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CONCENTRATION, MARKET POWER AND PERFORMANCE OF THE MALAYSIAN POULTRY INDUSTRY

ABDULRAZAK UMAR MUA'ZU

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By

ABDULRAZAK UMAR MUA'ZU

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

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DEDICATIONS

This work is dedicated to my parents

Hajiya Saudatu Ummaru Muazu

and

late Alhaji Ummaru Muazu (may his soul rest in peace)

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

CONCENTRATION, MARKET POWER AND PERFORMANCE OF THE MALAYSIAN POULTRY INDUSTRY

By

ABDULRAZAK UMAR MUA'ZU

April 2014

Chair: Professor Zainal Abidin Mohamed, PhD
Faculty: Agriculture

Over the last few decades, Poultry industry in Malaysia has undergone major structural changes both horizontally and vertically due to the consolidation and integration of agribusiness. As such there is increasing concern about concentration and possible exercise of market power along the industry supply chain. The general objective of this study is to examine relationship among the market structure (concentration), market power and performance of the Malaysian poultry market. The general objective is achieved through an integrated study approach segmented in two separate but related sections; the first segment is the structure-conduct-performance (SCP) and market power analysis and the second segment is price transmission and market integration analysis using time-series co-integration model.

The result of the SCP model suggests farm level market is moderately concentrated over the study period indicated by the CR4 61.9% and HHI 2179. Market conduct analysis shows firms' in the industry increases their profit through market share rather than price suggesting an oligopolistic market structure. The result of the 2SLS indicates market concentration in the Malaysian poultry market has positive relationship with advertising. Industry growth has significant but negative effect on both advertisements and profit. The result revealed a two-way cause and effects existed between market concentration and industry behavior.

The result of the estimated demand and supply equations of poultry market in Malaysia shows that chicken meat demand is inelastic -0.124 indicating that consumer are not sensitive to price changes. On the other hand income elasticity is

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elastic at 3.636 implying that poultry meat as luxury good. The cross-price elasticity with respect to beef is -2.405 rejecting beef as a substitute to chicken meat in Malaysia. Results of the market power analysis show that the coefficient of conduct parameter for the three sub-periods of 1980-1990, 1991-2004 and 2005-2010 were 0.6740, 0.5540 and 0.5790 respectively, rejecting the hypothesis that raising concentration means increasing market power. The values of the parameter lie between 0 and 1 which suggests imperfect competitive market in the Malaysian poultry industry as more farmers opt to join poultry integrators.

Analysis of asymmetry price transmission model reveals that retail prices react more rapidly but not completely to increases in upstream (producer) prices than to decreases. The result of Granger-Causality suggests regional markets as independents and central market of Kuala Lumpur as dominant market.

Based on the overall findings, we can postulate that vertically integrated market structure foster competition through efficiency gain as against market foreclosure as posits by the conversional SCP collusive hypothesis. The findings of the study would lead to development of new policy to increase viability, competitiveness and accessibility of the Malaysian poultry industry locally and internationally.

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

PENUMPUAN, KUASA PASARAN DAN PRESTASI TERHADAP INDUSTRI TERNAKAN AYAM DI MALAYSIA

Oleh

ABDULRAZAK UMAR MUA'ZU

April 2014

Pengerusi: Professor Zainal Abidin Mohamed, PhD
Fakulti: Pertanian

Sejak beberapa dekad yang lalu, industri Ayam di Malaysia telah mengalami perubahan struktur utama mendatar dan menegak disebabkan oleh penggabungan dan penyepaduan perniagaan tani. Oleh itu terdapat peningkatan kebimbangan mengenai kepekatan dan senaman mungkin kuasa pasaran di sepanjang rantaian bekalan industri.

Objektif umum kajian ini adalah untuk mengkaji hubungan antara struktur pasaran (penumpuan), kuasa pasaran dan prestasi pasaran ternakan Malaysia. Objektif kajian ini dicapai melalui pendekatan kajian bersepadu dibahagikan dalam dua bahagian yang berasingan tetapi berkaitan; segmen pertama adalah struktur-kelakuan Prestasi (SCP) dan analisis kuasa pasaran dan segmen kedua adalah penghantaran harga dan analisis integrasi pasaran menggunakan masa-siri bersama integrasi model.

Hasil model SCP mencadangkan pasaran peringkat ladang adalah sederhana tertumpu sepanjang tempoh kajian ditunjukkan oleh CR4 61.9% dan HHI 2179 . Pengendalian pasaran analisis menunjukkan firma dalam industri meningkatkan keuntungan mereka melalui bahagian pasaran dan bukan mencadangkan harga struktur pasaran oligopoli . Hasil daripada 2SLS menunjukkan penumpuan pasaran dalam ternakan Malaysia mempunyai hubungan positif dengan pengiklanan. Pertumbuhan industri mempunyai kesan yang ketara tetapi negatif kepada kedua-dua iklan dan keuntungan. Penemuan ini mengungkap punca dua hala dan kesan wujud antara penumpuan pasaran dan tingkah laku industri.

Hasil daripada permintaan dan penawaran persamaan anggaran pasaran ayam di Malaysia menunjukkan bahawa permintaan daging ayam adalah tidak boleh

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berubah -0.124 menunjukkan bahawa pengguna tidak sensitif dengan perubahan harga. Dalam pada itu, keanjalan pendapatan adalah elastik di 3.636 membayangkan bahawa daging ayam sebagai barang yang mewah. Keanjalan silang harga berkenaan dengan daging lembu adalah -2.405 daging lembu menolak sebagai ganti kepada daging ayam di Malaysia. Keputusan analisis kuasa pasaran menunjukkan bahawa pekali kelakuan parameter untuk tiga sub- tempoh 1980-1990, 1991-2004 dan 2005-2010 adalah masing-masing 0.6740, 0.5540 dan 0.5790, menolak hipotesis bahawa meningkatkan kepekatan bermaksud meningkatkan kuasa pasaran. Nilai-nilai parameter terletak di antara 0 dan 1 yang menunjukkan pasaran yang kompetitif yang tidak sempurna dalam industri ternakan Malaysia sebagai lebih ramai petani memilih untuk menyertai penyepadu ayam.

Analisis asimetri harga model penghantaran mendedahkan bahawa harga runcit bertindak balas dengan lebih cepat tetapi tidak sepenuhnya harga kenaikan huluan (pengeluar) daripada berkurangan. Hasil keputusan Granger - Causality mencadangkan pasaran serantau sebagai bebas dan pasaran utama di Kuala Lumpur sebagai pasaran dominan.

Berdasarkan dapatan kajian ini, secara keseluruhannya kita boleh mendalilkan bahawa persaingan memupuk struktur pasaran menegak bersepadu melalui kecekapan keuntungan berbanding pasaran forecloses sebagai posits oleh SCP konversional hipotesis pakatan sulit. Hasil kajian itu akan membawa kepada pembangunan dasar baru untuk meningkatkan daya maju, daya saing dan akses kepada industri ternakan Malaysia tempatan dan antarabangsa.

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I certify that a Thesis Examination Committee has met on 4 April 2014 to conduct the final examination of Abdulrazak Umar Muazu on his thesis entitled "Concentration, Market Power, and Performance of the Malaysian Poultry Industry" 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 Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Loh Teck Chwen, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

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

Annuar bin Md Nasir, PhD
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Internal Examiner)

Yusman Syaukat, PhD
Associate Professor
Bogor Agricultural University
Indonesia
(External Examiner)

NORITAH OMAR, PhD
Associate Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 19 May 2014

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Zainal Abidin Mohamed, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Chairperson)

Datuk Mad Nasir Shamsudin, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

Ismail Abdulatif, PhD
Senior Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

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

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Signature: _____
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Signature: _____
Name of Member of Supervisory Committee: Prof. Datuk Dr. Mad Nasir Shamsudin
Deputy Vice Chancellor (Academic & International)
Universiti Putra Malaysia
SERDANG

Signature: _____
Name of Member of Supervisory Committee: Ismail Abd. Latif, Ph.D
Jabatan Perniagaantani dan Sistem Maklumat
Fakulti Pertanian, Universiti Putra Malaysia
43400 UPM Serdang

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LIST OF ABBREVIATIONS

ADV	Advertising Intensity
ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
APT	Asymmetric Price Transmission
ARDL	Autoregressive Distributed Lag
ASEAN	Association of South-East Asian Nation
BL	Bresnahan-Lau
CAPI	Capital Intensity
CCM	Companies Commission of Malaysia
CR	Concentration Ratio
DOSM	Department of Statistics Malaysia
DVS	Department of Veterinary services
DWHT	Durbin-Wu-Hausman Test
ECM	Error Correction Model
FAMA	Federal Agricultural Marketing Authority
GC	Gini Coefficient
GDP	Gross Domestic Product
GRW	Growth of Sales
HHI	Herfindahl-Hirschman Index
KLSE	Kuala Lumpur Stock Exchange
MIDA	Malaysian Industrial Development Authority
MSIC	Malaysian Standard Industrial Classification
MOA	Ministry of Agriculture
NAP	National Agricultural Policy

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NEIO	New Empirical Industrial Organization
OLS	Ordinary Least Square
PCM	Price-Cost-Margin
PP	Philips-Perron
RM	Ringgit Malaysia
ROA	Rate of Return on Assets After Tax
ROE	Rate of Return on Shareholder's Equity After Tax
ROS	Rate of Return on Sales After Tax
R & D	Research and Development
SCP	Structure-Conduct-Performance
SSM	Suruhanjaya Syarikat Malaysia
TSLS	Two Stage Least Square
WTO	World Trade Organization
W-H	Wolffram-Houck
3SLS	Three-Stage Least Square

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CHAPTER 1

INTRODUCTION

1.1 Study Background and Motivation

The number of firms in most agricultural food industries has declined in most countries of the world. The declined has caused the average size of firms to increase in a process known as consolidation (Baker, 2003; Traill and Gilpin, 1998). As consolidation has proceeded, a few firms have increased market share more than the remaining firms through the process of concentration (Rogers 2001). Economists' assumption of many small, price-taking firms might be maintained in the presence of some consolidation, as firms become somewhat larger but each still has an equal and negligible influence in the market. Concentration, however, delivers a small subset of very large firms with the potential to exert greater influence over prices and trading conditions than their smaller counterparts. Concentration has been shown to occur in both input markets and product markets and at all stages of the marketing chain.

Identifying relationship between market concentration and efficiency/performance has been a central theme in industrial organization economics. Early followers of the structure-conduct-performance tradition tried to uncover a clear link between market structure (concentration) and economic performance using cross-industry data. Unfortunately, decades of empirical and theoretical research has established that there is not a consistent and unambiguous mapping from structure to performance. Although empirical studies generally find a positive relationship between industry concentration and profitability, the relationship is weak statistically .

The SCP paradigm dominates the industrial organization empirical to the study of relationship between concentration and performance between the 1950s until 1980s. The contribution of the paradigm to began to gradually erode in the 1980s with the emergence of the New Empirical Industrial Organization approach. Underlying the NEIO approach was the idea that individual industries are sufficiently distinct, and industry details sufficiently important, that cross-industry variation was often going to be problematic as a source of identification. Instead, the new wave of research set out to understand the institutional details of particular industries instead of cross-sectional industries and to use this knowledge to test specific hypotheses about consumer or firm behavior within the particular industry.

The structure and composition of the present day Malaysian poultry industry exhibit a modern form of vertical organization with large processing firms integrating the market value chain. By this many individual poultry processing companies own almost all aspects of production-breeding farms, multiplication farms, hatcheries, feed mills, some broiler growing farms, processing plants and poultry product retail outlets. With this development, the industry is vertically integrated with highly specialized forms of vertical coordination along the supply chain notably, the con-

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tract farming and integrated ownership operations by processing company.

This development has caused considerable structural changes in the industry in recent years. Most contentious among these changes is the acquisition and replacement of small-holder poultry farms into large scale farms which results in a decline in the total number of farms. Secondly, the substantial vertical coordination in the supply chain has resulted in the increasing importance of the integrators in the poultry production in the country. Contract farming has dominated the entire production system in the industry with a large proportion more than (75%) of broiler grower segment of the poultry production industry now under private contract arrangements.

With the vertical coordination by large firms in the Malaysian poultry market, interim reports by the Malaysian Company Commission on the status of broiler industry stated that 67 per cent of parent stock requirements in the country were supplied by 5 integrators. The report also shows 59 per cent of breeder farms' output was supplied by 5 integrators and 39 per cent was supplied by 21 non-integrators and only 5 integrators supplied between 50 to 60 per cent of the total output from all broiler growing farms. Furthermore, (DOSM 2008) computed the CR-4 ratio for the downstream poultry processing segment of the supply chain (at the MSIC 4-digit level) to be 88.5 per cent, and the Herfindahl-Hirschman Index ("HHI") to be 3,450.4. Both of these computed indices are clear indication of the increasing concentration in the industry.

1.2 Problem Statement

Early empirical industrial organization economics have established a significant positive relationship between concentration, market power and firm performance. According to conventional oligopoly theory, this signals the ability of the leading firms in concentrated markets to collude tacitly or explicitly. However, some analysts argue that it is the superior efficiency of large firms which result in both high concentration and high profits. The analysts support this argument with evidence in many instances that concentration increases the profits of large firms but not smaller ones. If the firms in an industry are equally efficient, effective collusion should raise the profits of small and large firms alike. Traditionally, various studies have tested these hypotheses using structure, conduct and performance paradigm (SCP).

According to this paradigm, structure affects the conduct of firms, which ultimately determines their performance. Concentration will facilitate the adoption of collusive conduct and, ultimately, the setting of prices departing from the perfectly competitive benchmark. In a perfectly competitive market, firms are considered too small to have an individual impact on the price of the good they produce.

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From the point of view of social welfare, perfect competition represents an ideal benchmark, since consumers pay the lowest possible price for the product they demand. Any situation in which firms command some degree of market power and are therefore able to set higher than competitive prices implies a social cost in terms of welfare loss for consumers.

The structure-conduct-performance paradigm further predicts that there is an increasing relationship between the level of market concentration and market power. Some authors are more precise in stating that the relationship, while it is increasing, may not be linear. One would expect that at low levels of concentration, conduct is close to competitive, and an increase in concentration would generate a substantial increase in market power. At high levels of concentration, conduct is already very far from the competitive benchmark, and an additional increase would not increase market power very much. Given this argument, the market concentration, market power and performance relationship could be studied in the integrated Malaysian poultry industry.

Further theoretical and empirical research of industrial economics leads to categorization of industrial organization studies into four approaches grouped in two major stream; the structural models and non-structural models (Bikker, 2004). The structural models include the structure-conduct-performance models and the structure-efficiency hypothesis (concentration-market power studies). The non-structural models are the New Empirical Industrial Organization (NEIO) and the time series models. Industrial organization literature revealed that these four approaches can be employed to analyze market structure,and industry performance.

Considering the importance of the poultry industry in Malaysia economy, and the fact that it doesn't strongly suggests whether efficiency, concentration, and profits are interrelated in Malaysian poultry industry, there is need to investigate whether the concentration-profits relationship derives largely from efficiency as belief by others or largely from collusive behavior, as the conventional view would have it. For years back this is has been an empirical question and the answer has important implications for merger policies, remedies pertaining to tacitly collusive oligopolies and monopolies.

This study adopted an integrated approach by combining three models; the SCP, NEIO, time series approaches to explaining the relationship among the market concentration, market power and industry performance in the Malaysian poultry industry.

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1.3 Objective of the Study

The general objective of the study is to examine the relationship between market structure (concentration), market power and performance of the integrated Malaysian poultry industry. The general objective will be achieved through the following specific objectives;

- To describe the structure-conduct and performance of the Malaysian poultry industry supply chain.
- To assess the degree of market power exerted by the integrators along the Malaysian poultry industry supply chain.
- To describe the retail-wholesale-farm price spread along the supply chain to observe symmetry or otherwise in the price transmission process within the industry.
- To examine spatial Price Transmission amongst Wholesale Poultry Markets in Peninsular Malaysia.

1.4 Significance of the Study

Malaysian poultry industry is likely to increase in importance in the near future, as the government is currently putting more importance to the development of agricultural sector to increase self-sufficiency level in food production and economic development. For instance, the ninth Malaysian plan had among other objectives projected to achieve developing and revitalizing agriculture to become third engine of the country's economic growth after service and manufacturing sectors. Poultry industry in Malaysia with largest share of the livestock sub-sector of the agriculture and high food manufacturing value added may be one of the government targets to achieve these objectives.

Secondly, although production has exceeded domestic demand for the poultry products, the industry may need to make new inroads for new markets overseas, especially with the Malaysian ambition of becoming international Halal food hub. It may deem necessary to develop a competitive and efficient markets through proper government policies and incentives.

In view of this, the study will be of significance to the government agencies and policy makers involve in policy formulation for the development of competitive and efficient poultry marketing system in Malaysia. Furthermore, as competitiveness and market efficiency are becoming increasingly more important with liberalization of both national and international markets under the World Trade Organization treaty (WTO), this study is significant to give more insight to those concerned. The outcome of the study will also be beneficial to researchers and students in

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improving the market for the poultry products in the country.

1.5 Structure of the Thesis

This study report is organized into seven chapters: The first chapter is the introductory, which includes the background and motivation of the study, discussing the main issues of concern, the objective of the study and the significance of the study. The second chapter is a comprehensive review of relevant past literature. The organization of the literature first provides a discussion on theoretical framework regarding methodologies on studies of market structure and performance and in the last part of the chapter there are reviews of empirical literature relevant to this study.

The third chapter presents an overview of the Malaysian agriculture in particular the poultry industry in Malaysia. The fourth chapter elaborates the methodology adopted to achieve the objectives of this study. The structure of the chapter is first, a brief introduction, the model specification and estimation method adopted. The results of this study is presented in two chapters (chapter five and six). Chapter five documents first finding as the results and discussions of the structure-conduct-performance and market power analysis. Chapter six outlines the second findings as the results and discussions of the price asymmetry and market integration analysis. Chapter seven presents summary, general conclusion and policy recommendations and limitations of the study.

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