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978-0-521-33045-9 - Information, Incentives and the Economics of Control

G.C. Archibald

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This book examines alternative methods for achieving optimality without all the apparatus of economic planning (such as information retrieval, computation of solutions, and separate implementation systems), or a vain reliance on sufficiently “perfect” competition. All rely entirely on the self-interest of economic agents and voluntary contract. The author considers methods involving feed-back iterative controls which require the prior selection of a “criterion function,” but no prior calculation of optimal quantities. The target is adjusted as the results for each step become data for the criterion function. Implementation is built in by the incentive structure, and all controls rely on consistency with the self-interest of individuals. The applicability of all the methods is shown to be independent of the form of ownership of enterprises: examples are given for industries which are wholly privately owned, wholly nationalized, mixed, and labor-managed.

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# Information, incentives and the economics of control

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To the memory of my father

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## Preface

A preface is perhaps a place to offer some explanation, and certainly a place to make acknowledgements and offer thanks.

The only part of this book which may, I think, require some explanation is Part II, and the explanation is not independent of some debts I wish to acknowledge. When I was an undergraduate at the London School of Economics the works of Oscar Lange and Abba Lerner were on the reading list, and, true to the liberal and open tradition of the School, “socialist economics” was prominent on the agenda. Later, when I was on the teaching staff of the School, I encountered the work of Karl Popper and some of his colleagues, as well as that of the great, if misguided, Bill Phillips. It was not until I had been for some years at this University that I realized that a feed-back, or iterative, control system might be designed in such a fashion as to avoid some of the difficulties inherent both in Phillips’ control systems and in central planning. Such a system requires the prior selection of what I call a Criterion Function. Such a function must have the properties that it signals clearly, probably by reaching an extremum, that the target has been reached, and sufficient information to estimate its value must be generated during the iterative process itself. Given these properties, there would be no need for a planning procedure: no need, that is, to collect sufficient information to calculate optimal quantities, or prices, in advance. Clearly, the iterative control process has itself to be incentive-compatible at every step, and strategy-proof. If, then, it is properly designed, the means of implementation are not to be considered as a separate

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step, as they are when the target is the outcome of a planning procedure. Errors, of course, operate in real time, and impose costs, as do errors in a process of market adjustment. I do not know how to estimate the costs of these errors, nor how to compare them with the adjustment costs of other systems.

Lerner's *The Economics of Control* left the problems of information and incentives quite unresolved, and this work may be regarded as, in part, an attempt to fill up some of the gaps he left (my title is a deliberate echo of his). Nonetheless, the use of iterative control systems in no way supposes state ownership. Examples in Part II are deliberately chosen to illustrate their use in cases of pure private ownership, public ownership, and mixed cases. This book is thus not intended as a contribution only to the "economics of socialism."

With these considerations in mind, I have, in Part II, provided what amounts to a "DIY manual" for the construction of feed-back control systems with desirable properties. All depends, however, on the choice of Criterion Function. In a Second-Best world, the justification of a Criterion Function may not be at all easy. I have accordingly offered a Second-Best example, but this depends on a brutal aggregation of consumers' preferences. It is sadly possible that the DIY kit serves no useful purpose.

Parts III and IV of this book require, I think no particular explanation. They are variations of the theme "control," in the interests of efficiency (and perhaps equity) without planning, but requiring the construction of appropriate institutions that allow the solution to be reached by voluntary contract rather than by command.

My remaining debts are too heavy to be fully acknowledged. I hope the many individuals who have contributed to my knowledge and understanding will forgive me for not listing them. (One chapter, indeed, was first written as a partial reply to a question posed by a conspicuously intelligent and able graduate student; I shall not even name him.) I clearly must identify and thank former collaborators who have permitted me to use our joint work here, and even read and commented on my use of it: Russell Davidson, David Donaldson, and Hugh Neary.

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I take pleasure in thanking several cohorts of graduate students who have patiently permitted me to try my ideas on them.

I am much indebted to the Canada Council for a Killam Research Fellowship during my tenure of which I was able to make coherent some of the material offered here. This University has given me the sabbatical leaves I needed for the writing, and the Social Science and Humanities Research Council of Canada has been generous with research grants and leave fellowships. My greatest single debt must, however, be to the Economics Department of this University, which has invariably provided both the atmosphere of challenge and friendly criticism, and practical support.

Ms. Marissa Relova somehow deciphered my handwriting and typed the whole text, and dealt patiently with my innumerable corrections and revisions.

My wife has had to put up for several years with a degree of preoccupation and abstraction sadly beyond the licensed “absent mindedness” of professors.

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