

FEDERAL RESERVE BANK OF PHILADELPHIA

Econometric Forecasting: Should You Buy It?

By Nariman Behravesh and John J. Mulhern*

Forecasting the economy, if you haven't already noticed, is a growth industry. Recent years have seen a proliferation of forecasters and forecasting methods. In the vanguard of this boom have been a few commercial econometric forecasters whose clients have more than doubled in the past five years and whose revenues now amount to tens of millions of dollars annually.

What accounts for this unprecedented growth? Certainly the novelty of econometric forecasts and the variety of services forecasters provide explain part of it. But a more

fundamental factor behind the rapid growth in the demand for forecasts may be the increased uncertainty in the economic environment over the past few years. Models, with their ability to track massive amounts of information, appear to offer a measure of relief from uncertainty. Thus, for a great many banks, other businesses, and government agencies, the increased availability of forecasting services plus the pressing need for more accurate economic information have made the acquisition of econometric predictions worthwhile.

Under what circumstances should you buy one of the forecasts now being marketed? That depends on the accuracy, accessibility, and relevance of the forecasts, as well as on the state of the economy overall and the market information otherwise available. The benefit obtained from such predictions must outweigh their cost to justify a decision to buy.

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INFORMATION . . . AT A PRICE

The art of forecasting has come a long way from isolated intuitive judgments about upcoming economic conditions. Sophisticated econometric methods now have become the basis of many commercially available forecasts, the simplest and cheapest as well as the most complex and expensive.

Models and What They Do. Econometric models are mathematical representations of the economy or of its parts—sets of equations that describe the interactions of key economic forces.¹ By using these models, forecasters can measure or estimate the impact of one key change, such as a wage or price increase, on an industry or on the economy as a whole. The broad-based or macro models used by the big forecasters may include hundreds of equations. One very large model of the U.S. economy, for example, consists of some 800 equations.²

Two features of econometric models make them especially useful as forecasting tools. First, because of the logic of their construction, judgmental information can be imposed on them easily and explicitly. Thus forecasters can have the advantage of using sophisticated models already built without sacrificing their own experience-based opinions. Second, it is very easy to explore realistic What If scenarios with these models. As long as the structure of the models corresponds closely to that of the economy over recent decades, tracing through the likely impact of higher interest rates, wage-price controls, or a tax cut, for example, presents few difficulties.

Because models are based on the economy's historical performance, they are not reliable guides to what would happen in unusual or unprecedented scenarios. Asking the model what would result if taxes were cut far more

radically than they have been in recent years, for instance, may evoke a misleading answer. Models can be abused. But when they are used discreetly and over not too long a horizon, they can be reliable aids to the forecaster. Thus models have a lot to offer the business or government planner.

Prepackaged Forecasts. For a relatively small consideration, the buyer can obtain any number of packaged forecasts. Some of these appear in newsletter form, others are in the form of computer printouts. The packaged services vendors offer range all the way from quarterly macroeconomic forecasts to more narrowly focused energy forecasts and agricultural forecasts. And the cost of subscribing to them may run anywhere from a few hundred dollars to a few thousand, depending on the detail of the forecast and the effort needed to generate it.

Prepackaged forecasts don't allow the client to participate in the forecasting process or to change the forecast in any way. But that's no obstacle to the typical customer for this kind of service, who either does not have the resources to get involved in making predictions or does not consider it worthwhile to subscribe to a higher level of forecasting services.

Access to Econometric Models. The popularity and profits enjoyed by econometric forecasters come from allowing clients to access models and tinker with forecasts. The client who wants access to commercial econometric models typically either disagrees with the judgmental information imposed on the models by the forecaster or wishes to explore What If scenarios, such as the effect that reimposition of wage-price controls would have on corporate profits and return on investment.

For the privilege of tinkering with models and generating tailor-made forecasts, firms pay tens of thousands of dollars. The cost depends on how many models the client wants to fiddle with, and how often. Firms that are interested in devoting resources to forecasting usually are large and can afford

¹ See Nariman Behravesh, "Forecasting the Economy with Mathematical Models: Is It Worth the Effort?" *Business Review*, Federal Reserve Bank of Philadelphia, July/August 1975.

² *New York Times*, January 8, 1978.

the staffs needed to run the models.

Customized Models. In many cases, even this higher level of service won't satisfy a firm's requirements, because the available models don't predict the variables that are most important to it. In cases like this, the vendor may build a satellite model which is tied to an existing model but which also predicts the variables that do interest the client. The cost of buying a satellite is very high, but some firms find it worthwhile for their complex and long-range strategic planning. Some utility companies, for example, may use such models to generate load forecasts.³

Thus commercial forecasters provide a menu of services, and clients have considerable leeway in choosing the services best suited to their interests and budgets.

DIFFERENT FORECASTS, DIFFERENT ADVANTAGES

The choice among forecasts depends on such features as accuracy and suitability to the requirements of the user. Whether to generate forecasts in house or pay for a commercial forecast depends on how much of a comparative advantage the commercial forecaster has in predicting and how much specialized information the client has which is not easily transferable to the forecaster. In some cases, a client's forecasting needs may be satisfied easily by outside predictions; in other cases, only inside forecasts may prove valuable.

Accuracy. However the forecast is generated, it is valuable only if it is at least as accurate as comparable forecasts. Judging predictions on the basis of their accuracy may not be easy. Fair assessments of accuracy require looking at long track records, which are not always available. Nevertheless, attempts have been made to assess the accuracy of publicly available forecasts of the economy. These studies suggest that some meth-

ods of prediction may have a slight advantage over others.⁴ But the method is not the whole story: information volume counts, too. The most accurate forecasts are the ones that rely on the most complete information.⁵ Consequently, successful forecasting usually involves combining different prediction methods.

Many forecasters admit that their predictions consist of roughly equal mixtures of econometric model inputs and judgmental inputs. This has been the case, for example, at the Federal Reserve Bank of Philadelphia, where the MIT-PENN-SSRC model has been modified by the judgments of three staff forecasters. There does indeed seem to be an advantage in eclecticism.

Most of the commercial forecasters who combine judgment and econometrics have similar track records. One may have an edge in predicting this or that set of variables, but none can claim superior prescience overall. And so many firms subscribe to more than one forecast in the hope of being assured access to the most accurate predictions. Thus the choice among the top-rated commercial forecasters often is made on the basis of criteria other than accuracy.

Other Criteria. Before subscribing to a forecast, prospective users need to know how many of the variables relevant to their own decisionmaking it predicts. Although predictions of inflation and unemployment may be of primary interest at the national policy level, they may not provide the information required for decisionmaking at individual firms or agencies. In an attempt to

⁴ Stephen K. McNees has published a number of evaluations of forecasts in the *New England Economic Review*, and Vincent and Josephine Su have written a number of articles for the National Bureau of Economic Research on this subject.

⁵ See Nariman Behravesh, "Forecasting Inflation: Does the Method Make a Difference?" *Business Review*, Federal Reserve Bank of Philadelphia, September/October 1976, and R. T. Falconer, C. M. Sivesind, "Dealing with Conflicting Forecasts: The Eclectic Advantage," *Business Economics*, September 1977.

³ *Business Week*, November 7, 1977.

attract more of these smaller customers, many econometric forecasters have expanded their models to include more industry detail and other specialized data. It still remains to be seen whether the consequent increase in the size of the models (and the associated increase in the cost of running them) will pay off in more accurate forecasts.

The frequency with which predictions are made also is of great importance to decision-makers. From their point of view, the timing of the forecasts should coincide with the timing of the major decisions to be made. From the forecast vendor's point of view, the frequency of prediction depends on how often new information is released. Most macroeconomic forecasting models are based on quarterly data and, therefore, generate new predictions once a quarter. But as the data are revised and as new monthly or weekly data become available, the quarterly macroeconomic forecasts may be updated quite frequently. At least one of the commercial econometric forecasters has an annual model which is advertised as a tool for long-run planning. At present, weekly or monthly models of macroeconomic activity are not well developed and are, therefore, unreliable. The choice of frequency depends largely on the cost of predicting more often versus the extra information that can be obtained from each new forecast.

The frequency of forecasts is related to their horizons. Long-term decisions require forecasts with long horizons. One major electrical equipment manufacturer, for example, has developed a model which helps it forecast energy requirements and resource availability out through the end of the century and even beyond.⁶ Such a model could make the difference when basic business decisions are being made, and its applications to government planning also are obvious.

It is only recently that some commercial forecasters have devoted substantial re-

sources to long-term forecasting; consequently, the errors from their predictions continue to be very large. But since econometric forecasting still is in its infancy, the choices with regard to types of variables predicted, frequency, and horizons of forecasts can be expected to widen.

TO BUY OR NOT TO BUY?

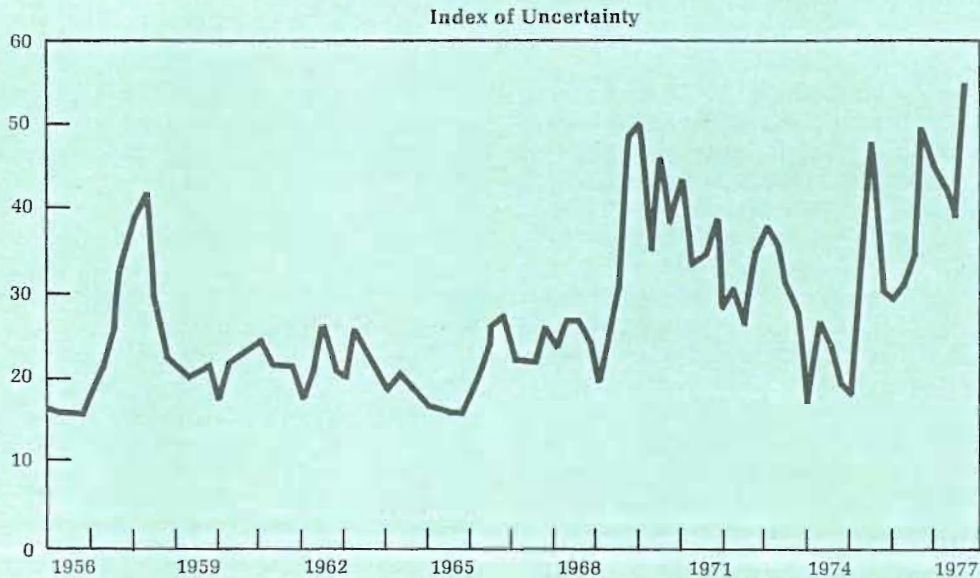
Whether to allocate resources to forecasting is a question of profitability for private firms and of cost effectiveness for government bodies. When are the costs of a forecast outweighed by the ability it confers to make better decisions? Two important factors influencing this choice are general economic conditions and the types of information otherwise available to the user through the markets in which it operates.

Increased Uncertainty Increases the Demand for Forecasts. In recent years, uncertainty about inflation and energy supplies has encouraged decisionmakers to try to acquire as much information about the future as possible (see RELATIVELY HIGH LEVELS OF UNCERTAINTY). It isn't unusual now for firms to look at more than one forecast in an attempt to sample different opinions about the outlook. And a number of firms have found it profitable to collect forecasts and market the information gleaned from them. Also, many newspapers, magazines, and electronic media regularly survey the leading forecasters.

A good deal of information about the future of the economy as a whole is available for free or at a nominal charge. Government agencies, such as the Department of Commerce, are continuously publishing assessments of the economy. And a number of academic and private organizations make their views on the future of the economy available for small fees. Provided these forecasts are as accurate as predictions made by commercial forecasters, it would be unprofitable to pay for the commercial forecasts. Unfortunately, such publicly available forecasts cover only a limited number of variables,

⁶ *Financial Times*, June 21, 1977.

RELATIVELY HIGH LEVELS OF UNCERTAINTY PREVAIL IN THE 1970s



SOURCE: Adapted from George Katona, "Behavioral Economics," *Challenge*, September/October 1978, p. 17. Katona's index reflects expectations about private welfare and business conditions one year out and business conditions five years out.

such as inflation, unemployment, and real growth.

Some Markets Provide Information About the Future. Futures markets in commodities, foreign exchange, and government securities implicitly provide information about the future prices of goods. In a futures market, buyers and sellers contract to buy or sell goods at some future date—July 1980, for example—at a price agreed upon today. Information that has any bearing on future movements in these markets is quickly reflected in prices. If new information becomes available suggesting that, say, next year's wheat crop will be smaller than previously anticipated, wheat prices in the futures market should rise. If the futures price didn't increase, anyone could profit by agreeing to buy wheat for delivery in July 1980 at pre-

viously anticipated futures prices, then turning around and selling it on that date at the higher price now expected to prevail at that time. Economists contend that such obviously profitable opportunities cannot go unnoticed and that this accounts for the link between changes in information and changes in futures prices.

Is it worthwhile to make price forecasts for goods or assets that are traded on futures markets? The answer depends on whether the forecaster thinks he can predict the future better than the market does by a margin that exceeds his cost of forecasting. The market's forecast is really a weighted average of the forecasts of those who currently are taking trading positions; and much evidence suggests that this weighted-average forecast efficiently takes account of readily

available information. Hence, unless one has some specialized information, it will be quite difficult to outperform the market. In this situation, forecasting will not be worth the effort and one should rely on the futures prices published in the financial press.

For many goods produced in the economy there are no futures markets, however, and here there may be a larger payoff to forecasting. In other words, in markets where information is not cheaply available, firms who have access to accurate forecasts stand to gain. In such circumstances, the benefits from forecasting may well outweigh the costs.

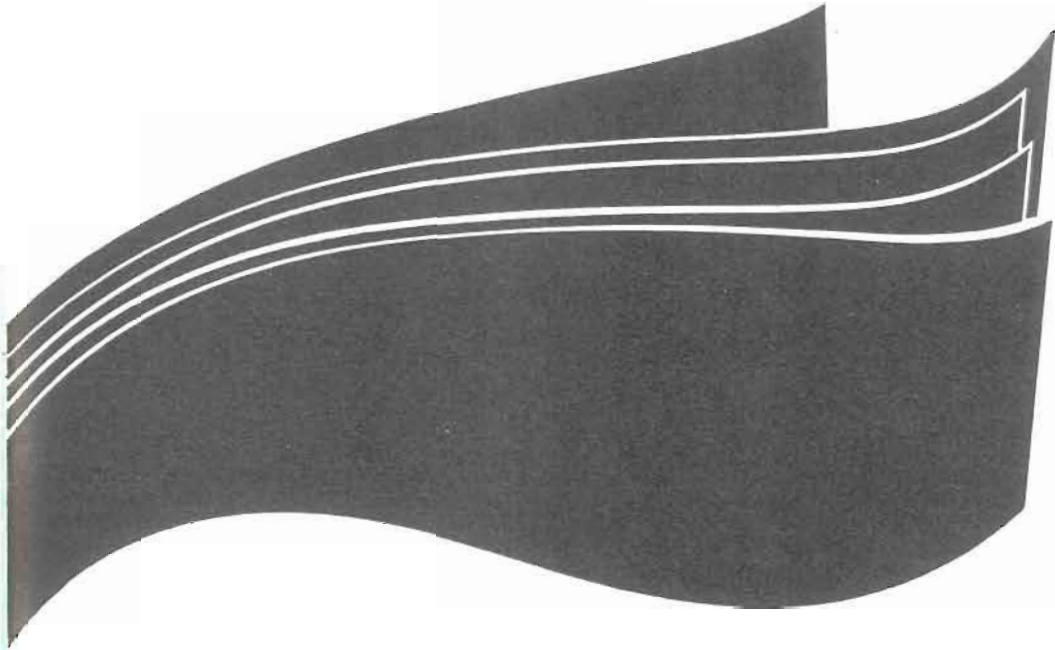
In the end, whether a firm can benefit from buying a given level of forecast services depends on the amount and type of information it can obtain easily from other sources about its own markets and about the economy as a whole. It's a matter of weighing costs and benefits. If the value of the additional information provided by forecasts exceeds the cost, then paying for the information will be worthwhile. Once this determination is made, then the firm may decide to generate its own forecasts or to contract for one or more of the many available commercial fore-

casts—again, a matter of deciding on the basis of costs and benefits.

SUMMING UP

Thus the decision to buy an econometric forecast is not always an easy one. Many forecast vendors are eager to sell their wares, and many prospective users are ready to pay for them. But there is no guarantee that a given level of forecasting services will answer every firm's or agency's requirements. The point of forecasting is to obtain information, and information is just one kind of input in the decisionmaking process. Sometimes it's a very costly input.

Whether it's worthwhile to spend a great deal of money on information depends on the outcome in profitability or cost effectiveness. In many smaller operations, accessing models will not be justified on a cost basis. But for some firms and agencies, especially those that deal with an extremely large volume of information and those that make broad-based business or policy plans, buying a high level of econometric forecasting services may have a lot to offer. In fact, it may make life a good deal easier for the executive planner.



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