

What Economic Forecasters Really Do

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Abstract: Academic critics of economic forecasters, including Robert Lucas, generally base their criticisms on the methodological shortcomings of the techniques used by business economists. In truth, these apparent problems represent profound wisdom about the nature of economic knowledge that is recognized by business economists and the users of their services. Addfactors and the use of judgment allow forecasters to simulate the actual mapping from non-quantitative space to quantitative space that actual economic actors undertake. This allows forecasters to tell plausible stories that are consistent with both economic theory and the entire information set available to forecast users.

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One of the most confusing features of econometric forecasting is the gap between how outsiders, especially academic economists, view forecasting, and how it is actually done. Econometric forecasting uses tools of statistics and engineering extensively. Forecasters regularly employ apparatus including large statistical models of the economy, advanced statistical techniques (some borrowed from engineering) and lots and lots of numbers. To outside observers, we appear to be engaged in a statistical or engineering exercise, a “scientific” and objective procedure.

This view of economic forecasting is misleading. Econometric forecasters use judgment as well as engineering techniques. Although this may appear “unscientific” there is a strong argument for combining our judgment with statistical models. Actual forecasting practice is not only efficient, it sheds light on some important problems in economic forecasting, and how they might be solved.

The Lucas Critique

Robert Lucas [1976] gives a typical view of how forecasting should actually proceed, and contrasts it with the “dirty” method actually used. Lucas describes econometric forecasting as an entirely statistical exercise:

For purposes of ex ante forecasting, or the unconditional prediction of the vector y_{t+1}, y_{t+2} given observation of y_s and $x_s, s \leq t$, the estimated reduced form, together with [a vector autoregression of x_t , the exogenous variables] is sufficient. This is simply an exercise in a sophisticated kind

of extrapolation, required no understanding of the structural parameters, that is, the *economics* of the model. [Lucas and Sargent, page 298].

Experienced economic forecasters may wonder just what Lucas and Sargent are talking about here. The processes of determining exogenous variables alone are far more complex than estimating a vector autoregression. Lucas and Sargent later dismiss the judgmental elements of forecasting: “the model builders themselves ... routinely employ an elaborate system of addfactors in forecasting, in an attempt to offset the continuing drift of the model away from the actual series” [page 303].

This is typical of the economic outsider’s view of addfactors, the process by which we build judgment into our model-based forecasts. It is also misleading. The addfactors are used in a variety of ways, and the problem of “drift” is relatively minor in this regard. By characterizing forecasting in purely engineering terms, Lucas and Sargent ignored the extent to which successful forecasting requires interaction between a mathematical model and the reasoned judgment of an educated observer. This second element in the mix, the ability of an individual to assimilate information more efficiently than a model, is vital to understanding what forecasters actually do.

Not All Economic Behavior Can be Measured

In his famous critique of econometric models, Lucas proposed changing the direction of econometrics to estimate the underlying “structural” parameters of the economic agents involved. The search for these structures (closely related to the search for microfoundations of macroeconomics) has been an important element in rational expectations research since the late 1970s. If we could discover these

invariant parameters, we could presumably forecast without the use of the addfactors and re-estimation that Lucas condemned so strongly.

In the last 15 years, a large number of researchers have attempted to carry out Lucas' suggested strategy. The result has been the voluminous literature on "real business cycles" with many clever attempts to surmount a basic problem not noted in the rational expectations literature. Lucas essentially suggested that we need to estimate not reduced form price and quantity equations, but the parameters of the underlying utility and cost functions. One line of research following Lucas typically begins by postulating a specific utility function, chosen generally for ease of computation. The research immediately becomes unconvincing because the hypothesis tests in the paper are always joint tests of the model and the specific form of the utility function.

In this, the failure of the real business cycle approach to yield usable forecasting models reflects a deep error about economic behavior and analysis. The fundamental behavior of economic actors, the structural parameters Lucas believes matter, is determined in a non-numerical setting. We simply don't have, and could never obtain, a true estimate of a representative utility function. The underlying beliefs that shape behavior, including beliefs about monetary policy, political risk, etc. that cannot be measured or described numerically. An important part of economic behavior consists of the mapping of these non-numerical beliefs and values to the numerical world of prices and quantities. No statistical technique can simulate, imitate, or estimate this mapping.

How Forecasting Solves the Mapping Problem

Model-based forecasting continues to be useful to our clients, and profitable for us, because current forecasting methodology recognizes the existence of this mapping problem. We use models and numbers in conjunction with our judgment to solve the mapping problem that has defeated academic economists. Addfactors allow us to alter model-based forecasts to allow for the use of judgment. To a surprising degree, it is this judgment, as much as the forecast itself, that we sell to our clients.

The WEFA group provides its clients with a remarkable document called “WEFA Group Forecasting Methodology”. The report describes the steps involved in producing WEFA’s short-term forecast. The document’s emphasis is not on solving models, but rather on meetings and the back-and-forth process by which WEFA economists agree on a forecast. The paper includes sections on “What Happens if Disagreement About the Forecast Arises?” and “What is the Client’s Role?”, topics which are hardly obvious according to the Lucas and Sargent description. In their world, the forecast is a simple extrapolation about which there can be no disagreement, and the client, or user of the forecast, is ignored.

Even a cursory reading of this document indicates clearly that the stress is on the people, not the model. Rather than selling a model, WEFA sells the judgment and experience of its staff, as the conclusion states:

To produce the highest quality set of forecasts, the WEFA Group professionals must perform like members of an orchestra, staying within the discipline of the common score while making full use of their individual expertise. The combination of seasoned forecasters and a

process which has been continually refined during the past 20 years is a tough combination to beat.

An orchestra is not what most academic economists have in mind when thinking about forecasting. But this is what businesses look for when shopping for economic forecasts: not an assurance that we can invert matrices, but that we have a process (including meetings, discussions, and “seasoned forecasters”) which is successful. Neither our clients nor our marketing staff would recognize Lucas’ description of forecasting, and for good reason. Pure engineering-based models of necessity embody less information than the combination of models and judgment that we actually use.

Kurt Karl’s Two Rules of Forecasting

As an example of how forecasting actually works, I would like to introduce two rules of practical forecasting. Kurt Karl, who has many years of experience forecasting for WEFA, has explained these to me as I’ve learned how to run a WEFA forecast. These rules are driven by client needs rather than econometric methodology, but, they indicate some important features of the actual methodology economic forecasters use.

Rule 1: *Don’t change the outlook radically in any one month.* Large changes in GDP forecasts drive clients crazy, so we try to avoid them. If we want to change our views, we do it gradually, often by no more than 0.2-0.3 percentage points of GDP each month. One reason clients hate large changes because their corporate planning mechanisms can’t assimilate them. Radical changes are unpopular with our clients for another reason, however. There is enough noise in high-frequency data that almost no

announcement or set of announcements in any given month provides enough real information to really change a forecast radically. If a mathematical model changes the outlook radically from one or two bits of data, business economists correctly suspect the model, and not their intuition. This forecasting rule tends to make forecasting turning points more difficult. It acknowledges, however, that monthly data can be misleading, and that we require confirmation of new trends from many different data sources before we can be confident in changing our forecast.

Rule #2: *Don't forecast radical changes in GDP growth from one quarter to another.* Early in our forecast we often find radical changes in GDP growth rates because of Auto Service assumptions about cars, or Regional Service assumptions about housing starts. Our clients, however, do not believe that we can forecast which quarter will be 5% and which will be 1% -- and they are right. We therefore attempt to forecast a steady growth rate consistent with the annual rates we aim for. Clients don't expect, and don't want, us to attempt to determine whether the exact quarterly pattern of growth. What they want to know is the overall, average growth rate for the economy over the next few years. They won't believe that we can forecast quarterly growth rates accurately, and probably shouldn't.

Although these are client-generated rules, they reflect a profound understanding of what we do, and don't know about the economy. The clients want our forecast of the underlying growth rate (which we do know something about), and they know that we are unlikely to learn a great deal from one month's data.

These rules suggest how important our judgment is. Left to its own devices, the model will not generate smooth growth patterns, and may well give radically

different answers each month, as data is revised. Our confidence in these changes is low, so we eliminate them. Our forecast then reflects our basic, overall view of the economy, which is what our clients want to know and pay us for.

How Judgment Enters the Forecast

Judgment is therefore vital to the forecasting process. Judgment is necessary to create forecasts that reflect all the information at hand, including information that can't be easily summarized numerically, and judgment is necessary to provide forecasts that reflect clients' needs for a clear view of the economic future. We impose our judgment on the model by adjusting the value of any variable about which we have more confidence in our own ideas than the model results. The deviation from the model-predicted value is the addfactor, a source of some embarrassment among economic forecasters. In fact, addfactors are not only not an embarrassment, they are an important link in the forecasting process, and provide an important solution to the Lucas critique.

Lucas's description of the use of addfactors shows a typical misunderstanding of how and why we make these adjustments:

Finally, and most suggestively, is the practice of using patterns in recent residuals to revise intercept estimates for forecasting purposes. For example, if a "run of positive residuals (predicted less actual) arises in an equation in recent periods, one revises the estimated intercept downward by their average amount. [1976, p 23].

Lucas is apparently unaware of the description of forecast adjustment in Klein's [1970] review of forecasting methodology. Klein discusses two reasons for adjustment of forecast values: first, the existence of non-random residuals (as

described by Lucas) and, second, “Other structural changes for known legislative or institutional reasons.” [p 50]. Klein goes on to note that “In addition there are ‘inside information’ and ‘latest news’.” Klein discusses the method used to include this information in some detail.

After the preparation of preliminary predictions from the most recently adjusted Wharton-EFU Model, there is a discussion of the assumptions and properties of the prediction with business and government specialists. A priori information on impending labor disputes, hedge purchasing, production bottlenecks, major economic decisions and similar phenomena are then suggested for further modification of parameter or residual values, and a revised forecast is prepared. [pp 50-51]

Addfactors are therefore much more than simply adjustments for the tendency of equation-based predictions to “drift” off over time. If this were the case, we would now simply reestimate the model every month, an operation possible with modern computers. Even the reestimated model would require addfactors, however, because we simply know more than can be expressed mathematically or contained in the equations. The forecaster’s judgment counts, too.

Addfactors have a great virtue which is ignored both within and outside of the business economics community. The published addfactors (you can find them in every month’s book we publish) provide a record of where the forecasting team’s judgment overrode the model. We not only use our judgment, we actually put it on record. Carl Christ [1993, p. 79] quoted Paul Samuelson as saying that econometric forecasts are a black box inside of which we find only Larry Klein. But it’s not a black box! Klein’s judgments, and ours, are published for the world to see. That students of forecasting do not take addfactors seriously is sad. It

suggests that a fascination with the engineering model of forecasting has blinded academic researchers to the most interesting and exciting part of the forecasting process.

Why, 15 years after the Lucas critique was published, do economic forecasting firms continue to use large-scale macroeconomic models? Addfactors provide the clue. Large-scale econometric models are employed not to complete the forecast, but to provide the discipline necessary in light of the complicated relationships involved in the real economy. The model handles those that can be statistically or mathematically modeled for us. But, as I mentioned earlier, many key relationships are mappings from the non-numerate to the numerate domain: the election of new president changes consumers' views of their permanent income, for example. These relationships cannot be modeled statistically, but they are vital for the economic outlook. Economic forecasters mimic the mapping from non-numerate to numerate domain by using addfactors when necessary.

Addfactors are a simple, convenient, and reliable solution to the problem of the Lucas critique. Unlike the research agenda Lucas suggested, they are not sterile. In fact, they are significantly more convincing to non-economists precisely because non-economists understand this "mapping problem". Purely mathematical models of any type will never appear as appealing to non-economists as the current process. Even if Lucas and Sargent could estimate a correct model with deep structural parameters, they probably couldn't sell it! Economic actors know that there is more to analyzing the economy than doing math. They are unlikely to ever be convinced that econometric methodology, useful though it may be, can substituted for reasoned judgment.

Economic Forecasting is Storytelling, not Engineering

The array of statistical modeling techniques has fooled some people into believing that forecasting the economy should be a statistical exercise which could, in principle, be automated and left to computers and research assistants. The new numbers could then be transmitted automatically every month to our clients. Economic analysis is not, at its heart, similar to engineering or mathematics. It is about telling our clients stories which help them understand the business environment in they operate. The numbers tell an important part of the story, but it is not surprising that mathematical techniques sometimes fail, and that we must use other forms of knowledge to supplement econometric model building.

The idea that economics should use storytelling in concert with our other tools has recently been discussed by Donald McCloskey [1985, 1990]. Forecasting practice supports the view that economic analysis consists of more than logic and facts. We deliver to our clients a coherent story of where the economy will go using the best economic tools available. We do so while supplying sufficient detail that our clients can determine the moral of our story for their industry or company.

Econometric models are a useful tool for our storytelling. They insure that each month's installment fits the same parameters and has the same characters as the previous month's story. Our model also determines when we need to bring our judgment to play, and forces us to consider all of the consequences of our opinions. Thus, when our forecast team decides that we want a story of a 3% growth rate next year, and the model doesn't support that story, I bring the problem back to the team. We then try to think more carefully about the story's details: do we want more growth in exports, or investment or consumption? Why

are we overriding the model? The model creates a framework in which to operate, forcing us to state our judgment explicitly.

Conclusion: Constrained Storytelling Remains Valuable

The Lucas Critique was a very potent criticism of forecasting with macroeconomic models. Lucas and Sargent's wild claims about the uselessness of econometric forecasting and simulation are clearly wrong, however. The continued use of macroeconomic models itself contradicts their view. We use these models because, when used correctly, they are effective tools for understanding how the economy works. Lucas and Sargent were unable or unwilling to understand how forecasters actually use the models, insisting on substituting their own methodology for that described by Larry Klein in his 1970 essay. Economists and business planners continue to find the combination of model and judgment that we offer of great value in understanding and interpreting the world in which we live.

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