The Art of Forecasting: From Ancient to Modern Times

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What men have seen they know;/ But what shall come hereafter/
No man before the event can see,/ Nor what end waits for him.
<div align="right">—Sophocles</div>

God hides the end of future time in misty night,/ And laughs if
mortal worries at what's right.
<div align="right">—Horace</div>

No, Virgil, no;/ Not even the first of Romans can learn/ IIis Roman
history in the future tense,/ Not even to serve your political turn;/
Hindsight as foresight makes no sense.
<div align="right">—W. H. Auden</div>

Forecasting and Magic

One could take the view that what people had to say about forecast-
ing before the application of matrix inversion is irrelevant. One could
believe that our new statistical techniques put us in a different class
of forecasts than the ancients—best linear unbiased, surely, and
maybe something better. But one doubts it. One doubts that the
mere presence of mathematics is enough to change the old pattern.

People have always wanted to forecast the future. In trying to do
so they have probably revealed more about themselves than about
the future, and the revelation may be of permanent value. In other
words, one can learn from the long history of forecasting a little about
why people do it and whether it has been good for them, at least
if the history exhibits stationarity. The most technically muscular

forecaster in Washington shares something with a Roman examiner of entrails. The two differ in the thick middle part of their arguments, where the one will discuss the Yule-Walker equation and the other the clefts in the liver of a sacrificial ox. But they are more similar at the ends, in the thinly argued justification for prediction and control.

Around 1600 in England it was reported that "among the common people he is not adjudged any scholar at all, unless he can tell men's horoscopes, cast out devils, or hath some skills in soothsaying" (Thomas 1971, p. 227). The press and public nowadays treat the economist as a soothsayer (if a dubious one), to the point of thinking that economics is directed mainly at forecasting.

But the forecasting of human events—which, of course, is not the main business of economics—has always been magical. In human affairs there is wisdom but not magical omniscience. "The unscrawled fores the future casts," sang the American poet and businessman Wallace Stevens (1972, p. 209), is "damned hoobla-hoobla-hoobla-how."

Forecasting the future seems at first more scientific and grown-up than the mere casting of spells. But forecasting the future and manipulating it are identically magical. The desire to forecast the future and the desire to change it are two sides of the same desire. The one forecasts the future from the flights of birds or the size of the eigenvalues, and is armed by the forecast to prevent evil. The other, less prestigious because more private, already knows the future evil, and arms itself with magic spells and prudent economic policies to head it off.

Real magic claims to have solved scarcity. It leaps over the constraints of the world. If you desire a ride to Baghdad, here is a magic carpet; it you desire your enemy dead, here is a magic doll; if you desire unlimited riches, here is a forecast of interest rates. The magic leaps outside the production possibilities. The "fiat" (the "let it be") in a spell is the desire to get outside what is ordinarily possible.

People desire to avoid heavy investments at the turning point of the business cycle, or they desire to avoid the bad luck from breaking a mirror. Magic that avoids evil is called "apotropaic." One desires an effortless forecasting of avoidable evil. The hiring of economists by politicians and businesspeople who are otherwise hard-nosed is apotropaic.

Children desire that avoiding evil or knowing the future were not so full of effort, a desire that fathers the thought. Small children think that if they wish hard enough it will be so. As Marcel Mauss ([1902–03] 1972, p. 63) noted in his old classic on the sociology of magic, "between a wish and its fulfillment there is, in magic, no

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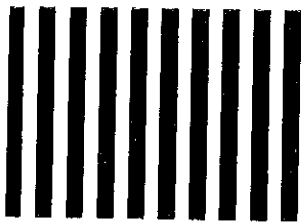
gap." Small children believe in the omnipotence of thought because they have not yet distinguished their private dreams from the collective dreams we name reality. Adults who cannot make such distinctions are said to be mad.

In *Ancient Egyptian Magic*, Bob Brier (1980, p. 117) describes the pharaoh before a sea battle sinking toy models of enemy ships in his bathtub. Real magic, as distinct from parlor tricks, depends commonly on such a metonymy, taking a thing associated with X as *being* X. It re-presents what the magician wishes to happen. The pharaoh reminds one of economic advisers representing an economy with a model, then sinking the deficit in the bathtub.

Cicero on the Art of Forecasting

The ancient techniques of prediction and control remind one repeatedly of the modern methods. According to Pease and Croon (1970), "Our most important ancient source" is Cicero's *De Divinatione*, written around 45 BC, during an enforced absence from politics. "Divination" is an all-inclusive term in Cicero (*Div.*, II, lxiii, 130): "The power to see, understand, and explain premonitory signs given to men by the gods." Cicero's book is divided into two parts, the first a speech notionally by his brother, Quintus, making the case for divination and drawing on the stoic philosopher Posidonius (Posidonius' works survive only in fragments); and the second Cicero's devastating reply. It makes uncomfortable reading for a modern forecaster.

Artificial and Natural Divination

The techniques of divination were divided into the artificial (*artifices* or inductive), based on observation and open to anyone competently trained, as distinct from the natural (*naturalia* or intuitive), based on dreams and revelation by god-possessed seers. One subdivision of the artificial was divination from living things, such as the behavior of birds (carried out by officials known as augurs or auspices—hence, "under the auspices of someone," it being important that the someone be a proper official), the entrails of sacrificial animals (haruspicy), or merely human omens, such as a sneeze at a critical moment. The other subdivision of the artificial was divination from lifeless things, such as lots (cleromancy, which resembles statistical methods), books (Amish priests are still chosen by *sortes Biblicae*), weather anomalies (*monstra*, the ancestors of sun spots), and, above all, astrology (associated in the classical mind with the Chaldeans and Babylonians, called on account of their numerical obsessions *mathematici*).

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Natural divination comes from within, as in the Greek word "enthusiasm" (god-possessed). As Quintus describes it in Cicero's dialogue (*Div.*, I, xviii, 34): "Those [artificial] diviners employ art, who, having learned the known by observation, seek the unknown by deduction. On the other hand those do without art [the natural diviners] who, unaided by reason or deduction or by signs which have been observed and recorded, forecast the future while under the influence of mental excitement." Dreams, drug-induced trances, calling spirits from the vasty deep (necromancy), and the like had, oddly, greater prestige and plausibility in the ancient world than did the artificial (*Div.*, I, iii, 5). The word *"ars"* or "art," means Greek *"techne,"* that is, "technology"—methodical and trained skill. It was better to be directly inspired by the gods than to laboriously accumulate and interpret the data.

Theory-Free Forecasting

The method of theory-free forecasting—leading indicators or Box-Jenkins analysis—is outlined by Quintus (*Div.*, I, xlix, 109): "In every field of inquiry a great length of time employed in continued observation begets an extraordinary fund of knowledge, which may be acquired even without the intervention or inspiration of the gods, since repeated observation makes it clear what effect follows any given cause, and what sign precedes any given event." Of observing crows, "Such signs as these have been observed for an unlimited time, and the results have been checked and recorded. Moreover, there is nothing which length of time cannot accomplish and attain when aided by memory to receive and records to preserve" (*Div.*, I, vi, 12). Or again, "I see, which is enough; why it is possible I do not know" (*Div.*, I, x, 16). And later, "They may not discern the very causes [read "the structure"], but nonetheless discern the tokens of the causes" (*Div.*, I, lvi, 127). This sort of divination, Quintus says, is derived from Fate, that is, from the connectedness of things (*Div.*, I, lvi, 128). The Babylonians claimed to have kept records of horoscopes for $N = 470,000$ years, enough degrees of freedom for most purposes (*Div.*, I, xviii, 36; II, xlvi, 97).

In other words, the modern distinction of theory-free and structural models of forecasting repeats the ancient distinction between artificial and natural divination. The artificial relies on the external signs, observed 470,000 times if one is fortunate in one's data set. The natural relies on internal intuitions, in the form of specifications of the structure or the other constraints of an economic theory not itself derived from the signs. The "tender loving care" that modern forecasters routinely apply to their (artificial) forecasts, in order that

judgment may have its proper place, is again natural and god-inspired.

Combining the two, Box-Jenkins with structural estimation, was prudent among the ancients as among the moderns. Oedipus invites Teiresias to save the city with every device of prophecy: "Do not begrudge us oracles from birds,/ or any other way of prophecy/ within your skill; save yourself and the city,/ save me" (Sophocles, *Oedipus the King*, 1, 310ff).

Ancient and Modern Skepticism

The attacks on ancient forecasters, and their defenses, have also a modern sound. Astrologers (sometimes including "sorcerers, philosophers, and other diviners") were ordered expelled temporarily from Italy on nine occasions between 139 BC and 93 AD (Scullard 1970). Augustus outlawed private casting of horoscopes in 11 AD—the problem was the treasonable possibility that someone would forecast the death of the emperor, an argument for censorship that would probably appeal to the Defense Department and certainly would appeal to Saddam Hussein. Diocletian (emperor 284–305) banned all divination, "*ars mathematica damnabilis.*" The Christian emperor Constantius II made divination a capital offense in 357 (the law had to be reenacted in 373 and 409, not instantly obeyed). By the 14th century Dante (*Inferno* 20: 38) provided a special place in hell for any "whose glance too far before him ranged," their heads twisted back-to-front.

Cicero attacks haruspices on the same grounds that modern forecasters are attacked, namely, that they disagree (*Div.*, II, xii, 28; compare for auspices II, xxxix, 81): "*An haec inter se haruspices Etrusci, Elii, Aegyptii, Poeni contulerunt?*"—"On these matters among themselves are the haruspices of Etruria, Elis, Egypt, and Carthage agreed?" Are the economic forecasters of MIT, Chicago, and Washington agreed on when the recession will end?

Any fault in forecasting, however, lies in the interpreter, not the signs or the method: *male coniecta maleque falsa sunt non rerum vitio, sed interpretum inscientia.* (The word "*vitium,*" here "*vitio,*" means "sin" but in particular means a failure to perform the ceremony correctly: an error of specification, or even of keypunching).

Even the statistical *vitia* of modern times find ancient parallel. Rigor about sampling errors and vagueness about errors of specification (compare Leamer 1983) or of conditioning (that is, the future conditions X derived from somewhere else put into the model of Y) are a feature of both ancient and modern practice. So is the turning

over of decisions to the technicians, contrary to decision theory (the
oracle at Delphi was careful to keep informed about current events,
the better to judge what losses the clients would suffer if they acted
on a wrong forecast). So are the use and misuse of significance tests.
Quintus (*Div., I, xii, 23*) argues thus, perfectly cogently: " 'Mere
accidents,' you say. Now, really, is that so? Can anything be an
'accident' which bears on itself every mark of truth? Four dice are
cast and a Venus throw [four different numbers] results—that is
chance; but do you think it would be chance, too, if in one hundred
casts you made one hundred Venus throws?" One is reminded of
the 18th-century argument that the closeness of the orbital planes
of the planets implies a common origin (on grounds that such a
peculiar arrangement is unlikely)—and the reply that, after all, *any*
particular arrangement is equally unlikely. Cicero himself gives an
answer (*Div., II, lix, 121*): "Then are we, like fools, to prefer to say
that it happened in the direction of Venus rather than by chance?"

Well, what of it? This: that the difficulties with forecasting are
ancient. The root difficulty with forecasting is what is known in
ancient rhetoric as "the circumstantial ad hominem" argument. One
argues against the opponent on account of his embarrassing circum-
stances. Though the argument has no place in formal logic (so much
the worse for formal logic; compare Walton 1985), we use it daily.
A lawyer arguing for the Tobacco Institute had better be seen smok-
ing in the hallway during the recess. That our teenage daughter has
a strong self-interest in not revealing that she took the car at 2:00
A.M. will properly cast doubt on her protestations of innocence. It is
relevant to the assessment of a Mafia informer that he is by profession
a liar and a cheat.

The Roman poet Ennius was only one among many to use the
circumstantial ad hominem to sneer at forecasters, "who for them-
selves the path do not know, yet for others show the way" (*"qui sibi
semitam non sapiunt, alteri monstrant viam,"* quoted in *Div., I,*
lviii, 132). Socrates attacked the other sophists for charging for their
advice, to which the sophists retorted that at least their advice was
worth something (Isocrates, *Soph.* 2f; compare 7; cited in Jaeger
1944, III, p. 57). It was said that the philosopher Thales of Miletus
made a fortune buying up the olive crop in his district (*Div., I, xlix,*
111), "in order to show that even a philosopher if he sees fit is able
to make money." And yet most of these philosophers and seers, like
modern professors of economics, were not rich.

An economist who claims to know what is going to happen to the
price of corn is claiming to know how to make money. Many models
printed for free in the journals of agricultural economics imply fore-

knowledge of the price of corn. With a little borrowing on the equity of his home or his reputation for sobriety, the agricultural economist can make enormous sums. If an agricultural economist could forecast the price of corn better than the futures market, he would be rich. Yet he does not put his money where his mouth is. He is not rich. It follows that he is not so smart. The same holds for all diviners, macroeconomists, astrologers, urban economists, and technical elves.

The argument applies only to *profitable* forecasts. A forecast of quantities is normally not profitable. An agricultural economist who knows the tonnage of next year's carryover of soybeans does not by that fact possess information valuable on the commodity exchanges. But profitable forecasts (at any rate if they were believable) are more common than most economists seem to realize. True, the average economist realizes that he cannot reasonably expect a course in econometrics to give him tips on the stock exchange. But any economic model that forecasts the price of anything correlated with an asset price is just as good as a hot tip concerning a buyout of General Dynamics. Many economic models forecast such price-correlated things. The turning point of the business cycle, for example, is correlated with the prices of business property and corporate stocks and government bonds. To put it more generally, the price change of any storable good, storable service, or financial or real asset (assets being storable by definition) should be unpredictable from any "artificial" (that is, mechanical) procedure, at least outside the "gold points" set by the normal rate of return and the premium for uninsurable risk. Eugene Fama stated the condition long ago for financial markets. The point here is merely that it had better apply to all assets, or else the forecaster is claiming to be very smart indeed. He who is so smart claims a Faustian knowledge, "Whose deepness doth entice such forward wits/ To practice more than heavenly power permits."

Economists' Objections

Most economists are not comfortable with such ancient skepticism. They have objections. It may be objected that the profitmaking is risky and that professors of economics are cautious. Therefore, they do not put their money where their mouths are, even though their mouths are working fine. Even a worldly philosopher, if he sees fit, is able to make money. The objection has the problem that the bet on the price of corn can be hedged, which is insurance. It is no bet. Someone who can outsmart the market on average, even a little, can

make a lot of money simply and safely. No wonder: The opportunity to buy corn low and sell high, like the right to run a TV station in the 1960s or to import Toyotas in the 1980s, is like finding a $500 bill any time you want.

It may be objected that profitmaking is complicated, and that professors of economics are elaborately trained experts in the complexities. Therefore, the profit is not available to just anyone, only to them. The wizards earn merely what they are worth, the normal return on years of studying wizardry. This objection, too, has little to commend it. The wizards are telling us about the future price of corn or bonds or housing at cocktail parties and in the newspaper, free. Why are they handing over to John Doe their just reward for going to wizard school? And the wizardry claimed is systematic, formulaic, and, when you come right down to it, pretty simple. It involves the fitting of a few hyperplanes to scatters of points. Take a course in economic statistics, the promise goes, and become able to forecast the future in profitable ways. The promise is hard to believe.

Ordinary secrets and routine advice do flow from economic forecasting, and doubtless economists earn their keep (less by forecasting, one would think, than by now-casting). Unlimited wealth, however, cannot be expected to flow from a book or even from many years of concentrated study in economics. Compared to unlimited wealth, many years of study is like the trivial cost of reaching down to pick up a quarter on the ground (Manhattanites, it has been found by experiment, will not stoop for less). If someone knows a scholarly formula for forecasting the price of corn or the level of interest rates on the turning point of the business cycle, it would already have been exploited.

It may be objected that sophisticated people do, in fact, buy stock market advice. An economist (and only an economist) would conclude that something of value had been bought. A reply has been suggested by James Burk (1988), a sociologist and former stockbroker, who found that the advice-giving industry sprang from legal decisions early in the century. The courts began to decide that the trustee of a pension fund or of a child's inheritance could be held liable for bad investing if he did not take advice. The effect would have been the same had the courts decided that prudent men should consult Ouija boards or the flights of birds. It was so at Rome: A consul who ignored the advice of the college of augurs was liable to prosecution after retirement. America decided through its judges that an industry giving advice on the stock market should come into existence, whether or not it was worthless. It did, and was. (Europe

is not similarly blessed, because the law is different.) And, of course, in other ways popularity is no guide. Cicero (*Div.*, II, xxxix, 81) mocks his brother's argument from popularity: " 'But,' you say, 'all kings, peoples, and nations employ auspices.' As if there were anything so absolutely common as want of sense!"

It may be objected that, after all, a great deal of money is made in the stock market. So also is money made at the track in Miami. Grandfather Stueland was offered Radio Corporation of America stock in the early 1920s, and regretted later that he had invested in Stueland Electric instead. Some people did buy RCA: They must have known. But that some people win with the stockbroker or the $100 window at Hialeah does not mean that they were justified in their true belief. They could have won by luck rather than by a justifying technique. People win at slot machines, too, but cannot tell how, because they use no justifiable, inscribable, bookable technique. And even if some people *do* know they will win (God appears to them in a dream and tells them, in the style of natural divination; or they have genuine inside knowledge, in the style of artificial divination), there is no way for the common pigeon to know that these alleged experts know. Why would they be telling us?

It may be objected, at last, that the economist or other seer in the stock or bond or housing market does not have access to the big loans to make big money. Yet consortiums do, and if the wisdom comes simply from being an economist, consortiums ought to be simple to assemble. A consortium of famous economists at Stanford and the University of Chicago in the early 1970s believed that interest rates, which were then at shocking, unprecedented highs (6, 6.5, my Lord, even 7.5 percent), just had to come down. The economists complained at lunch that their bankers would not loan them money to exploit this sure thing. But in the event, sadly, the bankers were right. Interest rates did not fall; they rose. The consortium of economists, relying on its collective expertise in forecasting, lost its collective shirt.

The routine is the usual one. I myself have lost a shirt or two on real estate deals that were bound to succeed and on a consortium of economists speculating in the foreign exchanges. From John Maynard Keynes (who lost money regularly before breakfast but had a Cambridge college backing him up) and Irving Fisher (who reduced Yale's endowment to half of Harvard's by touting stocks in 1928) down to the latest scheme of some economist to make money from mathematical models of gold speculation, economists have not earned the confidence of bankers. As it was put by Paul Samuelson ([1982] 1986, p. 541), who is in a position to know, "It's a mugs game

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for a dentist—or an associate professor of econometrics—to think that he and the telephone can have an edge over those who count the cocoa pods in Africa and follow the minute-by-minute arrival of new information."

The best-known counter-example among economists is said to be the late Otto Eckstein, a superb economist who had much natural, god-inspired sense and who extended the large-scale econometric model into commercial use. He built Data Resources into a company with revenues of $84 million in 1984. But Data Resources did not use its own forecasts of prices and interest rates to speculate. It sold them to others, mainly to companies who wanted a myth of knowledge to comfort them in uncertainty and to answer wrathful stockholders: "We took the best advice." If Data Resources had believed its own forecasts to the extent of speculating on them, and was correct in its belief, then it could have become fabulously richer than it was. To say that Eckstein or Samuelson or other honest purveyors of economic tips became, in fact, a little bit rich does not say that they are so smart. Eckstein and Samuelson (and Louis Rukeyser of Wall Street and Hot Horse Herbie of Broadway) became rich by *selling* advice, in the form of models and statistical equations and other charming talk, not by using it.

The Need for Modesty

Cato the Elder wondered that the haruspices, who examined livers in Rome with an expertise approaching the econometric, did not laugh on meeting one another (quoted by Cicero, *Div.*, II, xxiv, 52). Economists know lots of similar gags about their inability to forecast profitably: Forecasting is very difficult, especially if it is about the future (the physicist Niels Bohr is supposed to have originated this one); an economist is an expert who can tell you tomorrow why the thing he forecasted yesterday did not happen today; the best I can hope in a forecast is to be intelligently wrong or fortunately right.

Yet one must not get carried away. No one doubts that a well-informed economist can tell you a thing or two about the future, mainly from knowing the present well. As Robert Solow (1982) remarked about the forecasts from Eckstein's Data Resources, "Every month it provides an orderly description of the data, organized in such a way that one's attention is called to events that seem to conform with a reasonable person's understanding of the economy." Ancient skepticism does not undermine forecasts that offer little or no profit. A forecast makes no profit if it is commonplace or if does not offer a way to buy low and sell high. Forecasting that

the national income will not fall to zero next year is no more profitable than forecasting that the sun will rise tomorrow.

Other people view economists as social weather forecasters. Economists are not so happy with the analogy, since they know they are not so smart. Weather forecasters and price forecasters could both earn a lot of money on a good forecast if they could keep it secret. A study by Victor Zarnowitz and Geoffrey Moore (1982) showed that leading indicators, invented by Moore, can indeed forecast business cycle peaks—but with leads, alas, ranging from 1 to 19 months. "The economists are generally right in their predictions," Sidney Webb said once, "but generally a good deal out in their dates." Forecasting the end of prosperity as coming somewhere in the next 19 months is a little better than saying that if it is August then southern Florida has a fair chance after a while of getting a hurricane. Yet it is not so smart that the economic forecaster could retire to Miami. It is not good enough to be profitable; and if it were, it would be discounted already.

There are other ways than the circumstantial ad hominem of getting to the same doubt that economists can forecast. For one thing, unlike humans, hurricanes are not listening. Humans react to economic forecasts in ways that dampen or magnify the forecasts. It would be as though the hurricane presently north of Cuba reacted to a forecast that tomorrow it was going to move to Miami by saying, "Hmm: I'd better turn around and go to Haiti instead." People are not so stupid that they are easy to surprise; if they are not easy to surprise, then the economy is not easy to manipulate, and its manipulators would not be rich.

Further and more deeply, the equations of fluid dynamics applicable to the weather do not include an equation that rules out cheap but profitable forecasts. Economic models do. A person who was smart enough to know the solutions to the economic equations would be rich, unless profitable solutions were already anticipated and discounted by the model. Such solutions should be discounted. If the model is a widely available piece of information, or if its essence were embodied in a widely held judgment, it would be useless for making anyone rich. Wise in retrospect, maybe; rich in prospect, no.

The late-modern economist is modest about profitworthy detail, the detail from which he could buy low and sell high. He must be modest especially about the proud claim of economics in the 1960s, the claim to fine-tune the economy, making detailed adjustments to money and taxes in order to offset a depression just around the corner. As economists realize now after much tragedy sprung from hubris, if an economist could see around the corner he would be rich. Fine-

tuning violates the ancient and justified circumstantial ad hominem against forecasters. A fine-tuner would see dozens of opportunities for personal enrichment. The economists go on relating impossibly detailed scenarios into the microphones of television reporters, but in their hearts they know they are wrong.

The argument recommends intellectual modesty in the economic forecaster, if he does not want people to laugh on meeting him. Hubris will need divine protection. Xenophon (*Mem.*, I, 1, 7) reported Socrates saying:

> Those who intend to manage [*oikesein*, from which "economics"] houses or cities well are in need of divination. For the craft of carpenter . . . or economics [*oikonomikon*] . . . may be learned . . . ; but the greatest of these matters the gods reserve to themselves. . . . If anyone supposes that these [divinations] are not beyond reason, and nothing in them beyond our judgment, he is himself beyond reason.

Socrates could turn to the oracles for divine supplementation of a craft. We have lost today the favor of the gods, and books on econometric technique will not assuage our woe.

The Limits of Forecasting

Notice that the reason it is difficult to forecast is not merely that humans are too complicated or too changeable or too free. The humanistic criticisms of social science may be true but they are not telling; they are easy to make and easy to answer. The scientist answers, "Give us the money and we will finish the job." If humans are "ultimately" free, considered as individuals, they still can be forecasted on average and in the mass. And if human masses are complex, they still can be forecasted with another million dollars and another model. So long as humans are to be viewed as molecules bouncing against each other, the problem is merely to get the mathematics right. It is said that forecasting human beings is bound to be more complicated than forecasting planets or pigeons, but that is not true. It depends on what you are trying to forecast. The heart beat of a human is easier to forecast than the twitching of the 67th feather from the pigeon's tail. It is a matter of how ambitious the forecast is. The "simple" problem of space flight, "merely" an application of Newton's laws, requires days of computation at high speed if the ambition is to put a rocket precisely *there* on Mars. For a given ambition the complexity is only a matter of computer time.

The circumstantial ad hominem puts more fundamental limits on what we humans can say about ourselves. It puts a limit on mechanical

models of human behavior. It does not make the mechanical models useless for interesting history or routine forecasting; it just makes them useless for gaining an edge about the future. The various "solutions" of bargaining problems have this flaw: that if the economist knew the solution, then so would the players, which would make the solution valueless. The Turing machine that could forecast the next move of a competitor would sell for a lot of money. If Turing machines are cheap, no one can get rich by using them to outsmart others.

In the opening lines of *Faust*, before the Doctor has turned in vexation to magic, he laments that "I see that we can know nothing!/ It nearly breaks my heart." He immediately amends this sweeping skepticism, for the skepticism about forecasting does not imply literally that we can know nothing but merely, as he then complains on behalf of his fellow men, that he can know nothing, as he puts it disingenuously, *to better Mankind.* I'm from the forecasting agency and I'm here to better you. On further reflection he comes to the nub: His studies, damn them, have taught him nothing that betters *Herr Dr. Faust,* this very example of Mankind. "And *I* have neither property nor money,/ Nor honor and glory in the world:/ No dog should go on living so." There lies the tragedy, at the impossibility of forecast that would be profitable to Faust himself. He seeks the ability to forecast for personal profit (which in due course he obtains, though not for free) and gets his soul's fill of property and money.

Lacking the Devil's bargain, science cannot forecast itself. The paradox shows up in economics because economics so plainly must apply to itself, if it is so smart. But the paradox applies to any fore-knowledge of new knowledge. The impossibility of self-forecasting has become commonplace in philosophy. You do not know today what you will decide tomorrow, unless you have already decided it, in which case it is not tomorrow but today that you decide it.

"Prescience" is an oxymoron, like cheap fortunes: "Pre-science" is knowing before one knows. Prescience is required for central planning of science as much as of the economy. Karl Popper and Alasdair MacIntyre among others have pointed out that knowing the future of science requires knowing the science of the future. It is not to be done. MacIntyre notes that the unpredictability of mathematical innovation is a rigorous case, resting on theorems concerning the incompleteness of arithmetic and the incalculability of certain expressions, proven by Gödel, Church, and Turing in the 1930s. And "if the future of mathematics is unpredictable, so is a great deal else" (MacIntyre 1981, p. 90). If someone claims to know what method or

lack of method would yield good science, why is he not scientifically rich?

The distinction between routine forecasts and startling and profitable divination is analogous to the distinction between routine cooking and the profitable art of three-star cookery. In the peculiar little dialogue, the *Ion*, Plato/Socrates lampoons Ion the performing artist who imagines he *knows* something. It is significant that to mock Ion's claim to knowledge Socrates uses the example of divining. Allan Bloom (1970, p. 57) once remarked of the passage:

> If divining is to be considered an art, it is strange in that it must profess to know the intentions of the gods; as an art, it would, in a sense, seem to presuppose that the free, elusive gods are shackled down by the bonds of intelligible necessity. Divining partakes of the rational dignity of the arts while supposing a world ruled by divine beings who are beyond the grasp of the arts.

As Plato and the skeptic about forecasting would say, the claim of divining to be an art, Greek *techne*, mere bookable craft, is absurd.

Plato, therefore, wished to cage poetry, the god-possession that flatters men to think they know more than does the honest artisan, a technician in every sense. The followers of Plato down to the present age of technique are enamored of knowledge as *techne*, a craft written down in books. They propose to cast books lacking such craft into the flames, as poetry and pretense, mere sophistry and illusion. The trouble is that their version of the fully rational life, the bookable final rules for language games, requires unusual forecasts. And in human affairs a forecast beyond what earns merely usual returns is impossible, except by entrepreneurs, idiot savants, *auteurs,* and other prodigies of tacit knowledge. The notion that bookable knowledge can guide the world through its difficult moments, like the notion that central planning can guide an economy, is self-contradictory. If the philosopher kings and central planners were so smart they would be rich.[1]

The Market for Forecasting/Magic

Nothing I have said implies that the project of acquiring systematic knowledge about the economy is worthless. Inside the margin, as economists say, it is worthful. The world runs on little else. Everyone needs to know how to write an alphabet, though it took a Phoenician

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[1]As indeed they are, for a reason other than their ability to forecast. They live in a world ever hopeful that procedure, mechanism, calculation, bureaucracy, MBA degrees, and other social *techne* will keep us warm and safe. It will not, though the world is willing to pay handsomely for the illusion.

genius to think it up and make his fortune. No one afterwards, though, can expect to make a fortune by knowing the ABCs.

An economist examining the business world is like a critic examining the art world. Economists and other human scientists can reflect intelligently on present conditions and can tell useful stories about the past. These produce wisdom, which permits broad, conditional "forecasts." Some are obvious; some require an economist; but none is a machine for achieving fame or riches.

The argument is merely that at the margin (where supernormal profits and reputations for genius are being made) the observer's knowledge is not the same as the doer's, the critic is no improvement as artist over the artist, the model of the future is no substitute for the entrepreneur's god-possessed hunch. The critics become ridiculous only when they confuse speaking well about the past with doing well in the future. Critics of art and literature stopped being ridiculous this way a long time ago. It would be a fine thing if critics of society would join them in their modest and sober sophistication.

The economics itself says that desires cannot be granted easily and that magic is without practical efficacy. Economics is postmagical, the way the ancient poets and philosophers were. Yet the economists give in to the demands of their clients. The demand for prophecy is insistent. People believe that someone has the gift and are willing to listen to Nostradamus (the sales of his prophecies from Walden Books increased 400 percent following the outbreak of the new Persian Wars). When Teiresias tries to get out of delivering his terrible prophecy, Oedipus chides him angrily: "You'd rob us/ of this your gift of prophecy? You talk/ as one who had no care for law nor love/ for Thebes who reared you" (Sophocles, *Oedipus the King*, 322–24).

J. S. Armstrong (1978, p. 399) has proposed a "rain dance" theory of why expensive forecasters get hired: "The rain dance has something for everybody. The dancer gets paid. The clients get to watch a good dance. The decision-maker gets to shift the problem onto someone else in a socially acceptable way. (Who can blame him? He hired the best dancer in the business.)"

More economistically one could argue that people will not put a high value on what is cheap. The forecasts must be more expensive than merely snapping one's fingers, or else it will not be accounted magical. To deal with uncertainty, we need magic all the time. But the magic cannot be too easy. A magical spell that is valuable is believed; and, therefore, one way to get it believed is to make it expensive, boldly asserting its value. ESSL Corp. (P.O. Box 66054, Los Angeles, CA 90066) sells the most expensive of six programs available from various companies to guess the next numbers on the

lottery. The program sells not for its cost of production (a few dollars) or for its value in use (nothing) but for the persuasively substantial price of $59.95. Psychoanalysts require that the patient pay, because otherwise the therapy will not work. The patient has to make a sacrifice to get well. Divintel, one of several French astrological companies serving business clients, sells a consultation for FFr350 ($70). According to a survey by HEC, a French business school, one-tenth of French businesses use the service.

In other words—and this is the essential point—magic has to be expensive. The economic idea is rent seeking. Magic promises something for nothing. We clever moderns know, however, that magic does not work. If magic is to survive, it must be made expensive, or else people would complain that they snapped their fingers but still mistook the future. The rhetoric of magic demands that the magic be difficult to perform, or else its failure to work will be too evident. Magic promises profit, the same way an economic forecast does. Therefore, the business of magic will attract entry, at length driving down its profit. At length the costs of making the last bit of magic will equal its value in free rides to Baghdad or in daddies conveniently disposed of or in golden opportunities to profit from the coming financial crisis.

When forecasting is not being responsible, it sounds like magic. Magic, like forecasting, is often secret. Mauss ([1902–03] 1972, p. 23) argues that "religious rites are performed openly, in full public view, [but] magical rites are carried out in secret. ... And even if the magician has to work in public he makes an attempt to dissemble, ... [to] hide behind simulated or real ecstacies." One can doubt Mauss's assurance that magical and religious ceremony are sharply different, yet agree that secrecy is common for the magical type. The secrecy makes for scarcity, no less than a secret recipe for baking bread or a secret method for casting iron thin enough for pots.

Likewise, magic and the hot econometric tip are often exclusive. "Nobody can become a magician at will; there are qualities which distinguish a magician from the layman" (Mauss [1902–03] 1972, p. 27). Again the economics works to raise the price. The list of candidates for magical powers must be restricted to make it expensive. As Socrates says in his elitist way, "Not everyone is an artisan of names, but only he who keeps in view the name which belongs by nature to each particular thing" (Plato, *Cratylus*, 390E). The expert can see into the mind of God, being "a master of name giving" (389D; here as elsewhere it is hard to know if Plato is joking or not).

The candidate for magician must be unusual in some way. Smiths, barbers, shepherds, foreigners, infidels, primitives, and other

special, lonely people can become magicians (Mauss [1902–03] 1972, p. 28ff), meaning that one man's tribe is another man's league of sorcerers. The Jews were thus steadily suspected of magic, and the Lapps could sell bags of wind to European sailors (Mauss, p. 32). Specialness, not rarity, is the key—for women were commonly considered magical (because they were excluded from religion and from science), and there are plenty of women. Keith Thomas (1971, p. 274) speaks of the advantage that priests had over ministers in appropriating magic in the 16th and 17th centuries: "Precisely because the Church had its own magic . . . it frowned on that of others. . . . Set apart by his learning, his unique ritual power, and his official virginity, the priest was admirably qualified to be a key figure in the practice of popular magic." A magician learns the language of the spirits, at large cost. He knows the words the gods speak (Mauss, p. 38f; *Cratylus*, 391E; contrast 401A; and the gods loving a joke, 406C). The magician undergoes initiation. Any man can call spirits from the vasty deep, but only for a magician—or an elaborately trained econometric forecaster—will they come.

Above all, magic is often elaborate. It is notoriously so, hoobla-hoobla-hoo, an image of mysterious wisdom won by toil. The rites can last hours or days or weeks, the length of some computer runs. Magic is repetitious, covering every possibility—or else it does not work, since tiny failures to follow the prescription protect the magician from responsibility, the convenient *vitia*. "It is natural for a magician to take refuge behind questions of procedure and technicalities, to protect himself in case of failure in magical prowess" (Mauss [1902–03] 1972, p. 50; compare Thomas, p. 641).

Magical ceremonies are usually more elaborate than religious ceremonies. The scarcity in religion is accomplished by a restricted priesthood and, especially, by the limited efficacy of prayer, which otherwise looks like the fiat in a spell. The Christian sects with less elaborate preparation for their priests expect less from prayer, the one scarcity compensating for the other. The extreme cases are the Amish priests chosen by biblical lot or the Quakers with no priests at all. The sects that think that prayer works cheaply, every time, are regarded by mainstream religion as magical—for example, the cults of saints in the south of Italy or pentecostal sects in the United States.

Magic, then, is childish and anti-economic. Childishly, it gives way to the pressure of desire. Scarcity is wished away. But adults and economists know that scarcity cannot really, truly be wished away. The scarcity must show up somewhere. It does show up in most features of magic. And to the extent that forecasting is, in fact,

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magic, it will exhibit the same signs of rent seeking. The supposed profit arising from the evaded scarcity gets absorbed, competed away. Economics says: At the margin the hoobla-hoo must absorb the incipient profit from being able to take the magician to Baghdad on a carpet, if he could only get the damned thing running.

Economics as a science is a force of acculturation. It says: You cannot get that. The churches of the 16th and 17th centuries, Thomas (1971, p. 278) argues, put "strong emphasis upon the virtues of hard work and application" and "helped create a frame of mind which spurned the cheap solutions offered by magic, not just because they were wicked, but because they were too easy. Man was to earn his bread by the sweat of his brow." Like poetry, and unlike magic, economics in the century afterward dwelt on scarcity. It came to tell that all good things must be scarce in equilibrium; all magical opportunities must be used up. It tells us we must work by the sweat of our brows to achieve our desires. It tells us that we cannot be rich by snapping our fingers. And it tells us that individual morality does not ensure civic morality. Such hard messages would have been perhaps too hard for earlier and less settled times.

Economics is the science of the postmagical age. Far from being unscientific hoobla-hoo, economics is deeply antimagical. It keeps telling us that we cannot do it, that magic will not help. Only the superstitious think that profitable forecasts about human action are easily obtainable. That is why economics, contrary to the common sneer, is not mere magic and hoobla-hoo. Economics itself says that forecasts, like many other desirable things, are scarce. It cannot be easy to know which great empire will fall or when the market will turn. "Doctor Friedman, what's going to happen to interest rates next year?" Hoobla-hoo. Some economists allow themselves to be paid cash money to answer such questions, but they know they cannot. Their very science says so.

Sometimes, however, in its affection for forecasting, economics exhibits a nostalgia for magic. Therein lies the danger. Economics can go wrong and betray its postmagical sophistication by surrendering to the temptation of magic. If, say, poetry surrenders, we are perhaps not seriously damaged—although the poetry then stops performing its maturing function and can even rouse men to magical beliefs in the white man's burden or in some corner of a foreign field that is forever England. Such notions are mischievous enough. But an economics that is nostalgic for magic is radically dangerous.

Social Engineering: The Fatal Attraction

The danger lies in the uses of forecasting, particularly in the comfort it gives to the present state religion. The old state religion of

Rome was that the gods were in their heaven and all was well with the world, so long as Romans did their ritual duty, consulting whatever signs the gods might send. The ability to forecast the future is plausible on a theistic premise (Cicero, *Div.*, I, xxxviii, 82–83). The gods know; why would they not sometimes tell us? As Quintus says (*Div.*, I, xlvi, 104), "To make light of signs sent by the gods is nothing less than to disbelieve in the existence of the gods."

A sense of public duty, the republican virtue, was central to the Roman state religion. Quintus was suspicious of *qui quaestus causa hariolentur*—those who for profit's sake would prophecy. The forecasters were to give their wisdom to the republic. In early Rome "it was wisely decreed . . . that, of the sons of the chief men, six should be handed over to each of the Etruscan tribes [skilled in such matters] for the study of divination, in order that so important a profession should not, on account of the poverty of its members, be withdrawn from the influence of religion [i.e., state piety], and converted into a means of mercenary gain" (*Div.*, I, xli, 92).

The present state religion is similarly underpinned. It says that civil servants look after the common good, as the Progressives hoped, or at least that men of integrity will do their duty, as the Patricians hoped. It says that the common good can be sought positively, as the New Dealers hoped. And it says that common behavior can be manipulated with ease, as the knights of the Great Society hoped. All these hopes converge (unsupported hope being a theological virtue) to create a faith in prediction and control. "A really splendid and useful thing it is—if only such a faculty exists—since by its means men may approach very near to the power of gods" (*Div.*, I, i, 1).

To do for others through statecraft what they cannot do for themselves is social engineering. The best social engineering seeks positive freedom—freedom from want—and can achieve it if it can forecast accurately, which it often cannot. But in the meantime it is likely to be careless of negative freedom—freedom from control. Frank Knight ([1936] 1947, p. 38) noted the rhetorical contradiction in the idea that we can be helped by forecasting social engineers: "Natural science in the 'prediction-and-control' sense of the laboratory disciplines is relevant to action only for a dictator standing in a one-sided relation of control to a society, which is the negation of liberalism—and of all that liberalism has called morality."

Distrust of forecasting is not mere fatalism. The fatalistic view was well expressed by Jocasta advising Oedipus, "Why should man fear since chance is all in all/ for him, and he can clearly foreknow nothing?" (Sophocles, *Oedipus the King*, 977–78). "Foreknow nothing"

is too strong, leading in Jocasta's motherly/wifely advice "to live lightly, as one can, unthinkingly." Fatalism anyway is an Old World attitude, ill-fitting with American optimism.

And yet the ancient skepticism against forecasting is the beginning of wisdom. By all means attend to the forecasts of experts, as one must in order to live; but expect little, and trust them not. The beginning of maturity is to know that the "best-laid schemes o' mice and men / Gang aft a-gley." The beginning of responsible freedom is to know that yon expert "birkie, ca'd a lord,/ Wha struts, an' stares, an' a' that; / Tho' hundreds worship at his word, / He's but a coof for a' that."

No expert forecaster is justly subject to the skeptic's sneer who retains a proper modesty about what observation and recording and storytelling can do. We can observe the history of economies or the history of painting, and in retrospect tell a story about how security of commercial property or the analysis of vanishing points made for good things. An expert such as an economist is an expert on the past, and about the future that can be known without divine and profitable possession. Human scientists and critics of human arts, in other words, write history, not prophecy.

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THE LIMITS OF ECONOMIC FORECASTING
Michael D. Bordo

Donald McCloskey cogently argues that both the art of forecasting
and the case against it are ancient. The modern art of economic
forecasting is compared to ancient divination. There are two types of
divination: artificial and natural. Artificial divination makes forecasts
using the signs of nature and the heavens. Natural divination relies
on dreams and visions. In modern forecasting a two-fold division can
also be made—between the mechanical Box-Jenkins type analysis of
the pattern of time series and the use of structural models derived
from economic theory coupled with the use of judgment.

The case against forecasting is also ancient. Cicero argued, and
McCloskey reiterates, that forecasting cannot really have much
value, because if forecasters could really tell the future, they would
be fabulously wealthy and are not. The reason economists cannot
forecast the future of variables such as asset prices from economic
models is because if they could do it, others could do it too—the
new information would already be discounted. In other words,
opportunities for profits will always be exploited; there is no such
thing as a free lunch.

Some Questions

If economic theory tells us there is no real advantage to forecasting,
then why are economic forecasts paid such heed? The answer is
because they satisfy a demand for magic. People want free lunches,
and they are willing to pay so-called experts considerable sums of
money and other rewards to tell them stories about the future. If, as
it turns out, the forecasts are wrong, then the users can blame the
expert and the expert could reply, "Who could foresee a war?" Thus,
a caste of expert forecasters is created. For forecasting to have value,
forecasts must be complicated and understood by only a select few.

If forecasting were only a form of snake oil, then why should we worry about it any more than the sale of patent medicines or aphrodisiacs? The answer, which McCloskey spells out loud and clear, is that forecasting can become a problem when the government uses it for social engineering. If the government can forecast recessions accurately (i.e., know both the sources of shocks hitting the economy and the pace and timing of their relationship to the economy), then it can prevent them by the appropriate use of its monetary and fiscal tools. The problem with this prescription for fine-tuning, as Milton Friedman ([1951] 1953) pointed out, is that if the forecasts are wrong, then the fine-tuning can actually exacerbate the business cycle. Moreover, as Robert Lucas (1976) made clear, if the government can set up a structural model of the economy and use it to make both policy prescriptions (by simulations) and economic forecasts, so can the public. The public will incorporate the model into their decisionmaking and formation of rational expectations so that the government, even if its forecasts were reasonably correct, could never successfully manipulate the private economy.

Finally, does this mean that economic forecasting has no role? Here McCloskey takes the quite reasonable position that economists have an important role in explaining how the economy works today and how it has worked in the past. With this understanding, economists can make conditional forecasts that the government or private sector can use with a degree of caution.

Some Qualifications

I basically agree with the author's conclusion—forecasting is limited at best. However, I would like to qualify four points and salvage a bit of the case for forecasting.

First, although forecasting is limited, it has value and not just in the sense that anything that sells in the market has value. Forecasting has value in the conditional sense mentioned above. Moreover, it gives the public and the government flexibility. By providing information on how the economy works in the present and has worked in the past, and also in providing information on how past and present variables related to future variables in the past, an economic forecast gives insights on what could occur in the future. As McClosky correctly says, no one knows exactly what will happen in the future, but when an economist gives us information that increases our understanding of what could happen, and given what has happened, we have greater flexibility in making choices. He is correct in saying that an economist who says he knows exactly what will happen,

because his economic analysis tells him so, is being dishonest. But the economist can still present the menu and then say what his personal hunch is. The user, knowing the economist has not put his money where his mouth is, can then take the advice with a grain of salt—*caveat emptor.*

Second, economic analysis can be used to make qualitative predictions that can then help the policymaker (e.g., if you expand the money supply, inflation will follow; if you freeze prices, shortages will follow). Historical evidence can be used to back up these predictions.

Third, some forecasters can be better than others. The market will rate them, which indeed it already does. The key criterion used today is the forecasters' track record. Presumably, credibility and candor are also important criteria.

Fourth, there is a quibble over whether economists can make fortunes by using their economic knowledge to predict the future. According to McCloskey, entrepreneurs possess hunches—they make gambles based on their forecasts of future opportunities— which are sometimes successful. Economists as a group, however, cannot do that because any opportunities for profit that could be revealed by theory will be arbitraged away. To support his hypothesis, he gives examples of famous economists—most notably Irving Fisher—who lost their shirts because of bad forecasts. But there are counter examples. One case was Richard Cantillon, one of the founders of economic science, who made two fortunes on the basis of his understanding of the internal inconsistencies of John Law's "economic system."

Cantillon's second fortune is most instructive. One of the aims of Law's system was to displace specie with bank notes and stock. To do this, Law, as finance minister, announced on March 11, 1720, a series of depreciations of the value of specie in terms of the money of account or, alternatively, appreciations in the value of bank notes, and he imposed extensive exchange controls. Simultaneously, by issuing bank notes, Law continued to support the price of Mississippi stock. According to Antoin Murphy (1987), Cantillon realized the inconsistency of an appreciating exchange rate and an expanding money supply, so he sold French bank notes and bought Dutch guilders using his international banking connections to evade the exchange controls. Events proved Cantillon right— a run on the Banque Royale's specie reserves forced Law to reverse his policy, precipitating a massive loss of confidence and a quick collapse of the system. Cantillon made a fortune and fled the country under threat of the Bastille.

McCloskey's Insight

The fact that Cantillon used his economic analysis to make a highly profitable forecast does not mean that others could repeat his experience. The key insight of McCloskey's paper is the point based on Friedman and Lucas. You can spend billions of dollars building elaborate econometric models of the economy that may be very useful in aiding our understanding of the economy's structure. But when these models are used for forecasting and control purposes, the outcome can only be disastrous.

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