Jurnal Ekonomi Malaysia 34 (2000) 21 - 37

Linking Exchange Rates, Market Failures and Agricultural Land Demand

Jamal Othman

ABSTRAK

Krisis kewangan 1997/98 telah mendorong sektor pertanian negara berperanan semula sebagai enjin pertumbuhan ekonomi yang penting. Ini menimbulkan keprihatinan sama ada kemunculan semula sektor pertanian akan memberi kesan negatif kepada corak penggunaan sumber asli terutamanya faktor tanah. Kertas ini meneliti sama ada penurunan nilai matawang Malaysia akan menyebabkan permintaan terhadap faktor tanah meningkat secara signifikan khususnya dalam sub-sektor kelapa sawit. Satu model statik komparatif, komoditi tunggal dengan faktor tanah telah diguna. Analisis model mencadangkan penurunan nilai Ringgit sebanyak 40 peratus ceteris paribus akan mendorong peningkatan dalam permintaan faktor tanah secara nyata (lebih kurang 10 peratus untuk sub-sektor kelapa sawit). Dalam realiti, peningkatan guna tanah dalam sektor kelapa sawit mungkin lebih besar kerana terdapat penukaran guna tanah secara konsisten khususnya daripada tanaman getah kepada kelapa sawit akibat perubahan harga relatif komoditi dan peningkatan dalam kos pengeluaran.

ABSTRACT

The financial crisis of 1997/98 has provided the so-called "sun set" agricultural sector a rejuvenated role as a growth impetus. This leads to concerns as to whether agricultural augmentation would pose significant repercussions on the pattern of natural resource use, especially land factor. This paper explores whether sustained depreciation of the Malaysian Ringgit will pose significant impacts on agricultural land demand in the country, with special focus on the oil palm sub-sector. A comparative static, single commodity model with explicit land factor is employed. Analysis shows that a prolonged Ringgit depreciation of 40 percent ceteris paribus will have substantial impacts on land demand (about 10 percent for the oil palm sub-sector). In reality, expansion of oil palm land-use could be greater as other crops, especially rubber is steadily

being converted to oil palm due to relative commodity price changes and rising production cost.

INTRODUCTION

From mid 1997 through early 1999, Malaysia and most of South East Asian economies had experienced ominous macro-economic difficulties, attributed to the intertwined factors of massive short-term capital flight and currency depreciation. For the first time in 13 years, Malaysia registered a six percent negative GDP growth in 1998. This compares to its real GDP growth of some 8 percent annually for the period 1990 – 1996.

The financial crisis has led Malaysian policymakers to call for the so-called "sun set" agricultural sector to provide a renewed role as a growth impetus. This is due to the vitality of the agricultural sector in cushioning the effects of the crisis. For instance, the positive GDP growth of 4 percent in the second quarter of 1999 has been largely attributed to the robustness of the agricultural sector, particularly the oil palm sub-sector. Of late, policy makers have called for the expansion of oil palm (Malaysia's 'green gold'), and domestic food production to take advantage of the weaker Ringgit and to curb inflation. Malaysia's dependency on food imports has increased substantially over the years, amounting to some RM10 billion in 1997.

The renewed role of agriculture has led to concerns as to whether agricultural expansion would pose significant effects on the pattern of natural resource use especially conversion of forest land to agriculture. This paper first overviews the Malaysian agricultural economy and its forest resources and subsequently highlights a discussion as to whether currency depreciation will have significant effects on agricultural land demand with special focus on the oil palm sub-sector. A comparative static, single commodity model with explicit land factor is employed. Policy implications for the country are drawn from the analyses.

OVERVIEW OF MALAYSIA'S AGRICULTURAL ECONOMY

Malaysian agricultural production in absolute terms (real values) grew remarkably to more than 6 folds in 1996 relative to 1960. Overall, agricultural production grew by 4.64 percent annually in the 1960 – 1996 period (Table 1). Its share of the GDP declined substantially from 29 percent in

TABLE 1. Growth in Malaysian agricultural production (crops and livestock) and factors (%)

Period	Production	Land	Labor	Capital
1961-70	6.42	2.54	2.92	18.7
1971-80	5.15	2.06	1.26	6.15
1981-90	3.08	2.69	–0.12	3.78
1991-96	2.42	0.5	0.87	0.8
1961-96	4.64	2.24	0.10	6.2

Source: Calculated by the author from various secondary sources.

1970 to some 12 percent in 1997, but at a much lesser pace compared to its growth in absolute terms. In 1987, for the first time in the nation's history, Malaysia's manufacturing sector overtook agriculture in terms of GDP share.

Undoubtedly, agriculture has played a major role in the country's economy. Jamal and Chamhuri (1998) observed that a one percent increase in per-capita value adding activities in the agricultural sector was accompanied by a 0.43 percent increase in GDP per-capita, *ceteris paribus*. Agriculture's contibution to GDP was in-turn strongly affected by changes in agricultural land area which was mainly attainable through deforestation.

Between 1960 – 1996, agricultural land-use increased by 2.24 percent annually. This growth was largely due to the expansion of oil palm. However, overall agricultural land-use declined sharply in the 1990s (Table 1). The annual rate for that period was 0.43 percent as opposed to a high 2 percent in the preceding decades. The trend in total agricultural land-use somewhat suggests small adjustment towards biodiversity and/or forest conservation. Recent government policies on halting the openings of new forest lands for land development schemes (except for East Malaysia – Sabah and Sarawak) and concentrating on *in-situ* development suggest that Peninsular Malaysia may have reached the end of the road in terms of forest conversion for agricultural development.

Malaysia's major agricultural crops (oil palm and rubber) consistently constitute about 70 percent of Malaysia's total agricultural land area. Rubber planted area showed a sharp rise up to 1965, tapered off until 1982, and declined moderately thereafter. On the other hand, oil palm land-use steadily increased throughout the years. The increase in oil palm land-use had more than offset the decline in rubber, resulting in an upward trend in total land-use for the two crops. The surge in oil palm hectarage came not only from rubber conversion but also from deforestation, as other crops in aggregate were rising as well. Judging at the trend in total oil palm and rubber land-use, it is expected that oil palm expansion would continue (if fundamental economic factors remain favorable), particularly in East Malaysia where forest area is still in abundance. For instance, for the period 1993-95, about 200,000 hectares of new land was developed for agriculture, mainly in East Malaysia.

The growth of workforce and capital input in agriculture show a marked decline in the 1960-1996 period (Table 1). This reflects a shift in resource allocation from the agricultural sector to other sectors as a result of economy-wide policy measures which focused on the non-agrciultural sector particulary manufacturing and the service sectors.

OVERVIEW OF MALAYSIA'S FOREST MANAGEMENT

In 1995, total land area under forest cover in Malaysia was about 19.4 million hectares or 58.4 percent of the country's land area. Of the forested land, 14.7 million hectares were in East Malaysia and the remaining in West Malaysia. Plantation forests accounted for 146,000 hectares of the total forests.

Formal forest management in Malaysia was introduced in 1901 by the British colonial administration with the creation of a forest department. The department was involved in forestry botany, policy formulation, and forest preservation. Forestry policies formulated by the British in the 1920s and 1930s were consolidated as the National Forestry Policy (NFP) in 1978 to ensure orderly implementation of forest management, conservation and development across all states. This is because land and forest in Malaysia are strictly state matters. The ad hoc forest management policy practiced by each state complicates monitoring and control activities of forest resources at the federal level. The National Forestry Act (NFA) of 1984 provides for orderly harvesting, renewal and conservation of trees at the sustainable yield level.

As environmental matters became more prominent in the national development agenda, the NFP of 1978 was updated in 1992 to place greater focus on the conservation and sustainable utilization of its forests. Some of the steps include the reduction of log production, strengthening of R&D, intensive rehabilitation of degraded forest, and the adoption of a National Conservation Strategy. The NFA of 1984 was also amended in 1993 to provide for better management, administration and conservation of forest reserves. Among the major provisions of the Act is that logging would only be carried out on the principle of sustained yield.

The Environmental Quality Act of 1974 was also amended in 1987 to include Environmental Impact Assessment (EIA). An EIA must be done on any drainage of wetland, wildlife habitat or virgin forest covering an area of 100 hectares or more. In addition, a National Committee to establish the Criteria, Indicators and Activities for Sustainable Forest Management has been established. This provides the guidelines towards the attainment of sustainable forest management in accordance with Malaysia's commitment to ITTO objective by year 2000. In 1998, The National Biodiversity Policy was launched. This provides further emphasis on the importance of sustainable forest management.

Of the total of 19.4 million hectares of forests still left in the country, about 12.6 million hectares have been designated as Permanent Forest Estate (PFE) in accordance with the NFP. About 4.7 million hectares will be in Peninsular Malaysia, 3.4 million hectares in Sabah and 4.5 million hectares in Sarawak. About 11.23 million hectares of the PFE or 34 percent of total land area are classified as Productive Forests. These forests have to be managed in accordance with the principles of sustained yield. Besides the PFE, Malaysia has a total of 5.5 million hectares of forested state-land, of which about 0.77 million hectares are located in Peninsular Malaysia. These forests are however being apportioned for conversion into alternative uses.

CAUSES OF FOREST CONVERSION

In Peninsular Malaysia, forest areas have been declining substantially especially in the period from independence through the mid 1980s. In 1992, about 46 percent of Peninsular Malaysia were covered by forest as opposed to 65 percent in 1965 (Jamal 1998). Forest reduction inevitably implies a loss in bio-diversity. The causes of forest degradation or conversion in Malaysia can be classified under two main categories: immediate or apparent causes, and underlying forces.

The immediate or apparent causes include forest conversion to alternative uses, particularly large-scale ex-situ land development programs. In the late 1950s, FELDA (Federal Land Development Authority) was especially established to focus on large scale new land development programs and settlement. To date FELDA manages close to 900,000 hectares of plantations or about 2.7 percent of the total land area of Malaysia. Most of these lands are obtained through forest conversion.

The underlying cause of forest conversion is undeniably poverty and the quest for rural development. With the vast majority of the total population living in rural areas at the time of independence (1957), rural development had been adopted by the Government as a major development strategy. One important component of this strategy is land development. At the time, agriculture was the natural choice as engine of economic growth for the infant nation.

While there are a host of government (federal and states) agencies associated with land development, FELDA was especially created and empowered to spearhead the implementation of land development and settlement through the establishment of new land schemes, virtually out of virgin jungles throughout the country. The massive settlement of settlers by FELDA, in the last 3 decades, nevertheless, has been instrumental in reducing the rural-urban migration and poverty.

Other underlying factors include market and policy failures. Especially relevant are the inefficient sectoral pricing policies, for instance very low royalties that led to the "timber booms" in the 1970s. The lack of environmental regulations such as those governing environmentally sensitive forest resources contributed to rapid forest conversion during the same period. A related factor is institutional failures associated with inefficient procedures for allotting logging concessions. The allotment procedures have been very susceptible to private pressure and political lobbying as free competition is being ruled out in the bidding for concessions.

Owing to the lesser dependency of the country's economy on the agricultural sector, the government's commitment towards sustainable forest management by year 2000 is likely to be achievable. Although in the past non-compliance of forestry regulations by state governments was always a major drawback, such limitations are expected to be minimized with the increasing awareness of environmental concerns among government officials, politicians and the general public.

THE RENEWED ROLE OF AGRICULTURE

In the midst of the economic crisis, the National Economic Action Council (NEAC) was established in January 1998 as a consultative body to recommend pertinent policies to the government to address the crisis. The NEAC produced the National Economic Recovery Plan (NERP) in August 1998. The NERP presents a comprehensive framework for actions to steer the Malaysian economy into recovery.

The NERP focuses on six objectives – stabilizing the Ringgit, restoring market confidence, maintaining financial market stability, strengthening economic fundamentals, maintaining equity and socio-economic agenda, and reviving the adversely affected sectors. Each of these objectives is supported by recommended action plans.

The sector, which has direct relevance to agriculture, particularly in relation to land demand, is the primary commodities and resource based industries. The primary commodities sector comprises rubber, oil palm, forestry and other minor crops such as cocoa and tobacco. In 1997, the sector accounted for 8 percent of the country's total exports of RM115 billion. It employed 740,000 workers or 9 percent of total employment in the country. More than half (51 percent) was employed in the oil palm subsector, followed by forestry (30 percent).

The resource-based industries rely heavily on the primary commodities as production inputs. These include rubber, palm oil and wood-based products. In 1997, these industries accounted for 17 percent of total manufacturing value added and employed 10 percent of total labor employed in the manufacturing industry.

The NERP recommends the industry to take advantage of the Ringgit depreciation to promote output and exports. Specifically, the NERP recommends oil palm expansion particularly in East Malaysia and to review the funding measures for rubber replanting to sustain rubber output and to encourage the rehabilitation of 300,000 hectares of abandoned small rubber farmers. Another important provision of the NERP is the modification of the current investment incentives in agriculture to focus on suitable idle lands development rather than general land clearance practices that deplete natural forests and consequently encroach upon sensitive ecosystems.

LINKING EXCHANGE RATES AND AGRICULTURAL LAND DEMAND

Demand for factors of agricultural production such as land is derived from the market demand (domestic and export demand) for the agricultural output. The link between factor demand and output demand is the production function that defines the transformation of factors into output. Hence, analysis of the interactions between factor markets and exchange rates changes, requires a knowledge of factor supply and factor substitution elasticities.

We employed Hertel's (Hertel 1989) comparative static, partial equilibrium, single commodity trade model with explicit land factor to analyze the impacts of exchange rate changes (in particular the exchange control measure which pegged the Ringgit at RM3.80/1USD from about RM2.50/1USD in the period prior to the crisis) on long run equilibrium land factor demand in Malaysia. The unique strength of Hertel's model is its flexibility in quantifying explicitly the inter-linkages between factor-output markets and trade. The Malaysian oil palm sector is used as a base case to help identify the potential impact of Ringgit depreciation on agricultural land demand.

Hertel's system of equations for a long-run partial equilibrium model of the oil palm farm sector is presented in Table 2. The *hat* notation represents the percentage change in the relevant variable. The superscript M denotes a market quantity or price, while F refers to the farm sector. Superscripts D and E refer to domestic and export demands. The first equation explains the price responsiveness of market-level demand, q_O^M, for an aggregate agricultural commodity. The aggregate farm-level demand elasticity, $\in_D = [(1 - \alpha)\, \varepsilon_D^D + \alpha\, \varepsilon_O^D]$ is a weighted sum of the farm-level domestic and export demand elasticities, where a is the quantity share of exports in total demand. Note that the subscript *O* refers to the aggregate agricultural commodity being modelled.

Equation (2) describes the derived demand of a competitive agricultural sector operating under locally constant returns to scale. The variables c_i and s_{ji} represent cost share of an input and an Allen partial elasticity of substitution (AES), respectively. Equation (3) portrays the assumption of zero profits for the aggregate farm sector. Factor mobility is addressed in equations (4) and (5). Equation 4 depicts non-land factors being supplied to the oil palm sector at an exogenously determined price while equation 5 describes the responsiveness of total farmland supply to a change in rents under the assumptions that $0 < v_L < \infty$. Equations 6-1 through 6-3 incorporate exogenous sectoral *ad valorem* output, input, and trade policy variables into the model. The last two equations describe the market clearing conditions for output and land. Interested readers can refer to Hertel (1989) for a detailed presentation of the model.

Varying assumptions of demand and supply elasticities for output and input can be simulated within a static and partial equilibrium framework. An extended version of Hertel's model to incorporate shifts in demand and supply schedules has been developed and applied to examine the inter-linkages between factor markets and trade for the case of oil palm

TABLE 2. Hertel's equations for a partial equilibrium model of the farm sector

(1) $\hat{q}_O^M = (1-\alpha)\varepsilon_D^D \hat{p}_O^M + \alpha\varepsilon_D^E \hat{p}_O^E$

Commodity demand

(2) $\hat{q}_j^F = \sum_{i=1}^{N} c_i \sigma_{ji} \hat{p}_i^F + \hat{q}_o^F$

Derived factor demands under constant returns to scale technology

(3) $\hat{p}_O^F = \sum_{i=1}^{N} c_i \hat{p}_i^F$

Zero profits

(4) $\hat{p}_j^M = 0 \quad (j \neq L)$

Non-land inverse factor supplies

(5) $\hat{q}_L^M = v_L \hat{p}_L^M$

Land supply

(6-1) $\hat{p}_O^F = \hat{P}_O^M - \hat{t}_O$

Ad valorem – output subsidy

(6-2) $\hat{p}_j^F = \hat{p}_j^M - \hat{s}_j, \quad j = 1, \ldots\ldots, N$

Ad valorem – input subsidy

(6-3) $\hat{p}_O^E = \hat{p}_O^M + \hat{e}_O$

Ad valorem – export subsidy

(7) $\hat{q}_O^m = \hat{q}_O^F$

Commodity market clearing

(8) $\hat{q}_L^M = \hat{q}_L^F$

Land market clearing

in Malaysia (Jamal 1997). In the current study the parameters used in the model came from this source (see Table 3 and Table 4).

Theoretically, within a partial equilibrium framework, the impact of a prolonged shift in exchange rates on world prices in the case of goods

TABLE 3. Allen partial elasticities of substitutions and factor shares for Malaysia's FFB production (Baseline case)

	Land	Labor	Chemicals	Other Inputs
Land	–0.04	–0.05	0.1	0.1
Labor	–0.05	–0.525	0.1	0.5
Chemicals	0.1	0.1	–1.9	0.1
Other Inputs	0.1	0.5	0.1	–0.62
Factor Shares	*0.5*	*0.2*	*0.05*	*0.25*

Source: Jamal (1997)

TABLE 4. Parameter values for the model (Baseline)

Exogenous Variables	Parameters
Domestic demand elasticity	–0.273
Export demand elasticity	–0.46
Land supply elasticity	0.8
Labor supply elasticity	0.5
Chemical supply elasticity	∞
Other inputs supply elasticity	∞
Output supply elasticity (long-run)	1.08
Base export share of FFB production	0.8

Source: Jamal (1997)

traded in foreign denomination are similar to export subsidies or taxes. However, unlike an export subsidy which unambigously increases both domestic consumer and producer prices, domestic prices in the case of currency depreciation may or may not rise. In the short-medium run, currency depreciation would only shift the excess supply curve to the right, as exporters would now be willing to supply more goods at the same level of foreign prices. This induces an increase in both producer and consumer prices resulting in a decrease in domestic consumption and expansion of production (Figure 1). In the long run, both domestic and export supply schedules will shift to the right. Under this situation, currency depreciation, unlike export subsidies will not cause a wedge between world and domestic prices. Domestic prices may or may not rise, depending on the magnitude of the shift of the supply schedule. Domestic consumption,

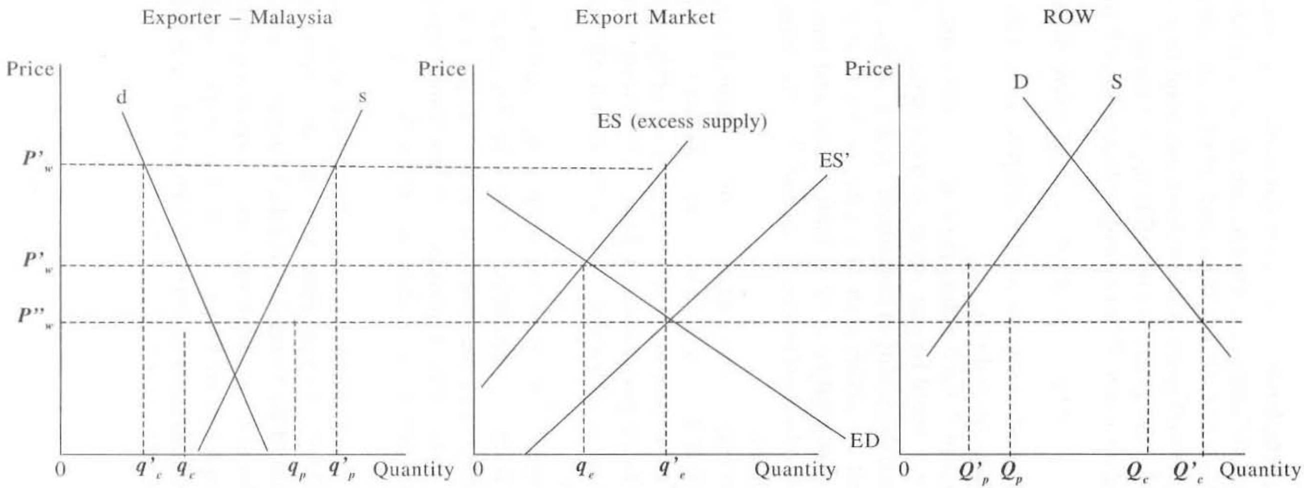

FIGURE 1. Short run impacts of currency depreciation for trade denominated in foreign currency (large exporting country case)

production and exports, however, are expected to increase. The longer-run repercussions of exchange rates changes are depicted in Figure 2.

This study focuses on analyzing the impacts of exchange rate changes in the short-medium run (Figure 1) where less than complete acreage response is assumed to take place. We therefore append Hertel's equation (6-3) to consider the inclusion of the exchange rate parameter. Equation 6-3 thus become $\hat{p}_O^E = \hat{p}_O^M + (\hat{e}_O + \hat{E})$ where $\hat{E}$ denotes percentage change in exchange rates. A positive sign for implies a depreciation of the domestic currency relative to the US dollar.

To what extent a prolonged change in exchange rates impacted agricultural land demand would be contingent on the magnitude of export demand elasticity and the rigidity of land supply itself. The rigidity of land supply is dependent on factors such as (1) the existence of market or policy failures, (2) the availability of suitable agricultural land through deforestation, (3) development of idle lands, and (4) conversion of other land uses to agriculture.

Market failures are said to exist if environmental policies or regulations which seek to internalize environmental costs to reflect the true social value of environmental benefits foregone are not in place or not enforced. This includes government policies and perverse investment incentives which accelerates the pace of environmental resource degradation.

The factors determining the rigidity of land supply can be modelled by assuming various levels of land supply elasticities. The lower value of land supply elasticity reflects the immobility of land supply as a result of implementation of environmental policies affecting natural resources as well as the structural constraints with respect to the development of idle lands.

In this study, varying values of land supply elasticities, i.e., 0, 0.2, 0.8 (baseline situation), 1.5 and 2.5 are employed with a 40 percent change in exchange rates to model the depreciation of the Malaysian currency vis a vis the US dollars. We also simulated two levels of export demand elasticities, i.e., –0.46 to represent the base case and –1.2 to represent an elastic export demand for the Malaysian palm oil. Recall that all these parameters for the base case are taken from Jamal (1997).

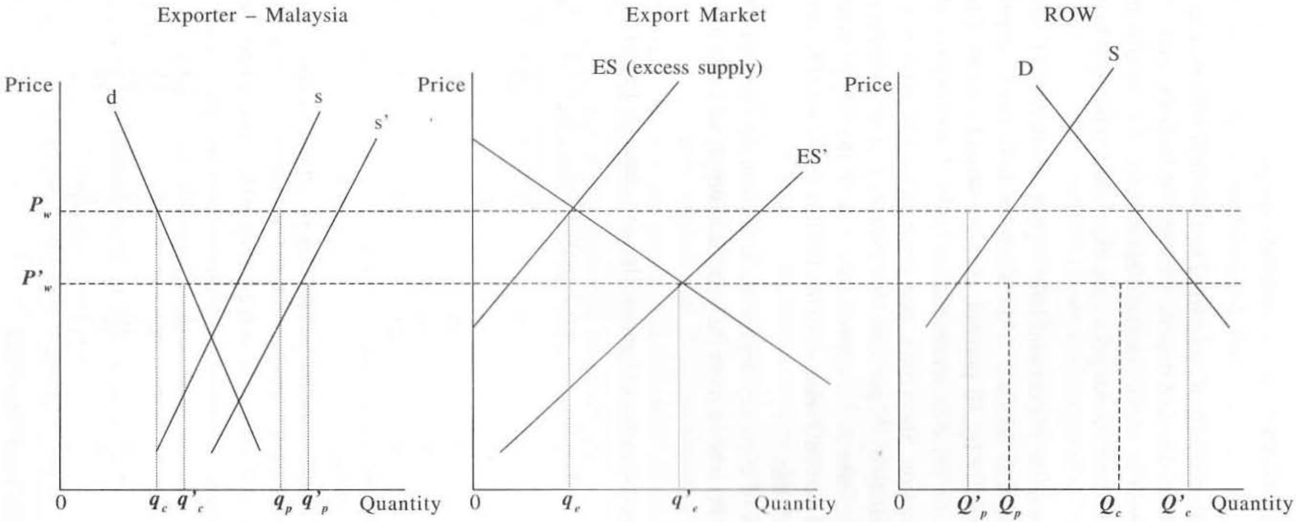

FIGURE 2. Long run impacts of currency depreciation for trade denominated in foreign currency (large exporting country case)

SIMULATION RESULTS

Intuitively, the short-medium run partial equilibrium effects of currency depreciation on land demand depend strongly on both the magnitude of land supply as well as export demand elasticities. The results are presented in Tables 5a and 5b. All prices are expressed in foreign denomination (US dollars).

Using the baseline export and land supply elasticities of –0.46 and 0.8, respectively, land demand in the short medium run is expected to increase considerably by 10 percent. Exports would rise by a high 14 percent as domestic price increases induce higher farm output and lower domestic consumption. Short run export price (in US dollars) is expected to dwindle substantially by 30 percent. However, export revenue (in ringgit) is expected to increase as the depreciation rate of the ringgit is substantially greater (40 percent) relative to the decline in the equilibrium price, expressed in US dollars.

The impacts of currency depreciation on land demand are less pronounced (6 percent) when a more inelastic land supply of 0.2 is used. With

TABLE 5a. Simulation results (percent change) – Inelastic Export Demand

$\in_D^E = -0.46$	$V_L = 0$	$V_L = 0.2$	$V_L = 0.8$	$V_L = 1.5$	$V_L = 2.5$
Output	1	7	11	12	12
Domestic Price	32	18	10	7	6
Land Demand	0	6	10	11	12
Export	4	10	14	15	16
Export Price	–8	–21	–30	–32	–34

TABLE 5b. Simulation results (percent change) – Elastic Export Demand

$\in_D^E = -1.2$	$V_L = 0$	$V_L = 0.2$	$V_L = 0.8$	$V_L = 1.5$	$V_L = 2.5$
Output	1	11	20	23	25
Domestic Price	36	27	18	15	13
Land Demand	0	10	19	22	24
Export	4	15	26	30	32
Export Price	–4	–13	–22	–25	–27

Note: V_L denotes land supply elasticities higher values of land supply elasticity, the model as expected, show more significant increases in land demand. For instance, using an elastic land supply of 2.5, land demand is expected to increase by a high 12 percent.

When an elastic export demand elasticity is simulated (–1.2), the repercussions of increased land supply elasticities on the selected variables become more evident (Table 5b). An inelastic land supply elasticity of 0.2 would increase land demand by 10 percent compared to 24 percent with an elastic land supply of 2.5. Impacts on domestic price are also greater which lead to greater effects on output and export markets. For all assumed values of land supply elasticities, changes in export price are less pronounced relative to the inelastic export demand scenario, yielding a higher export revenue.

As noted earlier, lower values of land supply elasticities (0.2 and 0.8) represent effective implementation of sustainable forest management, and adherents to other environment related regulations (e.g. National Biodiversity Policy) including the structural constraints in developing idle land for oil palm cultivation. With a perfectly inelastic land supply ($V_L = 0$), currency depreciation would have no effects on land demand at all.

The results clearly suggest that if export demand is inelastic, and when market failure is not prevalence, currency depreciation will pose relatively less pronounced impacts on land demand. If export demand is elastic as in the case of non-perennial crops (pepper, vegetables etc.), the impacts on land demand given the same extent of market failure can be relatively substantial (double).

POLICY IMPLICATIONS AND CONCLUSION

The short-run partial equilibrium impacts of sustained currency depreciation on land demand in a country can be ambiguous. This is because market and policy failures may lead to adverse changes on land use. For instance, increased export demand for Indonesian timber was not the major factor for deforestation in Indonesia (Barbier et al. 1995). Distorted market factors such as inefficient prices, subsidies, and institutional failures were found to have played a greater role in the conversion of forest in the country.

Owing to the commitment of Malaysia towards sustainable forest management, the currency depreciation as a single factor *ceteris paribus* is expected to result in minimal forest clearings for agricultural expansion. The increases in land demand for oil palm expansion are expected to be largely met by conversion of rubber and to some extent the development of idle lands.

If the current currency pegged is sustained, Malaysia will inevitably see larger increases in oil palm land-use as conversion of rubber crops to oil palm has been increasing even in the period prior to the crisis. This conversion is largely due to unfavorable changes in relative palm-rubber prices as well as the increase in production costs. The depreciation of the Thai Baht and Indonesian Rupiah further worsens the competitiveness of the Malaysian natural rubber and this would accelerate rubber conversion even more.

Note that the model employed in this study assumes that in the short run currency depreciation only shifts the excess supply curve to the right, *ceteris paribus*, while domestic supply schedule remains unchanged. In the long run, given increased farm areas, domestic supply schedule may also shift to the right, as depicted in Figure 2. As it is difficult to adjust farm output level for a perennial crop, the influx of supplies (for a large exporting country) will dampen world and domestic prices in the longer-run. Therefore, the results from the short-run model need to be interpreted with caution, particularly the effects on domestic prices. The model suggests that the expected higher domestic prices will only be transitory, as in the longer run increased domestic supplies (as well as supplies from other palm oil producing countries) may lead to depressed world and domestic prices. The windfall profits that farmers were enjoying during the crisis period may only be short-lived.

This paper has provided a general overview on the importance of addressing the issues of market and policy failures in mitigating potential environmental repercussions of currency fluctuations, export demand enhancement due to freer trade, improved product image or increased disposable income in traditional importing countries.

REFERENCES

Barbier, E.B., N. Bockstael, J.C. Burgess & I. Strand. 1995. The linkages between the timber trade and tropical deforestation – Indonesia. *World Economy* 18(3).

Grossman, G.M. & A.B. Krueber. 1991. Environmental impacts of a NAFTA. *Discussion Papers in Economics*. Princeton University (November).

Hansen, J.K., S. Hansen, J. Claussen & H. Harboe. 1996. Integrating environmental concerns into economywide policies in developing countries: The role of multilateral development banks. Development and Multilateral Institutions Programme *Working Paper No. 6* (March).

Hertel, T.W. 1989. Negotiating reductions in agricultural support: Implications of technology and factor mobility. *Amer. J. of Agricultural Economics*, (August): 559-573.

Jamal Othman. 1997. Linking factor markets, environment and trade: The case of oil palm in Malaysia. *Jurnal Ekonomi Malaysia* 31: 53-69.

Jamal Othman & Mohd Shahwahid H. Othman. 1996. Sustainable forest management in Malaysia: Issues and perspectives. Paper presented at the IGCC and CSIS Conference on Economic Integration and the Environment. Jakarta. (5-6 Sept.). Published in Http://www-igcc.ucsd.edu/IGCC2/pub/pubsonline/environment/seasiatrade environ96/othman.html.

Jamal Othman & Chamhuri Siwar. 1998. Examining economic factors and biodiversity linkages. In. Mohd Nordin Hassan, et.al. (Eds) *National Review on Environmental Quality Management in Malaysia: Towards the Next Two Decades*. UKM, Bangi: Lestari.

Munasinghe, M. & W. Cruz. 1995. Economywide policies and the environment: Lessons from experience. *World Bank Environment Paper No. 10*.

Mohd Shahwahid H. Othman. 1995. Forest conservation and its effects on Peninsular Malaysian log supply. *ASEAN Economic Bulletin*, (March).

Sutton, J.D. ed. 1988. *Agricultural Trade and Natural Resources: Discovering the Critical Linkages*. Boulder and London: Lynne Rienner Publisher.

Faculty of Economics
Universiti Kebangsaan Malaysia
43600 UKM Bangi
Selangor Darul Ehsan