经济与金融高级研究丛书

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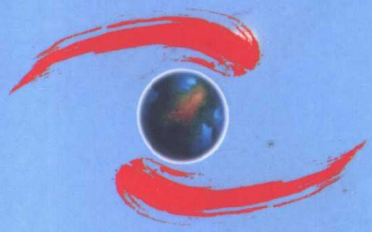

激励理论的应用

Applied Incentive Theory

让·雅克·拉丰　著

Jean-Jacques LAFFONT

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经济与金融高级研究丛书
出版前言

中国的经济学和金融学研究如何走向世界？这是一个值得探讨的问题。中国经济学者素以刻苦求知、真诚报国为荣。在国内，自改革开放以来经济学者的突出贡献已深得国人认同；在海外，中国的经济学者同样做出了可喜的成绩。但是，国内经济学者的学术成果得到国际上认可的为数寥寥，而海外中国经济学者所取得的学术成果在国内也鲜为人知。同时，国际经济学者的学术成果在国内的传播也很有限。凡此种种，原因当然是多方面的，其中之一是学术传播与交流上的障碍。这些障碍的存在造成彼不知我，我亦不知彼，国内经济学者的学术研究难以走向世界，国际经济学者和海外中国经济学者的学术研究难以走进中国这样一种尴尬的局面。不言而喻，在全球经济一体化趋势主导世界潮流的今天，这种状况不利于中国经济和中国经济学的发展。

随着改革开放的一步步深化，中国经济与世界经济日益接轨。世界各国经济学者对中国经济发展和中国经济研究的兴趣和热情有增无减。海内外中国经济学者的拳拳报国之心也日益高涨。科学无国界，学术交流也无国界。我们相信，学者们的热情与努力将冰释学术交流中的所有障碍。因此，在经济全球化的今天，在经济腾飞指日可待的中国，这套《经济与金融高级研究丛书》的出版是时代的要求，更是我们的历史使命。

本套丛书将尽可能全面地收录国际经济学者特别是中国经济学者在国际上已获得公认的学术成果。每部著作将基本保留其最初发表在国际刊物上的原貌(或其创作的原貌),由作者按研究专题编纂成书。此举一方面是为了让更多的国人了解这些学者的研究成果,或者至少感知一下国际经济学者和海内外中国经济学者在国际主流经济学发展进程中所迈出的坚实的步伐,从而激励更多的青年学子求知问道;另一方面也是为了使世界各国的经济学者对中国经济学者的研究成果有更多和更全面的了解,或者至少感知到中国的经济学研究并非固步自封置身世界之外,而是与世界同步与潮流并进的。知己知彼,互相交流,这对于繁荣学术是有百利而无一弊的。北京大学出版社真诚地希望更多的海内外学者向我们赐稿,并给我们批评、建议,以助于这项造福世人的学术文化传播事业。

北京大学出版社

经济和金融高级研究丛书
编者说明

本丛书收录世界各国经济学者特别是海内外中国经济学者从事当代经济学和金融学理论研究和实际研究的前沿成果。就某一专题或者多个专题，作者既可以把已经发表的论文收集成册，也可以修辑整理成一部或多部专著。收集成册的公开发表的论文一律保持其发表时的各刊物排版印制的原貌，以方便读者查寻援引；尚未公开发表的论文则一律保持其创作原貌，以供读者参考。

本丛书主编同时还与海内外众多学者合作主办英文学术刊物 *Annals of Economics and Finance*。此刊物出版尚未发表的至少具有一些原创性的经济学和金融学（英文）论文。如有兴趣借此刊物宣布自己学术思想的学人，敬请寄论文给：

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但愿此丛书和杂志能促进中国经济学者与世界各国经济学者的学术交流，促进中国经济学和金融学研究走向世界主流。

邹恒甫

于北京大学

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Introduction

Even though the tradition among French students was to go to Berkeley to study economics, I decided to go to Harvard where Kenneth Arrow had recently arrived. I was mysteriously attracted by his work despite a great lack of information and no direct knowledge of his personality. Our contacts during the year I wrote my thesis were very few, but enough to give me a long lasting complex of inferiority.

I was writing my thesis quickly because the military service was waiting for me; I sat in his information course, and in the middle of a somewhat disorganized course the strike of his genius occurred, as so many times before and after. In the fall of 1973 he came to the class wtih an issue of Econometrica containing two articles he was finding somewhat contradictory: Gibbard's article proving that there exist no non manipulable voting mechanisms and Groves' article exhibiting a class of dominant strategy mechanisms.

This was for me the point of departure of discussions with Jerry Green, then young assistant professor and also sitting in the class, which led us in the Summer 1974, at Stanford where we were invited by Kenneth Arrow, to prove the theorem characterizing the class of dominant strategy mechanisms as Groves mechanisms, point of departure of several years of work which led to our book *Incentives in Public Decision Making*. I was plunged into incentive theory and never got out of it, despite several attempts to quit an area where I felt I had spent too much time and where the developments looked interesting but too clearly so.

I came back to incentive theory in the middle of the 1980s with the help of Roger Guesnerie when I realized that after all, the theory of public goods was maybe not the most exciting application of these ideas. After having pushed with Roger the mathematical economics of the topic as far as it seemed reasonable, I started with Jean Tirole working on a modest model of regulation which turned out to be an unexhaustible mine of new problems which ended up, momentarily, with our book: *The Theory of*

Incentives in Procurement and Regulation, followed more recently by *Competition in Telecommunications*.

A further impetus for my excitement in the theory of incentives came with my interest in development economics raised by my former students back to Africa, Latin America and China. When looking at LDCs, one cannot escape the need for enlarging economics to political economy, hence a few years later my book *Incentives and Political Economy*.

And I am afraid it is not over. I am finishing a book on an engineering approach to regulation which studies incentive regulation in calibrated engineering models of telecommunications and I have started writing with David Martimort a textbook in three volumes, *The Theory of Incentives*, with the first volume due in 2001.

In the present two volumes, under the gentle pressure of Heng-fu Zou, I have gathered my papers on incentive theory that I like the most. Of course, these papers owe a lot to the many prestigious co-authors I have been lucky to collaborate with in my career and who taught me so much. I hope these readings will give to Chinese students a sense of how this topic developed over the years and will excite them to the point of giving them the desire to pursue further this line of research which, in my view, is the most successful complement in economic theory of the Arrow-Debreu general equilibrium theory in the 20th century.

Good reading and my best wishes for bringing further this exciting field.

Jean-Jacques Laffont,
Colomiers, December 2, 2000

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Part V Political Economy and Development

Part I

Public Economics

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ON THE REVELATION OF PREFERENCES FOR PUBLIC GOODS

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1. Introduction

The problem of ascertaining tastes for public goods is one of serious practical as well as theoretical concern. Recently, attention has been devoted to the design of mechanisms to elicit the true tastes of the population and to act in accordance with the information revealed [Groves (1973), Groves and Loeb (1975), Kurz (1974)]. We shall be concerned with the simplest of such problems – the determination of the desire of the population for a single specific public project. We require that the procedure be known to all participants, and that the government be bound to act in accordance with the announced preferences.

Groves (1973) has studied one such process which has the following desirable properties: it is in every individual's interest to announce his true preference for the project independent of the announcements of others, and the project is undertaken whenever the announced value to society exceeds its cost. Such procedures we call *individually incentive compatible and successful.*

Specifically, it is supposed that individual i's willingness-to-pay for the project is v_i and his announced valuation is w_i. Without loss of generality, we take the cost of the project to be zero. Costly projects can be treated by subtracting the per capita cost from everyone's evaluation.[1] The project is undertaken whenever

*The authors would like to thank K.J. Arrow for helpful discussions. This work was supported by National Science Foundation Grants GS-31688 at Harvard University and CS-40104 at the Institute for Mathematical Studies in the Social Sciences, Stanford University. This paper was previously circulated as Stanford (IMSSS) Technical Report No. 140, September 1974.

[1]An alternative procedure is to introduce the government as an artificial player whose expressed preferences for the project are minus its cost. If the decision is then made on the basis of the sign of the sum of willingnesses-to-pay, including the government's, the project will be accepted only if the value exceeds the cost. Transfer payments must also be calculated including the government's statement as well, but, if the costs are assumed to be proportional to the number of individuals served by the project, all of the results of this paper are preserved. Subtracting the per capita cost from individuals' statements, as suggested in the text, leads to a system that is exactly analogous to this one as well.

$\Sigma_i w_i \geqq 0$, and the ith individual receives a subsidy of $\Sigma_{j\neq i} w_j$ in this case. If the project fails, no subsidy is paid. Whatever the values for w_j, $j \neq i$, the ith individual cannot do better than to set $w_i = v_i$, for with this choice he will receive

$$v_i + \sum_{j\neq i} w_j \quad \text{if} \quad \sum_i w_i = v_i + \sum_{j\neq i} w_j > 0,$$

and zero otherwise. With other choices of w_i, the individual runs the risk of either a negative payoff (if $w_i > v_i$) or a zero payoff when the truth would have led to a positive result (if $w_i < v_i$), and there is no potential gain.

Since the strategy of 'telling the truth' is dominant for each individual, the Nash equilibrium in which everyone follows this policy has a strong claim on our attention. We want to ascertain if the costs of attaining it through the Groves procedure are warranted. If a project is accepted a total of $\Sigma_i \Sigma_{j\neq i} w_j$ must be paid in subsidies. If it can be recouped through lump sum mechanisms so as not to distort the incentives, then the cost is purely the adverse effect on the distribution of income. An upper bound on these costs can therefore be obtained by treating the total subsidy payment as a dead weight loss.[2]

One way of attempting to mitigate these losses is taking a random sample from the population to estimate tastes, and acting upon this estimate. This introduces the obvious trade-off – sampling error vs. the cost of the subsidies.[3] This procedure does not insure that a Pareto optimum relative to the full information situation will be found. The potential for nonoptimal decisions is one manifestation of the costs of the government's imperfect information. The distribution of the mean preference of the sample is, of course, independent of the size of the population. But when an error is made, it affects all the people who were omitted from the sample. The risks therefore increase with the size of the population while the cost of the procedure grows at the rate of the square of the sample size. It is natural to ask how the optimal sample size depends on the size of the entire population and in particular to focus on the asymptotic

[2]An additional problem is that, although the mechanism induces honest responses on an individual level, it is not immune to cooperative behavior. In fact, any two individuals can guarantee each other a highly desirable outcome by both announcing a very large, fictitious, evaluation of the project. Furthermore, on the individual level, the incentive to reveal one's true tastes decreases with the size of the population. The only instance in which the announcement affects an individual's payoff is when it changes the sign of the aggregate. The likelihood of this clearly decreases as the population grows. Thus, although the incentive to tell the truth still exists, it is greatly weakened in large group situations. In a separate paper we take up the question of choosing an individually incentive compatible mechanism with desirable properties relative to these problems as well.

[3]Related to the problems mentioned in footnote 2, this idea has some subsidiary advantages. Sampling may tend to make cooperative behavior more costly as members of potential coalitions may have trouble seeking each other out. Moreover, by keeping the set of individuals smaller, the strength of the incentives to tell the truth (or the potential regret associated with waking an erroneous response), will increase.