UNIVERSITI PUTRA MALAYSIA

AN ECONOMETRIC STUDY OF PALM OIL IMPORT DEMAND IN THE MIDDLE EAST AND NORTH AFRICAN COUNTRIES

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By

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

January 2005

**DEDICATED TO MY LATE FATHER, MY MOTHER,
MY HUSBAND AND MY CHILDREN**

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

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Chairman: **Professor Fatimah Mohamed. Arshad, PhD**

Faculty: **Economics and Management**

With vegetable oils supplies at record levels, increased emphasis is being placed on finding new and growing markets for different oils. The Middle East and North Africa region (MENA) is one of such emerging markets for palm oil and its products. Strong consumption growth for vegetable oils in general, and palm oil products in particular, coupled with limited vegetable oils production capabilities in the region, have been behind the increase in trade. Further growth is anticipated in large part due to a strong regional GDP forecast. Palm oil has the opportunity to be a prime beneficiary of this growth in trade, due to its export competitiveness in the global market of fats and oils. The objectives of this study are; firstly to analyse the palm oil import demand in representative MENA countries, namely Algeria, Egypt, Iran, Jordan, Libya, Morocco, Saudi Arabia, Sudan, Syria, and Turkey, over a period of time; and secondly, to identify the prospects of expanding its market in the MENA region. Ten single equation models are specified, following a general to specific approach, to represent palm oil import demand functions in these countries. The

models have been estimated using multivariate cointegration and ECM methods for the analysis through utilizing the ARDL technique.

The findings of the study show that the palm oil price variable emerged to be a significant determinant of palm oil demand across the ten models. Soybean oil proved to be an important substitute for palm oil in Algeria, Egypt, Iran, Jordan, Morocco and Turkey. The major substitute oil for palm oil in Saudi Arabia and Libya is corn oil, while rapeseed oil and sunflower seed oil came out to be important substitutes for it in Sudan and Syria respectively. The prices of substitute oils in almost all countries have been found to play an important role in shaping the palm oil demand. Palm oil demand in all countries turned to be significantly dependent on income. The remarkably high palm oil discount was an important factor in raising the Turkish demand for palm oil. The results suggest that the sharp increase in world petroleum prices in 1970s contributed significantly to the palm oil import demand in Saudi Arabia.The anti-palm oil campaign came out to be an important factor that negatively affected the palm oil import demand in Algeria and Iran. The Malaysian market promotion effort proved to have a great influence in expanding the demand for palm oil in Egypt. The Gulf war crisis and trade sanctions on Iraq expanded the market of palm oil in Jordan, whereas the trade embargo on Libya suppressed the demand. Exchange rate also proved to be an important determining factor for shaping Libyan import demand for palm oil. Demand elasticities with respect to own price, substitute price and income came out to be very high indicating its high responsiveness to changes in these variables and implying the importance of considering them in the process of formulating the marketing policies.

Finally, projections for palm oil import demand revealed that import demand is expected to increase in all the countries under consideration, with variations in the magnitude of expansion among them, indicating the good potentiality of this market for absorbing more palm oil.

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

KAJIAN EKONOMETRIK PERMINTAAN TERHADAP MINYAK KELAPA SAWIT DI NEGARA-NEGARA TIMUR TENGAH DAN AFRIKA UTARA

Oleh

AMNA AWAD ABDEL-HAMEED

Januari 2005

Pengerusi: **Profesor Fatimah Mohamed. Arshad, Ph.D.**

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Memandangkan penawaran penawaran minyak sayuran telah bertambah dengan ketara, beberapa usaha dilaksanakan untuk mencari pasaran baru dan yang sedang berkembang untuk pelbagai jenis minyak. Kawasan Timur Tengah dan Afrika Utara (atau MENA – *Middle East and North Africa)* adalah merupakan salah satu daripada pasaran potensi baru yang semakin penting bagi minyak kelapa sawit dan produk berasaskannya. Ini adalah kerana jangkaan pertumbuhan Keluaran Dalam Negeri Kasar (KDNK) yang pesat di kawasan ini dan pada masa yang sama kemampuan pengeluaran minyak sayuran kawasan ini adalah terbatas. Minyak kelapa sawit memiliki peluang untuk mengambil faedah dari pertumbuhan dalam perdagangan ini kerana daya saing eksportnya dalam pasaran minyak dan lemak dunia. Objektif kajian ini adalah; pertama untuk menganalisis permintaan import minyak kelapa sawit daripada beberapa negara terpilih yang mewakili MENA, iaitu Algeria, Mesir, Iran, Jordan, Libya, Maghribi, Arab Saudi, Sudan, Syria dan Turki dalam satu tempoh masa tertentu. Kedua, untuk mengenalpasti prospek permintaan di kawasan ini. Untuk tujuan ini, sepuluh model 'persamaan tunggal' telah digunakan berdasarkan pendekatan 'umum kepada khusus' untuk mewakili fungsi permintaan

import minyak kelapa sawit bagi negara tersebut. Model ini dianggarkan dengan menggunakan kointegrasi pelbagai variat dan "kaedah pembetulan ralat" atau *"Error Correction Model (ECM)"* menggunakan *Autoregressive Distributed Lag* atau *ARDL.*

Penemuan kajian menunjukkan bahawa pembolehubah harga minyak kelapa sawit dalam kesemua sepuluh model tersebut merupakan penentu penting dalam permintaan terhadap minyak kelapa sawit. Minyak kacang soya didapati merupakan pengganti utama kepada minyak kelapa sawit di Algeria, Mesir, Iran, Jordan, Maghribi dan Turki. Di Arab Saudi dan Libya, pengganti utamanya ialah minyak jagung, manakala di Sudan, minyak sesawi dan di Syria, minyak bunga matahari. Harga minyak pengganti di hampir kesemua negara tersebut didapati berperanan penting dalam membentuk jumlah permintaan terhadap minyak kelapa sawit. Diskaun yang sangat ketara bagi minyak kelapa sawit di Turki didapati merupakan faktor penting dalam meningkatkan permintaan pasaran Turki terhadap minyak kelapa sawit. Di Arab Saudi, kenaikan harga petroleum yang mendadak pada dekad tujuh puluhan (70an) merupakan penyumbang penting ke arah peningkatan permintaan import minyak kelapa sawit. Kempen anti minyak kelapa sawit pula didapati memberi kesan negatif terhadap permintaan minyak kelapa sawit di Algeria dan Iran. Usaha Malaysia untuk mempromosi minyak kelapa sawit terbukti memberi kesan yang besar dalam memperluaskan permintaan terhadap minyak kelapa sawit di Mesir. Krisis Perang Teluk and sekatan perdagangan terhadap Iraq telah meningkatkan permintaan terhadap minyak kelapa sawit di Jordan manakala embargo perdagangan ke atas Libya mengurangkan kadar permintaan di negara tersebut. Di Libya, satu lagi faktor penting ialah kadar pertukaran wang asing.

Keanjalan permintaan harga minyak kelapa sawit itu sendiri, harga minyak pengganti dan pendapatan terbukti berada pada tahap yang tinggi dan ini menyarankan bahawa pasaran adalah responsif terhadap perubahan pembolehubah tersebut dan juga kepentingan pembolehubah ini diambil kira dalam pembentukan polisi pemasaran.

Unjuran permintaan import minyak kelapa sawit menunjukkan bahawa permintaan ini dijangka akan terus meningkat di semua negara yang dikaji walaupun wujud perbezaan dari segi kadar perkembangan permintaan antara negara. Bermakna, pasaran di MENA berkemampuan untuk menerima kemasukan lebih banyak.minyak, kelapa sawit.

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3 SLS	3 Stage Least Squares
AIDS	Almost Ideal Demand System
AR	Autoregressive
ARDL	Autoregressive Distributed Lag.
ARIMA	Autoregressive Integrated Moving Average
ARMA	Autoregressive Moving Average
ASEAN	Association of South East Asian Nations
BECM	ayesian Error Correction Mechanism
bn	Billion
BVAR	Bayesian Vector Autoregressive
CAP	Common Agricultural Policy
CES	Constant Elasticity of Substitution
CIF	Cost, Insurance, and Freight
COMMEX	Commodity and Monetary Exchange of Malaysia
CPO	Crude palm oil
CUSUM	Cumulative sum
CUSUMSQ	Cumulative sum of squares
DM	Deutsche Mark (German Currency)
EC	European Community
ECM	Error Correction Model
ECT	Error Correction Term
ECU	European Currency Units
EEC	European Economic Community.
EMPOPA	East Malaysia Palm Oil producers association
EU	European Union
Ex-USSR	Former Soviet Union
FAO	Food and Agriculture Organisation of the United Nations.
FDA	Food and Drug Administration
FFB	Fresh Fruit Bunches
FOB	Free on Board
GATT	General Agreement on Tariffs and Trade
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GLS	Generalised Least Squares
ha	Hectare
HS	Harmonized System
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund.
Kg	Kilogram.
KLCE	Kuala Lumpur Commodity Exchange
KLOFFE	Kuala Lumpur Options and Financial Futures Exchange
LAAIDS	Linear Approximate Almost Ideal Demand System
MA	Moving Average
MARMA	Multivariate ARMA
MDEX	Malaysia Derivatives Exchange
MENA	Middle East and North African Region.
MFN	Most Favoured Nation

mn	Million
MOU	Memorandum of Understanding
MPI	Ministry of Primary Industries
MPOB	Malaysian Palm Oil Board
MPOGC	Malaysian Palm Oil Growers' Council
MPOPC	Malaysian Palm Oil Promotion Council
NW Europe	North West Europe
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
P	Production
PKO	Palm kernel oil
POCPA	Palm Oil Credit Payment Arrangement
PORDB	Palm Oil Research and Development Board
PORIM	Palm Oil Research Institute of Malaysia.
PORLA	Palm Oil Registration and Licensing Authority
PPO	Processed palm oil
RBD	Refined bleached deodorized
RM	Malaysian Ringgit.
RMSE	Root Mean Square Error
RMSPE	Root Mean Square Percentage Error
RSDAIDS	Restricted Source Differentiated AIDS
RVAR	Restricted VAR
SDAIDS	Source Differentiated AIDS
SSR	Self Sufficiency Ratio
SUR	Seemingly Unrelated Regression
T	Metric ton = 1000 Kg.
TAS	Technical Advisory Services
UAE	United Arab Emirates
UD	Domestic utilisation
UK	United Kingdom
UN	United Nations.
UNCTAD	United Nations Conference on Trade and Development
UR	Uruguay Round of trade negotiations
USD	United States Dollar.
USDA	United States Department of Agriculture
USSR	Union of Soviet Socialist Republics
VAR	Vector Autoregressive
WMOPA	West Malaysian Palm Oil Producers Association
WTO	World Trade Organisation

CHAPTER 1

INTRODUCTION

1.1 General background

Palm oil is the most traded vegetable oil in the world, capturing about 48% of the global vegetable oil trade volume in 2002 (Oil World, 2003). A distant second is soybean oil with around 22% of the global trade. It is produced mainly (more than 80%) in South East Asia where Malaysia leads with more than 50% of the world production, followed by Indonesia with about 30% of global production (FAO, 2004). Malaysia exports most of its productions (i.e. about 84%). Indonesia, on the other hand, consumes 60% of its annual production of palm oil. Palm oil plays an important role in Malaysian economy as an export earner and a source of living for about 0.3 million families employed in various land schemes and in palm oil estates. The exports of Malaysian palm oil expanded rapidly since 1980s. In order to make use of the added value of processed oil for creating more national income and increase employment opportunities, the government adopted policies directed to promote the exports of processed palm oil. Palm oil production is expected to expand rapidly, driven on the demand side by cost advantage over alternative crops, and on the supply side by relative profitability over other competing crops (USDA, 1995).

The overall demand for vegetable oils is expected to grow in the 21st century due to increasing population and per-capita income especially in developing countries where there is latent demand to be met as purchasing power increases. Total fats and oils supply for developing countries is 64 gm/capita/day, compared with 125gm/capita/day in developed countries (FAO, 2004). This will give opportunity for different vegetable oils to expand their markets. In addition to that the new century is expected to witness liberalisation of trade due to the successful completion of Uruguay Round of General Agreement of Trade and Tariffs (GATT). There will be lowering of barriers to entry as well as of subsidies under the auspices of World Trade Organisation. This might also intensify the competition of different vegetable oils.

Middle East and North Africa region (MENA)[1] is home of more than 426 million people (about 7% of the world population). The percentage of MENA to the world population is expected to increase to 8% by 2020 according to FAO projections (FAO, 2004).

[1] There is no specific definition of the MENA region. The most comprehensive definition comprises 24 economies; the 21 members of the Arab League (Algeria, Bahrain, Djibouti, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Palestine, Qatar, Saudi Arabia, Somalia Sudan, Syria, Tunisia, The united Arab Emirates and Yemen), Turkey, Iran and Israel. The most restrictive being the one that embraces Egypt, Lebanon, Jordan, Israel and the West Bank of Gaza (El-Erian and Fischer, 1996). For the purpose of this study MENA is defined to cover four Maghreb countries (Algeria, Morocco, Libya and Tunisia) located in north Africa, four economies situated at the geographical centre of the area (Egypt, Syria, Jordan and Lebanon), Sudan, and the six members of the Gulf Cooperation council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirate), and Turkey. Iraq, Yemen, and Lebanon are not included in the analysis because of the lack of recent economic data. Israel is also excluded because there is no evidence of trade relationship between it and Malaysia (apparently because of the trade embargo imposed by members of the Islamic League against Israel).