Preface

In a globalized and multi-polarized world, the competition between nations' comprehensive strength is becoming increasingly fierce. Innovation has become the core element of a nation's competitiveness. As a developing country, China confronts the multiple challenges such as human capital upgrade, transform of economic structure, etc. "Mass innovation and entrepreneurship" has gradually become the new impetus to develop Chinese economy and society. The science and technology innovation in universities is the underpinning of the national science and technology innovation system.

After the "211 Project" was launched in 1995, China has invested tremendously amount of money in building research universities and key disciplines, which considerably advances the international ranks of Chinese universities, and makes a few of them step into the world top 100. Nevertheless, compared with world-class universities, especially those top ones in the U.S.A, UK or Germany, Chinese universities still lag far behind in aspects such as nurturing and educating high-quality innovative talents, improving the knowledge and technological capacity of scientists and researchers. At the same time, under the circumstances of enlarging public expenditures in university research, the phenomena like over-construction in infrastructure, waste in resources, are becoming more prevalent in university research activities. In order to promote the construction of world-class universities as well as improve the research level of research universities, introducing efficiency evaluation is a necessity, and the only way to push university research activities on to the direction of intensified and sustainable development.

This book places the research efficiency at the center, and combs through the concepts of efficiency, the related theories and methodologies, and builds an indicator system for evaluating research efficiency in Chinese research universities by taking universities entitled "211 Project" (or 211Us) as the research object. Based on all these, this book conducts empirical analysis by building econometric models with the statistic data of 211Us in the third phase of "211 Project" (2006–2010), and takes in-depth analysis on the key factors impacting on the research efficiency of Chinese research universities. The whole book consists of seven chapters.

Chapter 1 is an introduction, which is also the starting point and the basis of this research. This chapter gives a brief demonstration on the contents from four aspects: research background, research value, research contents, and analytical framework.

Chapter 2 is mainly about the theories and related literature review. This chapter first clarifies the concepts of efficiency and productivity, then reviews the recent empirical studies and summarizes their main features by thoroughly hackling the recent development in methods of evaluating efficiency and productivity, so as to point out issues that deserve further exploration and extensions of production efficiency and productivity in Chinese universities. This chapter provides the basis for the research methodologies and designs in the following chapters.

Chapter 3 presents the overall research production status of 211Us from the perspective of input and output, and uncovers and discusses the underlying logics. This chapter first gives a brief introduction to the sample, the indicator system, and the data sources; then analyzes and compares the research input and output state and change of 211Us; at the end, this chapter summarizes the findings and makes some discussions and comments. Meanwhile, the descriptive analysis in this chapter also serves as the basis for the following chapters.

Chapter 4 employs DEA model to evaluate the relative efficiency of research production in Natural sciences, Engineering, Agriculture and Medicine (NEAM) and Humanities and Social Sciences (HSS) disciplines of 211Us. First, this chapter analyzes the operation stage of university research activities, by decomposing research production efficiency into Pure Technical Efficiency (PTE) and Scale Efficiency (SE). Second, this chapter compares research efficiency of different groups of 211Us, by dividing 211Us according to their types and locations. Last, this chapter applies analysis of projection to discuss how to improve the research production efficiency of DEA-inefficient universities from the perspective of cutting the redundant inputs or exploring output potential, namely, looking for the direction of university research efficiency improvement from the view of entirety.

Chapter 5 gives a dynamic evaluation and comparison on the research productivity of 211Us based on DEA-Malmquist approach. First, this chapter evaluates the dynamic research productivity of universities from the perspectives of NEAM disciplines and HSS disciplines respectively, and then do the attribution analysis. Second, this chapter makes comparison on the research productivity change between universities with or without the title of "985 Project". Last, this chapter makes comparison between 211Us located in different regions.

Chapter 6 explores the key factors affecting the research efficiency in 211Us based on DEA-Tobit method. This chapter first reviews the recent studies related to impact factor analysis of university research efficiency, and sets up a fit-for-purpose theoretical framework for analyzing the impact factors. Then, this chapter uses DEA-Tobit model to do econometric analysis on factors impacting on the university research efficiency.

Chapter 7 is concluding remarks and policy implications. This chapter summarizes the main findings from the empirical analysis in chaps. 4–6, and derives some policy implications.

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