

经济与金融高级研究丛书

Advanced Studies in Economics and Finance

丛书主编 邹恒甫

Editor in Chief Heng-fu Zou



# 劳动分工网络的 超边际分析

Inframarginal Analysis of the Network  
of Division of Labor

杨小凯 著

Xiaokai Yang



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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。

1998/11

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,也可以编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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# Preface

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This book belongs to an emerging and rapidly growing literature of economics. It differs from Marshall's marginal analysis that separates the analysis of demand and supply from the analysis of individuals' decisions in choosing their levels of specialization. It differs from his neoclassical dichotomy between pure consumers and firms. This book begins from an analysis of individual consumer-producers' decisions in choosing levels of specialization, and then applies inframarginal analysis (total benefit-cost analysis across corner solutions in addition to marginal analysis of each corner solution) to investigate how the network size of division of labor in society is determined in the market place. According to this inframarginal analysis, demand and supply are two sides of the division of labor (Allyn Young, 1928). Hence demand and supply are determined not only by resource allocation for a given network pattern of division of labor, but also by the network pattern of division of labor.

Also, this book differs from Samuelson's prototype of the second generation of economics. It does not have a dichotomy between microeconomics and macroeconomics. Since a particular level of division of labor is associated with a certain size of market network, the extent of the market and aggregate demand are determined by individuals' decisions in choosing their levels of specialization that yield the network size of division of labor for society as a whole. Hence many macroeconomic phenomena, such as unemployment and business cycles are some special features of the complicated network of division of labor.

In this book non-linear programming, dynamic programming, and other nonclassical mathematical programming are employed to resurrect the spirit of classical mainstream economics within a modern body of formalism. Since the spirit of the book is older than neoclassical economics, while its body is younger than neoclassical economics, I would like to address the new species *New Classical Economics*.

Several new classical general equilibrium models are used to develop an overarch-

ing framework for explaining all micro and macro phenomena. It is shown that when the network size of division of labor is endogenized in a general equilibrium analysis, marginal comparative statics for a given pattern of the network can address conventional microeconomic resource allocation problem, while inframarginal comparative statics explain discontinuous jumps of the equilibrium size of network of division of labor and related aggregate variables across different structures. The inframarginal comparative statics (or dynamics) can then explain emergence of money, business cycles, and unemployment from division of labor. Hence, for our grand synthesis, macroeconomic analysis and microeconomic analysis are just at two different levels within an integrated framework.

Many insights of Buchanan, Cheung, Coase, and North into transaction costs, property rights, institution of the firm, and contract are formalized in the text. Challenges posed by nonlinear evolutionary economics (see Nelson, 1995, Conlisk, 1996, and references there) and by the Austrian School (see Kirner, 1997, and references there) against the mainstream are taken and absorbed into the text. For instance, the concept of Walrasian sequential equilibrium is developed to predict concurrent evolution of economic organisms and evolution of information acquired by society through social experiment with various organisms using price mechanism. The recursive paradox, which means that a decision problem based on bounded rationality cannot be well defined, raised by nonlinear evolutionary economists is solved in a well closed dynamic general equilibrium model based on adaptive behaviors and bounded rationality. The dynamic equilibrium model substantiates the proposition in nonlinear evolutionary economics that concurrent evolution of organisms and information about organisms acquired by society involves uncertainty of the direction of the evolution as well as a certain tendency of the evolution (Nelson, 1995).

Too many individuals and institutions contribute to this project. I am first greatly grateful to my teachers back to Princeton University, Hugo Sonneschein who taught me the theory of general equilibrium, Edwin Mills who taught me development economics and urban economics, Gene Grossman and Avinish Dixit who taught me trade theory and new general equilibrium models with increasing returns, Gregory Chow, Whitney Newey, Angus Deaton, and Richard Quandt who taught me econometrics, Joseph Stiglitz, Barry Nalebuff, and Sandy Grossman who taught me information economics and game theory, Alan Blinder and John Taylor who taught me macroeconomics, and William Baumol, Michael Katz, and Robert Willig who taught

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Last, but not least, without love, patience, and strong support of my family, this book would never exist in this world. I hereby express my deepest love and thanks to my wife, Xiaojuan Wu and kids, Xiaoxi, James, and Edward.

Of course, any remaining errors are solely my own responsibility.

Xiaokai Yang

March, 2002, at Monash University

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后记

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劳动分工网络的超边际分析

# **第一篇**

## **文献综述和超边际分析及新兴 古典经济学的基本方法**





# Specialization and Division of Labour: A Survey

Xiaokai Yang and Siang Ng

## 1.1 CLASSICAL LITERATURE ON SPECIALIZATION AND DIVISION OF LABOUR

The purpose of this chapter is to survey the literature on specialization and the division of labour in society. In the introductory section the classical literature on specialization is briefly reviewed. The neoclassical literature on specialization and new trade and growth theory based on marginal analysis will be reviewed in Section 1.2. The formal decision models that apply inframarginal analysis to endogenize individuals' levels of specialization and the equilibrium models that apply marginal analysis to endogenize individuals' levels of specialization will be surveyed in Section 1.3. New classical equilibrium models of specialization based on corner solutions and inframarginal analysis will be surveyed in Section 1.4.

Houthakker (1956, p. 182) expressed the belief that 'Most economists have probably regarded the division of labour, in Schumpeter's words, as an "external common place", yet there is hardly any part of economics that would not be advanced by a further analysis of specialization'. This implies that the analysis of specialization and division of labour is not one of many fields of economics, but rather is at the core of classical mainstream economics. The focus of classical economics was on the implications of specialization and division of labour for economic growth and welfare. Plato (380BC, pp. 102–6) considered the welfare implications of the division of labour and specialization and the connection between the division of labour, the market and money. Xenophon also examined the connection between cities and the division of labour (see Gordon, 1975, p. 41). William Petty (1671, I, pp. 260–1) noted that specialization contributes to skilful clothmaking and pointed out that Dutch could convey goods cheaply because they specialized each ship for a specific function. Petty later gave a more striking example of the division of labour in the manufacture