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# 玉米加工业 (的)

## 效率与竞争力研究

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## 序

近年来，中国玉米加工业以较快的速度发展，成为引人注目热点产业。玉米加工业起步于 20 世纪 80 年代后期，是在我国农村改革取得巨大成功、粮食总产量跨过 4 亿吨台阶的基础上发展起来的。1984 年我国粮食取得了历史性的大丰收，人均粮食占有量第一次接近了世界平均水平，与此同时，粮食主产区也出现了卖粮难的问题。发展粮食转化产业，包括畜牧业转化和加工业转化，成为解决粮食主产区农民“卖粮难”问题的重要途径，同时也是调整农村产业结构，扩大农民就业，增加农民收入的有效途径。20 世纪 90 年代以后，玉米加工业作为农产品加工业的重要组成部分，持续发展，成长起一批玉米加工企业，玉米加工不断从粗放型加工向精深型加工方向发展。进入新世纪以来，国家实施了消化陈化玉米的政策，进一步推动了玉米加工业的发展。玉米加工业的高额利润，成为强有力的投资市场拉动力。在玉米主产区，提出了发展玉米产业或玉米经济产业规划，多个玉米工业园开始建设。

与水稻和小麦不同，玉米除了作为粮食作物外，还是优质的饲料作物和加工潜力巨大的经济作物。在目前的玉米消费结构中，作为主食消费的玉米已经降到 10% 以内。畜牧业消费和加工业消费成为玉米消费的主体。中国作为世界第一人口大国，保证粮食安全历来是一项基本国策，多年来中国

的粮食自给率基本保证在 95% 以上。未来的中国,面临着人口增长和耕地资源下降的挑战,保障粮食安全的压力越来越大。在此背景下,既要保证玉米加工业在一定规模基础上的发展,又要保证国家粮食安全的需要。因此,提高玉米加工业的效率与竞争力,必然成为中国玉米加工业发展中的重要命题。

延边大学农学院杨兴龙副教授作为农业经济学界的学术新人,在潜心研究的基础上,完成了《玉米加工业的效率与竞争力研究》专著。在他的著作中,不仅对我国玉米加工业的国际竞争力变化进行了定量分析,而且以吉林、辽宁、山东、河北等 4 个玉米主产省为例,对我国玉米加工业的国内竞争力、生产效率及两者之间的关系进行了比较系统的实证分析,进一步扩展了现有的研究,在研究视角和研究方法等方面都具有一定的创新性。作者运用显示性比较优势指数(RCA)、贸易竞争指数(TC)和国际市场占有率(MS)等指标,通过对我国玉米主要加工品的国际竞争力进行测算,分析了玉米加工业的国际市场竞争力;运用区位商(LQ)、国内市场占有率(MS)等指标对 4 个玉米主产省玉米加工业的国内竞争力进行了比较分析;以 4 个玉米主产省为例,运用数据包络分析法(DEA)对我国玉米加工业的生产效率进行了对比分析;以吉林省为例,对玉米加工业的竞争力与生产率的关系进行了实证分析。根据定性与定量分析的结论,提出了提高我国玉米加工业生产效率和进行结构调整的对策建议。显然,作者的研究成果对科学进行我国玉米加工业的决策具有很好的参考价值。

近年来,我国许多中青年农业经济学者坚持理论与实践

相结合，运用先进的理论与方法，立足于我国农业发展实际，以一个地区或一个产业为研究样本，进行了卓有成效的研究，取得了令人欣喜的成果。杨兴龙副教授多年来一直工作在农业经济教学和科研岗位，立足农业发展实际，扎实地开展农业经济问题研究，这是值得提倡的治学之风。中国作为一个农村人口占多数的发展中国家，有许多农业和农村经济问题值得深入研究。研究农业与农村经济问题，既要具备宽厚的理论基础和科学的研究方法，也要具备深入实际、献身农业、献身科学的职业风范。农业和农村的现代化是中国经济与社会现代化的最后一道门槛，但愿有更多的有志者，与亿万中国农民一道去跨过这道门槛。

中国农业经济学会副会长  
吉林省农业经济学会会长

**郭庆海**

2009年3月



## 摘 要

近 10 年来,我国玉米加工业发展迅速,其发展速度已远高于美国等国家。我国玉米加工业的快速发展,有效地调动了农民种植积极性,带动了玉米种植业的发展,对引导农业结构调整、促进农民增收、农业增效、推动地方经济发展都起到了积极的作用。但是,近年来一些地区出现了玉米加工能力扩张过快、低水平盲目建设严重、加工转化利用效率低等问题,如不加以引导,不仅玉米加工业难以健康发展,还将引发粮食总量和结构问题(国家发展改革委,2006)。因此,我国玉米加工业的发展迫切需要正确引导。

解决现阶段我国部分地区玉米加工业存在问题的关键是要调整玉米加工业的产业结构和提高玉米加工业的转化效率。调整玉米加工业的产业结构应以玉米加工业竞争力的研究为基础和依据,因为在结构调整中发展什么、稳定什么、压缩什么,其基本依据是玉米加工业的产业竞争力,而效率是竞争力的集中体现,所以要研究玉米加工业的竞争力问题,就有必要分析玉米加工业的效率状况。因此,为对玉米加工业进行结构调整、提高玉米加工业的转化效率,促进玉米加工业健康持续发展,有必要从效率(包括全要素生产率和技术效率)的视角来研究玉米加工业的竞争力问题。

本研究以产业竞争力和效率为主线,结合玉米加工业的行业特点,在对生产效率理论和产业竞争力理论回顾的基础

上,首先采用多种指标对我国玉米加工业的国际竞争力状况进行了分析,然后采用区位商(LQ)、市场占有率和计量经济分析等方法,对玉米加工业的竞争力水平及其影响因素进行了实证分析,并验证了全要素生产率是玉米加工业竞争力的重要影响因素之一;其次采用数据包络分析法(DEA)考察了吉林、辽宁、山东、河北4个主产省玉米加工业的全要素生产率增长、技术进步与技术效率的变化情况,发现技术效率的缓慢增长制约了全要素生产率的增长;随后分析了4个主产省玉米加工业的技术效率水平及其影响因素;最后,给出了本书的研究结论和政策建议。

本书的主要研究结论如下:

(1) 我国玉米加工业的国际竞争力较强,而且近几年呈现上升的趋势。本书以我国玉米主要加工品为代表,以美国、阿根廷、巴西、南非、法国等玉米主要出口国为参照,综合运用国际市场占有率(MS)、贸易竞争力指数(TC)和显示性比较优势指数(RCA)等指标对我国玉米加工业的国际竞争力进行了对比分析。研究表明,我国玉米的主要加工品整体上具有较强的竞争优势,而且近几年呈现出上升的趋势,但各种主要玉米加工品的竞争优势有很大差别,其中玉米淀粉表现出了极强的竞争优势,玉米油的竞争优势较强,而玉米面的竞争优势较弱。

(2) 各主产省玉米加工业的国内竞争力较强,各地区均有自己的优势子行业。通过采用区位商、国内市场占有率指标对吉林、辽宁、山东、河北等4省玉米加工产业1998—2005年的动态比较优势和市场竞争力进行了比较分析。研究表明,从玉米加工业总体的区位商来看,各省玉米加工业总体区位商的大小顺



序为：吉林 (2.077 7) > 山东 (1.433) > 河北 (1.052 2) > 辽宁 (0.810 5)，其中吉林、山东、河北 3 省的区位商都大于 1，表明这 3 个省玉米加工业的地区比较优势较强；从玉米加工业总体的市场占有率来看，各省玉米加工业的市场占有率都大于全国平均水平 (3.23%)，1998—2005 年各省 8 年平均市场占有率的高低顺序是：山东 (12.72%) > 河北 (5.43%) > 吉林 (4%) > 辽宁 (3.64%)，可见，各省玉米加工业的国内竞争力较强。根据本书构建将比较优势和竞争优势相结合选择地区优势产业的两条标准衡量，吉林省玉米加工业的优势子行业为淀粉及其制品制造业和酒精制造业，辽宁省的优势子行业为饲料加工业，山东省的优势子行业为淀粉及其制品制造业、白酒制造业和酒精制造业，河北省的优势子行业为淀粉及其制品制造业。

(3) 玉米加工业的全要素生产率 (TFP) 是其竞争力的重要影响因素。通过以吉林省为例对玉米加工业竞争力和 TFP 的相关性进行分析，发现二者在 1% 的水平上显著相关，并且玉米加工产业市场竞争力影响因素的回归结果表明，全要素生产率在 1% 的水平上显著，通过了检验。

(4) 玉米加工产业技术效率的缓慢增长影响了全要素生产率的增长。研究表明，1998—2005 年，吉林、辽宁、山东、河北 4 省总体玉米加工业中淀粉及其制品业、饲料加工业、酒精制造业、白酒制造业的 TFP 年均增长率分别为 22%、13.3%、23.7% 和 7.7%，这一时期各子行业技术进步的年均增长率分别为 18.9%、11.3%、19.9% 和 4.1%，而 4 个子行业技术效率的年均增长率分别为 2.6%、1.8%、3.1% 和 3.4%，可见技术进步构成了推进 TFP 增长的主要因素，技

术效率的增长非常缓慢,所以技术效率的缓慢增长影响了全要素生产率的增长。

(5) 各主产省玉米加工产业的技术效率比较低,经实证检验,企业规模、资本密集度、产业集聚、产权结构等都是技术效率提高的影响因素。本书运用 DEA 的两阶段法,采用 Tobit 模型以吉林省为例对玉米加工产业技术效率的影响因素进行了分析。回归结果表明,企业规模、资本密集度、产业集聚和产权结构分别在 10%、5%、1% 和 5% 的水平显著,这 4 种因素都不同程度地对玉米加工产业的技术效率产生正向显著影响,其中产业集聚的显著性最大。

基于以上研究结论,本书简略提出了四点政策建议:一是优先考虑粮食安全,适度发展玉米加工业;二是采取有效措施,不断提高玉米加工业的全要素生产率和技术效率水平;三是加快科技创新,不断促进玉米加工业的技术进步;四是根据资源优势和竞争力情况,调整玉米加工业和种植业的产业结构。

**关键词:** 玉米加工业; 全要素生产率; 技术效率; 竞争力; 结构调整

## Abstract

In the recent 10 years, china's maize processing industry is developing fast; its development speed has even exceeded that of US. The fast development of china's maize processing industry has effectively stimulated the farmer's planting enthusiasm, which also promotes the development of china's maize production, it plays a positive role in guiding the restructuring of the agriculture, increasing the farmers' income, raising the agricultural production efficiency and promoting the provincial economic development. But, some problems also exist, for example, in some areas, the maize processing capacity is expanding too fast, the aimless and low level construction is serious, the efficiency of transformation and utilization after processing is low. If the government does not guide, not only the maize processing industry is hard to develop in the correct direction, it will also cause the problem in the total output and structure of grain (national development and reform commission, 2006), therefore, the development of china's maize processing industry urgently needs guidance of the government.

The key to solve the existing problems in the maize processing industry in some areas at present is to adjust the

industrial structure and raise the utilization rate of the maize processing. And the adjustments of the structure of the maize processing industry should be based and relied on the research of the competitiveness of maize processing industry, because we have to decide what is to develop, what is to stabilize and what is to compress according to the competitiveness in maize processing industry, so we should conduct the deep research to the domestic competitiveness in the sub-industry in the maize processing industry. Therefore, the final analysis of the restructuring of maize processing industry is to analyze its competitiveness, and the efficiency just embodies the competitiveness, as a result, it's necessary for us to analyze the efficiency before we study the competitiveness of maize processing industry. Through the analysis mentioned above, it is necessary to study the competitiveness of maize processing industry from the perspective of efficiency in order to restructure the maize processing industry, enhance its utilization efficiency, and promote its sustainable development.

The book takes the industrial competitiveness and the efficiency as the main research line, it combines the characteristics of maize processing industry, based on the review of the theory in productivity and industry competitiveness, firstly, the multi-indexes are adopted to analyze the international competitiveness in the maize processing industry, then analyze the competitiveness and its influencing factors of maize processing industry taking the methods such as locational quotient (LQ),

market share and econometric analysis and at the same time the paper confirmed that TFP is one of the important factors that influence the maize processing industries' competitiveness; Therefore the book used the data envelope analysis method (DEA) to test the changing situation of the increase of TFP, technical improvement and technical efficiency in the maize processing industry in four main maize processors, which are Jilin Liaoning Shandong and Hebei provinces. The result shows that the slow increase speed of technical efficiency affect the increase of TFP in the maize processing industry. It also analyzes the level of technical efficiency and its influencing factors of maize processing industry. Finally, this book put forward the research conclusions and suggestions in policies.

The main research conclusions of this book are as follows:

(1) China's international competitiveness in terms of maize processing industry is comparatively strong and in recent years it shows an increasing trend. This book chooses the main maize processing products in china as representative products, and chooses the maize processing products of the main maize exporters such as United States, Argentina, Brazil, the Republic of South Africa, France as referred, using indexes such as international market share (MS), international trade competitiveness (TC) and revealed comparative advantage (RCA) etc. to analyze and compare the international competitiveness of china's main maize processing products. The result shows that the main maize products in china has a comparatively

strong advantage in the whole level, and it shows a strengthening trend in recent years, however, different maize products have very different comparative advantages, for example, maize starch shows a extremely strong comparative advantage, the competitiveness of maize oil is comparatively strong, while which of maize flour is comparatively weak.

(2) The provinces, which are the main maize producers in china as mentioned above, have a comparatively strong domestic competitiveness, and different areas has advantages in their own different sub products. This book compares and analyzes the dynamic comparative advantage and market competitiveness of the maize processing industry in Jilin, Liaoning, Shandong and Hebei provinces from 1998 to 2005 using indexes of location quotient and domestic market share. The research shows that, the levels of location quotient of different provinces are as follows: Jilin (2.077 7) > Shandong (1.433) > Hebei (1.052 2) > Liaoning (0.810 5), among which the location quotients of Jilin, Shandong and Hebei are all more than 1, which shows that these three provinces have comparatively strong local competitiveness. With regard to the market share of the maize, these provinces all enjoy a market share higher than the national average level, which is 3.23%, and the average market shares of the provinces of 8 years during 1998 to 2005 are as follow: Shandong (12.72%) > Hebei (5.43%) > Jilin (4%) > Liaoning (3.64%), which shows that all these provinces have a strong domestic



competitiveness in maize processing industry. This book combines comparative advantage and competitive advantage together to evaluate. The sub industries that enjoy comparative advantage in maize processing industry in Jilin Province are the starch and its products manufacturing industry and the ethanol manufacturing industry, the competitive sub productive industry of Liaoning provinces is feed processing industry, while which of Shandong province is starch and starch processing industry, wine production industry and alcohol production industry, and the competitive sub productive industry of Hebei province is starch and starch processing industry.

(3) The total factor productivity (TFP) of the maize processing industry is the important factor that influences the competitiveness of maize processing industry. Through the analysis of relation between competitiveness in maize processing industry and TFP taking Jilin province as an example, it discovers that the two are significantly related in 1% level. And the regression result of the influencing factors of maize processing industry shows that TFP is remarkable on 1% level and passes the test.

(4) The slow increase speed of technical efficiency affect the increase of TFP in the maize processing industry. The research shows that from 1998 to 2005, the average increasing rate of TFP annually in terms of starch and its processing industry, feed industry, alcohol industry and wine processing industry are 22%, 13.3%, 23.7%, 7.7% respectively in

Jilin, Liaoning, Shandong and Hebei provinces, in this period the average increasing rate annually of technological progress in the four sub productive industry are 18.9%, 11.3%, 19.9%, 4.1% respectively, and the average increasing rate annually of technological efficiency in these four sub productive industry are 2.6%, 1.8%, 3.1%, 3.4% respectively. We can see that obviously the technology progress constitutes the main factor that promotes the increase in TFP, the increase in the technological efficiency is very slow, as the slow growth rate in technological efficiency affects the increase in TFP in the maize processing industry.

(5) The technological efficiency in maize processing industry of every Province is quite low, after the positive examination, the enterprise scale, capital density, industry concentration and the property right structure and so on are the influencing factors which influence the increase in the technical efficiency. This book utilizes DEA two phases method, using the Tobit model to analyze to the influencing factors that influence the technical efficiency of maize processing industry taking Jilin province as an example. The regression results show that the factors such as enterprise scale, capital density, industry concentration and property right structure are remarkable in the 10%, 5%, 1% and 5% level respectively, that is to say, they have positive and remarkable influence in the technical efficiency on different extent, especially industry concentration's influence is most remarkable.

Based on the researching conclusions above, this book puts forward four political suggestions briefly: First, Take the food security as a priority, developing the maize processing industry as with a proper level, Second, take effective measures to enhance the TFP and technical efficiency in maize processing industry. Third, speed up scientific innovation and promote the technical progress in maize processing industry. Fourth, adjust the industrial structure of maize processing industry and maize planting industry.

**Key Words:** Maize Processing Industry; Total Factor Productivity (TFP); Technical Efficiency (TE); Competitive Power; Structure Adjustment