

杨东亮◎著

# 国债理论研究 与中国 实证检验

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 全国百佳图书出版单位

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## 摘 要

国债理论与国债实践所关心的三个国债基础命题——国债经济效应、国债最优规模和国债最优期限结构，一直是经济学与金融学研究的热点。本书以这三个国债基础命题为研究重点，依据“理论研究——现实分析——实证支持”的研究范式展开研究。本书首先对国内外学者关于三个国债基础命题的经典研究文献进行系统的梳理，提炼出国债基础命题的经典理论研究结论；其次，对经典理论研究的结论进行现实分析，发现现实经济环境中的不确定性对国债基础命题研究均有重要意义，结合我国实际，提出作者关于国债基础命题研究的基本观点，包括对经典理论研究结果检验的新思路 and 国债基础命题研究的新视角；最后，利用我国实际数据，对作者关于国债基础命题研究的基本观点进行了实证分析与检验。

本书的具体结构安排如下：

第1章是引言。对本书的选题背景和选题意义进行阐述，对本书研究的主要对象——国债，进行基本概念的辨析和界定，提出本书的研究思路与方法，结构与内容，以及主要的创新点。

第2章是文献综述。本章对国债经济效应、国债规模和国债期限结构三个方面的国内外研究文献进行综述。其中，在国债经济效应研究方面，包括古典经济学家、凯恩斯主义和李嘉图等价定理的国债观点，着重介绍了国内外学者对李嘉图等价定理和不确定性下居民消费行为的理论和实证研究。在国债规



模研究方面,包括从福利最大化、税收平滑和政府财政活动可持续性角度对国债最优规模的研究,国债规模、国债风险、债务危机和金融危机的关联研究,国债风险度量研究等文献。在国债期限结构研究方面,包括从政策时间一致性、不确定性条件下的税率平滑角度对国债最优期限结构的研究,国债期限结构、融资成本和利率期限结构的关联研究,解释利率期限结构的预期理论研究等文献。

第3章是国债经济效益的理论与实证研究。首先,本章对公债经济效益的经典研究文献与模型进行了精炼概述,包括 Diamond (1965) 的代际交叠模型和 Barro (1974) 的利他代际转移支付模型,以及 Leonardo (1988) 对李嘉图等价定理应用环境的扩展分析。其次,从代际间的转移支付、流动性约束、扭曲税收和不确定性四个方面对李嘉图等价定理成立的前提假设进行了现实分析,并介绍了检验李嘉图等价定理的常用实证模型,包括单方程线性模型、联立方程模型和协整方程模型。最后,对1981年我国国债再次对内发行以来近三十年的国债实践情况进行考察,分三个阶段细致分析了我国国债的绝对经济效应和相对经济效应,利用我国实际数据,实证分析李嘉图等价定理在我国的表现。

第4章是不确定性条件下国债经济效益的理论与实证研究。首先,本章对不确定性条件下公债经济效益的经典研究文献与模型进行了精炼概述,包括 Blanchard (1985) 的有限期界模型和 Strawczynski (1995) 的收入不确定性模型及 Carroll (2001) 对收入不确定性模型的扩展。其次,对国债经济效应研究的现实困难进行分析,提出不确定性条件下公债经济效益的研究思路 and 具体实证研究方法。再次,利用1990年以来我国的实际月

度数据,实证分析了我国国债的总体经济效应表现。最后,阐述本章对国债经济效应进行研究获得的重要启示。

第5章是国债规模的理论与实证研究。首先,本章对国债最优规模的经典研究文献与模型进行了精炼概述,包括 Bierwag、Grove 和 Khang (1969)、Park (1991) 在确定性无穷期框架下最优公债规模的研究,Barro (1979) 在公债经济效应中性条件下最小化税收扭曲成本的研究,Hamilton 和 Flavin (1986) 在政府财政活动非庞氏博弈条件下公债规模可持续性的研究,以及 Henning (1995) 在随机状态条件下财政赤字可持续性的研究。其次,指出国债最优规模研究的现实困难,提出从控制国债风险角度分析国债规模的研究思路,并分析国债风险的常用测量指标和平滑区制转移模型建模方法。再次,利用我国实际数据与常用国债风险测量指标对我国国债风险进行测量分析,并对 1994 年以来,反映我国国债规模与国债风险的基准指标,国债负担率进行动态建模分析与预测。最后,阐述本章对国债最优规模进行研究获得的重要启示。

第6章是国债期限结构的理论与实证研究。首先,本章对国债最优期限结构的经典研究文献与模型进行了精炼概述,包括 Lucas 和 Stokey (1983) 在政府支出不确定性条件下的状态或有债券研究,以及 Barro (1995) 在经济不确定性条件下的税率平滑研究。其次,分析了影响国债期限结构的现实因素和利率期限结构预期理论。再次,利用我国国债发行期限实际数据对我国国债的期限结构进行经验分析,利用 2007 年上海银行间同业拆放利率 (Shibor) 发布以来的日数据对利率期限结构预期理论在我国的表现进行实证检验。最后,阐述本章对国债最优期限结构进行研究获得的重要启示。



通过上述研究，本书取得的主要结论如下：

1. 通过对国债经济效应经典研究文献进行系统地梳理与回顾，发现公债经济效应研究中的两个里程碑——凯恩斯主义公债效应与李嘉图等价定理，本质区别是巴罗基于代际间存在利他转移支付动机提出的个体新效用函数，在李嘉图等价定理众多的现实假设中，理性预期假设是李嘉图定理成立的核心前提。通过利用我国实际数据校准 Carroll (2001) 提出的不确定性条件下个体消费行为模型参数，模拟得到我国个体在现实经济环境中收敛的最优消费和储蓄行为，发现我国个体具有高边际消费倾向、高贴现率和预防性储蓄行为特征，不满足理性预期假设。

2. 通过把国债分为正常财政赤字融资和与税收互换两部分，区分出两部分国债拥有的独立经济效应，并相应的称之为国债绝对经济效应和相对经济效应，其中，相对经济效应研究与李嘉图等价定理研究等价。通过对不确定性条件下国债经济效应进行现实分析，指出因难以确定正常税收量，无法确定产生经济效应的两部分国债规模，提出把确定性的财政支出看做税收引起的，财政支出的不确定性部分是国债引起的，从财政支出不确定性对个体消费影响的新视角对国债的总经济效应进行了实证研究。

3. 通过对 1981 年我国国债再次对内发行以来近三十年的国债实践情况进行考察，分三个阶段细致分析我国国债的绝对经济效应和相对经济效应，发现在第一时期（1981 年—1998 年），国债的两种经济效应都是十分显著的；在第二时期（1998 年—2004 年），国债的相对经济效应变弱，李嘉图等价定理渐进成立；在第三时期（2004 年—2008 年），国债的绝对经济效应也

开始变弱。我国国债实践中国债经济效应表现出的这一阶段性特征是与此阶段我国的经济现实环境和居民对国债延迟税收本质认识的提高是密切相关的。

4. 通过选取 1990 年以来我国的实际月度数据, 利用时变参数区制转移模型从确定性冲击与随机冲击两个角度对财政支出增长率不确定性进行分解计量, 并考察两种不确定性成分对消费增长率长期趋势的影响, 研究发现我国国债具有正向的总经济效应, 提出我国应保持灵活的财政支出政策以应对外生随机冲击的不利影响, 降低财政支出增长率对宏观经济环境变量反应的短期敏感度。

5. 鉴于国债规模、国债风险与政府债务危机之间的密切关系, 提出把国债负担率作为度量我国国债风险与国债规模的基准指标, 我国政府应定期统计与披露我国国债余额和我国国债负担率数值。同时, 利用国债偿债率等国债风险基本测量指标对我国国债风险进行综合测量, 发现各指标均在长期内保持稳定, 在近期呈下降趋势。利用平滑区制转移模型对我国国债负担率建模, 发现我国国债负担率满足全局平稳性要求, 经验数据支持我国国债规模的长期可持续性, 对未来一段时期国债负担率进行自助抽样预测, 发现在没有突发剧烈外生冲击的情况下, 我国国债负担率水平将继续保持慢速下降趋势。

6. 通过利用我国国债发行期限实际数据对我国国债的期限结构进行了经验分析, 发现我国国债发行期限结构从单一逐步到丰富, 各期限发行规模从集中逐步到分散, 形成了目前较合理稳定的期限结构, 而这一过程是与我国债券流通市场的发展密不可分的, 并提出我国应积极发挥市场基准利率的作用, 形成完整的市场利率期限结构曲线。





7. 通过选取 2007 年上海银行间同业拆放利率 (Shibor) 发布以来的日数据, 利用门限误差修正模型对 Shibor 利率中活跃的周利率和月利率进行实证检验, 发现二者的关系与动态变化特征满足利率期限结构预期理论假设, 从而证明了国债融资成本角度设计国债期限结构是可行的选择。

**关键词:**

国债经济效应, 国债规模, 国债期限结构, 实证研究



## Abstract

The economic effects of national debt, the optimal size of national debt and optimal term structure of national debt has long been the hot spots of economic and financial research, which are the three basic propositions of national debt theory and practice. On a basis of three basic bond propositions, this paper follows the research paradigm of “theoretical research—the reality analysis—the empirical analysis”. In the first place, this paper reviews the classic literature at home and abroad and extracts the classic theory and conclusion of national debt study. Secondly, the reality analysis is applied to the conclusion of the classical theory. We draw a conclusion that the uncertainty of realistic economic environment holds sway over the national debt research. Combined with the reality of our country, this paper proposes the fundamental point of view concerning the basic national debt theory, including the new directions of theoretical research and the new research perspective of proposition. Finally, taking advantage of the actual data, this paper brings about an empirical analysis and testing on the basic propositions of national debt theory.

The full text is divided into six chapters and the specific structure and content are as follows:



Chapter I is the Introduction, which includes the research on background and significance of the topic, and the definition of the basic concept of national debt. It also outlines the research concept, methods, structure, contents and main innovations of the paper.

Chapter II is literature review from the angles of the economic effects of national debt, national debt scale and term structure of national debt. In terms of the economic effects, literature review consists of the classical economists, Keynesian and the Ricardian Equivalence Theorem, which places the focus on the theoretical and empirical research of Ricardian equivalence theorem and consumer behavior. Turning to the national debt scale, the study covers the welfare maximization, tax smoothing and sustainability as well as the association of national debt scale, treasury risks and financial crisis. In the matter of the term structure of national debt, the study concentrates on time consistency of policy, tax rate smoothing under uncertainty as well as the association of term structure of national debt, interest rates and term structure of interest rates, in order to explain the expectations theory.

Chapter III provides the theory and empirical research on the economic effects of national debt. This chapter carries out systematic theoretical analysis and empirical testing on two bond theory: Keynesian bonds economic effects and Ricardian Equivalence Theorem. First of all, this chapter outlines the refined statement of classic models, including the overlapping generations'



model by Diamond (1965), altruism inter—generational transfer payments model by Barro (1974) and the application of the Ricardian Equivalence Theorem by Leonardo (1988)

Secondly, combined with the prevailing realities, this chapter conducts in—depth theoretical analysis on the four key assumptions of Ricardian Equivalence Theorem, such as liquidity constraints, inter—generational transfer payments, tax distortions and uncertainties. In addition, this paper introduces several important models of Ricardian Equivalence Theorem, inclusive of the single—equation linear models, simultaneous equations model and co—integration equation model. Finally, we explore the practice of the national debt since domestic national debt were issued in China in 1981. We analyze the absolute and relative economic effects of national debt in three stages through the Ricardian Equivalence Theorem.

Empirical research on economic effects of national debt under uncertainty is performed in Chapter IV. This chapter examines the economic effects of national debt from the respect of individual consumer behavior. First, we outline the concise summary of classical models of economic effects of public debt, including limited sector model by Blanchard (1985), income uncertainty model by Strawczynski (1995) and income uncertainty expansion model by Carroll (2001). Secondly, we investigate the difficulties of analysis on economic effect of national debt and put forward the research concepts and specific empirical research methods of economic effects from the perspective of financial ex—



penditure uncertainty' impact on individual consumer.

Finally, draw on time-varying parameter model and the actual monthly data since 1990, the chapter measures two uncertainties of fiscal expenditure growth rate caused by time-varying parameters and random exogenous shocks. It also studies the effect of uncertainty on long-term trend of household consumption growth rate, in order to grasp the overall economic representation of national debt.

Chapter V is theoretical and empirical study of national debt scale. This chapter analyzes the national debt scale and systematic risk.

First, we summarize the classical research on the optimal size of national debt, including the study in the context of infinite certainty period by Bierwag, Grove and Khang (1969), Park (1991), minimum tax cost distortions under the neutral economic effects by Barro (1979), by sustainability research Hamilton and Flavin (1986) and general equilibrium model by Henning (1995). Then, from the perspective of national debt scale risk, we select the national debt burden rate as the basic indicator as the measurement of bond risk and bond scale and construct the smooth transfer model. Finally, this chapter provides the basic measurement of China's bond risk and models the dynamic changes of national debt burden rate. The use of bootstrap forecasting method find the national debt risk, trends of national debt scale.

Chapter VI is the empirical research on term structure of na-



tional debt theory. First of all, we sum up the classic literature about the optimal term structure, including contingent bond research under uncertainty by Lucas and Stokey (1983) and the optimal term structure under the uncertain shock and smoothing objectives by Barro (1995). Secondly, this chapter investigates the realistic factors which affect the term structure of national debt and explains the expectation theory. Finally, on the ground of the China's actual data, threshold error correction model and Shanghai Interbank Offered Rate since 2007, this paper tests the expectancy theory of term structure of interest rates.

Through the above research, the main conclusions made in this article are as follows:

1. Through the study of classical literature of economic effects of national debt, we find that the difference, in essence, between the two research milestones—Keynesian bond effects and Ricardian Equivalence Theorem is that barocchi came up with the new utility function of the individual and rational expectations assumption is the core of Ricardian Equivalence Theorem. The consumer behavior model under uncertainty presented by Carroll (2001) simulates the convergent optimal consumption and savings behavior of our country. The results reveal that individual has a high marginal propensity to consume, high savings rate and preventive behavior, which does not meet the rational expectations assumption.

2. Dividing the national debt into normal revenue deficit financing and tax exchange, we differentiate two independent eco-



economic effects of national debt as absolute and relative economic effects respectively. Relative economic effects research equals with Ricardian equivalence theorem. By means of realistic analysis of economic effects under uncertainty, this paper points out that due to the difficulty of normal tax, it is difficult to identify national debt scales. The feasible solution is to view the financial expenditure as a tax and to think of fiscal expenditure uncertainty as the result of national debt. In the wake of the above hypothesis, we conduct the empirical research on overall economic effects of national debt, from the perspective of the impact of financial expenditures uncertainty on individual consumption.

3. The three—stage exploration of the absolute and relative economic effects of China's national debt for almost 30 years indicates that in the first period (1981—1998), both economic effects were very significant. In the second period (1998—2004), the relative economic effects weakened and Ricardian Equivalence Theorem came into play. In the third period (2004—2008), the absolute economic effects of national debt also weaken. The characteristics of economic effects of China's national debt in this stage are closely related with our economic environment and raised awareness of deferred tax.

4. By choosing the actual monthly data since 1990 and time-varying parameters regime switching model, we apply the decomposition measurement to the uncertainty of financial expenditure from the angles of definitive shocks and random shocks. Besides, this paper also identifies the long—term impact



of two components of uncertainty on consumption growth rate. The outcome signifies that China's total national debt has a positive economic effect and the flexible fiscal expenditure policy is beneficial to deal with random exogenous adverse shocks and lower the short-term sensitivity of macroeconomic environment variable in response to the growth rate of financial expenditure.

5. Given the close relationship among national debt size, national debt risk and government debt crisis, this paper deems the national debt burden rate as the fundamental benchmarks of measuring national debt scale and national debt risk. Our government should regularly calculate and disclose statistics of balance of our national debt and our national debt burden rate. At the same time, the employment of some risk indicators, such as debt servicing ratio, to the comprehensive risk measurement jumps to the conclusion that the indicators remain stable in the long term and maintain a downward trend in the near future. China's overall debt burden meets the stability requirements and empirical data supports our long-term sustainability of government bonds. The bootstrap prediction of national debt burden rate bears out that national debt burden rate will continue to maintain a slow downward trend in the absence of sudden severe exogenous shocks.

6. The empirical analysis on term structure of China's national debt proves that term structure of China's national debt varies from single to rich and issuance scales of different stage vary from to concentrate to disperse, which forms the current





reasonable term structure. This process has a bearing on development of China's bond circulation market and market benchmark interest rate should plays an active role in the formation of a complete curve of term structure of interest rates.

7. By choosing the Shanghai inter—bank Offered Rate (Shibor) in 2007, we make use of threshold error correction model to test the active weekly interest rates and daily interest rates. The results proves that the relationship and dynamic characteristics of the above two interest rates meet the theoretical assumptions, which further demonstrates that the design of national debt term structure depends on financing cost is a viable option.

**Key words:**

National Debt Economic Effect, National Debt Size, National Debt Term Sturcture, Empirical Studies