UNIVERSITI PUTRA MALAYSIA

FACTORS AFFECTING TECHNICAL EFFICIENCY OF TRAWL FISHERY IN PENANG, MALAYSIA

LIM GHEE THEAN

FP 2011 6

FACTORS AFFECTING TECHNICAL EFFICIENCY OF TRAWL FISHERY IN PENANG, MALAYSIA

LIM GHEE THEAN

MASTER OF SCIENCE
UNIVERSITI PUTRA MALAYSIA
2011

FACTORS AFFECTING TECHNICAL EFFICIENCY OF TRAWL FISHERY IN PENANG, MALAYSIA

By

LIM GHEE THEAN

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

March 2011

Specially dedicated to my beloved

Grandma,

Tang Siew Gan (1926 – 2008)

Wife,

Lee Huay Lin

Parents,

Lim Ah Seng & Ng Gook Hiang

Brothers,

Lim Ghee Sern & Lim Ghee Geen

Uncles, Aunties, Cousins

And

Friends

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

FACTORS AFFECTING TECHNICAL EFFICIENCY OF TRAWL FISHERY IN PENANG, MALAYSIA

By

LIM GHEE THEAN

March 2011

Chairman : Ismail Abd Latif, PhD

Faculty : Agriculture

The main objective of this study is to investigate the level of technical efficiency and factors affecting technical inefficiency for a sample of local trawl vessel operating in Penang, Malaysia. This study was conducted due to the declining trend of marine fish landing of Penang trawl fishery 1993 – 2009. The annual cumulative number of days of local trawl vessels in these seventeen years was also declining in tandem. Data of this study were collected through questionnaire survey that was conducted from November 2009 to January 2010. Sixty-nine fishermen were selected randomly for this study. Information on landing per trip, number of crew, fishing days per trip, diesel consume per trip, gross registered tonnage of vessel and horsepower of vessel were gathered and analyzed by using two approaches namely, stochastic frontier analysis (SFA) and data envelopment analysis (DEA). Furthermore, the determinants of technical inefficiency (family background, age, years of experience and education level of fishermen together with age of vessel and possession of echo sounder) were analyzed through SFA and tobit regression. The results from both approaches (DEA and SFA) indicated that technical

efficiencies among vessels varied between 12.3% and 100%. The mean technical efficiency for DEA approach was 56.6% while SFA approach recorded 71.7%. The inefficiency model from SFA indicated that experience of fishermen, age of vessels and possession of echo sounder contributed positive influences on technical efficiency. In addition, the inefficiency model from tobit regression showed that family background, education, experience of fishermen and possession of echo sounder contributed positive influences on technical efficiency. The inefficiency models from both SFA and tobit regression consistently indicated that possession of echo sounder was the only significant variable having positive influence on technical efficiency which meant a vessel with possession of echo sounder would be more efficient compared with those vessels without echo sounder. Hence, this study suggested that fishermen should be encouraged to acquire an echo sounder and improve the marine fish landings through offering loans, subsidies or other incentives provided by the government to lessen the high capital investment cost borne by the fishermen.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

FAKTOR-FAKTOR YANG MEMPENGARUHI KECEKAPAN TEKNIKAL PERIKANAN PUKAT TUNDA DI PULAU PINANG, MALAYSIA

Oleh

LIM GHEE THEAN

Mac 2011

Pengerusi : Ismail Abd Latif, PhD

Fakulti : Pertanian

Kajian ini dijalankan untuk menyelidik tahap kecekapan teknikal dan faktor kecekapan teknikal untuk sampel kapal pukat tunda di Pulau Pinang, Malaysia. Kajian ini dijalankan disebabkan jumlah pendaratan ikan di Pulau Pinang semakin menurun sejak tahun 1993 – 2009. Tambahan pula, kajian ini turut dijalankan memandangkan jumlah bilangan hari menangkap ikan tahunan didapati juga menurun. Data untuk kajian ini diperoleh dan dikumpul melalui kajian soal selidik yang telah dijalankan dari bulan November 2009 hingga bulan Januari 2010. Seramai enam puluh sembilan orang nelayan telah dipilih secara rawak untuk kajian ini. Segala maklumat tentang jumlah pendaratan ikan, jumlah hari menangkap ikan, kuantiti minyak diesel yang digunakan, pendaftaran muatan kasar kapal dan kuasakuda enjin kapal telah diperoleh dan dianalisis melalui dua kaedah, iaitu *Stochastic Frontier Analysis* (SFA) dan *Data Envelopment Ana*lysis (DEA). Selain itu, faktor kecekapan teknikal yang merangkumi latar belakang keluarga, umur ,tahun pengalaman, tahap pendidikan, umur kapal dan kemudahan pemerun

gema turut dianalisis melalui SFA dan regresi *tobit*. Keputusan yang diperoleh melalui kedua-dua kaedah (DEA dan SFA) telah menunjukkan bahawa tahap kecekapan teknikal kapal pukat tunda adalah antara 12.3% dan 100%. Purata thap kecekapan teknikal untuk sampel kapal dalam kaedah DEA ialah 56.6% manakala kaedah SFA merekodkan 71.7%. Model ketidakcekapan dari SFA menunjukan bahawa pengalaman nelayan, umur kapal dan kemudahan pemerun gema memberi kesan positif kepada kecekapan teknikal. Di samping itu, model ketidakcekapan dari regresi *tobit* menunjukan bahawa latar belakang, pendidikan, pengalaman nelayan dan kemudahan pemerum gema memberi kesan positif kepada kecekapan teknikal. Kedua-dua model ketidakcekapan daripada SFA dan regresi *tobit* memaparkan bahawa kemudahan pemerum gema merupakan satu-satunya pemboleh ubah yang memberi kesan positif yang ketara kepada kecekapan teknikal. Hal ini bermakna kapal yang dilengkapi dengan pemerun gema akan beroperasi dengan lebih cekap berbanding dengan kapal yang tidak dilengkapi dengan alat ini. Oleh itu, melalui kajian ini, dicadangkan bahawa para nelayan harus digalakkan menggunakan alat pemerum gema untuk meningkatkan jumlah pendaratan ikan marin melalui penawaran pinjaman, subsidi dan insentif lain yang diberi oleh kerajaan untuk mengurangkan kos pelaburan yang tinggi yang ditanggung oleh nelayan.

ACKNOWLEDGEMENTS

I gratefully acknowledge the funding from the project of Fundamental Research Grant Scheme (project number: 05-11-08-631 FR).

I am grateful to my supervisor, Dr. Ismail Abd Latif, for the two years mentoring, guidance and kindness throughout the completion of this work. I am also grateful for the suggestions and comments from Prof. Dr. Md. Ariff Hussein.

I would like to thank the staffs in Department of Fisheries, Penang for their assistance. Special thanks to Pn. Zubaidah Ahmad (Assistant Officer SMPP, DoF) for her assistance and the permission to use the secondary data. I would like to thank all the fishermen surveyed during the interview for their cooperative, helpful and friendly.

Special appreciation to my dearest wife and my beloved parents for their invaluable encouragement and support. Finally, I would like to thank God for enabling me to go though my master study.

APPROVAL

I certify that a Thesis Examination Committee has met on **15th March 2011** to conduct the final examination of Lim Ghee Thean on his thesis entitled "**Factors Affecting Technical Efficiency of Trawl Fishery in Penang, Malaysia**" in accordance with the 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 Master of Science.

Members of the Thesis Examination Committee were as follows:

Abdullahi Farah Ahmed, PhD
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Amin Mahir Abdullah, PhD
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Mohd. Mansor Ismail, PhD
Associate Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Abdul Hamid Jaafar, PhD
Associate Professor
Faculty of Economics and Business
Universiti Kebangsaan Malaysia
(External Examiner)

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

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 **Master of Science**. The members of the Supervisory Committee were as follows:

Ismail Abd Latif, PhD
Senior Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Md. Ariff Hussein, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

_____

HASANAH MOHD GHAZALI, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

DECLARATION

I declare that the 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 Universiti Putra Malaysia or at any other institution.

_____

LIM GHEE THEAN

Date: 15 March 2011

TABLE OF CONTENTS