PRODUCTIVITY CHANGES FOR TRAWLERS AND PURSE SEINER IN TWO REGIONS AND FISHING ZONES IN PENINSULAR MALAYSIA

SHARIFAH ERIN BINTI SYED SEMAN

FP 2012 53
DEDICATION

This thesis is dedicated to my beloved husband, ummi, sisters, brothers, parents in-law, friends and who have supported and encouraged me throughout this study
Abstract of thesis presented to the Senate of University Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

PRODUCTIVITY CHANGES FOR TRAWLERS AND PURSE SEINER IN TWO REGIONS AND FISHING ZONES IN PENINSULAR MALAYSIA

By

SHARIFAH ERIN BINTI SYED SEMAN

November 2012

Chairman : Professor Zainal Abidin bin Mohamed, PhD

Faculty : Agriculture

Marine fish landings in Peninsular Malaysia have shown increasing pattern starting from year 1996 to 2009. Most of the total landings in Peninsular Malaysia had come from inshore fisheries. The objective of this study is to examine technical efficiency and productivity fishing gear (trawl and purse seines) in different region and fishing zone. Data for the study was collected from Malaysia Fisheries Department between 2000 until 2009.

Information on number of fishing units, number of days, number of trips, number of hauls and number of hours were gathered and analysed using the Data Envelopment Analysis (DEA) and Malmquist Index. Results of the study shows that, most of purse
seines operating in the frontier line in inshore location while majority of trawl net operating below the frontier line for both fishing zone. Overall, technical efficiency of trawl in Peninsular Malaysia is 26% and 100% for purse seines. This implies inputs were not used efficiently and systematically by trawl net. Inputs used in this study are, number of fishing gear, number of days, number of trips, number of hauls and number of hours. Total Factor Productivity (TFP) for trawl increased in west coast for both sea locations and decreased in east coast for both sea locations. Meanwhile Total Factor Productivity for purse seines increased in east coast for both sea locations and decreased in west coast for both sea locations. Overall, Total Factor Productivity for trawl in Peninsular Malaysia is 23.4% and 28.7% for purse seines. These findings suggest that there is much room for improvement for trawl and purse seines in deep-sea and inshore in term of technical efficiency and productivity with appropriate training, regular monitoring and usage of more advanced technologies. In conclusion the analyzed period of time we found that the increased in marine fish catches in line with the increased use of technology to suit the zone location.
Abstrak tesis yang dikemukakan kepada senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

PERUBAHAN PRODUKTIVITI PUKAT TUNDA DAN PUKAT JERUT DI RANTAU DAN LOKASI PERAIRAN DI SEMENANJUNG MALAYSIA

Oleh

SHARIFAH ERIN BINTI SYED SEMAN

November 2012

Pengerusi : Profesor Zainal Abidin bin Mohamed, PhD

Fakulti : Pertanian

berbanding pukat tunda yang hanya beroperasi di bawah garisan kecekapan sahaja di kedua-dua perairan. Secara keseluruhan, kecekapan teknikal bagi pukat tunda ialah 26% dan 100% bagi pukat jerut yang beroperasi di Semenanjung Malaysia. Ini menunjukkan bahawa nelayan pukat tunda tidak menggunakan input dengan cekap dan sistematik. Input yang digunakan dalam kajian ini adalah seperti bilangan pukat tunda dan pukat jerut, bilangan perjalanan kapal, bilangan hari, bilangan kali memukat dan bilangan jam. Keputusan kajian ini menunjukkan bahawa pertumbuhan produktiviti faktor keseluruhan (TFP) untuk pukat tunda meningkat di pantai barat bagi kedua-dua perairan laut dan menurun di pantai timur bagi kedua-dua perairan laut. Sementara pertumbuhan produktiviti faktor keseluruhan (TFP) bagi pukat jerut meningkat di pantai timur dan menurun di pantai barat bagi kedua-dua perairan laut. Secara keseluhannya, pertumbuhan produktiviti faktor keseluruhan (TFP) pukat tunda di Semenanjung Malaysia adalah sebanyak 23.4% berbanding pukat jerut iaitu 28.70%. Kajian ini menunjukkan bahawa terdapat banyak ruang untuk penambahbaikan dalam penggunaan pukat tunda dan pukat jerut melalui latihan yang sesuai, pemantauan yang berterusan dan dengan menggunakan teknologi yang terkini supaya dapat meningkatkan kecekapan teknikal dan pertumbuhan produktiviti faktor keseluruhan (TFP). Secara kesimpula, dalam tempoh masa yang dianalisis kita dapati bahawa peningkatan hasil tangkapan ikan laut sejajar dengan peningkatan teknologi yang digunakan mengikut kesesuaian zon perairan.
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 grateful and indebted to Prof. Dr. Zainal Abidin Mohamed, Department of Agribusiness and Information System, University Putra Malaysia as the chairman of supervisory committee who provided valuable guidance, unwavering support and kindly advises in all aspects of my research process.

Special thanks are also due to my supervisory committee member, Dr. Amin Mahir Abdullah for sharing time and ideas, comments and advice on developing and reporting this research and for serving as a member of my committee. I would like also to thank Dr. Ismail Latiff for his help and guidance over my study period. Thanks also go to all the lectures and staffs at the department in Faculty of Agriculture UPM for warm communication, hospitality and support throughout my study. My appreciations are also to my colleagues and my best friends Mohd Nizam Aziz and Siti Hasshurah Hashim (MOA) for the moral support and sharing the idea. Last but not least, I am ever grateful to my husband for his endless love and sacrifices, my mother, sister, brother and my parents-in-law for moral support.
APPROVAL

I certify that a Examination Committee has met on 6th November 2012 to conduct the final examination of Sharifah Erin Binti Syed Seman on his Master thesis entitled “Productivity Changes For Trawlers and Purse Seiner In Two Regions and Fishing Zones In Peninsular Malaysia.” in accordance with Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the

Members of the Examination Committee are as follows:

Golnaz Rezai, PhD
Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Ismail Bin Abd. Latif, PhD
Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Nolila Binti Mohd Nawi, PhD
Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Abdul Hamid Bin Jaafar, PhD
Professor
School of Economics
Faculty of Economics and Management
Universiti Kebangsaan Malaysia
(External Examiner)

SEOW HENG FONG, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

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

Zainal Abiddin Mohamed, PhD
Professor
Faculty of Agriculture
University Putra Malaysia
(Chairman)

Mohd Amin Mahir Bin Abdullah, PhD
Lecturer
Faculty of Agriculture
University Putra Malaysia
(Member)

_______________________

BUJANG BIN KIM HUAT, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:
DECLARATION

I hereby 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 or concurrently submitted for any other degree at Universiti Putra Malaysia or other institutions.

SHARIFAH ERIN BINTI SYED SEMAN

Date: 6 November 2012
TABLE OF CONTENT

DEDICATION          i
ABSTRACT           ii
ABSTRAK           iv
ACKNOWLEDGEMENTS        vi
APPROVAL           vii
DECLARATION          ix
TABLE OF CONTENTS         x
LIST OF TABLES          xii
LIST OF FIGURES          xiv
LIST OF ABBREVIATIONS        xvi

CHAPTER

1. INTRODUCTION
   1.0 World Fish Production 1
   1.1 World Fish Consumption 3
   1.2 Overview of Fisheries in Malaysia 4
       1.2.1 Fishing Profile 4
       1.2.2 Marine Capture Fisheries 6
       1.2.3 Status of Export and Import of Malaysia Fisheries Commodities by Regional Grouping, 2008 15
       1.2.4 Fisheries Technology in Malaysia 18
   1.3 Problem Statement 22
   1.4 Objective of The Study 24
   1.5 Significance of The Study 24

2. LITERATURE REVIEW
   2.0 Introduction 25
   2.1 Conceptual of Production in Fisheries 25
       2.1.1 Concepts of Production and Efficiency 27
       2.1.2 Static and Dynamic View to Productivity and Efficiency 28
       2.1.3 Importance of Productivity and Efficiency in Fisheries 31
       2.1.4 Factors Influencing Productivity Growth 31
   2.2 Measures of Productivity Growth and Efficiency 33
       2.2.1 Non-frontier Approaches vs Frontier Approaches 34
       2.2.2 Non-Parametric Approach vs Parametric Approach 37
       2.2.3 Approaches to TFP Growth Measurement 39
       2.2.3.1 Data Envelopment Analysis (DEA) Method 47
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.3.2</td>
<td>Malmquist TFP Index</td>
<td>50</td>
</tr>
<tr>
<td>2.3</td>
<td>Techniques to Determine Factors Affecting TFP and Efficiency</td>
<td>52</td>
</tr>
<tr>
<td>2.4</td>
<td>Empirical Evidences of TFP and Efficiency in Agriculture</td>
<td>52</td>
</tr>
<tr>
<td>2.5</td>
<td>Overview of TFP and Efficiency in Fishery</td>
<td>54</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Empirical Evidences in Fishery Industry</td>
<td>55</td>
</tr>
<tr>
<td>3.</td>
<td>METHODOLOGY</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Introduction</td>
<td>63</td>
</tr>
<tr>
<td>3.1</td>
<td>Theoretical Framework</td>
<td>63</td>
</tr>
<tr>
<td>3.1.1</td>
<td>Empirical Model to Measure Technical Efficiency</td>
<td>64</td>
</tr>
<tr>
<td>3.1.2</td>
<td>The Malmquist TFP Growth Indices</td>
<td>65</td>
</tr>
<tr>
<td>3.2</td>
<td>Data and Data Sources</td>
<td>73</td>
</tr>
<tr>
<td>3.3</td>
<td>Output and Input Variables</td>
<td>74</td>
</tr>
<tr>
<td>3.4</td>
<td>Framework of the Study</td>
<td>76</td>
</tr>
<tr>
<td>3.5</td>
<td>Type of Fishing Gear</td>
<td>77</td>
</tr>
<tr>
<td>4.</td>
<td>RESULT AND ANALYSIS</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>Introduction</td>
<td>80</td>
</tr>
<tr>
<td>4.1</td>
<td>Technical Efficiency</td>
<td>80</td>
</tr>
<tr>
<td>4.1.1</td>
<td>TE for Both Vessel in Deep-Sea in East Region</td>
<td>80</td>
</tr>
<tr>
<td>4.1.2</td>
<td>TE for Both Vessel in Deep-Sea in West Region</td>
<td>82</td>
</tr>
<tr>
<td>4.1.3</td>
<td>TE for Both Vessel in Inshore in West Region</td>
<td>84</td>
</tr>
<tr>
<td>4.1.4</td>
<td>TE for Both Vessel in Inshore in East Region</td>
<td>86</td>
</tr>
<tr>
<td>4.1.5</td>
<td>Summary of TE</td>
<td>88</td>
</tr>
<tr>
<td>4.2</td>
<td>The Total Factor Productivity Growth and its Decomposition</td>
<td>89</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Vessel in Deep-Sea in East Region</td>
<td>90</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Vessel in Deep-Sea in West Region</td>
<td>93</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Vessel in Inshore in East Region</td>
<td>96</td>
</tr>
<tr>
<td>4.2.4</td>
<td>Vessel in Inshore in West Region</td>
<td>99</td>
</tr>
<tr>
<td>4.2.5</td>
<td>Summary of TFP</td>
<td>102</td>
</tr>
<tr>
<td>5.</td>
<td>CONCLUSION AND RECOMMENDATIONS</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>Introduction</td>
<td>104</td>
</tr>
<tr>
<td>5.1</td>
<td>Summary of Result and Conclusions</td>
<td>104</td>
</tr>
<tr>
<td>5.1.1</td>
<td>Vessel in Deep-Sea in East Region</td>
<td>105</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Vessel in Deep-Sea in West Region</td>
<td>105</td>
</tr>
<tr>
<td>5.1.3</td>
<td>Vessel in Inshore in East Region</td>
<td>106</td>
</tr>
<tr>
<td>5.1.4</td>
<td>Vessel in Inshore in West Region</td>
<td>107</td>
</tr>
<tr>
<td>5.2</td>
<td>Conclusion</td>
<td>108</td>
</tr>
<tr>
<td>5.3</td>
<td>Recommendations</td>
<td>109</td>
</tr>
</tbody>
</table>

BIBLIOGRAPHY

BIODATA OF STUDENT