGINEERING NEWS**

<http://www.fenews.com/subscriptions>