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AN ECONOMIC ANALYSIS OF MALAYSIAN COCOA PRICES: A STRUCTURAL APPROACH

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AN ECONOMETRIC ANALYSIS OF MALAYSIAN COCOA PRICES: A STRUCTURAL APPROACH

By

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LIST OF ABBREVIATIONS

CPA	Cocoa Producers Alliance
FAMA	Federal Agriculture Marketing Authority
FAO	Food and Agriculture Organization
ICCA	International Cocoa Agreement
ICCO	International Cocoa Organization
IMF	International Monetory Fund
RMSE	Root Mean Square Error
RMS%E	Root Mean Square Percentage Error
SDR	Special Drawing Right

ABSTRACT

Abstract of thesis submitted to the Senate of Universiti Pertanian Malaysia in partial fulfilment of the requirements for the degree of Master of Science.

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JUNE 1991

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Cocoa industry is vulnerable to price fluctuations arising from fundamental changes in supply and demand and other technical and social factors. Consequently, price variability can affect the producers' returns and the foreign exchange earnings. This study is undertaken to investigate the main factors that determine cocoa prices.

Econometric cocoa models for the world and Malaysian markets were developed and estimated using annual time series data. Each model consists of supply, demand and price equations, with stock as the identity. The analyses and standard tests show that the models are satisfactory. The R^2 obtained for all the equations are above 0.75 and

most coefficients have the correct signs. The RMS%E's are all below 5 percent except for the world price equation and Theil's inequality coefficients are all below 0.005.

Our results show that domestic cocoa prices are determined by prices prevailing in the world market. Domestic stock change is not significant. In the world market itself, stock and consumption are the main factors that influence the behaviour of cocoa prices. World consumption and export demand are significantly influenced by the production index of the industrial nations and price of cocoa. On the supply side, cocoa production is determined by cocoa price lagged by the gestation period. This implies that investment decision on cocoa three to five years earlier is an important factor that determines cocoa supply.

The effects of market fundamentals on cocoa prices are further enhanced by the low price elasticities of supply and demand. The effects are therefore substantial.

Owing to the importance of cocoa to the economies of producing countries, it is therefore important to ensure cocoa price stability, which may be achieved by efficient price stabilization programmes. Such a programme can be established through improvements of the existing buffer

stock programme of the International Cocoa Agreement, such as, for example, through proper stock management. Promotion and downstream activities are alternative instruments that can be exploited to encourage demand, hence bolster cocoa price. Malaysia should therefore support any programme that aims at stabilizing the world cocoa price.

ABSTRAK

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagian daripada syarat-syarat untuk mendapatkan ijazah Master Sains.

SATU ANALISIS EKONOMETRIK HARGA PASARAN KOKO MALAYSIA: SATU PENDEKATAN STRUKTURAL

oleh

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Industri koko adalah mudah dipengaruhi oleh turun naik harga pasaran koko yang disebabkan oleh faktor-faktor asas pasaran seperti penawaran dan permintaan dan faktor-faktor teknikal dan sosial. Variasi harga koko akan memberi kesan kepada pendapatan petani dan tukaran asing negara. Kajian ini dijalankan dengan tujuan untuk menentukan faktor-faktor utama yang mempengaruhi harga pasaran koko.

Model ekonometrik pasaran koko di Malaysia dan dunia telah dirangka. Setiap model mengandungi persamaan-persamaan penawaran, permintaan dan harga, manakala stok sebagai identiti. Model tersebut telah dianggarkan

berdasarkan data tahunan. Keputusan analisis dan ujian-ujian piawai menunjukkan bahawa model tersebut adalah memuaskan, dengan R^2 bagi semua persamaan melebihi 0.75. Koefisien bagi kebanyakan variabel mempunyai tanda seperti yang dijangkakan. Ujian simulasi mendapati bahawa RMS%E bagi semua persamaan adalah kurang daripada 5 peratus kecuali persamaan harga pasaran dunia, manakala ujian Theil's memperolehi nilai kurang daripada 0.005.

Hasil kajian menunjukkan bahawa harga pasaran koko tempatan adalah bergantung kepada keadaan harga koko dunia. Perubahan stok di pasaran tempatan tidak menunjukkan keputusan yang nyata. Di pasaran dunia pula, harga koko ditentukan oleh paras stok dan permintaan koko. Permintaan koko pada keseluruhannya bergantung kepada indeks pengeluaran industri bagi negara-negara perindustrian dan harga koko, manakala pengeluaran koko dipengaruhi oleh harga koko tiga hingga lima tahun. Ini menunjukkan bahawa keputusan untuk menanam koko tiga hingga lima tahun terdahulu merupakan faktor penting dalam menentukan tahap pengeluaran koko.

Anggaran keanjalan harga penawaran dan permintaan adalah rendah. Ini menunjukkan bahawa kesan perubahan penawaran dan permintaan terhadap harga koko adalah besar.

Memandangkan kepada pentingnya koko kepada ekonomi negara-negara pengeluar, maka adalah wajar langkah-langkah positif diambil untuk mempastikan kesetabilan harga koko. Ini dapat dilakukan melalui pengurusan stok yang lebih cekap seperti pemulihan semula stok penimbal koko di bawah kelolaan Perjanjian Koko Antarabangsa. Promosi dan aktiviti hiliran merupakan alternatif-alternatif yang boleh digunakan bagi meningkatkan permintaan ke atas koko dan seterusnya menyokong harga koko. Oleh yang demikian, adalah wajar bagi Malaysia untuk memberikan sokongan kepada program tersebut yang bertujuan untuk mensetabilkan harga pasaran koko.

CHAPTER I

INTRODUCTION

Cocoa Industry in Malaysia: An Overview

Cocoa was introduced into this part of the world around 1600, but it was only planted as a garden plant or 'kampung' cocoa. Cocoa was first grown in the Government Research Station in Serdang. These plants came into bearing in 1937. Seeds from selected plants were then used to establish cocoa plots in Cheras and Temerloh.

Attempts to grow cocoa on a commercial scale started between 1947-1950, when a number of rubber estates planted them on a small scale with seeds obtained from the Department of Agriculture. These initial attempts were not successful, owing to various pests and diseases. The first commercial cultivation was in 1950 with the planting of cocoa on a plantation in Jerangau, Terengganu. Trinitario was the only material available then. Later, in 1954, Amelonado materials were introduced. Amelonado was also introduced to Sabah from Peninsular Malaysia (Malaya) and West Africa.

Prior to 1960, the area planted with cocoa virtually stagnated due to serious attacks of Vascular Streak Dieback (VSD) disease, especially in Peninsular Malaysia.

The introduction of a wide range of materials, notably the vigorous Upper Amazon materials, which were more resistant and higher yielding than Amelonado, had helped to revive the industry. With the limited available materials and the importation of the new stocks, Malaysia had successfully bred good hybrid cocoa plants. The availability of these hybrid materials led to a number of coconut estates adopting intercropping of cocoa with coconut. Today, most of the cocoa planted in the country are of the hybrid type, developed in the mid-60s.

Low commodity prices for rubber, palm oil and pepper in the late sixties and early seventies accelerated the development of the cocoa industry. Cocoa prices were more attractive and this encouraged the planting of cocoa as an alternative crop. Various Government efforts had also been taken to promote the industry. As the result, cocoa is now one of the most important agricultural commodities in Malaysia's economy.

Cocoa cultivation in Malaysia can be categorised into estates, smallholdings and various land schemes. Estates account for about 48 percent of the total crop area, followed by smallholdings and government land schemes. The total crop hectarage under cocoa had expanded more than 20 times from about 15,000 ha in 1972 to about 363,009 ha in 1987 (Table 1). In terms of crop

Table 1

Planted Hectarage of Cocoa, Malaysia

Year	Peninsular Malaysia	Sabah	Sarawak	Total
		(h e c t a r e s)		
1972	8,984	5,447	880	15,311
1973	11,599	6,242	1,481	19,322
1974	13,634	8,126	2,313	24,073
1975	17,587	9,823	2,870	30,280
1976	20,796	11,673	3,342	35,811
1977	29,635	14,994	3,850	48,479
1978	34,286	22,467	4,557	61,292
1979	45,168	37,803	6,385	89,356
1980	57,345	57,984	8,526	123,855
1981	64,618	83,455	10,711	158,784
1982	82,185	114,474	12,740	209,399
1983	83,949	132,729	14,402	231,080
1984	89,163	159,288	17,059	265,510
1985	106,932	172,713	24,252	303,897
1986	117,525	189,821	26,654	334,000
1987	122,772	196,944	43,293	363,009

Source

Statistics on Commodities, Ministry of Primary Industry, Malaysia (various issues).

area, Sabah alone accounted for about 56 percent, followed by Peninsular Malaysia with 32 percent. Cocoa cultivation in Sarawak is quite new, with total crop hectarage of about 43,293 ha in 1987, which is about 12 percent of the total national hectarage under cocoa.

Cocoa production increased from about 5,000 tonnes in 1972 to about 185,000 tonnes in 1987 (Table 2). Estates now account for more than two thirds of the total national cocoa production. The main cocoa production is from Sabah, which contributes about 60 percent of the total national output in 1987.

Nearly 90 percent of the cocoa produced in Malaysia are exported (Table 3). Cocoa exports are mainly in the form of cocoa beans. The exports of cocoa products like cocoa butter, liquor and paste remain low, despite good prices. However, the exports of the various cocoa products have been experiencing an upward trend notably after 1980.

The major export markets for Malaysian cocoa are the European countries, Singapore, the United States of America, Japan and Australia (Table 4 and 5). In terms of volume, Singapore is the main importer of cocoa from Malaysia with the 1987 import amounting to about 40 percent of the total Malaysia's export. This indicates

Table 2

Production and Export of Cocoa Beans, Malaysia

Year	Production (tonnes)	Export (tonnes)
1972	5,000	4,084.5
1973	9,000	5,655.6
1974	10,000	9,720.3
1975	13,000	11,729.9
1976	15,434	14,751.3
1977	16,708	13,610.6
1978	17,564	17,625.8
1979	26,580	24,100.5
1980	36,500	30,640.4
1981	45,200	42,237.0
1982	66,200	57,614.4
1983	69,000	57,268.5
1984	88,000	66,133.0
1985	108,000	81,465.2
1986	132,700	106,083.5
1987	185,000	157,428.0

Source

Statistics on Commodities, Ministry of Primary Industry, Malaysia (various issues).

Table 3

Export of Cocoa Beans and Cocoa Products, Malaysia

Year	Export of cocoa products						Total
	Beans	Butter	Paste	Powder	Choco-late	Total	
	(tonne)	(tonne beans equivalent)					(tonne)
1972	4,085	645	50	35	55	785	4,870
1973	5,656	843	148	241	105	1,337	6,993
1974	9,720	785	17	0	2	804	10,524
1975	11,730	249	138	1	7	395	12,125
1976	14,751	145	374	9	26	554	15,305
1977	13,611	1,284	1,037	16	128	2,465	16,074
1978	17,626	15,451	1,643	89	115	17,298	34,924
1979	24,101	2,653	1,488	0	110	4,251	28,352
1980	30,640	3,579	1,433	26	135	5,173	35,813
1981	42,237	4,305	1,725	61	134	6,225	48,462
1982	57,614	5,610	1,733	206	88	7,637	65,265
1983	57,269	6,979	1,669	2,556	164	11,368	68,637
1984	66,133	11,771	2,961	3,710	138	18,580	84,713
1985	81,465	12,277	5,220	3,296	107	20,900	102,365
1986	106,084	13,663	9,831	1,261	160	24,915	130,999
1987	157,428	17,269	9,134	4,150	415	30,968	188,396

Source

Statistics on Commodities, Ministry of Primary Industry, Malaysia (various issues).

Statistics of External Trade Malaysia, Department of Statistics, Malaysia (various issues).

Conversion factors;

Cocoa butter	1.33	(ICCO)
Cocoa liquor/paste	1.25	(ICCO)
Cocoa powder	1.18	(ICCO)
Chocolate	0.5	(FAMA)

Table 4

Export of Cocoa Beans by Destination, Malaysia.

Destination	1981	1982	1983	1984	1985	1986	1987	1988
			kilograms					
France	60,000	50,000	6	40,000	150,000	845,800	460,000	1,520,000
Germany FR	5,581,370	6,608,400	7,449,121	10,526,910	6,633,636	11,530,557	23,440,000	24,219,000
Netherlands	5,490,518	6,335,563	2,819,998	13,287,714	24,192,798	39,542,088	52,649,000	55,718,000
UK	928,557	1,709,200	4,137,202	2,371,041	2,143,500	3,083,980	2,888,000	3,128,000
Spain	461,700	403,825	175,001	373,000	120,000	380,000	183,000	325,000
USA	6,370,235	5,759,421	4,301,024	5,374,883	1,265,100	1,585,446	6,180,000	13,477,000
Australia	2,585,160	2,672,500	2,222,500	2,174,100	833,000	632,500	1,100,000	351,000
China PR	0	50,000	1,320,000	392,500	2,001,225	4,104,250	1,560,000	5,588,000
Japan	1,287,442	2,257,069	1,763,740	1,805,315	1,822,064	3,149,000	2,704,000	3,725,000
Singapore	18,172,260	29,225,094	30,195,926	26,800,303	40,196,629	39,408,817	64,289,000	77,140,000
Others	1,299,647	2,543,293	2,884,001	3,013,245	2,107,290	1,821,000	1,975,000	4,198,000
Total	42,236,950	57,614,367	57,268,519	66,133,002	81,465,242	106,083,375	157,428,000	189,389,000

Source

Statistics on Commodities, Ministry of Primary Industry, Malaysia (various issues).

Table 5

Export Destinations of Cocoa Products, Malaysia

Countries	1984/85	1985/86	1986/87
	tonne bean equivalent		
Australia	3,475	4,332	5,273
Germany FR	2,394	109	
Japan	251	1,362	582
Singapore	1,018	1,065	870
Netherland	1,954	1,240	1,641
United Kingdom	1,004	855	2,032
United States	6,408	7,810	9,052
Others	2,000	5,842	5,840

Note: Cocoa products include cocoa butter, powder and paste.

Source

ICCO Quarterly Bulletin of Cocoa Statistics (various issues)

the reliance on Singapore as the distributing agent for Malaysian cocoa.

Malaysia has now emerged as one of the world major cocoa producers, which currently ranked fourth, after Ivory Coast, Brazil and Ghana. Malaysia contributed about 10 percent of the total world cocoa production in the 1988/89 cocoa year.