UNIVERSITI PUTRA MALAYSIA

PRODUCTIVITY AND COMPETITIVENESS OF THE FOOD MANUFACTURING INDUSTRY IN IRAN

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MAJID SANAEI TORGHABEH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor Philosophy

June 2008

Dedications

This thesis is dedicated to my late parents who always wished the best for me and to my wife and sons, Amir Hossien and Mohammad Moien for their support and encouragement throughout this study.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor Philosophy

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Chairman: Associate Professor Mohd Mansor Bin Ismail, PhD

Faculty: Agriculture

Food manufacturing industry is an important industry in the Iranian economy and has been identified as a thrust area for development. The country has enormous potential in the production and export of various food items due to the abundance of resources and available markets in the world, particularly in the Middle East. In recent years, the government has encouraged the expansion of this industry in an effort to reduce its dependency on oil exports. However, there are various kinds of challenges which need to be addressed immediately to achieve this objective. These challenges have emerged due to the opening up of the economy leading to an influx of imported processed foods from other countries. In addition, much of the raw material is not fully utilized due to low processing level and there has been an ever increasing demand for food in the country every year.

This study therefore attempts to evaluate the productivity and competitiveness of food manufacturing industry in the country so that necessary actions can be taken to improve its performance. There are two empirical analyses carried out namely total factor productivity (TFP) and Revealed Comparative Advantage (RCA). The TFP analysis of this study is based on the non-parametric approach of DEA and Malmquist index which allows for the decomposition of TFP into three constituent elements for different sources of productivity growth: technological progress (TECHCH), scale efficiency change (SECH), and pure efficiency change (PECH). Data were collected from the Statistical Centre of Iran and they were annual data of 22 four-digit industrial groups (ISIC Rev. 3) which made up food manufacturing industry in the country from 1997 to 2002. The RCA analysis, on the other hand, seeks to identify which industries in the country have a comparative advantage status in producing food commodities in the world market. The analysis was based on annual data from 1999 to 2003, published by the UN COMTRADE.

The results of this study reveal several important findings. First of all, there was an improvement in the food manufacturing industry's TFP growth. The highest and lowest TFPCH were 10.7 and 5.6 per cents, respectively, with the former being for the medium-sized firms in the private sector and the latter being for the medium-sized firms in the public sector. Secondly, most of the productivity growth measured for the food manufacturing industry as a whole was due to TECHCH whereas EFFCH was not found to exert a positive effect on productivity growth. On average, technical efficiency

scores were estimated to be 0.94 and 0.92 for the large and medium enterprises, respectively. This implies that technical inefficiency could be reduced by 6 and 8 per cents through improvement in scale efficiency and elimination of pure technical inefficiencies, respectively. Thirdly, food manufacturing firms in the country had been scale inefficient due to slacks in production labour, fixed capital and energy use. To overcome this problem, there is a need to work on the optimal levels of input mix and to rationalize the process of acquiring and usage of inputs.

Meanwhile, it was found that the growth in the number of food sub-sectors with an RCA index above 100 had been stagnant over the study period. In addition, food manufacturing industry as a whole had a comparative advantage in less than 20 per cent of all of its exported products in 2000 through 2003. Despite the advantages of abundant raw materials and cheap labour in the country, many food firms had not been able to expand and increase their market shares. This calls for the adoption of high-tech machine and technologies and the development of infrastructure to improve their competitiveness. Certain individual groups of commodities however, featured a very high comparative advantage status. These groups of commodities were Caviar and caviar substitutes, Frozen shrimps and prawns, Cucumbers, Apple juice and juice of other single fruit, Sunflower seed and safflower oil, Prepared cereals in grain form, Black tea, Sweet biscuits, Waffles, and wafers, Vegetable fats, and Inactive yeasts.

As a conclusion, policy makers of the country should design a proper policy framework in addressing the identified problems of the industry. On the other hand, food manufacturers should find ways to improve the capacity utilization of factor inputs especially for raw material, capital and energy to avoid unnecessary wastage. They should also adopt proper methods of sourcing quality raw material for food production to shorten the supply chain which can reduce their production costs. Finally, Iran will be able to sustain or enhance its share in world`s manufacturing trade, however, this will depend on the capacity of its food manufacturing sector to adjust itself to the changing of world composition trade and to compete on the basis of both price as well as non-price factors.

Keywords: Competitiveness, Total Factor Productivity (TFP), Data Envelopment Analysis (DEA), Revealed Comparative Advantage (RCA), Food Manufacturing Industry, Iran

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PRODUKTIVITI DAN DAYA SAING INDUSTRI PEMPROSESAN MAKANAN DI IRAN

Oleh

MAJID SANAEI TORGHABEH

Jun 2008

Pengerusi : Profesor Madya Mohd Mansor Bin Ismail, PhD

Fakulti : Pertanian

Industri pemprosesan makanan merupakan industri yang sangat penting dalam ekonomi Iran dan sudah dikenalpasti untuk dimajukan. Negara ini mempunyai potensi besar dalam pengeluaran dan eksport pelbagai bahan makanan berproses kerana memiliki banyak sumber bahan mentah dan terdapat pasaran luas terutama di Timur Tengah. Kerajaan telah pun menggalakkan perkembangan industri ini supaya dapat mengurangkan pergantungan terhadap hasil ekonomi utama iaitu eksport minyak. Namun, terdapat pelbagai jenis halangan yang perlu ditangani segera agar matlamat ini dapat dicapai. Halangan ini timbul disebabkan dasar kerajaan yang telah membuka ekonomi kepada negara luar, mengakibatkan kebanjiran banyak produk makanan luar ke negara ini. Tambahan lagi, sumber bahan mentah tidak digunakan secara optimum disebabkan tahap pemprosesan makanan yang terlalu rendah sedangkan permintaan bahan makanan negara sentiasa meningkat setiap tahun.

Kajian ini dilakukan untuk menilai produktiviti dan daya saing industri pemprosesan makanan di negara ini supaya langkah-langkah sesuai dapat diambil bagi memperbaiki prestasinya. Ia merangkumi dua analisis berasingan iaitu analisis Jumlah Faktor Produktiviti (*TFP)* dan analisis Kebaikan Bandingan Tersurat (*RCA)*. Analisis *TFP* dalam kajian ini adalah berdasarkan kepada kaedah Analisis Kandung Data (*DEA)* dan indeks *Malmquist* yang membolehkan produktiviti dipecahkan kepada tiga komponen iaitu perubahan teknologi (*TECHCH*), perubahan kecekapan disebabkan faktor skala (*SECH*), dan perubahan kecekapan disebabkan faktor pengurusan (*PECH*). Data yang digunakan diperolehi daripada Pusat Statistik Iran, (SCI). Data tahunan berkenaan adalah bagi 22 kumpulan industri pemprosesan makanan (berdasarkan 4 digit) yang beroperasi di negara tersebut dari tahun 1997 hingga 2002. Sementara itu, analisis *RCA* cuba mengenalpasti status kumpulan – kumpulan industri pemprosesan makanan berkenaan dari segi kelebihan mengeksport komoditi makanan dalam pasaran antarabangsa. Analisis ini dibuat berdasarkan data tahunan yang dikeluarkan oleh UN COMTRADE bagi tahun 1999 higga 2003.

Kajian ini menghasilkan beberapa penemuan penting. Pertama sekali, analisis *TFP* menunjukkan bahawa secara keseluruhannya, terdapat pertumbuhan jumlah produktiviti dalam industri yang dikaji. Pertumbuhan produktiviti paling besar dan paling kecil adalah sebanyak 10.7 dan 5.6 peratus setahun, bagi sektor swasta dan awam, masing – masing. Kedua – dua pertumbuhan ini dicapai oleh industri bersaiz sederhana. Penemuan

kedua dalam kajian ini adalah pertumbuhan produktiviti yang dicapai oleh industri yang dikaji hanya berpunca daripada peningkatan dalam penggunaan teknologi manakala kecekapan disebabkan faktor skala dan pengurusan tidak menyumbang kepada pertumbuhan ini. Secara purata, indeks – indeks bagi mengukur tahap kecekapan ini adalah sebanyak 0.94 bagi industri bersaiz besar dan 0.92 bagi industri bersaiz sederhana. Ini menunjukkan tahap kecekapan industri – industri ini telah turun sebanyak 6 dan 8 peratus masing – masing. Ketiga, industri – industri pemprosesan makanan di negara ini tidak beroperasi secara cekap pada skala yang betul. Didapati bahawa terdapat pembaziran dari segi penggunaan buruh, modal tetap, dan sumber tenaga yang kesemuanya menyumbang kepada ketidakcekapan industri ini. Masalah – masalah ini perlu diatasi dengan segera dan salah satu daripada cara – caranya adalah dengan menggunakan faktor – faktor pengeluaran ini secara optimum.

Sementara itu, didapati bahawa pertumbuhan dalam bilangan sektor makanan yang mencapai indeks *RCA* melebihi 100 tidak banyak berubah sepanjang tempoh kajian ini. Tambahan lagi, industri pemprosesan makanan hanya memiliki kelebihan (indeks *RCA* mengatasi 100) dalam kurang daripada 20 peratus jenis komoditi makanan yang dieksport pada tahun 2000 hingga 2003. Walaupun memiliki banyak bahan mentah dan tenaga buruh yang ramai, kebanyakan firma dalam industri ini gagal memanfaatkan kelebihan ini untuk meningkatkan jumlah pengeluaran dan eksport. Oleh itu, penggunaan alat – alat atau teknologi moden perlu dipertingkatkan dan pelbagai prasarana penting perlu dimajukan bagi

meningkatkan daya saing mereka di peringkat antarabangsa. Sungguhpun begitu, masih terdapat beberapa kumpulan makanan yang berjaya menguasai pasaran antarabangsa. Kumpulan – kumpulan berkenaan adalah Kaviar dan pengganti kaviar; Udang yang disejukbekukan; Pelbagai jenis mentimun; Jus epal dan jus buah – buahan lain; Biji matahari dan minyak kesumba; Bijirin dalam bentuk biji – bijian; Teh hitam; Biskut manis, waffle, dan biskut wafer; Lelemak sayuran; serta Ragi tak aktif.

Sebagai kesimpulan, pembuat – pembuat dasar kerajaan harus menyediakan satu rangka kerja yang sesuai dalam menangani masalah – masalah yang dikenalpasti dalam industri ini. Pemproses – pemproses makanan juga patut mencari jalan penyelesaian bagi meningkatkan penggunaan kapasiti input – input pengeluaran terutamanya bahan mentah, modal dan sumber tenaga agar pembaziran dapat dielakkan. Mereka juga perlu mengambil kaedah – kaedah sesuai bagi mengurangkan rantaian pembekal apabila memperolehi sumber bahan mentah berkualiti agar kos penghasilan makanan dapat dijimatkan. Akhir sekali, industri ini boleh bersaing dan mengekalkan atau meningkatkan bahagian dalam pasaran antarabangsa jika tahap piawaian dan keupayaan firma – firma industri ini ditingkatkan.

Kata kunci: Daya saing, Jumlah Faktor Produktiviti (*TFP*), Analisis Kandung Data *(DEA)*, Kebaikan Bandingan Tersurat *(RCA)*, Industri Pemprosesan Makanan, Iran

ACKNOWLEDGEMENTS

All praises to the Almighty Allah, the Most Gracious and Merciful, who is omnipresent, for giving me the strength and determination to complete this study. No words can express adequately my sense of indebtedness yet I feel I shall be failing in my obligation if I do not put on record my gratitude to the following persons:

I am deeply indebted to Associate Prof. Dr. Mahd Mansor bin Ismail, Department of Agribusiness and Information Systems, Universiti Putra Malaysia, as the chairman of supervisory committee who, provided valuable guidance in all aspects of the research process. Special thanks are also due to my supervisory committee members, Prof. Dr. Md. Ariff Hussein and Associate Prof. Dr. Zainal Abidin Mohamed for sharing their time and ideas, comments and advice on developing and reporting this research and for serving as members of my committee.

I am very grateful to Dr. Alias Radam who taught me many about DEA and Dr. Abdullahi Farah Ahmad for all his kind help during my study period. This research has also benefited tremendously from the many friends at the University Putra Malaysia. Special thanks to Dr. Mohammad Hashem Musavee Haghighi, Dr. Azharuddin Mohd. Amin, Ms Golazaz Rezaee, Ms Anahita Hsseini Matin and Mr Azizan for countless hours spent discussing fruitful ideas. Thanks also go to all lecturers and staff in the Faculty of

Agriculture, University Putra Malaysia for their warm communication, hospitality and support throughout my study**.**

I wish to express my special thanks to Dr. Seyed Mohammad Tabatabaei, Dr. Rahimi Soorehe, Dr. Hossien Tavakoli, Dr. Seyed Ahmad Mohadess Hosseni, Dr. Yousef Rostami, Dr. Mohammad Mazhari, Mr. Taimori and Ms. Fatemeh Paseban for all their support.

I would also like to acknowledge and thank all members of Agricultural and Natural Resources Research Centre of Khorassan Razavee province, Rural Community Problem Research Centre, Tehran, Iran, and Agricultural Planning and Economic Research Institute (APERI), Iran for their support. Last but not least, I would like to thank my wife for her endless love and encouragement throughout this entire journey. Without her, I would have struggled to find the inspiration and motivation needed to complete this dissertation.

I certify that an Examination Committee met on ---------- to conduct the final examination of Majid Sanaei Torghabeh on his of Doctor Philosophy thesis entitled “Productivity and Competitiveness of Food Manufacturing Industry in Iran” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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Date:

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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Date: 11 September 2008

DECLARATION

I declare that this thesis is my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at UPM or other institutions.

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MAJID SANAEI TORGHABEH

Date: 20 August 2008

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