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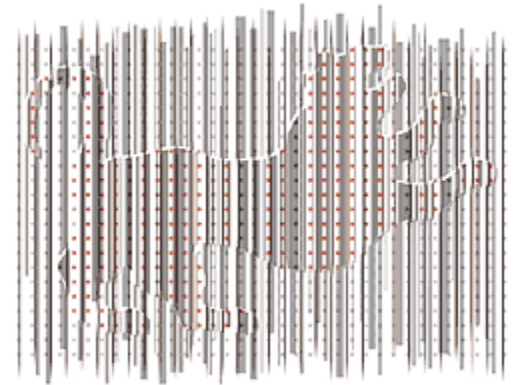
**Economist.com****OPINION****Economics focus**

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**Econometrics, once the province of forecasters and financiers, now provides the underpinning for a vast area of economics**

WHEN James Heckman and Daniel McFadden won the Nobel prize for economics this week, lapsed students of the field may have asked, "Who?" They may have wondered if a whole branch of economics had not passed them by. In a way, it is worse than that: what has slipped by unnoticed is not so much a single branch as a methodology that is indispensable to every branch.

Messrs Heckman and McFadden made vital contributions to econometrics—the application of statistical theory to economic investigation. As the Nobel committee recognised, econometrics now provides the standard of proof across the full range of applied microeconomics, which studies everything from household spending and investment by firms to the organisation of industries, labour markets and the effects of public policy.



Suppose you were interested in the relationship between wages and work experience. You might begin by giving some workers in a particular firm a questionnaire, asking how much they were paid and how long they had been working in their present jobs. You might well find a strong positive correlation between pay and years of experience—but, from an econometric perspective, that answer would not be much use.

One problem is **omitted-variable bias**. Suppose that years of schooling, gender or race were also important determinants of wages, as seems plausible. Not only would you be ignoring this valuable information, thus making your answer incomplete; worse, as econometric theory demonstrates, the missing information pollutes the estimated correlation between the two variables you did examine.

Or consider **reverse causality**—the idea that wages may affect experience, as well as vice versa. Perhaps employees who receive higher wages are more likely to stay with the company, and thus gain more experience. If so, conclusions drawn from the estimated correlation might be misleading. A remedy might be to work with a "proxy" for experience, choosing a variable that is unaffected by wages: age, for example.

Next come questions of **precision and robustness**—asking, in effect, how reliable are the results? Were enough employees polled to yield results that could hold for all the company's workers, and perhaps for workers at other firms as well? Do the workers who answered the questionnaire share a trait that could influence their wages? Do wages of men and women vary differently with experience? Did the workers answer truthfully and accurately? To satisfy an applied microeconomist, all of these issues have to be resolved using econometric tools.

Econometrics also points out that different methods are needed for analysing different kinds of choices. The tools you would use to estimate a static relationship between two continuous variables, such as wages and experience, could not be correctly applied to the choice between two options, such as deciding whether or not to buy a car; or to a multiple choice, such as working out how many children to have; or to a choice over time, such as budgeting for retirement; or to a choice on more than one level, such as deciding whether to apply to university and then selecting which institution to attend.

This year's Nobel laureates each solved one of those big methodological puzzles. Mr Heckman confronted the

sample-selection problem: in terms of the examples just given, for instance, the effect on the results if the workers who answered the questionnaire differed in important ways from those who did not. If you can work out what factors determined who responded—perhaps only workers with high wages were free to take time to fill in the questionnaire—the estimates can be made much more accurate.

Mr McFadden developed ways of modelling several types of choices, such as how many children to have. (He made time for three.) Multiple choices such as this one involve complex statistical analyses, since the factors influencing a couple to have their first child may not be the same as the ones that lead the parents of three children to have a fourth.

In addition to blazing the trail in econometric theory, Messrs Heckman and McFadden put their new tools to work in a variety of applied microeconomic fields. Mr Heckman studied how people decide how much to work, as well as the roles of education and training. Mr McFadden's interests include the economics of transport, energy, the environment, health, development and industrial production. Biological, medical and other social sciences have also found applications for their work.

## Dynamic duo

These new Nobel laureates are the pioneers, in both theory and application, of a field whose time at last appears to have come. Regardless of philosophical or political bent, economic research must use econometrics to gain statistical legitimacy. And statistical legitimacy is a necessary (though maybe not sufficient) condition for the credibility that the science of economics still lacks outside its own domain. The sloppy statistical work of the past—and perhaps even the unspoken belief that it is okay for economists to mine data until they find “proof” to support virtually any conclusion—has largely disappeared in applied microeconomics, at least as done in good universities.

These days, in fact, applied microeconomists often look askance at the work of macroeconomists—once the paragons of economic research, and the original apostles of econometrics—who are failing to take advantage of state-of-the-art methods. To lag behind the Nobel-prize committee in recognising crucial work: that takes some doing.

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