

Computers: aid or hindrance in economic forecasting?

ECONOMICS as a social science has lost its credibility in the eyes of the public.

This is the result of two developments which have occurred over the last decade:

- The pain of involuntary mass unemployment. People were led to believe that, thanks to advances in economic theory, full employment could be attained by appropriate political decisions.

- The confessions of leading practitioners that they do not really know how the "real world" economy operates. As Benjamin Friedman, professor of economics at Harvard University, recently observed: there are "lots of aspects of economic activity that we don't understand very well."

This is after 200 years of theorising.

So in response to their failures, economists are building ever more complex models of the economy. They hope to improve their performance. Says Alan Greenspan, who was chairman of the Council of Economic Advisers under President Ford:

"Even though we've had an extraordinary increase in our tools, such as computers, we have not been able to keep pace with the growing complexity of economic relationships, both domestic and international."

EMBARRASSMENT deepens as economists vie with each other to prove that *they*, at least, earn their fat salaries.

But comparisons of their performances serve only to further expose economics to ridicule. Take, for example, attempts to forecast the growth of the economy.

In 1983, the UK Treasury and 15 university and private sector institutions published their predictions (see table). The *likely outcome* for growth in gross domestic product is between 1½-2%.

Only five forecasters predicted this order of growth. The government's experts were not among them.

The amplitude of error is increasing: little wonder that President Reagan, after his reelection, toyed with the idea of abolishing his Council of Economic Advisers, whose forecasts in recent years have been wider off the mark than those of private business forecasters.

So the great search is on for the reasons for the poor predictive powers of economics.

It speaks volumes for the way in which this social science has strayed in past decades that its leading practitioners are searching for the world of reality.



● A SUBJECT is a science only if its theories make it possible to predict future events. On the basis of this criterion, the collapse of confidence in economics as a social science appears to be warranted. Or is it?

Are the professionals asking the wrong questions? And looking for the wrong evidence?

Nine months ago, *Land and Liberty* correspondents from Helsinki to Tokyo began looking for answers. They found that vital equations were missing from the scores of mathematical models of the economy.

And Editor FRED HARRISON (below) flew to San Diego, Southern California, to report on what could become a remarkable breakthrough in economics.



This comes through from the words of Michael Spence, of Harvard, who last year was selected by the American Economics Association as the nation's outstanding economist under 40.

He told the *New York Times*: "Economics is at the point where we could use some breakthroughs to make substantial progress. Macroeconomics, which deals with the works of an entire economy, seems stuck at the moment because we do not have a powerful

enough theoretical basis for understanding reality.

"The same is true in microeconomics, where the conceptual apparatus is not as powerful as we would like. The person who provides more powerful tools will have made a major contribution. If I stayed in economics, that is what I would spend my time trying to do".

FOR DECADES, under Keynesianism, economists have been able to delude themselves that they had the tools to manipulate the economy.

Harsh realities have now forced them to try to scramble back into the real world – and they are searching for a bridge to link ivory tower and soup kitchen.

Increasing faith is being placed in econometrics – the application of mathematics to economic theory, aided by the computer.

Increasingly complex econometric models of the economy are being built, in the search for accurate predictions of trends – the results of which just might help the politicians to construct new, more successful policies.

The stakes are high, for Western governments shape their decisions – involving the livelihoods of millions of people, and investments worth billions of dollars – on the basis of small percentage changes in the trends of key variables.

These models, however, are still built on old assumptions.

Could it be that mathematical precision is vesting them with a spurious authority?

Could it be that some basic equations are missing?

THE U.K. ECONOMY

Forecast made for 1984 at end of 1983

	Gross Domestic Product (annual % growth)
London Business School	2.2
Phillips & Drew	2.4
National Institute of Social & Economic Research	2.0
Society of Business Economists	2.3
Treasury	3.0
Liverpool	3.7
OECD	2.25
ITEM	3.0
Cambridge Econometrics	1.8
James Capel	1.9
Hoare Govett	2.6
Wood MacKenzie	2.0
Capel-Cure Myers	1.0
Simon Coates	2.0
Henley	2.4
Oxford	1.9
LIKELY OUTCOME	1½-2

FRED HARRISON
reports from
San Diego, California

The missing

NEVER before has so much brain and computer power gone into forecasting trends in western economies.

The margins of error in these forecasts, however, are increasing. This is evidence of a fundamental flaw in the theoretical perception of how the economy works.

The deficiency in the statistical data is a residual problem: the errors begin with the way in which economists are ordering the relationships of variables, and the relative importance placed on individual components of the economy.

Bigger computers are being used by economists, feeding in ever-increasing numbers of equations in their attempts to tell the world what is about to happen in such vital areas as investment and job-creation.

Bigger, however, does not mean better. In fact, even the professional forecasters now agree that they do not have an adequate understanding of what is going on in the real world.

UNTIL 1973, governments assumed that – except for brief periods – full-employment was here to stay.

Since then, more and more people have found themselves in the dole queues, and the politicians (whether wilfully or otherwise) have not been able to do much about it.

But that is why forecasting is important: either to justify existing policies, or to modify them to ensure full employment.

Economists, however, have now conceded that their mathematical models of the economy do not enable them to anticipate sharp turning points in the trends.

This is partly because the models rely on extrapolations of past trends, which cannot – by themselves – make allowances for unanticipated shifts in one or more of the component variables.

Arguably, of course, this is not the fault of the econometrician or his computer: no one can foresee *qualitative* changes which have a major impact on the cogs and wheels of the economic machine.

The fault, however, lies in the way in which economists judge the importance of what they deem to be key phenomena.

Take, for example, the use of stock exchange trends as one of the components of the "longer leading" index, which is supposed to give 12 months notice of future trends.

A boom in stocks and shares suggests business optimism, with money pouring in from investors that will be invested by companies to create new technology and more jobs.

The New York stock exchange certainly led the Washington Administration to adopt an optimistic attitude last year.

Heavy dealing on Wall Street, however, was far from evidence of confidence in U.S. corporations. We find, in fact, that a record number of companies – about 575 – repurchased their own shares. According to one estimate, \$17bn was put into stock repurchases in the first six months of 1984.¹

The principal motive: companies wanted to raise the prices of their shares above the levels placed on them by the market.

Thus, firms were depleting their cash flows (money that would have gone into new capital formation) in favour of maintaining a financial image.

The forecasters, however, were misled into thinking that all this business activity on Wall Street was evidence of future prosperity: hence the predictions – falsified in the dying months of 1984 – that there would be no downturn in the U.S. economy.

The year ended with 76 bank failures in the U.S. – more than for any 12 month period since 1937.

WE BELIEVE that the poor performance of economists can be traced to one major error.

They make exhaustive allowance for trends in the labour and capital markets – but turn an almost completely blind eye on the land market.

Dozens of equations are fed into their computer models of the economy. Missing, however, are the equations on trends in land values.

No-one can be criticised for not being able to anticipate unforeseeable

events (such as the protracted miners strike in Britain): that's the work of clairvoyants.

But one-third of economic life is wilfully ignored by economists:

- Land is one of the three factors of production – yet it is effectively assigned a zero value, or neutral role, in professional assessments of economic activity.²

- Rental income, when properly assessed, amounts to about 30% of a nation's total income.³

Economic forecasters go to great lengths to measure the psychic disposition of consumers and businessmen, in their anxiety to anticipate people's intentions and actual behaviour.

Exhaustive surveys are conducted by universities and civil servants into the shifting price of potatoes and rate of change of "invisible" exports.

But when it comes to calculating the rate at which rental increases are shutting down firms – zilch.

The forecasters get full marks for *trying*. Wharton's annual model of the U.S. economy, for example, has 1,000 variables, which have to be solved simultaneously; and 800 variables in the quarterly model. As with all the other models, however, Wharton's use of housing starts in the construction industry is the nearest it gets to incorporating the impact of the land market on the economy in general.

Not surprisingly, therefore, the Wharton model – which is claimed to be different from Keynesian models, in that it does not neglect incentives and supply side considerations – fares no better than others when it comes to correctly forecasting the turning points in economic trends.

ONE ROUTE by which the land market stunts economic growth has been described by Graham Pye, the new president of Britain's House-Builders Federation.

Land prices had risen by 500-1,000% in the past five years. Result: in the south-east – where the best job prospects for recession-hit Britain are to be found – land represented 30-40% of the price of a new house.

This forced the average price up to £43,500, thereby "putting up walls against mobile workers who want to get on their bikes and find a job, and then find they can't afford a house," says Mr. Pye.

This obstacle to labour mobility meant that people were forced into involuntary idleness, and the economy grew at a slower rate.

South-eastern land prices, says Mr. Pye, ought to be reduced to 20% of the cost of a house.



● Graham Pye

equations



"Errors are greater and the challenge is more severe at the turning points," observe Klein and Young in their study of the Wharton model.⁴ They add, in a lament that fits other attempts at warning people about significant deviations from historical trends:

"It is not surprising to find that forecasts by any method fared relatively badly in the turbulent years since 1971. Turning points and change are more difficult to forecast than steady growth or decline.

"When the economy fell precipitously, the predicted changes were uniformly too high, and when the inflation rate climbed the most, predicted changes were uniformly too low.

"As a general rule, economists tend to underestimate change. The period of the oil embargo and the 1974 recession was a severe test for all forecasting techniques."⁵

BUT WHAT value is there in financing a forecasting industry whose rate of accuracy is only high when there is no change — when they can apparently only predict an "as you were" momentum to the economy?

Surely the resources that go into forecasting can only be justified if they correctly inform us of *changes* in the path of economic activity?

But these resources are wasted, precisely because the theory that is used to marshal them is critically defective. The 1971-4 phase of economic history is a classic example. This was a period of spectacular land speculation, a cyclical phenomenon that can be traced over the course of 200 years in Britain and the U.S.A.

Armed with a theory of the land markets, economists *could* have correctly predicted the slump of 1974, which would have occurred even without the intervention of the OPEC oil cartel.⁶

The blind spot in economic theory is inevitably matched by the vital equations that are missing from the econometric models.

That gap, however, is about to be plugged with research now being conducted by economists at San Diego State University, southern California.

Dr. George Babilot, Director of the Centre for Public Economics and a professor in SDSU's department of economics, plans to adapt a model of the San Diego County economy to incorporate new equations that deal with the land market.

The model is being fed into the university's computer by 28-year-old graduate student Cindy Woodard. In its

present form, the quarterly forecasting model has 56 equations.

The model, said Miss Woodard, "is very functional. It is set up so that it can be expanded or contracted — so that we can enjoy ourselves and be creative."

Her first problem is to trace back what are called "free parameters" in the model, to see how they were developed. Prof. Denis Flag, who recast the model's language to make it compatible with the university's computer, explained:

"Sometimes you have to fudge certain relationships to get a workable result," he said. This was necessary, "since we are not able to duplicate the world as it actually is. You need to improve the result by fooling around with particular estimates, and using something different."

The free parameters are assumptions that are made to make the model produce results that apparently fit the real world experience. This manipulation is obviously necessary where the model is incomplete in some crucial way.

Andrew Britton, Director of Britain's National Institute of Economic and Social Research, is disarmingly frank in his description of "data-mining", the term he uses to describe how econometricians make their models fit reality.

Mr. Britton admits that "model-builders cannot claim to have a full understanding of fluctuations in economic activity."⁷ The size of forecasting errors had increased during the 1970s, but this he appears to attribute to "a multitude of unique and random events of a kind which models don't try to explain."



● Cindy Woodard

These random events, in fact, may play a small part in the errors in forecasts. For econometric models are *bound* to yield wrong forecasts simply because a major part of economic activity — as represented by the land market — is not directly incorporated into the models.

So how do economists overcome their propensity to make errors of increasing amplitude? By respecifying the equations so that, for a short period at any rate, they yield tolerably accurate forecasts. The equations are made to fit the facts.

Theoretically, there is a problem with this. "If one goes on looking long enough one is almost bound to find something which fits the data well; but unfortunately that doesn't guarantee that one has discovered the model which explains how the data were generated."⁸

And so, inevitably, as Mr. Britton confesses:

"In their present form, however, the models don't explain many of the longer-term trends in the economy, the slower growth of output in the 1970s for example."

This is where the San Diego research may now yield seminal results.

THE MISSING land equations will be written by Fred Galloway, a 30-year-old professor in the economics department who is a whizzard at applied mathematics.

Working with some colleagues, he has already made his mark in the real estate world with a model that improves the technique of appraising the value of family homes. This model uses multiple regression analysis to calculate property values, rather than relying on the traditional approach of comparing properties with similar characteristics.

Prof. Galloway's main task is to write an equation that will enable the San Diego model to abstract land values out of general property values.

He will then have to incorporate a spatial dimension into the university's model.

"The methodology is straightforward," says Prof. Galloway. "All we need is time and money."

The new land equations, when run on the computer, will reveal simultaneous adjustments in all the other equations — and predict changes in trends for housing construction, consumption, investment, and so on, in

response to changes in the value of land in the market.

Economists will be anxious to discover if the modified San Diego model then produced more accurate predictions than the conventional econometric models.

PROF. BABILOT, who originated the San Diego project, has no doubt about the policy implications that could stem from the research. He told me:

"I and a couple of colleagues concluded that we would be able to plug a land-values formula into the model of San Diego County.

"We have the basic equation already, which will have to be modified to separate land from the value of improvements."

One task is to find new ways of raising government revenue. California is regularly assailed with political propositions to reduce the tax burden on income earners. Prof. Babilot wants to know what would happen if tax rates were raised on land and lowered on, say, consumption or incomes.

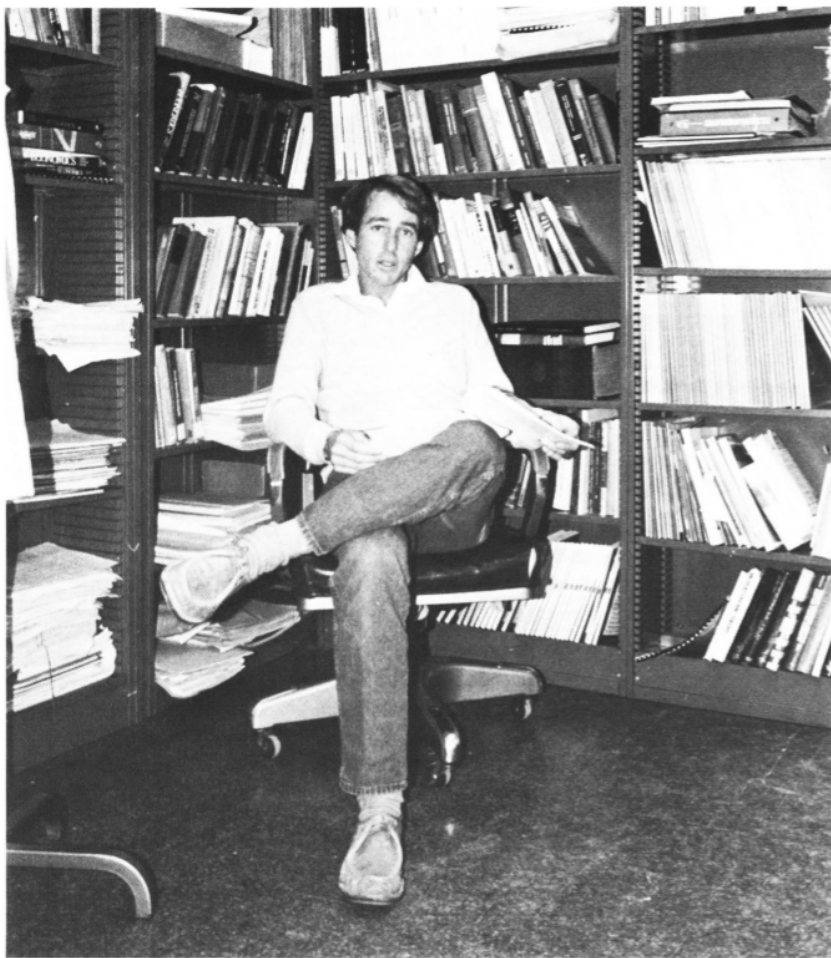
San Diego, he points out, is land-rich, but does not compare particularly well with the rest of California in terms of median incomes.

"But we have tremendous value in our land, and that seems to be our best tax base. So we want to show what would happen if we replaced, say, a sales tax with a site-value tax."

The pioneering model, he suggests, should make it possible to calculate whether land values offered the base to generate enough revenue at national level – thereby opening up land value taxation as a realistic alternative source of federal revenue.

"It strikes me that if we are serious about reducing the expenditure side of the budget, the land value tax policy is timely."

Conclusive results from San Diego would lead to theoretical turmoil among economists, who would be



● Fred Galloway – a whizzard at applied mathematics

determined to defend their entrenched philosophical interests.

But if the San Diego computer spews out numbers that could not be challenged, a new era in the development of economics as a social science would be opened up.

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From tax burden to boom time

WHAT would the San Diego computer model reveal if the missing equations were fed into it?

Prof. George Babilot, who received his Ph.D from the University of Oregon, was willing to make some predictions of his own.

If the computer was asked to foretell the impact of a shift in the property tax onto land values and off the value of buildings, this – says the professor of economics – is what it would come up with:

- There would be a boom in capital formation and the construction industry.

- Money flowing into the undeveloped land market – for purely

speculative purposes – would be reduced.

- Consumers would spend more – if, says Prof. Babilot, an increase in the land tax were associated with a decrease in taxes on low and middle-income earners.

- New jobs would be created, in line with the increase in private spending.

Prof. Babilot knows that there will be resistance to his fiscal proposals, but he believes that a reform of the property tax would be fair to most people.

For the current structure of taxation is regressive, he says. "It puts the burden on the low and middle-income

groups.

"A shift to a higher land tax would be progressive, because it would be a move away from the regressive sales tax.

"It would do what Henry George [the 19th century social reformer]* said would happen, and everybody would benefit – benefit from it absolutely. Relative positions would change, which is why people with vested interests would oppose it. But the whole economic pie would increase".

*Prof. Babilot is one of the authors of *Critics of Henry George* (editor: Prof. R. V. Andelson), Fairleigh Dickinson U.P., 1979.