How Sustainable Energy Trend gives Producers Benefits: A Case of Southeast Asian Palm Oil

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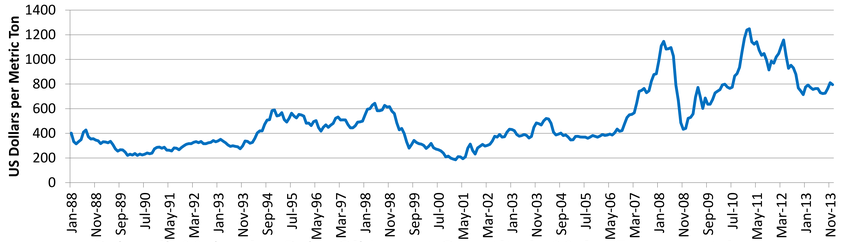
Problem Identification

- Replacing petroleum-based fuels with renewable energy sources, corn and sugar cane for ethanol and soybean, canola, and palm oil for biodiesel, has become important to reduce global climate change related to burning fossil fuels and help achieve a sustainable energy supply.
- "Biofuels is the biggest market failure ever seen" (Stern 2006) reflects the importance of studying biofuels as an alternative energy source from not only a sustainability perspective, but from an economic perspective.
- Important to consider whether biofuels will become a significant global energy source, especially in countries that must import large quantities of renewable energy sources.
- EU is one of largest biofuel markets, and each country has different renewable energy policy and consumption.
- However, previous palm oil studies analyzed EU as one destination market, and ignored destination market characteristics of palm oil consumptions.

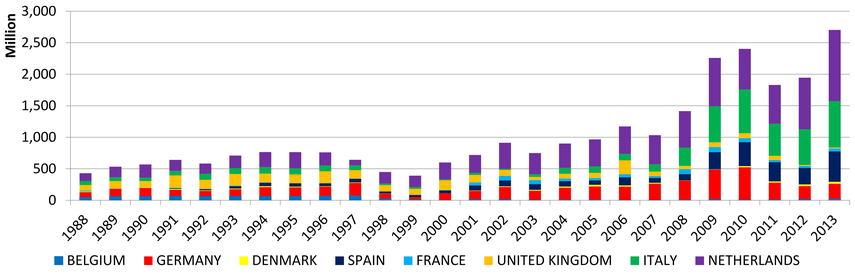
Objectives

- Fills the gap in previous analysis of the market power of exporters in European palm oil import markets.

Palm oil, Malaysia Palm Oil Futures (first contract forward) 4-5 percent FFA, US Dollars per Metric Ton



Palm oil, Malaysian Palm Oil Import Quantity in Major Euro countries



Model

- The residual demand elasticity (RDE) model to measure the market power of a single firm in an imperfectly competitive market (Baker & Bresnahan 1988).
- Exchange rate fluctuations as an ideal cost shifter to investigate the market power of exporters in a specific foreign market without firm specific export prices of their competitors (Goldberg & Knetter 1999).
- Each country is a single firm, and the model parameters could be interpreted as the share-weighted industry average for all firms within one country (Carter et al. 1999).
- RDE model in Southeastern Palm oil Exporting Countries:

$$lnP_i^{ex} = \alpha_0 + \eta_i^j lnQ_i^j + \Gamma lnZ^j + \Phi lnW^j + \varepsilon_{ij}$$

where P_i: price of palm oil exports,
Q_i^j: total quantity of palm oil exports,
W^j: cost shifters, ER between exporters and other destination,
Z^j: destination market demand shifters, income and labor cost,
i: Indonesia, Malaysia
j: EU, Belgium, Germany, France, UK, Netherlands, Italy

Data

- The monthly data set is for the period from December 2000 to December 2013, 157 Observations.

Conclusions and Discussions

- This study measures the market power not only in EU but also in individual European destination markets.
- The profit margin the Indonesian palm oil exporter is 22.8% in EU-27, while 16.3% in Belgium, 22.9% in Germany, 14.8% in France, 17.9% in U.K., 18% in Netherlands, and 11.5% in Italy.
- The profit margin the Malaysian palm oil exporter is 34.3% in EU-27, while 22.7% in Belgium, 14.9% in Germany, 26.2% in France, 24.6% in Netherlands, and price taker in U.K. market.
- This study shows that the model considered whole EU market as one destination overestimates Indonesian and Malaysian exporters margins compared with the model considered each destination market.
- Therefore, this study finds that Southeastern palm oil exporting countries have relatively lower margins in each European destination than that in EU-15 or EU-27 in palm oil trade.

Results

Table 1. Estimation Results of the Indonesian RDE Models (IV)
Dependent Variables: Prices of Indonesian Palm Oil Exports (in Euro)

	EU27	*EU15*	*Belgium*	*Germany*	*France*	*U.K.*[1,2]	*Netherlands*[2]	*Italy*
Intercept	18.7459***	17.4717***	23.0450***	39.4936***	42.8068***	-7.1670	10.3895**	5.5470
	(5.6232)	(6.3218)	(4.7246)	(5.2637)	(7.2317)	(4.8088)	(4.2936)	(4.5031)
$lnQ^j_{Indonesia}$	-0.2281***	-0.2136***	-0.1633***	-0.2289***	-0.1480***	0.1785**	0.1796**	-0.1153***
	(0.0739)	(0.0757)	(0.0535)	(0.0483)	(0.0287)	(0.0808)	(0.0885)	(0.0138)
$lnER^j_{Malaysia}$	0.9017**	0.8175**	1.3313***	1.6397***	1.1997***	0.7534	1.1489***	0.6552*
	(0.3532)	(0.3606)	(0.4974)	(0.3794)	(0.3780)	(0.8269)	(0.4326)	(0.3388)
$lnER^j_{Thailand}$	0.0129	0.0945	-0.9894*	-1.0084**	0.0567	-0.2427	-0.4118	0.4579
	(0.4014)	(0.4114)	(0.5734)	(0.4542)	(0.4212)	(0.9309)	(0.4818)	(0.3442)
$lnER^j_{Argentina}$	-0.2097***	-0.2078***	-0.1811***	-0.0855*	-0.1660***	-0.4850**	-0.1995***	-0.2103***
	(0.0474)	(0.0483)	(0.0523)	(0.0484)	(0.0422)	(0.2347)	(0.0590)	(0.0383)
$lnPDI^j$	-1.3856***	-1.2518**	-2.5988***	-3.0212***	-4.5579***	0.0735	-1.5871***	-0.9151**
	(0.4416)	(0.4900)	(0.4563)	(0.3255)	(0.7671)	(0.4653)	(0.4033)	(0.4149)
$lnLC^j$	0.0313	-0.2230	0.9244***	-0.1417	1.8553***	-0.0187	-0.1103	0.2246
	(0.5097)	(0.5141)	(0.3426)	(0.1649)	(0.6015)	0.6038	(0.1114)	(0.2162)
Adjusted R^2	0.8061	0.8007	0.7294	0.8103	0.8309	0.7242	0.7712	0.8251
DW	2.0419	2.0442	2.0708	1.9999	1.9791	2.0758		2.0178
Hausman – Wu	9.54***	7.96***	9.33***	22.46***	26.72***	4.88**	4.12**	69.74***

*, **, and *** indicate coefficient estimates are statistically significant at the 10%, 5%, and 1% level, respectively.
[1] UK uses exchange rate between pounds and competitors, respectively.
[2] IV estimation has ARIMA(2,1,1).

Table 2. Estimation Results of the Malaysian RDE Models (IV)
Dependent Variables: Prices of Malaysian Palm Oil Exports (in Euro)

	EU27	*EU15*	*Belgium*	*Germany*	*France*	*U.K.*[2,3]	*Netherlands*
Intercept	-20.4297***	-21.7985***	-2.2565	-23.492***	-33.2934**	-13.4336***	-17.0430***
	(4.2762)	(5.0819)	(9.2112)	(6.6704)	(15.0353)	(3.4167)	(3.0609)
$lnQ^j_{Malaysia}$	-0.3432***	-0.3509***	-0.2273***	-0.1489***	-0.2624***	-0.0005	-0.2456***
	(0.0856)	(0.0911)	(0.0442)	(0.0307)	(0.0358)	(0.0148)	(0.0744)
$lnER^j_{Indonesia}$	-0.0273	0.0195	0.0649	-0.6869**	-0.9823**	0.6353***	0.2570
	(0.1612)	(0.1603)	(0.6181)	(0.2847)	(0.4484)	(0.2021)	(0.2059)
$lnER^j_{Thailand}$	-0.8970***	-0.9405***	-0.9266	-0.1994	0.2111	-1.2771***	-1.1817***
	(0.1844)	(0.1840)	(0.6651)	(0.3722)	(0.4831)	(0.2530)	(0.1765)
$lnER^j_{Argentina}$	0.2049***	0.2053***	0.1745	0.1918***	0.1341	0.3010***	0.2434***
	(0.0427)	(0.0431)	(0.1476)	(0.0713)	(0.1078)	(0.0527)	(0.0417)
$lnPDI^j$	1.6935***	1.7637***	0.2835	2.3172***	3.6228*	-0.8149***	1.8430***
	(0.4458)	(0.513)	(1.4296)	(0.5853)	(1.8687)	(0.2393)	(0.3554)
$lnLC^j$	0.9761***	1.0634***	0.5711	0.3760	-0.0457	0.1687	0.1920**
	(0.3511)	(0.3497)	(0.9444)	(0.2887)	(1.4054)	(0.0.2913)	(0.0880)
Adjusted R^2	0.8137	0.8108	0.3140	0.6152	0.6028	0.6960	0.7899
DW	2.0123	2.0115	2.0103	1.8649	1.8962		2.0087
Hausman – Wu	16.07***	14.84***	26.49***	23.47***	53.61***		10.89***

*, **, and *** indicate coefficient estimates are statistically significant at the 10%, 5%, and 1% level, respectively.
[2] UK uses exchange rate between pounds and competitors, respectively.
[3] OLS estimates.

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