DETERMINANTS OF FOOD SECURITY IN MALAYSIA

By

NOOR THOYIBBAH BINTI ABDUL WAHAB

Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the Master of Economics

DECLARATION

I declare that this substance of this project paper have never been submitted for any degree or post-graduate program and qualifications.

I certify that all the supports and assistance received in preparing this project paper and all the sources abstracted have been knowledge in this stated project paper.

Noor Thoyibbah binti Abdul Wahab

813351

Othman Yeop Abdullah

Graduate School of Business

Universiti Utara Malaysia

06010 Sintok

Kedah Darul Aman

PERMISSION TO USE

In presenting this dissertation paper in partial fulfillment of the requirement for a Post Graduate degree from Universiti Utara Malaysia (UUM), I agree that the library of this university may take it freely available for inspection. I further agree that permission for copying this dissertation paper in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my dissertation paper. It is understood that any copying and publication or use of this dissertation paper parts of it financial gain shall not be allowed without written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholar use which may be made of any material from my dissertation paper.

Request for permission to copy or to make other use of materials in this dissertation paper in whole or in part should be addressed to:

Dean of Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman

ABSTRACT

Food security issue is getting more attention by world today. Although, Malaysia is a middle income country able to produce her own food, but there is still lack of food supply for domestic needs. She still has to import some food commodities including rice (staple food) to fulfill the demand of food. The increasing deficit between domestic demand and local production is expected to continue and this cause threat to food security to the country. With these trends lurking, understanding the determinants of food security is important because it will help the policy makers keep abreast of the main variables for food security in Malaysia. This paper thus analyse the factors that affect the food security model in Malaysia during the period of 1982-2011. Based on theoretical principles and research experience, the analysis in this paper include food production index as food security proxy while the other variables include food prices, Malaysian population, CO2 emission and foreign workers as important determinants of food security. The assessment of the impact of these factors is achieved using the Johansen Juselius Cointegration Test for long run model and Vector Error Correction Model approach (VECM) to check the adjustments of the cointegrated variables towards their equilibrium values. These series are defined in logarithm. Preliminary investigation revealed that the series were found to be I (1) process at initial level while the series become I (0) after first differences. The trace statistics test shows that the series on the food prices, Malaysian population, CO2 emissions and foreign workers are co-integrated each other. The results from Johansen test shows that all the variables are cointegrated each other and important determinants of food security in the long run. While, results from VECM shows only foreign worker is important determinant of food security in the short run. This model is a useful tool that

can guide the policy makers to develop more effective policies and strategies to improve food security level in the country. It could also provide a more quantitative means of assessing food security, and in particular to pinpoint specific variables that explain the highest effect to food security at the national level.

Keywords: Determinants, Econometric analysis, Food security, VECM

ABSTRAK

Isu keselamatan makanan semakin menjadi perhatian oleh dunia pada masa kini. Walaupun Malaysia merupakan sebuah negara berpendapatan pertengahan yang mampu menghasilkan makanannya sendiri, tetapi ia masih mengalami kekurangan bekalan makanan untuk keperluan tempatan. Malaysia masih perlu mengimport beberapa jenis makanan termasuklah beras (makanan ruji) untuk memenuhi permintaan terhadap makanan. Defisit yang semakin meningkat diantara permintaan dan pengeluaran tempatan dijangka akan berterusan dan ini menyebabkan ancaman kepada keselamatan makanan negara. Dengan menularnya trend ini, memahami penentu keselamatan makanan adalah penting kerana ia akan membantu pembuat dasar agar seiring dengan penyebab utama bagi keselamatan makanan di Malaysia. Dengan itu, kajian ini menganalisis faktor-faktor yang mempengaruhi model keselamatan makanan di Malaysia bagi tahun 1982 sehingga 2011. Berdasarkan kepada prinsip teoritikal dan kajian-kajian lepas, analisis di dalam kajian ini menggunakan indeks pengeluaran makanan sebagai proksi kepada keselamatan makanan, sementara pembolehubah lain yang digunakan ialah harga makanan, penduduk Malaysia, pembebasan karbon dioksida dan pekerja asing sebagai penentu penting kepada keselamatan makanan. Penilaian kepada kesan faktor-faktor ini dicapai dengan menggunakan ujian cointegrasi Johansen Juselius untuk model jangka panjang dan pendekatan 'Vector Error Correction Model' (VECM) untuk jangka pendek. Siri ini ditentukan dalam bentuk logaritma. Kajian awal menunjukkan bahawa siri ini mengalami proses I(1) pada tahap awal manakala menjadi I(0) selepas pembezaan pertama. Ujian statistik menunjukkan bahawa kesan siri pada harga makanan, penduduk Malaysia, pembebasan CO2 dan pekerja asing adalah berkointegrasi antara satu sama

lain. Keputusan daripada ujian Johansen menunjukkan semua pembolehubah adalah penentu penting kepada keselamatan makanan dalam jangka panjang. Manakala keputusan daripada pendekatan VECM menunjukkan hanya pekerja asing merupakan penentu penting kepada keselamatan makanan dalam jangka pendek. Model ini merupakan satu alat yang berguna yang boleh memberi panduan kepada pembuat polisi untuk mengembangkan lebih banyak polisi dan strategi yang berkesan untuk meningkatkan tahap keselamatan makanan di dalam Negara. Ia juga boleh menyediakan satu cara yang lebih kuantitatif dalam menilai keselamatan makanan, khususnya untuk menentukan pembolehubah-pembolehubah tertentu yang mdemberikan kesan yang paling tinggi kepada model keselamatan makanan di peringkat nasional.

Keywords: Penentu-penentu, Analisis Ekonometrik, Keselamatan makanan, VECM

ACKNOWLEDGEMENT

Firstly, I would like to thank Allah for blessing me and giving me the time, health and ability to finish my whole thesis completely.

My deepest gratitude goes to my supervisor, Dr. Shri Dewi A/P Applanaidu, Senior Lecturer College of Business, Universiti Utara Malaysia, who inspires the approach and give full encouragement, constructive critics and guidance to me. It really helps me to complete my whole thesis. I am also grateful to all of my lecturers in Universiti Utara Malaysia for everything they have taught me throughout my academic studies.

The great appreciation goes to my beloved family. They have given endless encouragement and support to me in the proses of completing this thesis. Last but not least, I would like to thank everyone involved who has given inspirations and guidance whether directly or indirectly. Thank you.

Table of Contents

List of Tables

List of Figures

List of Abbreviation/Notation/Glossary Of Term

FAO – Food and Agriculture Organization

MOA – Ministry of Agriculture and Agro-Based Industry

DJBM – Dasar Jaminan Bekalan Makanan

NPK – Nitrogen, Phosphorus and Potassium

DOS – Department of Statistics

BERNAS – Padiberas National Berhad

SSL – Self-Sufficiency Level

USDA – United State Department of Agriculture

UNDP – United Nation Development Programme

GHG – Green House Gases

CO2 – Carbon Dioxide

IPCC – Intergovernmental Panel on Climate Change

WTP – Willingness-to-Pay

CVM – Contingent Valuation Method

OLS – Ordinary Least Square

ECCR – Ecumenical Council for Corporate Responsibility

VECM – Vector Error Correction Model

ARCH – Auto-Regressive Conditional Heteroscedasticity

LM – Lagrange Multiplier

ADF – Augmented Dickey-Fuller

PP – Phillips-Perron

KPSS – Kwiatkowski-Phillips-Schmidt-Shin

AIC – Akaike Criteria

VAR – Vector Autoregressive

FPE – Final Prediction Error

SC – Schwarz Information Criterion

HQ – Hannan-Quinn Information Criterion

CHAPTER 1

INTRODUCTION

1.1 Introduction

Food is important in human being's life. It is essential for a nation to have sufficient food in terms of quality and quantity for all people to continue its development. Lack of food in the long term with rapidly growing population will cause hunger and starvation that may cause death.

Since the World Food Conference in 1974, food security concept was introduced due to food crises and major famines in the world. This concept was evolved, developed, and diversified by the academic community and politics. There are several developed definitions of food security considering the original view point of food security problems. The international organizations and researchers defined it in different ways without much change in the basic concept.

According to the Food and Agriculture Organization (FAO) 2002, food security exist when all people, at all time, have physical and economic access to sufficient, safe and nutritious food that meet their dietary needs and food preferences for an active and healthy lifestyle. Thus food insecurity defined as exists when people do not have adequate physical, social or economic access to food. They also state that there are four components of food security such as food availability, accessibility, utilization and stability. Food availability addresses the supply side of food security and is determined by the level of food production, stocks levels, net food trade (exports minus imports) and

The contents of the thesis is for internal user only

References

Aker, J., & Lemtouni, A. (1999). A framework for assessing food security in face of globalization: The case of morocco. *Agroalimentaria Junio, 8*, 13-26.

Ahmed, F., & Siwar, C. (2013). Food security status issues and challenges in Malaysia: A review. *Journal of Food, Agriculture and Environmental, 11(2), 219-223.*

Akhir, A. M., Omar,R., & Abd Hamid, H. (2009). Food security - A national responsibilitynof regional concern: Malaysia case. *Confeeerence Paper on Food Security and Sustainable Development*. Rome.

Alam, M. M., Siwar, C., Murad, M. W., & Toriman, M. E. (2011). Farm level achievement of climate change, agriculture and food security issues in Malaysia. *World Applied Science Journal, 14*, 431-442.

Amaza, P. S., Adejobi, A. O., & Fregrene, T. (2008). Measurement and determinants of food insecurity in Northeast Nigeria:Some empirical policy guideline. *Journal of Food Agriculture and Enviroment, 6*, 92-96.

Ambler-Edwards, S., Bailey, K., Kiff, A., Lang, T., Lee, R., Marsden, T., Simons, D. and Tibbs, H. (2009). Food futures: Rethinking UK strategy. Chatham House (the Royal Institute of International Affairs).

Arshad, F. M., & Hameed, A. A. A. (2010). Global food prices: Implications for food security in Malaysia. *Journal of The Consumer Research and Resource Centre*, 21-38.

ASEAN Ministers on Agriculture and Forestry. (2008, Oct 23). Report of 30th Meeting of the AMAF.

ASEAN Secretariat (1988). ASEAN document series 1967-1988*. Third Edition. ASEAN Secretariat, Jakarta*, 225-229.

ASEAN Secretariat (2009). Fact Sheet: ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action on ASEAN Food Security (SPA-FS). *ASEAN Secretariat, Jakarta.*

Baffoe-Bonnie, J., & Gyapong, A. O. (2012). The dynamic implication for wages changes on productivity, wages and employment in a developing economy: a structural VAR analysis. *The Journal of Developing Areas, 46*, 397-417.

Bashir, M. K., Schilizzi, S., & Pandit, R. (2012). Food security and its determinants at the crossroads in Punjab, Pakistan. *Working Paper*. School of Agricultural and Resource Economics, University of Western Australia, Crawley, Australia.

Bernama (2008, May 26). Agricultural cooperation between Malaysia-Japan crucial to ensure food security. Retrived from http://www.bernama.com.my/

Center for Global Development (2007). World agriculture faces serious decline from global warming. Retrieved from http://www.cgdev.org/content/article /detail/14404

Department of Agriculture (2009). Retrieved from http://www.doa.gov.my/

Department of Statistics Malaysia (2013, Oct). Population and demography. Retreived from http://www.statistics.gov.my

Eagle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, *55*, 251-276.

Edame, G. E., Ekpenyong, A. B., Fonta, W. M., & D., E. (2011). Climate change, food security and agriculture productivity in Africa: Issues and policy direction. *International Journal of Humanities and Social Science, 1*, 205-223.

Faridi, R., & Wadood, S. N. (2010). An assessment of household food security in Bangladesh. *The Bangladesh Development Studies, XXXIII*, 97-111.

Food and Agriculture Organization (1996). Part III - Food Security: Some Macroeconomic Dimension. Retreived From http://www.fao.org/3/a-w1358e/w1358e14.htm

Food and Agriculture Organization. (2002). In Food Security: Concepts and Measurement. Retrieve from http://www.fao.org

Gebre, G. G. (2012). Determinants of food insecurity among households in addis ababa city, Ethopia. *Interdisciplinary Description of Complex System*, *10*, 159-173.

Government of Malaysia (2000). Eighth Malaysia Plan 2000-2005. *Kuala Lumpur, Percetakan Negara*, 194.

Green, C., & Kirkpatrick, C. (1981). Insecurity, food financing and the IMF. *Food Policy*, *6*, 135-146.

Green, C., & Kirkpatrick, C. (1982). A cross-section of food insecurity in developing countries: Its magnitude and sources. *The Journal of Development Studies, 18*(184-204).

Hamid, J., & Sing, L.Y. (2008, July 7). Reuters: Malaysia urges muslim food security plans. Retrieved from http://uk.reuters.com/

Hamilton, W. L., Cook, T. J., Thompson, W. W., Buron, L. F., Frongillo, E. A., Olson, C. M., & Wehler, C. A. (1997). Household food security in the United States in

1995. *US Department of Agriculture Food and Consumer Service, Washington D.C.*, 1-69.

Intergovernmental Panel on Climate Change (2007). Climate change: The IPCC scientific assessment. *Cambridge: Cambridge University Press*. Retrieved from http://ipccwg1.ucar.edu/wg1/Report/AR4WG1_Print_SPM.pdf

James, O. M., Robert, A., and Thomas, T. (2013). Determinants of household food security in the Sekyere-Afram plains district of Ghana. *Global Advanced Research Journal of Agricultural Science, 2*, 34-40.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with application to the demand for money. *Oxford Bulletin of Economics and Statistics, 52*, 169-210.

Kanapathy, V. (2006). Migrant workers in malaysia: An overview. *Paper presented at the Workshop on an East Asian Cooperation Framework for Migrant Labour*, Kuala Lumpur.

Khadka, N. (1990). Regional cooperation for food security in south asia. *Food Policy, 15*, 492-504.

Khee, P. C., Mee, L. Y., & Keong, C. C. (2011). The economic impact of climate change on food security in Malaysia. *Munich Personal RePEc Archive Paper, 37199*, 1-18.

Kiong, P. W. M. (2012). Express Additional Mathemathics: Form 4. Retreived from http://books.google.com.my/books?id=lUeYAwAAQBAJ&dq=index+numbers+form+4&source

Lobell, D., & Field, C. (2007). Global scale climate-crop yield relationship and the impact of recent warming. *Public Health Resources Paper 152*. Retrieved from http://digitalcommomns.unl.edu/publichealthresources/152

Malaysia Factbook (2013). Foreign workers in Malaysia. Retreived from http://malaysiafactbook.com/Chronology:Foreign_workers_in_Malaysia

Malthus, T. (1798). *An essay on the priciple of population*. London: J. Johnson.

Mellor, J. (1988). Global food balance and food security. *World Development, 16*, 997-1011.

Ministry of Finance (2013). Chapter three: economics performance and prospects. Economic Report 2012/2013. Retreived from http://www.treasury.gov.my/index.php?option=com

Mitiku, A., Fufa, B., & Tadese, B. (2012). Empirical analysis of determinants of rural households food security in Southern Ethiopia: The case of Shashemene district. *Basic Research Journal of Agricultural Sciene and Review ISSN, 1*, 132-138.

Mohamed, R. K. M. H., Ramendran SPR, C., & Yacob, P. (2012). The impact of employment of foreign workers: Local employability and Trade Union roles in Malaysia. *International Journal of Academic Research in Business and Social Sciences October 2012, 2*(10).

Omotesho, O. A., Adewumi, M. O., Muhammad-Lawal, A., & Ayinde, O. E. (2006). Determinants of food security among rural farming households in Kwara State, Nigeria. *African journal of General Agriculture, 2*, 7-15.

Othman, P. F. (2000). Food security in Malaysia. *Proceedings of the Asian Productivity Conference. Asian Productivity Orgamization. Tokyo*, 204-221.

Philips, T., & Taylor, D. (1990). Optimal control of food insecurity: A conceptual framework. *American Journal of Agriculture Economics, 72*, 1304-1310.

Reutlinger, S., & Knapp, K. (1980). food security in food defisit countries. *World Bank Staff Working Paper*. World Bank. Washington DC.

Reutlinger, S. (1987). Food security and poverty in developing countries. *Gittinger, J. Leslie and C. Hoisington (eds). Food policy: Intergrating supply, distribution and consumption*. Baltimore and London.

Staatz, J. M., & Carl, K. E. (1990). Agriculture development ideas in historical perspective. *In Carl K. Eicher and John M. Staatz (eds). Agriculture development in third world*. Baltimore: John Hopkins University Press.

Stern, N. (2006). The economics of climate change. *Cambridge University Press*.

Thomson, A., & Metz, M. (1999). Implication of economic policy for food security – A training manual. *Food and Agriculture Organization Publication*, 263-285. Retrieve from http://www.fao.org/docrep/004/x3936e/X3936E02.htm

United State Department of Agriculture (2013, Oct). World agriculture supply and demand estimated. Retreived from http://www.usda.gov/oce/commodity/wasde/latest.pdf

Wooldridge, M. J. (2013). Introductory Econometric. Retreieved from http://people.brandeis.edu/~yanzp/Study%20Notes/EconometricsWooldridge.pdf

World Bank (2013). World Bank data. Retrieved from http://data.worldbank.org