Are Markets Rational?

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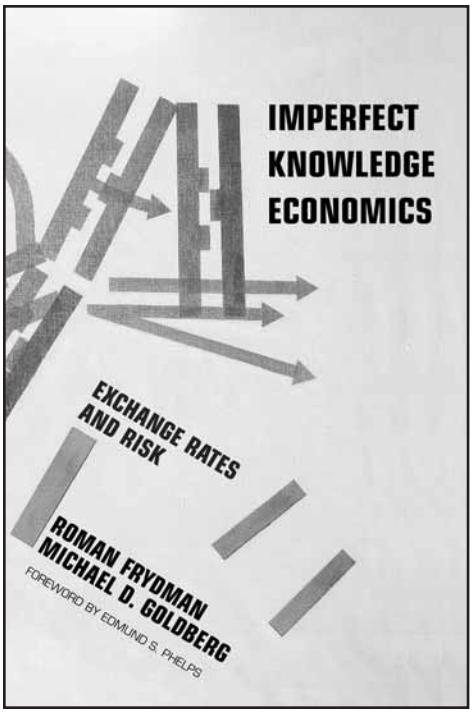
888 16th Street, N.W.
Suite 740
Washington, D.C. 20006
Phone: 202-861-0791
Fax: 202-861-0790
www.international-economy.com



An interview with Roman Frydman, whose book with Michael D. Goldberg, Imperfect Knowledge Economics: Exchange Rates and Risk, *was recently published by Princeton University Press.*

TIE: **Your book leads an assault against the rational expectations school of economics. What is wrong with rational expectations?**

Frydman: To put it simply, despite its name, Rational Expectations Hypothesis (REH) has nothing to do with rational forecasting.

The basic problem with REH models can be traced back to the widespread belief among contemporary economists that economic models can't be considered scientific unless, except for a purely random error term, they generate exact predictions of outcomes. Obviously, forecasts of asset prices drive outcomes in financial markets. But if we acknowledge this, and yet insist on exact predictions, we must come up with an exact model of how market participants think about the future. That's a tall order. And REH goes even further. It supposes that market participants forecast according to the exact model that economist themselves create.

This is even odder than it sounds. After all, economists' bread and butter is the search for alternative models. But if a particular economist's model were to capture rational forecasting, the use of other models would be irrational,

Interestingly, John Muth, who proposed REH in the early 1960s, was well aware of the danger that the term "rational expectations" might suggest some notion of individual rationality. But, despite his warning, REH is commonly viewed as the way to model rational forecasting. As such, REH is not just of academic interest. It is widely used as the centerpiece of sophisticated models to price derivative products and risk in financial markets.

TIE: **So is not the failure of sophisticated finance models the telltale that REH is seriously flawed?**

Frydman: Spot on. We should have expected REH models to fail in financial markets. After all, outcomes in these markets are primarily driven by forecasts, and REH is a particularly poor forecasting model. Many of our colleagues cite REH models' failures as

Roman Frydman is Professor of Economics at New York University and Editor and Director of Project Syndicate.

evidence that markets are populated by irrational traders. In fact, rational individuals in real-world markets do not follow pre-existing rules and procedures, let alone exact forecasting rules implied by economists' models. So the failures of REH models do not prove that markets are irrational. They simply show that economists have a wrong model of rationality. Neither REH models nor, for that matter, any other quantitative model, can capture exactly how profit-seeking market participants forecast the future.

TIE: **You argue that economic forecasting is not a science. The forecaster is more like an entrepreneur who relies on intuition and judgment. Where do quantitative methods fit in?**

Frydman: Quantitative models have a place in the forecaster's toolbox, but the choice among them and how they are used must involve subjective judgments. To begin with, quantitative models contain a number of unknowns that must be estimated. But, because an economy's structure changes, it is unclear how much past data a forecaster should use to come up with statistical estimates of the unknowns in his model. Even the most sophisticated statistical techniques would not automatically pinpoint when the last structural break had occurred. Of course, the choice among various alternative models also requires subjective judgments. Unsurprisingly, even when it comes to the past, let alone forecasting the future, interpretations vary among individuals depending on their personal knowledge, experience, and intuitions.

Consider the problem of forecasting exchange rates. Many market participants no doubt use quantitative models to form exact forecasts of the future exchange rate, for example, that in a week a euro will cost $1.50. After all, currency traders must decide on their market position at each point in time. But, although they may base their trading on exact predictions, they do not arrive at such predictions by relying solely on quantitative models, much less the same model in every time period. Instead, they often combine quantitative models with their own insights concerning other traders' behavior, the historical record on exchange rate fluctuations, and their evaluation of the impact of past and future decisions by policy officials. And, because they act on the basis of different experiences, interpretations of the past, and intuitions about the future, they adopt different strategies for forecasting exchange rates.

TIE: **So how should economists operate in a world of imperfect knowledge?**

Frydman: Economists are trained early on to believe that models that do not generate exact predictions are not worthy of consideration. But the opposite is true. To be useful, economic models must be consistent with the basic fact that participants hold diverse views about the future. How this diversity translates into prices over time must be left for the markets to determine. No mathematical model can hope to mimic exactly what markets do.

For example, euro bulls and bears have diametrically opposed forecasts. Despite drastic differences in how they form their forecasts, however, the ways in which they revise their forecasting strategies may share certain qualitative features. *Imperfect Knowledge Economics* (IKE) makes use of such regularities and shows how they help us understand the tendency for the exchange rate to move away from parity in some periods of time and revert back to this benchmark in others. Such qualitative predictions are admittedly less ambitious than aiming for exact predictions. But our book shows that economists can learn more about markets if we ask less of our models.

TIE: **How would you apply your approach to understanding currency movements?**

Frydman: IKE acknowledges the limits of economists' knowledge. Not aiming for exactness has enabled Michael and me to uncover important factors that one needs to consider in understanding exchange rate fluctuations. Our models of currency movements have focused on the role of macroeconomic fundamentals and revisions of individual forecasting strategies.

The inclusion of fundamentals would probably surprise our academic colleagues. They have spent decades trying to show that fundamentals matter for currency movements, but have come up empty-handed time and again. Many of them now believe that irrational traders drive currency movements. But this is another odd conclusion. After all, most observers, including economists themselves, blame the dollar's decline on fundamentals like the U.S. economy's weakness, the interest-rate differential relative to Europe, and America's enormous current-account deficit.

The reason macroeconomic fundamentals have disappeared from academic explanations of currency movements is disarmingly simple. Most academic economists treat economics like a form of engineering, limiting themselves to searching for models in which the relationship between the exchange rate and fundamentals is either fixed or changes in mechanical ways.

Continued on page 72

Continued from page 61

But in a dynamic world economy, why should anyone believe that a single set of economic fundamentals has mattered in exactly the same way since floating currencies became the norm in the 1970s? IKE acknowledges that finding one true model for currency movements is outside the reach of economic analysis, so it has no problem recognizing that macroeconomic fundamentals really are important for currency movements, which statistical analysis also demonstrates. But which fundamentals are important may change from one point in time to another.

TIE: **So IKE does not deliver ready-made forecasting models?**

Frydman: Right. If economic theory could deliver an exact forecast of the market price, markets would not play as essential a role as they do. The role of economic theory ends with providing a menu of useful factors and a set of models that generate qualitative predictions of market outcomes. Ultimately, it is up to the forecaster to decide how to use of these factors in predicting future market outcomes.

TIE: **What are the implications of your thinking for the subprime mortgage crisis and the role of credit ratings agencies?**

Frydman: This is a big topic. Let me just briefly mention two implications.

The rating agencies have generally been better at rating corporate bonds than at rating asset-backed collateralized debt obligations. One reason is that when they rate corporate bonds, they rely on both a mathematical model and their own specialists' judgment. For subprime-related securities, they had no experience or intuition, not least because the instruments were so new, so they could use only mathematical models.

Beyond ratings, quantitative finance models have been widely used to price various derivative and insurance products. But, for the most part, what is usually referred to as the price of risk has nothing to do with market prices or risk. All that these models can deliver is their creators' mechanistic view of what markets do. But their supposedly scientific pedigree creates the illusion that all uncertainty can be priced by financial engineers and sold and insured as if it were ordinary probabilistic risk.

Obviously, it's not surprising that there was such great demand for products that offered to rid financial market decisions of their inherent non-probabilistic uncertainty. But, because contemporary finance models aim to generate exact predictions of outcomes and their likelihoods, they must ignore uncertainty. Unfortunately, this time the consequences of insisting on models that imply exact predictions were not confined to seminar rooms and academic journals. ◆