Alternative approaches to evaluation in empirical microeconomics*

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Abstract. Four alternative but related approaches to empirical evaluation of policy interventions are studied: social experiments, natural experiments, matching methods, and instrumental variables. In each case the necessary assumptions and the data requirements are considered for estimation of a number of key parameters of interest. These key parameters include the average treatment effect, the treatment on the treated and the local average treatment effect. Some issues of implementation and interpretation are discussed drawing on the labour market programme evaluation literature.

Key words: Evaluation methods – Matching – Instrumental variables – Social experiments – Natural experiments

JEL Classification Numbers: J21, J64, C33

1 Introduction

In this review we consider four distinct but closely related approaches to the evaluation problem in empirical microeconomics: (i) social experiments, (ii) natural experiments, (iii) matching methods, and (iv) instrumental methods. The first of

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these approaches is closest to the ‘theory’ free method of medical experimentation since it relies on the availability of a randomised control. The last approach is closest to the structural econometric method since it relies directly on exclusion restrictions. Natural experiments and matching methods lie somewhere in between in the sense that they attempt to mimic the randomised control of the experimental setting but do so with non-experimental data and consequently place reliance on independence and/or exclusion assumptions.

Our concern here is with the evaluation of a policy intervention at the microeconomic level. This could include training programmes, welfare programmes, wage subsidy programmes and tax-credit programmes, for example. At the heart of this kind of policy evaluation is a missing data problem since, at any moment in time, an individual is either in the programme under consideration or not, but not both. If we could observe the outcome variable for those in the programme had they not participated then there would be no evaluation problem of the type we discuss here. Thus, constructing the counterfactual is the central issue that the evaluation methods we discuss address. Implicitly, each of the four approaches provides an alternative method of constructing the counterfactual.

The literature on evaluation methods in economics is vast and continues to grow. There are also many references in the literature which document the development of the analysis of the evaluation problem in economics. In the labour market area, from which we draw heavily in this review, the ground breaking papers were those by Ashenfelter (1978), Ashenfelter and Card (1985) and Heckman and Robb (1985, 1986).

In many ways the social experiment method is the most convincing method of evaluation since it directly constructs a control (or comparison) group which is a randomised subset of the eligible population. The advantages of experimental data are discussed in papers by Bassi (1983,1984) and Hausman and Wise (1985) and were based on earlier statistical experimental developments (see Cochrane and Rubin, 1973; Fisher 1951, for example). A properly defined social experiment can overcome the missing data problem. For example, in the design of the impressive study of the Canadian Self Sufficiency Project reported in Card and Robbins (1998), the labour supply responses of approximately 6000 single mothers in British Columbia to an in-work benefit programme, in which half those eligible were randomly excluded from the programme, were recorded. This study has produced invaluable evidence on the effectiveness of financial incentives in inducing welfare recipients into work.

Of course, social experiments have their own drawbacks. They are rare in economics and typically expensive to implement. They are not amenable to extrapolation. That is, they cannot easily be used in the ex-ante analysis of policy reform proposals. They also require the control group to be completely unaffected by the reform, typically ruling out spillover, substitution, displacement and equilibrium effects on wages etc. None-the-less, they have much to offer in enhancing our knowledge of the possible impact of policy reforms. Indeed, a comparison of results from non-experimental data to those obtained from experimental data can help assess appropriate methods where experimental data is not available. For example, the important studies by LaLonde (1986), Heckman, Ichimura and Todd (1997)