Comparative Advantage of Energy Products in the Midst of ASEAN Economic Integration

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17 August 2016

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Abstract

This research aims to analyze the ASEAN countries' comparative advantage of energy products. Trade Balance Index (TBI) is applied. This research uses data import value and price of energy products under SITC 3 digits. This research concludes that Coal, lignite and peat (SITC 333) and gas, natural, and manufactured (SITC 341) are the upfront energy commodity line that share positive index, meanwhile briquettes; coke and semi-coke; lignite or peat; retort carbon (SITC 332) is the least competitive basket in energy market.

Keywords: energy products, energy market integration.
JEL: Q04, F3, I3.

1. Introduction

The first solid effort toward regionalism in the South Asian region was the Association of South East Asian Nation (ASEAN) Free Trade Area (AFTA) launched in 1992 by the ASEAN. The AFTA is aimed to promote further cooperation in the economic growth by accelerating the liberalization of intra-ASEAN trade and investment after the success of the ASEAN in maintaining international and political stability in the region. In 2015, ASEAN countries are eager to establish more advanced level of economic integration, namely ASEAN Economic Community (AEC) through the "ASEAN way" which is a little bit different with the theoretical stages of economic integration by Balassa (1961), i.e. Free Trade Area (FTA), Customs Union (CU), Common Market (CM), Economic Union (EU), and Complete Economic Integration (CEI). With the free movements of skilled labor and capital, the AEC has the parallel characteristics with those of Common Market (CM) in the theoretical successive stages of economic integration. The problem of rule of origin (ROO) might occur in the AEC since individual members still maintain their own tariffs against non-member countries. Consequently, flow of production factors (capital and labor), trade diversion and trade creation could not be optimized in the AEC due to the absence of common external tariffs. However, with "ASEAN way" the governments' ASEAN countries

still want to realize the AEC on schedule 2015. Energy is needed in supporting distribution, consumption and production activities in the AEC; the community needs to consider ASEAN Energy Market Integration (AEMI).

ASEAN is one of the fastest growing economic regions in the world and has a fast rising energy demand driven by both economic and demographic growth. The region's economic and population growth had resulted in a consequential increase in final energy consumption. With the assumed GDP growth rate of 5.2 percent per annum from 2007 to 2030, it was estimated the final energy consumption increases to 427 MTOE (million tons of oil equivalent) in 2010 and will grow at an average annual rate of 4.4 percent to 1,018 MTOE in 2030 (the 3rd ASEAN Energy Outlook). This growth is very much higher than the world's average growth rate of 1.4 percent per year in primary energy demand over 2008-2035 (IEA World Energy Outlook 2010). In view of the high economic growth and need of energy supply, the challenge to ensure a secure supply of energy is a prevailing concern for the AEC

This research basically aims to answer three main research questions. *First*, how is the position of ASEAN countries' comparative advantage in energy products? Second, has price equalization in energy products prices ASEAN occurred? Theoretically under the assumption of perfect competition; therefore, regionalism and market integration in ASEAN postulates the existence of energy price equalization. *Third*, how are the potential welfare impacts of the ASEAN energy market integration?

2. Literature Review

Regional economic cooperation is an essential locomotive for raising the economic development of member states, to enable them to utilize efficiently their full economic potential resources. Energy infrastructure is therefore a key pillar supporting the participating countries' drive for development through regional cooperation (Chang et al, 2013). Several

factors are driving the move towards regional energy cooperation. Uneven distribution of energy resources among member countries, suboptimal level of energy interrelationships, least-cost solutions to energy constraints and rocketing prices of global energy boots the attractiveness of large hydropower project options (CAREC, 2008).

Theoretical perspective provides wide picture of the role of energy market integration (EMI) as building block of regionalism, especially in economic development sector. However, evidence from empirical studies is still limited in number. Among the few, Bhattacharya and Kojima (2008, 2010) show the supportive finding stating that benefits from EMI counts more than costs required. Linkages of electricity grids can create both economic and environmental benefits. In addition, Park (2000) concludes that free trade agreement, in which energy products are in, may bring positive economic impact to member countries within the region. Lee et al (2009) and Chang et al (2013) evaluate the potential effects of the ASEAN Economic Community (AEC) on economic welfare, trade flows and sectoral output of the member states using a dynamic computable general equilibrium (CGE) model and Global Trade Analysis Project (GTAP) model, respectively. In specific, the consequence of bearing arm-length characteristics is near-complement to capital in the short run, but a substitute for capital in the long run. Similar suggestion later comes from Lee and Plummer (2010).

Nevertheless, Sheng and Shi (2011) identify three limitations that have restricted the wide spread of the above literature. First, most of these studies applied computable general equilibrium (CGE) models, neglecting how EMI can generate positive economic effects in the region. Second, EMI has always been defined just as tariff cutting in these studies, which underestimates EMI's benefits through non-tariff barrier elimination, improvements in market accessibility and market deregulation. Third, all these studies focus on the net welfare of EMI but ignore its re-distribution effects across countries. In particular, they cannot inform to policy makers on whether EMI may narrow development gaps (NDG) across countries and

thus facilitate economic integration within a region. Thus, further empirical studies are required to address all three limitations.

To fill the space, Sheng and Shi (2011) offer the economic convergence analysis (including both the σ- convergence and β-convergence approaches) to scrutinize the impact of EMI across countries with emphasize on East Asian countries between 1960 and 2008. The results show that in addition to trade, an integrated energy market may help to reduce economic development gaps among countries and accelerate the catch-up of Least Developing Countries' income per capita. In particular, the positive impact of energy trade facilitation may play a more important role for the European Union (EU) countries and the North American Free Trade Area (NAFTA) countries than for the East Asian countries. The study also finds that investment and capacity building may help to facilitate the catch-up and promote economic convergence across countries.

In addition to the previous study, Sheng and Shi (2012) observe that countries with relatively higher energy market integration level have, on average, a higher energy consumption per capita compared with countries with relatively lower energy market integration level. This implies that EMI (or its representing institutional arrangement) is an important factor affecting the relationship between energy consumption and income and price. Thus, energy market integration can help to reduce such a pressure by improving the domestic energy supply and thus reduce the price elasticity. Yu (2011) takes slightly different design in his study. It aims to build up an index system by using the principal component analysis approach. This paper provides such information by ranking of the extent of energy market integration for 16 East Asian countries, including the ASEAN 10 countries, China, Japan, Korea, India, Australia, and New Zealand. A further integrated energy market is good for each country. Countries in East Asia area should try their every effort to foster their energy market integration. According to recent work by Shi and Kimura (2010), the next

steps for further EMI in the region lie in three areas: (1) regional agreements on energy trade and investment; (2) energy infrastructure development and national energy market liberalization; and (3) energy pricing reform and fossil fuel subsidies. Due to disparities in the level of economic development across countries, each country will have different abilities to participate in each dimension.

Limited domestic source of funds supporting well-being of development are covered by the stream of foreign direct investment (FDI). There are ample of studies figuring out the importance of FDI in development such as development strategies. Several studies have supported this intention, such as Caves (1974), Blomstrom and Kokko (1998), Liu et al. (2002), Buckley et al. (2002) and Durham (2004).

In the context of international integration such as common union and common market, the role of FDI remains indispensable still. Neary (1988) finds that mobile capital precipitates larger production cost of tariffs than immobile capital. Trade dispersion effects will be cut off by trade creation effects. Even so, the discussion is much wider than the two conflicting orthodox boundaries. The existence of FDI and its entity of foreign rents in the host country affect income redistribution. Additional gains or losses for the host country will be determined by this change as delivered by Tironi (1982) through the concept of foreign profit diversion effect.

3. Methodology

3.1. Energy Products

This research applies the definition of “energy products” based on the Standard International Trade Classification (SITC) classification. Under the SITC, products are classified according to (a) the materials used in production, (b) the processing stage, (c)

market practice and uses of the products, (d) the importance of the commodities in terms of the world trade, and (e) technological changes. This paper uses the 3-digit SITC Revision 2 and focuses on energy products i.e. SITC Section 3. The main categories are:

- *food, drinks and tobacco* (Sections 0 and 1 - including live animals);
- *raw materials* (Sections 2 and 4);
- *energy products* (Section 3):
- *chemicals* (Section 5);
- *machinery and transport equipment* (Section 7);
- *Other manufactured goods* (Sections 6 and 8).

3.2. Comparative Advantage

To examine the pattern of ASEAN countries' comparative advantages in energy products, we apply Trade Balance Index (TBI) (Lafay, 1992).TBI is formulated as follows:

$$TBI_{ij} = (x_{ij} - m_{ij})/(x_{ij} + m_{ij}) \quad (1)$$

where TBI_{ij} denotes trade balance index of country i for group of products (SITC) j; x_{ij} and m_{ij} represents exports and imports of group of products j by country i, respectively. This index ranges from minus one to one. The values minus and positive imply that a country is as "net-importer" or "net-exporter", respectively.

3.3. Data

This paper uses data on import value and volume of energy products in 1979-2012 for ASEAN5 countries (Indonesia Malaysia, Singapore, the Philippines, and Thailand) published by the United Nations (UN) namely the United Nations Commodity Trade Statistics Database

(UN Comtrade). This research uses the 3-digit SITC Revision 2. The imported products are classified into ten groups:

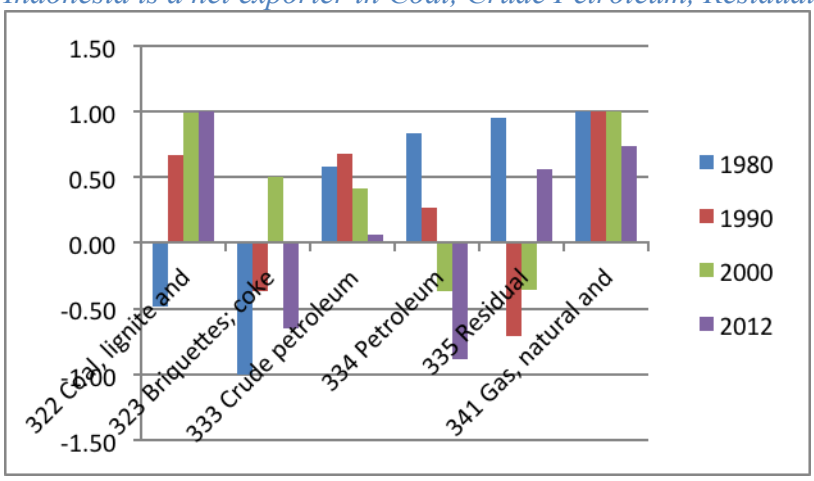
- SITC 322: Coal, lignite and peat
- SITC 323: Briquettes; coke and semi-coke; lignite or peat; retort carbon
- SITC 333: Crude petroleum and oils obtained from bituminous minerals
- SITC 334: Petroleum products, refined
- SITC 335: Residual petroleum products, nes and related materials
- SITC 341: Gas, natural and manufactured
- SITC 351: Electric current
- SITC 0-2
- SITC 4-8
- SITC 9

4. Results

The ASEAN member countries have different pattern of energy commodity basket. Some of them may have abundant resources and actively involve is exchange of goods across such as coal, lignite and peat (322) and crude petroleum and oils obtained from bituminous minerals (333). It implies on the positive value of TBI as they are in 'net-exporter' group. In contrast, there are number of countries carry on high consumption of certain energy product and importing it from other country. It affects the TBI value to be negative as they are identified as 'net-importer group'.

Figure 1. Trend in TBI of Energy Products: Indonesia

Indonesia is a net exporter in Coal, Crude Petroleum, Residual Petroleum, and Gas in 2012

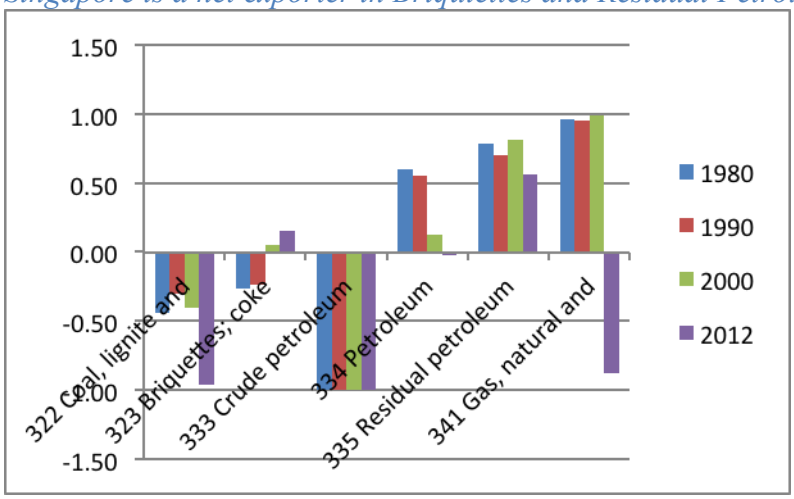


Source: UN Comtrade, author's calculation

Figure 1 compares inter spot years TBI of Indonesia starting from 1980 to 2012. It is seen that Indonesia mantains competitiveness across time period for briquettes; coke and semi-coke; lignite or peat; retort carbon (333) and gas, natural and manufactured (341). Coal, lignite and peat (322) shows changing pattern from 'net-importer' in 1980 to 'net-exporter' during the next 30 years.

Figure 2. Trend in TBI of Energy Products: Singapore

Singapore is a net exporter in Briquettes and Residual Petroleum in 2012

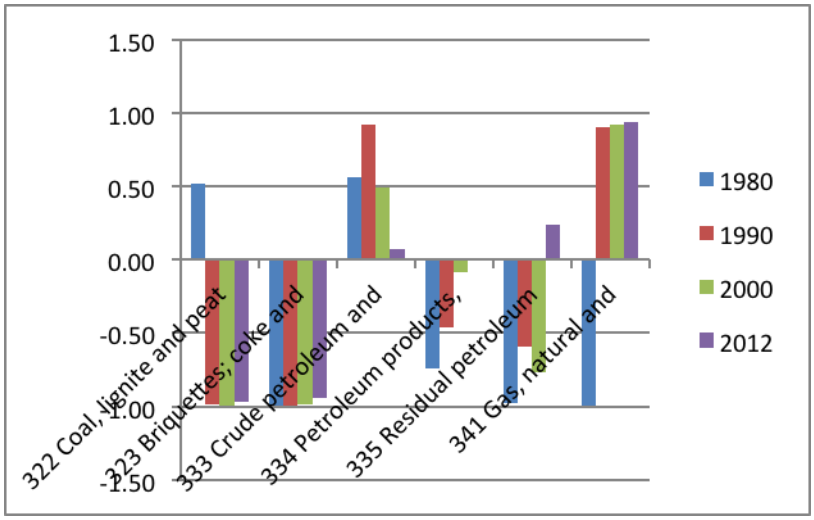


Source: UN Comtrade, author's calculation

Figure 2 potrays trend in TBI Index of Energy Products in Singapore during the period of 1980-2012. It shows solid 'net-exporter' trend in residual petroleum products, nes, and related materials (335) over years. On the other side, no shift is found either in crude petroleum and oils obtained from bituminous minerals (333) and coal, lignite and peat (322) as the two have been 'net-importer' all the time.

Figure 3. Trend in TBI of Energy Products: Malaysia

Malaysia is a net exporter in Crude Petroleum, Residual Petroleum, and Gas in 2012

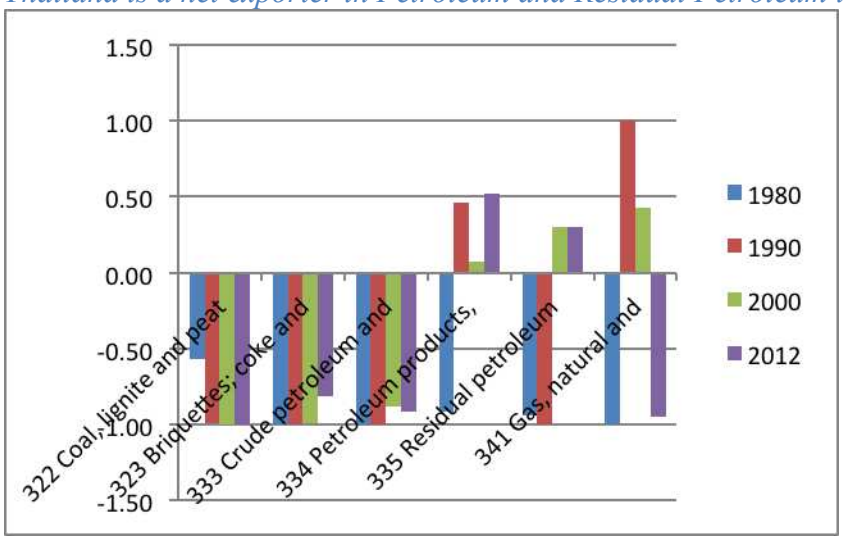


Source: UN Comtrade, authors' calculation

Figure 3 shows the dynamics of TBI in Malaysia for energy products in 1980, 1990, 2000, and 2012. While Malaysia is a 'net-exporter' in crude petroleum, residual petroleum, and gas (333) during the time range, it remains standing as 'net-importer' for briquettes; coke and semi-coke; lignite or peat; retort carbon (323) and petroleum products, refined (334).

Figure 4. Trend in TBI of Energy Products: Thailand

Thailand is a net exporter in Petroleum and Residual Petroleum in 2012



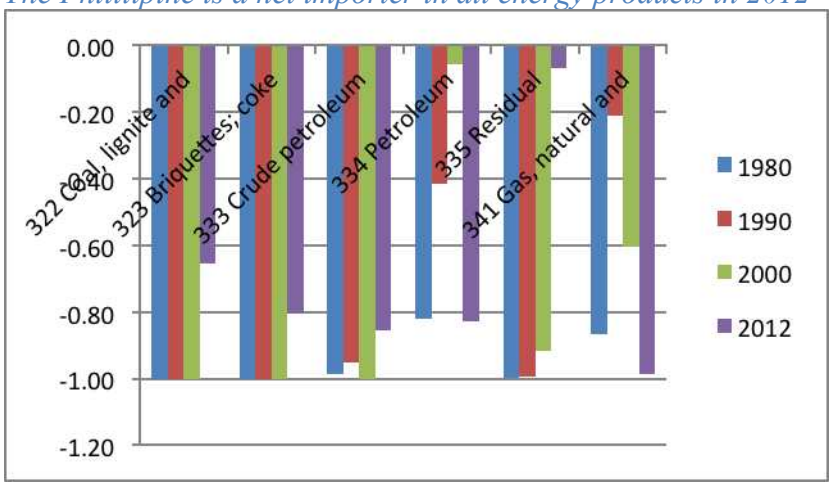
Source: UN Comtrade, author's calculation

Figure 4 plots sequential changes on TBI of Energy Products in Thailand from 1980 to 2012. Three commodities named coal, lignite and peat (322), briquettes; coke and semi-coke; lignite or peat; retort carbon (323), and crude petroleum and oils obtained from bituminous

minerals (333) are constantly in the classification of 'net-importer'. The other two, Petroleum products, refined (334) and residual petroleum products, nes and related materials (335), however, have been forwarding encouraging trend since 1990 when the index value started to be positive.

Figure 5. Trend in TBI of Energy Products: The Philippines

The Phlillipine is a net importer in all energy products in 2012

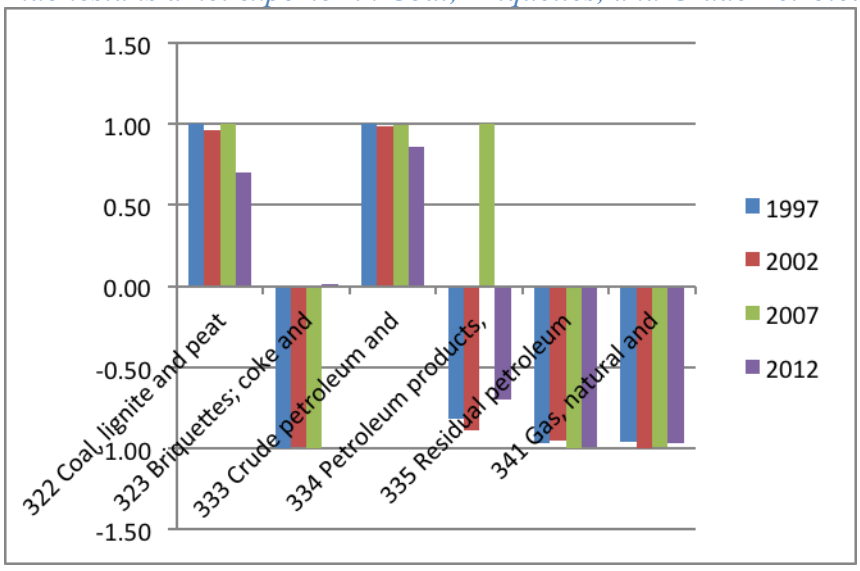


Source: UN Comtrade, authors' calculation

Figure 5 compares inter spot years TBI of Philippines starting from 1980 to 2012. TBI value have been persistently negative during the orserved period. Such finding indocates that Phlilipines is a net importer in all energy products all the time.

Figure 6. Trend in TBI of Energy Products: Vietnam

Indonesia is a net exporter in Coal, Briquettes, and Crude Petroleum in 2012

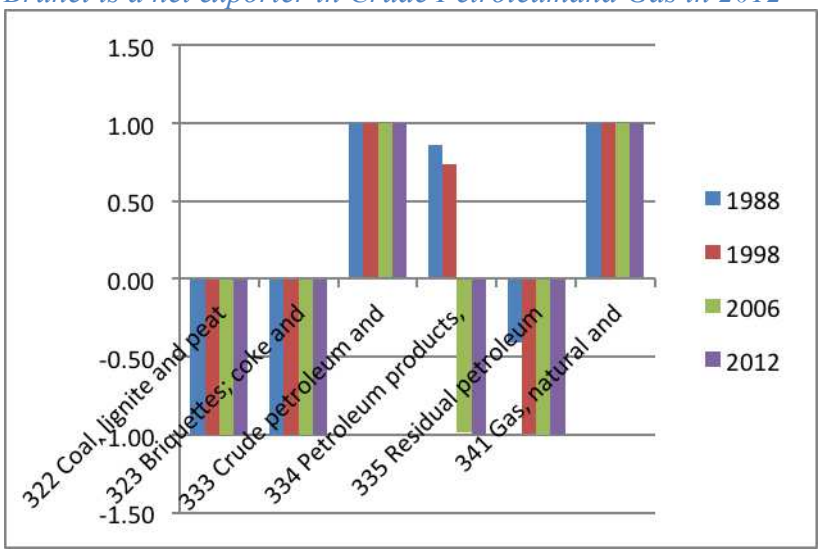


Source: UN Comtrade, authors' calculation

Figure 6 potrays trend in TBI Index of Energy Products in Vietnam during the period of 1997-2012. Vietnam performs competitive advantage in coal, lignite and peat (322) and crude petroleum and oils obtained from bituminous minerals (333). On the other hand, Vietnam always stands as 'net-importer' for residual petroleum products, nes and related materials (335) and gas, natural and manufactured (341).

Figure 7. Trend in TBI of Energy Products: Brunei

Brunei is a net exporter in Crude Petroleumand Gas in 2012

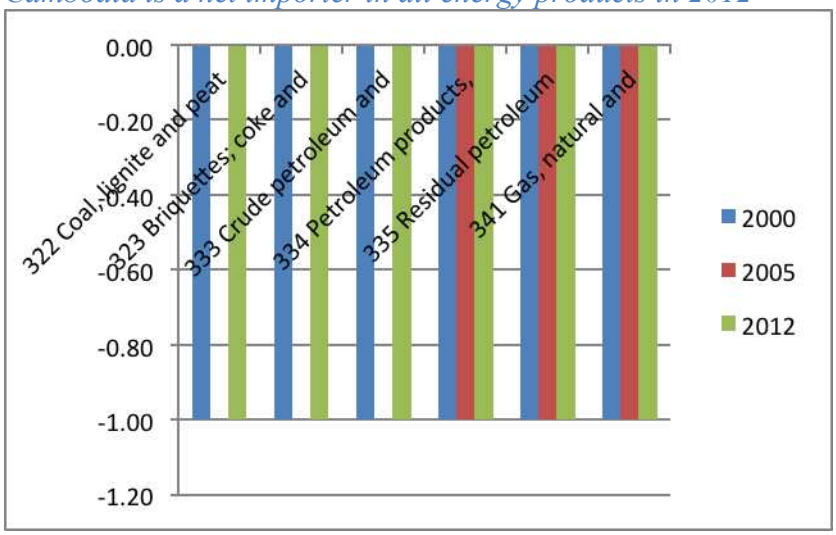


Source: UN Comtrade, authors' calculation

Figure 7 shows the dynamics of TBI in Brunei for energy products in 1988, 1998, 2006, and 2012. Brunei has robust position in crude petroleum and oils obtained from bituminous minerals (333) and gas, natural and manufactured (341) as indicated by positive value of TBI. Reverse trend, meanwhile, is signified by coal, lignite and peat (322) and briquettes; coke and semi-coke; lignite or peat; retort carbon (323).

Figure 8. Trend in TBI of Energy Products 1976-2012: Cambodia

Cambodia is a net importer in all energy products in 2012

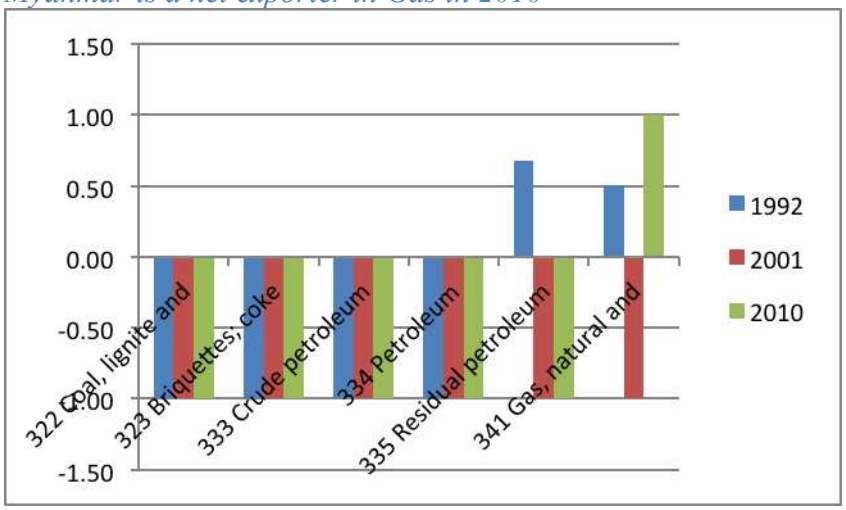


Source: UN Comtrade, authors' calculation

Figure 8 compares inter spot years TBI of Cambodia starting from 2000 to 2012. TBI value have been persistently negative during the observed period. Such finding indocates that Cambodia is a net importer in all energy products all the time.

Figure 9. Trend in TBI of Energy Products 1976-2012: Myanmar

Myanmar is a net exporter in Gas in 2010



Source: UN Comtrade, authors' calculation

Figure 9 plots sequential changes on TBI of Energy Products in Myanmar from 1992 to 2010. While the first four energy products remains negative in TBI, the last two reveal abrupt up and down. TBI of residual petroleum products, nes and related materials (335) was positive

in 1992 but then was cut off. In 2010, gas, natural and manufactured (341) was the only basket in which Myanmar acted as 'net-exporter'.

5. Conclusions and Policy Implications

Comparative advantage indicates what commodity trade of a country can be classified into 'net-exporter' or 'net-importer'. TBI shows that coal, lignite and peat (333) and gas, natural, and manufactured (341) are the upfront energy commodity line that share positive index, meanwhile briquettes; coke and semi-coke; lignite or peat; retort carbon (332) is the least competitive basket in energy market. The complementarities of comparative in energy products in the ASEAN means that some countries have comparative advantage in specific energy products the others do not. If the ASEAN Economic Community (AEC) and the complementarities in energy product among the member countries are the major concern for ASEAN, then intra-regional ASEAN trade in energy product must be prioritized rather than inter-regional trade.

Theoretically, EMI would bring efficiency in resources allocations across region, and further it would lead to equalize the energy product market prices. In the situation, it could be energy prices increase in certain countries but decrease in the other countries. Most probably, all countries would have experiences with increases in energy product prices differently. Coordinated gradual subsidy reduction in energy is therefore more preferable to big-bang subsidy reduction. To bind the commitments of each individual member of the ASEAN in reducing energy subsidy, "Common Effective Preferential Energy Subsidy Reduction" (CEPESR) is required. It is like Common Effective Preferential Tariff in ASEAN Free Trade Area (CEPT-AFTA). The CEPESR consists of the commitments of each individual member in reducing energy subsidy with preferred rate and period.

Acknowlegement

I would like to thank Rafiazka Milanida Hilman who provided superb research assistance.

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