

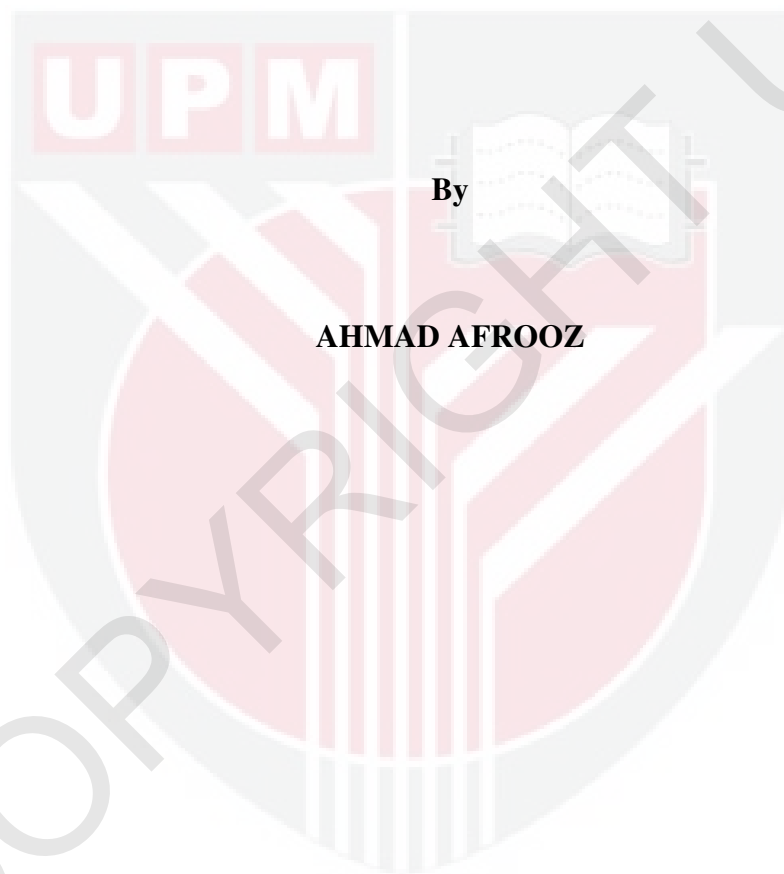


UNIVERSITI PUTRA MALAYSIA
***PRODUCTIVITY AND EFFICIENCY
IN FOOD INDUSTRIES IN IRAN***

AHMAD AFROOZ

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**PRODUCTIVITY AND EFFICIENCY
IN FOOD INDUSTRIES IN IRAN**



By

AHMAD AFROOZ

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

April 2012

DEDICATION

This thesis is dedicated to:

“Iranian Martyrs”

“Sirjan Martyrs”

“Zidabad Martyrs”

and

Dedicated to:

My dear wife “Bibi Zahra” for her patience during the course of my study

And

My beloved children Amir Hossein and Ali Reza who missed me always.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment
of the requirement for the degree of Doctor of Philosophy

**PRODUCTIVITY AND EFFICIENCY
IN THE FOOD INDUSTRIES IN IRAN**

By

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March 2012

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Economists, managers and those involved in economic planning all over the world are familiar with the term 'productivity' as it is the central concept in planning strategies for nation building. It is a concept with far-reaching impacts, especially in the areas of national economy and social well-being. The importance of productivity cannot be overly stated, as it affects all humanity, be it at the national, industrial or individual levels.

Efficiency and productivity studies can be useful to diagnose problems and make recommendations based on their empirical work and their review of economic theories of industrial productions. Many stakeholders, policy makers, managers, and owners of agribusinesses are concerned with the results established in these efficiency and productivity studies. In line with these facts, efficiency and productivity analyses are important in this modern era of rapidly changing technology and increasing input costs. Furthermore, efficiency analysis which is

aimed at studying factors affecting productivity will guide policy-makers in the planning and management of their national economy.

The food industry in Iran is widely recognized as a 'sunrise industry', with a huge potential for uplifting the agricultural economy and creating large-scale processed food manufacturing and food-chain facilities which may result in the generation of employment and export earnings. The industry also possesses enormous significance for Iran's development due to the vital linkages and synergies that it promotes between the two pillars of the economy, namely industry and agriculture. In addition, the food industry is also one of the largest industries in Iran. In fact, the industry is ranked as the top industry in terms of its provision of employment (18 percent) and the number of manufacturers (20 percent).

In spite of the importance of the industry, there are several problems faced by the manufacturers and also within the food industry. While the food industry of Iran is labour-intensive, most of the problems are related to the workforce and factors affecting their productivity. On the other hand, over the last two decades, the government has encouraged privatization for the expansion of agro-industries and food industry. Unfortunately, the position of food industry, in comparison with other industries in terms of labor productivity and total factor productivity, remains to be in the dark to the authorities up until now.

Considering the above mentioned problems and also the importance of the food industry due to the policies of the precedence of the Non-Oil Exports in Foreign Trade, Response to Nutrition Requirements of the Population and the Prevention of

Wastage, this study examines the determinants of labour productivity, efficiency and technical changes in Iran's food industry from 1995-2006. Thus, in order to achieve the objectives of this study, the parametric approaches are applied. Meanwhile, the Stochastic frontier approach is utilized to measure efficiency and determinants of inefficiency. Cob-Douglass production is also applied to estimate technical changes.

This research should fill several gaps in the literature on the determinants of productivity and efficiency. Many stakeholders, policy makers, managers, and owners of agribusinesses are interested in the results established in various efficiency and productivity studies. In line with the above statement, the efficiency and productivity analyses are therefore, important in the current era of rapidly changing technology and increasing input costs. Even more so, the efficiency analysis is aimed at studying the factors affecting productivity that would help guide policymakers in aspects like planning and management. Hence, a comparison of efficiency and productivity in the private and public sectors of food industry will guide policymakers and authorities for better planning in the future.

Briefly, this study has attempted to comprehensively investigate the determinants of efficiency in the entire food industry, including both the private sector and government sectors of the food industries separately. Likewise, the levels of efficiency in the aforementioned areas have also been estimated. Next, the productivity and efficiency of the private and public sectors of the food industry are compared. Finally, the total factor of productivity growth is calculated and compared with that of all the other industries as a whole. This study applies the

Cobb-Douglas production function of industry to examine the determinants of productivity and total factor of the productivity growth. Also, the Stochastic Frontier Analysis is utilized in measuring the total efficiency, both in the private and public food industry sectors.

The results of this study show that the labor productivity and the total factor of productivity of the food industry are lower than those of the global industrial average over the same period. Moreover, an estimation of the technical change in the public and private sectors of the food industry is respectively 0.064 and 0.16 percent over the same period. Meanwhile, determinants such as the specialization of the workers, their education level and skills, contain the most effects on the labor productivity in both sectors in the food industry. In particular, their education level, skills, and specialization have contributed to the differences in Iran's productivity of food industry. The most important factor is found to be the employee's specialization in this industry. An estimation of efficiency shows that Iran's food industry is only 74% technically efficient. Comparisons of private and public sectors of food industry have revealed that unlike the implications of classic theories, in which the private food industry sectors are always better than the public sector, the labor productivity and total factor of the productivity of the food industry are higher in the public sectors of the food industry than those of its private sectors over the same period. The technical efficiency in both sectors, however, is notably close to each other.

Some of the important implications of this study are as follows: (1) The government should facilitate in creating training workshops for both the private and the public sectors; (2) The private sectors should attempt to invest in the education of its workers and employ more specialized workers, and the utilization of new machineries and new technology by private manufacturers should also be increased; (3) The Government should attempt to develop the field of food industries in universities; (4) Manufacturers should also attempt to manage the ratio of their workers with regards to their abilities, skills, and wages; and (5) Manufacturers should consider insuring their workers.

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

PRODUKTIVITI DAN KECEKAPAN DALAM INDUSTRI PEMAKANAN DI IRAN

Oleh

AHMAD AFROOZ

Mac 2012

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Produktiviti merupakan suatu konsep yang telah digunakan oleh ahli ekonomi, pengusaha serta individu yang terlibat dalam merancang strategi ekonomi untuk pembangunan negara. Konsep ini telah memberikan impak yang besar terutamanya kepada ekonomi negara dan kehidupan sosial masyarakat. Kepentingan produktiviti tidak dapat disangkal memandangkan ia telah memberi kesan terhadap negara, industri mahupun masyarakat. Kajian terhadap kecekapan dan produktiviti merupakan suatu kaedah yang digunakan dalam menyelesaikan permasalahan serta membuat saranan berdasarkan kepada kajian empirikal and teori ekonomi. Hasil kajian kecekapan dan produktiviti ini telah mendapat perhatian terutamanya oleh pihak berkepentingan, pembuat dasar serta pemilik perniagaan asas tani memandangkan ianya penting, seiring dengan perubahan teknologi yang pantas di samping berlakunya kenaikan kos input pada masa kini. Di samping itu, kajian kecekapan telah digunakan dalam mengenalpasti faktor-faktor yang mempengaruhi produktiviti dalam sesebuah industri. Oleh yang demikian, kajian ini dapat membantu pihak pembuat dasar dari segi perancangan polisi dan pengurusan untuk sesebuah negara.

Industri makanan di Iran telah diiktiraf sebagai sebuah “industri teknologi tinggi berpotensi” terutamanya dari segi meningkatkan taraf kehidupan dalam sektor pertanian, menjana pengeluaran makanan secara besar serta mempunyai kemudahan rantai makanan. Oleh yang demikian, kemajuan dalam industri makanan ini telah memberi impak dalam mewujudkan peluang pekerjaan dan menjana hasil eksport. Selain itu, industri makanan ini juga memainkan peranan yang penting dalam mempengaruhi pembangunan di Iran berikutan wujudnya rangkaian dan sinergi di antara sektor industri dan pertanian yang merupakan tunjang penting dalam ekonomi. Di samping itu, industri makanan juga merupakan antara sektor yang terbesar di Iran. Industri ini telah mencatat kedudukan yang pertama dari segi sumbangan pekerjaan iaitu 18 peratus manakala bilangan pengusaha sebanyak 20 peratus.

Walaupun industri makanan merupakan industri yang penting, namun terdapat beberapa masalah yang wujud dalam industri tersebut. Memandangkan industri makanan menggunakan buruh secara intensif, maka kebanyakan permasalahan adalah berpunca dari kaum buruh dan juga faktor berkaitan yang lain yang mempengaruhi produktiviti di Iran. Sehubungan dengan itu, langkah telah dilaksanakan oleh kerajaan pada dua dekad yang lepas dalam menggalakkan penswastan yang bertujuan untuk memperkembang industri pertanian dan industri makanan. Namun demikian, sehingga kini kedudukan industri makanan masih tidak jelas terutamanya dalam mempengaruhi produktiviti buruh dan jumlah faktor produktiviti. Menyedari wujudnya masalah dalam industri makanan di samping sektor ini berperanan penting berikutan dari wujudnya dasar keutamaan terhadap Pengeksportan Barangan Bukan-Minyak dalam perdagangan asing serta terdapat

sambutan terhadap Gizi Penduduk dan Pencegahan Pembaziran, maka, kajian ini bertujuan untuk mengkaji faktor penentu dalam produktiviti buruh, kecekapan dan perubahan teknikal dalam industri makanan di Iran dari tahun 1995-2006. Dalam mencapai objektif kajian ini, pendekatan parametrik akan digunakan.

Kajian ini seharusnya merapatkan jurang dari segi kajian lepas berkaitan penentuan produktiviti dan kecekapan. Hal ini memandangkan kebanyakan pihak berkepentingan, pembuat dasar, pengurus serta pemilik perniagaan asas-tani berminat untuk mengetahui keputusan kajian ini. Selain itu, analisis dalam produktiviti dan kecekapan adalah penting memandangkan pada masa kini berlakunya perubahan teknologi yang pantas serta kenaikan kos input. Oleh yang demikian, tujuan analisis dalam kajian ini adalah untuk mengkaji faktor yang mempengaruhi produktiviti yang dapat membantu pembuat dasar dalam perancangan dan pengurusan. Perbandingan di antara produktiviti dan kecekapan dalam sektor swasta dan kerajaan akan dapat membantu pembuat dasar dan pihak yang bertanggungjawab dalam membuat perancangan yang lebih berkesan pada masa hadapan.

Secara ringkasnya, kajian ini cuba mengkaji berkaitan penentuan produktiviti dalam industri makanan secara menyeluruh termasuk dalam sektor swasta dan kerajaan secara berasingan. Kajian ini juga telah mengukur tahap kecekapan yang telah dilaksanakan oleh kajian terdahulu. Seterusnya, kajian ini membuat perbandingan produktiviti dan kecekapan antara sektor kerajaan dan sektor swasta dalam industri makanan. Akhir sekali, ***Pertumbuhan Produktiviti Faktor Keseluruhan*** telah dihitung dan dibuat perbandingan dengan sektor lain secara

keseluruhan. Kajian ini menggunakan fungsi pengeluaran Cobb- Douglas dalam industri untuk mengkaji penentuan produktiviti dan TFPG. Selain itu, Analisis Frontier Stokastik juga digunakan untuk mengukur aras kecekapan dalam kedua-dua sektor swasta dan kerajaan dalam sektor industri makanan.

Keputusan kajian ini menunjukkan bahawa produktiviti buruh dan *Produktiviti Faktor* keseluruhan dalam industri makanan adalah lebih rendah berbanding industri global secara purata dalam tempoh yang sama. Keputusan juga menunjukkan bahawa penganggaran untuk perubahan teknologi dalam industri makanan untuk sektor kerajaan dan swasta adalah masing-masing sebanyak 0.064 dan 0.16 dalam tempoh yang sama. Tahap pendidikan, kemahiran dan pengkhususan turut menyumbang kepada berlakunya perbezaan produktiviti dalam industri makanan di Iran. Manakala penganggaran bagi kecekapan menunjukkan bahawa industri makanan di Iran hanya cekat secara teknikal sebanyak 74%. Dari segi perbandingan di antara sektor kerajaan dan swasta dalam industri makanan keputusan yang berbeza telah ditunjukkan dari segi teori klasik. Keputusan menunjukkan bahawa sektor industri makanan swasta sentiasa lebih cekap berbanding sektor kerajaan. Manakala TFP dalam industri makanan sektor awam adalah lebih tinggi berbanding sektor swasta dalam tempoh masa yang sama. Namun, dari segi kecekapan teknikal menunjukkan bahawa kedua-dua sektor saling berkait rapat.

Dari segi implikasi polisi, hasil kajian ini menunjukkan bahawa kerajaan seharusnya membantu dalam mewujudkan bengkel latihan dalam kedua-dua sektor kerajaan dan swasta. Di samping itu, penggunaan mesin baru dan teknologi baru

oleh pengeluar-pengeluar swasta harus diperbanyakkan. Kerajaan juga perlu mencuba mewujudkan pengajian dalam bidang industri makanan di universiti. Di samping itu, pengeluar-pengeluar juga seharusnya berusaha untuk menguruskan pekerja mengikut kemampuan, kemahiran dan upah. Akhir sekali, pengeluar-pengeluar juga sepatutnya membuat pertimbangan dalam memberi insurans kepada pekerja.



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Thank God that whatever my heart ever desired
God hath given me, and more than I could ever seek.

(Hafiz - e Shirazi)

I thank God for all His blessings and for giving me courage and strength to finish my studies. It is understood that human beings cannot repay one another enough. Hence, it is better to request the Almighty Allah to reward the people who did me favors and to give them the best.

A person cannot go through life without the help and guidance from others. One is invariably indebted, knowingly or unknowingly, to these people. These debts may be physical, mental, psychological or intellectual in nature but they cannot be denied. To list all of them is not easy. To repay them even in words is beyond my capability. The present work is an imprint of the many persons who have made significant contributions to its materialization.

The success of this thesis would not have been possible without various contributions and support to this work, directly or indirectly, and I would like to convey my special appreciation to those who made it possible. I wish to express my deep sense of appreciation and gratitude towards my committee chairman and supervisor, Prof. Dr. Khalid B Abdul Rahim for his valuable patience, guidance and supervision of this dissertation. Your moral fiber, constant support and encouragement have helped me to press on until the research was written and completed. I learned and experienced a lot in doing a good research.

I am grateful to my advisory committee members, Dr. Zaleha Bt Mohd Noor, Dr. Lee Chin and Dr. Ali Sourı for your recommendations and guidance that lead this thesis to successful completion. Please accept my heartiest gratitude; you all have been an amazing source of help, encouragement, and valuable advice to me. I am also grateful for your valuable suggestions and guidance during this study, without which the completion of my research would not have been possible.

Words are not enough to express my gratitude to my family for their patience and perseverance during my absence and for keeping me warm even when out of the country. I owe a lot to my parents and for accepting the inconveniences of my absence during my study. They have been a constant source of encouragement. Finally I am especially grateful to my dear wife and children for their patience during the course of my study.

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APPROVAL

I certify that a Thesis Examination Committee has met on 7th March 2012 to conduct the final examination of Ahmad Afrooz on his thesis entitled “Productivity and Efficiency in Food Industries in Iran” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the University Putra Malaysia [P.U. (A) 106] 15 March 1998. The committee recommends that the student be awarded the Doctor of Philosophy.

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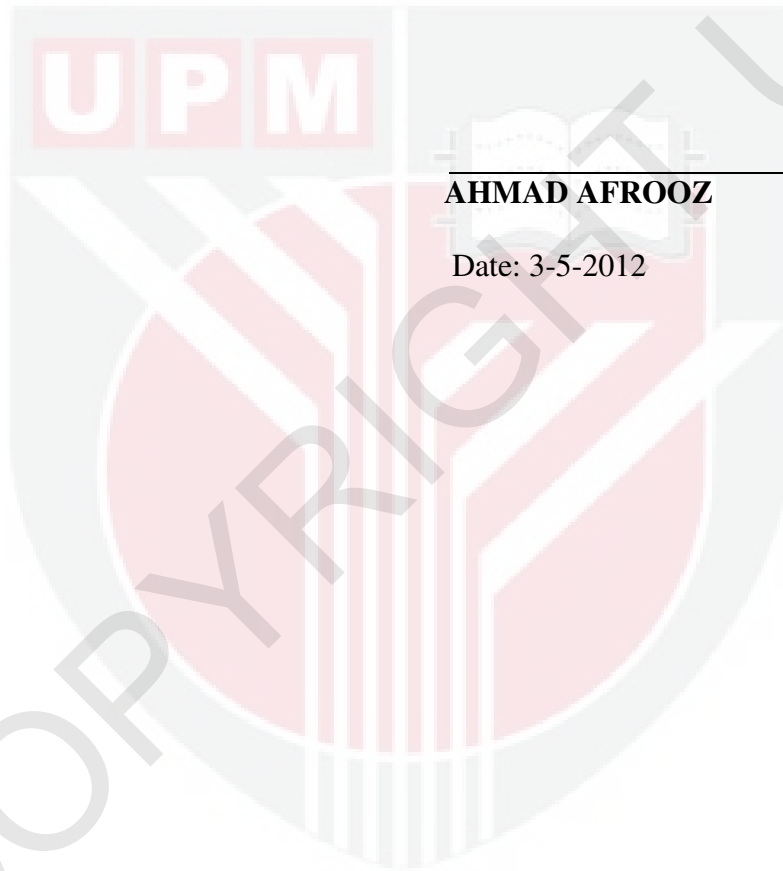
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DECLARATION

I declare that the thesis is based on 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 University Putra Malaysia or at any other institution.



AHMAD AFROOZ

Date: 3-5-2012

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LIST OF ABBREVIATIONS

ADV	Added Value
APERI	Agricultural Planning and Economic Research Institute
APO	Asian PROD Organization
CBI	Central Bank of Iran
C-D	Cobb-Douglas
CP	Capital Productivity
CRS	Constant Return to Scale
DEA	Data Envelopment Analysis
EF	Efficiency
FAO	Food and Agriculture Organization of the United Nations
FI	Food Industries
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GS	Government (Public) Sector
GSF	Government (Public) Sector Food Industries
ISIC	ISIC International Standard Industry Classification
IMF	International Monetary Fund
INEF	Inefficiency
LDC	Less Developed Countries
LM	Lagrange multiplier
LP	Labor Productivity
PS	Private Sector

PF	Production Function
PSF	Private Sector of Food industries
MFP	Multifactor PROD
ML	Maximum Likelihood
MLE	Maximum Likelihood Estimation
OLS	Ordinary Least Square
OECD	Organization for Economic Co-Operation and Development
PROD	Productivity
PSF	Private Sector Food Industries
REM	Random Effect Model
SCI	Statistical Centre of Iran
SFA	Stochastic Frontier Analysis
TE	Technical Efficiency
TINEF	Technical Inefficiency
TFP	Total Factor of Productivity
TFPG	TFP Growth
TOT	Total Industries
VRS	Variable Return to Scale
UNIDO	United Nation Industrial Development Organization

CHAPTER I

INTRODUCTION

Productivity (PROD) has long been the central pillar for policymakers and those involved in designing the country's developmental strategies for both the economy and community. In fact, it is a well-known concept among those in the managerial and administrative positions. The concept of PROD has far-reaching consequences in the lives of all layers of people, be it at the individual or national level. A nation's gross national product (GNP) is heavily dependent upon PROD, as well as its inflation rate and the worth of its currency. The PROD concept is also responsible for creating an atmosphere of healthy competition amongst firms and industries, which can further lead to national economic growth (Pritchard, 1992).

At the individual level, PROD can lead to improvements in the quality of life, increased leisure time and advancement within an organization. Kendrick (1984), Pritchard (1992) and McGinn (2002) reflect on the impact PROD could have on a person's standard of living. It is found that the PROD concept could be affected by several factors, such as human capital, research and development (R&D), foreign direct investment (FDI), macroeconomic policies and so on. Investigations of these factors have been of great importance to policymakers, enterprises and owners of industries. This study investigates the determinants of PROD and efficiency (EF) in Iranian food industries (FI), particularly in relation to the importance of the food industry (FI) in Iran and its role in boosting Iran's economy.

1.1 Problem Statement

In view of the obvious dominance of oil, agriculture has always been a key economic contributor in Iran. However, the sector continues to struggle with self-sufficiency. As indicated earlier on, the FI in Iran is widely recognized as a 'sunrise industry', with a huge potential for uplifting the agricultural economy, creating large-scale processed food manufacturing and food-chain facilities and resulting in the generation of employment and export earnings. This industry is one of the largest industries in Iran. Based on the recent data (2008) from the Statistical Centre of Iran (SCI), the industry was ranked first in terms of its provision of employment (18 percent). Table 1.1 shows the share of FI related to total industries (TOT) in terms of the number of manufacturers, employment, as well as investment and added values. In terms of the latter, however, it was only ranked the third (16 percent). The third rank of FI in terms of added value shows that this industry plays a big role in Iran's economy.

Table (1.1) Share of Food Industries to Total Industries

Subject	Share %	Rank
Number of industries	20.53	1
Number of employment	18	1
Investment	6.3	7
Added value	16	3

Source: author's calculation using the SCI data

According to SCI, the total industries of Iran are categorized in 23 groups. The food industries have the most number of manufacturers and employments. As table 1.1 shows, the FI is ranked first in terms of the number of firms and workers employed. In terms of investment, the FI is ranked seventh. The high employment in this sector of Iran's economy illustrates that the FI is labor-intensive. As the table 1.2

shows, the ratio of capital to worker (capital per worker) in FI is lower than other industries, i.e. textile and chemical industries, and it is to be mentioned that this ratio is, also, lower than the average of total industries. Simply put, the capital per worker (K/L) ratio in the FI in comparison with textile and chemical industries (as the typical industries in Iran) is very low; the Table 1.2 illustrates the capital per worker in FI is 31.96 million RI¹ while this ratio for textile and chemical industries is 41.19 and 290.85 million RI respectively. By the way, the value of capital per worker for the average total industries as the above mentioned table shows is 59.94 million RI. Therefore, it is concluded that the ratio of workers to capital in FI is more than the ratio of worker to capital in other industries, and this issue illustrates that the FI is labor-intensive.

Table 1.2 Capital per Worker and Labor Productivity

Industry	Capital per Worker (K/L) (million RI)	Labor productivity (million RI)
Food	31.96	0.012
Textile	41.19	0.014
Chemical	290.85	0.016
Total(average)	59.94	0.014

Source: author's calculation using the SCI (2007/2008) data

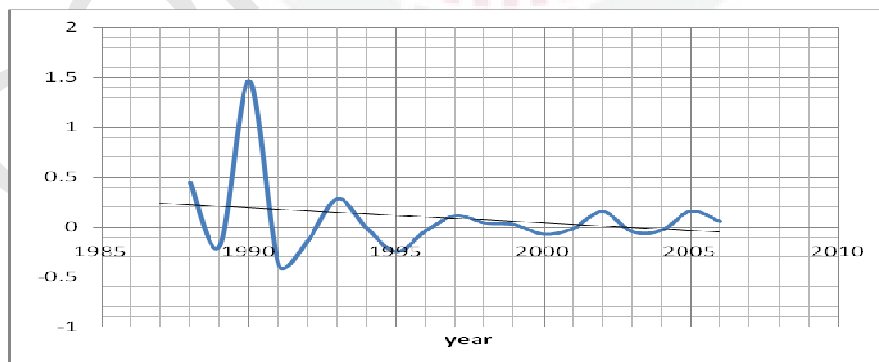
On the other hand, this industry is almost domestic and it has a strong dependency on important inputs. The FI's dependency on important inputs is 10.7 percent when compared with the metal industry (45.6 percent)². Besides, the fact that the capital is retained within the country helps to create more employment. The industry is also enormously significant for Iran's development due to the vital linkages and

¹ Currency of Iran

² Source: Ministry of Industries, *Eight years Effort for Industry, 1989-1996*, Tehran, June 1997, p. 58.

synergies that it promotes between the two pillars of the economy, namely industry and agriculture. The growth of the FI will bring about immense benefits to the economy, raise agricultural yields, enhance PROD, as well as create employment and raise the standard of living throughout the country, especially in the rural areas. The brief importance of FI is due to three important factors: (1) The precedence of the non-oil exports in foreign trade; (2) The response to the nutritional needs of the population; and (3) The prevention of wastage.

In spite of the importance of the industry, there are several problems within the FI. Although the FI of Iran is labour-intensive, most of the problems are related to the workforce and factors affecting their PROD. One of the problems related to this particular industry is the low labor productivity (LP). As shown in Figure 1.1, the growth of the labour productivity (LP) in the FI in 1987-1996 had a negative trend. In other words, in the past two decades, the LP in the FI of Iran has decreased in growth and has not been regarded as satisfactory by the authority and manufacturers. The LP growth in all the years was very low; as the Figure 1.1 shows, the LP growths were close the zero and in some years they were negative.



Source: author's calculation using the SCI data

Figure (1.1) The Trend of Growth of Labor Productivity in Food Industries

The second column of Table 1.2 shows the LP for textile, chemical, food and, also, the average of total industries. Based on the Table 1.2, the LP in FI is lower than other industries; LP for FI is 0.012 million RI while LP for textile, chemical industries and the average of total industries is 0.014 million RI, 0.016 million RI and 0.014 million RI respectively. Thus, it is concluded that LP of FI isn't satisfactory and there was not any attempt to improve labor productivity.

The low LP is observed not only in the FI sectors but also, this problem can be observed in all economic sectors in Iran. The last report from APO reveals that the labour productivity growth in Iran's economy was very low as compared to other Asian countries. According to this report, the LP growth for Iran's economy was constant, while the LP growth for some other Asian Countries was very high, for example the LP grow was 690% in Bahrain but in Iran the LP growth was 0.0% in particular two periods (2000-2005, 2005-2008).

Table 1.3 Cross-Country Comparisons of Labor Productivity Growth

Country	2000-2005	2005-2008	%Growth between 2 period
China	8.3	10.7	29
India	3.6	5.4	50
Sri Lanka	2.5	4.7	88
Bahrain	-2.6	4.3	690
Philippines	1	3.7	270
Malaysia	3.1	3.6	16
Korea	2.8	3.1	11
Indonesia	3.6	3	-17
Thailand	2.6	2.5	-4
Iran	2.1	2.1	0

Source: APO Productivity Data book 2011

As presented in Table 1.3, the LP of Iran remained unchanged for 8 years (2000-2008), while the LP growth for some countries such as Bahrain, Philippine,

SriLanka, India and China was shown to be 690%, 270%, 88%, 50%, and 29%, respectively. Also the APO reports illustrate that the level of LP in the last 35years in Iran's economy was very low. The level of LP is illustrated in Table 1.4 and Figure 1.2. As illustrated in these graphics, the level of LP in the entire Iran's economy fluctuated in the period of 1972-2008. In addition, the LP of Iran had a negative trend.

Table 1.4 Labor Productivity in Total Iran's Economy

YEAE	LP	YEAR	LP
		1991	0.835
1972	1.098	1992	0.891
1973	1.015	1993	0.936
1974	1.084	1994	0.863
1975	1.127	1995	0.843
1976	1.246	1996	0.849
1979	1.199	1997	0.877
1980	1.087	1998	0.897
1981	0.975	1999	0.902
1982	0.834	2000	0.908
1983	0.774	2001	0.902
1984	0.85	2002	0.898
1985	0.925	2003	0.926
1986	0.899	2004	0.968
1987	0.804	2005	1
1988	0.771	2006	1.02
1989	0.707	2007	1.06
1990	0.747	2008	1.06

Source: APO Productivity Data book 2011



Source: APO Productivity Data book 2011

Figure (1.2) The Trend of LP in Iran's Economy

In general, low LP was observed in the whole of Iran's economy and this is seen as a big problem. The FI is a fraction of the Iranian economy which is not excluded from this problem. On one hand, due to the low PROD and inefficiency (INEF) in the FI of Iran during the past two decades, the wastage rates in this sector remained constant at 30% (Dehghani, 2010). On the other hand, low PROD and INEF in the sector led to increase in prices. In a more specific context, the high prices and low quality products were the most important failures of the FI in response to domestic and foreign (regional and Europe) markets (Dehghani, 2010). The manufacturers and policymakers have been worried about this dilemma. Nonetheless, the fear for low PROD had stimulated the authorities to develop programs which are aimed at promoting economic PROD.

Although there is ample statistical information such as added value (ADV), investment, the number of firms and workers related to the FI in comparison to total industries of Iran as whole (TOT), these are not analytical studies which have shown interest in comparing the FI and TOT in terms of the LP and TFP. Unfortunately, the position of the FI in comparison with other industries (average of industries) in terms of the LP and TFP remains unknown to the authorities until the present day.

Finally, over the last two decades, the government has encouraged the expansion of agro-industries and the FI. One of the ways that has been chosen by the government is industrial privatization. Privatization is the transfer of ownership from the public sector to the private sectors. The policies emphasize on decreasing the public ownership in industries and also encourage more private sector ownership. Table 1.5 shows changes in the number of manufacturers between the public sector and private sector in the period of 1995 to 2006.

Table 1.5 Changes in the Number of Manufacturers

Industries	1995	2006	%change
Total number of public industries	1101	508	-54
Public food industries	246	127	-48
Private food industries	1636	2077	27

Source: author's calculation using the SCI data

As shown in Table 1.5, these policies have caused the number of public industries to decrease from 1101 in 1995 to merely 508 in 2006³, whereas the number of public food firms decreased from 246 units in 1995 to only 127 units in 2006. Moreover, the number of private food firms increased from 1636 units in 1995 to 2077 units in 2006 (SCI, 2007/08). In conventional theories, one of the aims for privatization is the promotion of the EF and PROD. The increment of PROD is one of the methods for the firms' profits to increase.

In general, the strongest arguments for privatization of public firms are: 1) Increased flexibility resulting from a reduction of bureaucratic complexity and procedures, and 2) Reduced costs resulting from improved efficiency, especially if there is a truly competitive process with clear performance criteria.

³ Manufacturing with more than 10 workers

In view of the problems stated above, the study will respond with the following research concerns:

1. What are the main factors affecting PROD and how strong is the impact of each factor?
2. What is the amount of INEF in the FI?
3. Which sectors (private or public) of the FI have better PROD and EF?
4. How is the situation of the LP and TFP in the FI? Or to put it more accurately, what is the state of the PROD growth of the FI in the past years as compared to the present?

1.2 Objectives of the Study

The general objective of the study is to investigate the PROD and EF in the Iranian FI. The specific objectives are:

1. To investigate the determinants of the PROD in the Iranian FI from 1993 to 2006.
2. To determine the value of the EF in the Iranian FI.
3. To compare the determinants of PROD and EF between the public and private sectors.
4. To examine and compare TFP levels and its growth between the FI and other industries (average of total industries) as a whole.

1.3 Significance of the Study

The FI's effect on other industries such as plastic, glass and cardboard manufacturing is undeniable. As a matter of fact, the FI improves both agricultural development and other industries simultaneously. The dependency on other economic sectors to the FI is very high and also the FI's dependency on other economy sectors has been significant. Based on the *Output-Input Table* of Iran, the *backward linkage multiplier* coefficient of Iran's economy is 1.52 units while the rank of its *backward linkage multiplier* is the third (out of 91 sections). The coefficient for Iran's FI is about 2.55. This means that each Rial⁴ increase in demand for food products causes about 2.55 Rials increase in the production of other economic activities, which is caused by the FI's dependency on different economic products (OMP, 2004).

Also, the *forward linkage multiplier* of Iran's economy is 1.46 units while the same coefficient for the FI is 2.487 units. The coefficient shows the extent to which other manufacturing sections are dependent on food products. In fact, this shows that the FI could play a significant role in Iran's economy. Regarding these abilities, the government has paid specific attention in the expansion of the agro industry with the aim of enhancing non-oil export and self-sufficiency in the FI. Moreover, the development of these industries would increase the demand for agricultural products and reduce the level of wastage. The importance lies equally in the identification of the strengths and the weaknesses of the FI in presenting scientific solutions to researchers. It will also assist economic policymakers to reach their program goals quickly.

⁴ Currency of Iran

EF and PROD studies and their determinants are useful when it comes to diagnosing problems and making recommendations based on empirical work and the economic theories of industrial production. This research should fill several gaps in the literature on the determinants of the PROD and EF. The government and private owners will be interested to know which factors have strong effects on the LP and EF. Many stakeholders, policy makers, managers, and agribusiness owners are interested in the results of these EF and PROD studies. In line with the statement above, the EF and PROD analyses are important in the current era of rapidly changing technology and increasing input costs. Even more so, the EF analysis aims to study factors affecting the PROD that will guide the policymakers in planning and management. Due to the high number of manufacturers of the FI and also high number of workers in the industry, it is clear that the government and private sectors could be able to attempt to develop highly significant factors and diagnose the factors assumed to be weak. The comparison of the PROD and EF determinants in the PS&GSs of the FI will guide policymakers and authorities to devise a better plan in the future. The results of the comparison of two sectors of the FI can well lead to the government being encouraged or discouraged to pursue privatization.

Due to high number of manufacturers of the FI and also high number of workers in the industry, it is necessary that the government attempts to know the LP, TFP, and TFPG in comparison to those of other industries. Therefore, assessing the position of the FI in terms of the EF and PROD with respect to total industries (TOT) is important for macro-policy makers of the industry because of the fact that the Fifth Development Plan can contribute in increasing the PROD in all sectors of

Iran. Although few researches have been made on the TFP in the country, unfortunately, no research has been made on the “PROD and EF in Iran’s FI”. The results of this study can be helpful to authorities in promoting a vast array of FI abilities and could be useful for relevant industry players in elevating their capacities and abilities.

1.4 Organization of the Thesis

The following study is divided into six chapters. It begins with an introduction and continues to provide an overview of the study. This section contains information on the research challenges, the purpose of the study, the importance of the study, and the organization of the study.

Chapter 2 reviews the background of the Iranian economy, specifically with respect to its FI. Also, this chapter explains shortly the economy of Iran and, also, the properties and importance of the FI in Iran.

Chapter 3 reviews the background of the PROD and EF, working definitions, the theoretical framework and famous approaches to measure the EF. Further, the related literature on productivity, determinants of productivity and the measurement of the EF will be presented.

Chapter 4 presents the empirical methodology for identifying factors that affect the PROD. Subsequently, the strategies for TEF measurement in the FI will be explained. Also, it brings to the fore all the factors affecting PROD levels, measurements and empirical models for the TFP growth.

Chapter 5 will show the research findings on the basis of research questions and objectives mentioned previously in Chapter One; also, the methodology will be discussed in Chapter Four. This chapter evaluates the determinants of PROD and measurement EF in the FI of Iran including both the PSF and GSF, measures the TFP levels and examines the TFP growth in the TOT and FI in Iran. Finally, the factors affecting the EF in the PSF and GSF will be investigated.

Chapter 6 presents the summary and conclusion of the thesis. The results from the assessment of PROD and EF determinants, as well as the TFP levels and TFP growth in the FI of Iran will be summarized in this chapter. The limitations of the study and, also, the suggestions for future studies will be highlighted in this chapter.

characteristics (education, training, skilled and so on) the study didn't able to investigate the relationship between productivity and differential gender's characteristics.

Finally, the lack of data related to macro determinants of productivity in food industries, such as interest rates, innovation, R&D and exports is one striking limitation of this study.

6.2.3 Recommendations for Future Research

The results of the study have well demonstrated that human factors, such as education, engineering and skilled workers, have had the most effect on the LP in the FI. Thus, these factors can also worth examining in the other industries in Iran. The role of the government to increase human capital is also suggested for future research.

Due to the importance of the FI in Iran, a further study focusing on the relationship between the PROD and quality is suggested. Studies related to high-quality of packing and exports are also recommended.

Research related to productivity, efficiency and Comparative Advantage in food industries of Iran is also suggested. Other than those aforementioned, another thing on which researchers can place focus would be the comparison of productivity and efficiency between food industries and other industries.

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Afrooz, A., & Rahim, K. B. A. (2010). A Review of Effects of Gender, Age, and Education on Wage and Productivity [Electronic Version], from <http://www.eurojournals.com/finance.htm>

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