Economic Development in a Small Open Economy with a Rich Resource Endowment

The Case of Brunei

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I Introduction

Following the Fukushima nuclear disaster in March 2011, many countries have decided to strengthen the capacity and usage of thermal power generation. LNG is considered to serve as one of the major and reliable sources for power generation. The increased demand for additional LNG supplies has created a positive effect upon LNG shipments from exporters (suppliers). For example, Japan increased LNG imports by 8.5 million tons after Fukushima; nearly half of this additional volume was supplied by Qatar, but a significant portion has been diverted from the Atlantic basin, via the flexibility and the long-term contracts of American and European operators. Shipments of LNG from Brunei were also diverted to the Japanese terminals. These shipments were initially bound to South Korea, another major importer of LNG from Brunei Darussalam.

The supply of LNG has a flip side, namely from the perspective of suppliers. For many countries where LNG and oil proceeds support a large part of the revenue for social and economic development, a stable and robust income stream is fundamental to the national interest. One such example is Brunei which receives large incomes and foreign exchange generated by LNG and oil exports to provide funds to finance its development programs. Brunei LNG has successfully serviced the gas market of Japan for 40 years and has delivered well over 5,000 cargoes of liquefied natural gas.[1)] With this impressive track record behind it, Brunei LNG is now very much looking to the future.

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1) This figure is for the year 2005.
Up to date data for LNG cargoes is not available.

The significance of this study lies in the drastic increase in natural gas production which has exceeded the level of oil production since 1987. For example, in 1970 Brunei produced natural gas of 0.2 million tons oil equivalent (mtoe). By 1987, this figure had increased significantly to 7.7 mtoe and exceeded the oil production of 7.5 mtoe in that year. In 2012 gas production reached 11.3 mtoe. In contrast oil production reached its peak in 1979 (12.7 mtoe) and has declined since then to 7.8 mtoe in 2012.

This paper will address the effect of LNG production on the economic development of Brunei by focusing upon to what extent LNG has made a contribution to Brunei society and the economy. The next section shows gas and oil wealth of Brunei and the benefits it has provided to its people and national development. Following that, a brief review is made of the history of LNG industry. Section 4 deals with the contribution of LNG production since 1986 with particular attention given to its contribution to export performance. Section 5 examines some economic problems, which may serve as a risk factor, of LNG and oil dependence. The paper concludes with some brief comments.

II Natural Gas Wealth of Brunei

Brunei is a small country located on the north coast of the island of Borneo, in the South China Sea. The size of the country is 2,226 square miles (5,765 square kilometers), slightly larger than Mie Prefecture of Japan. Brunei is divided into four districts: Brunei-Muara which includes the capital Bandar Seri Begawan, the smallest, yet with the highest population density of the four administrative districts. Tutong, a rural district housing many ethnic tribes; Belait, the oil town of the country; and Temburong, divided from the rest of the country by the Limbang district of Sarawak, a state of Malaysia, and the least populated district in Brunei.

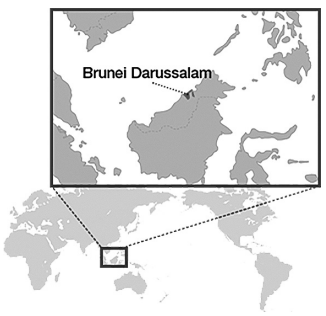


Table 1: Oil and Natural Gas Wealth Per Capita for East Asia and Australia in 1995 and 2005 (in 2005 US dollars)

	Total wealth per capita		Oil wealth per capita		Natural gas wealth per capita	
	1995	2005	1995	2005	1995	2005
Brunei	356,457	232,275	66,087	79,371	58,374	93,587
Indonesia	16,132	19,769	272	420	246	703
Malaysia	52,026	64,767	2,506	4,436	1,244	5,642
Philippines	17,114	19,698	5	537	0	0
Singapore	218,461	300,975	0	0	0	0
Thailand	28,272	37,765	29	108	93	499
Vietnam	n.a	9,374	n.a	724	n.a	138
China	9,845	19,234	203	269	18	71
Japan	407,797	548,751	5	4	13	40
South Korea	158,985	248,180	0	0	0	0
Australia	416,394	518,805	2,413	4,309	1,832	5,358

Source: World Bank, *The Changing Wealth of Nations*, 2011.
Available at http://data.worldbank.org/data-catalog/wealth-of-nations

The current population of Brunei is a scant 399,800 people with GDP per capita B$52,989. The economic growth was only 0.9 percent in 2012, compared to 3.4 percent in 2011 (Brunei Government, 2013). The oil and gas sector has been the key determinant of her GDP changes.

Brunei has substantial oil and natural gas wealth. Per capita oil and natural gas wealth was estimated as U$78,371 and U$93,587 in 2005 respectively (Table 1). This per capita natural gas wealth of Brunei is 17 times higher than that of Malaysia, 133 times that of Indonesia, and 18 times that of Australia in the year 2005.

Natural gas wealth per capita for Brunei increased from US$58,374 in 1995 to US$93,587 in 2005, implying an increase of 60.32 percent from the level in 1995. It is this oil and gas wealth that has helped to provide Brunei with a high standard of living for its people. With a per capita GDP of B$52,989 in 2012, Brunei is one of the wealthiest countries in the world. And that wealth makes it possible that the society enjoys a good welfare system. Bruneians pay no income tax and also benefit from generously subsidized housing and interest-free government loans. They are also provided with a free education system up to university level, with easily accessible scholarships for students. They also benefit from generous subsidies on the staple foods, sugar, fuel, liquefied petroleum gas, water and electricity.

Available natural gas reserves in Brunei are 350 bcm (12.36 tcf). Brunei currently produces some 11.4 bcm (402.54 bcf) per year and exports 8.81 bcm (311.09 bcf) annually, focusing on the major export markets of Japan and Korea. The major gas field of Brunei is South West Ampa, the largest gas field in operation in the country, which produces 75 percent of gas in the Sultanate. Other key fields include Fairley, Gannet and the Maharaja Lela-Jamalulalam field, which commenced production in 1999. All these gas producing fields are located offshore (TOGY 2012, p. 30).

Brunei Shell Petroleum is the main producer of oil and gas in Brunei. Since 1985, the Government of Brunei has had a 50 percent share in the company. In addition the company pays petroleum income tax of 55 percent and royalties. The royalties are 12.5 percent of the value of crude oil and natural gas produced from wells on land, 10 percent from wells between 3 and 10 miles offshore, and 8 percent from those more than 10 miles from the coast (Cleary and Eaton 1992, p. 219).

To cater for the LNG trade with Japan, Brunei Liquefied Natural Gas (BLNG), Brunei Shell Tankers, and Brunei Gas Carriers were formed within Brunei Shell Petroleum. Brunei Liquefied Natural Gas was formed in 1969 after a joint venture agreement between three partners – the Government, Shell Petroleum and the Mitsubishi Corporation. Initially Shell and Mitsubishi had 45 percent of the shares each; the Government share was later increased to 50 percent (Mitsubishi Corporation 2012). Brunei Liquefied Natural Gas Company was established to build and operate the Lumut LNG plant, completed in 1973, for exporting LNG exclusively to Japan.

III The Rise of LNG in Brunei

Table 2 indicates the patterns of production of oil and gas between 1970 and 2012. Oil production in Brunei has experienced ups and downs over the past four decades. Production

of oil reached its peak in 1979 at 12.7 million tons. Since then it has fallen to 7.8 in 2012, due to the maturing of oil wells and a 1981 conservation policy instituted by the Government (Cleary and Wong 1994, p. 43). Due to the conservation policy, oil production was reduced to 150,000 barrels per day by 1988; this was later amended to 152,000 barrels by 1990 and 175,000 barrels in 1995.

There was no similar constraint on gas where about 1,100 million cubic meters are produced per day. As a result natural gas production in Brunei has increased steadily over the past four decades, from 0.2 mtoe (million tons of oil equivalent) in 1970 to 11.3 mtoe in 2012. In 1987 gas production exceeded oil production – gas 7.7 mtoe and oil 7.5 mtoe. Since then gas production has kept this trend, implying that this segment is strategically more important than oil production (Table 2 and Figure 1).

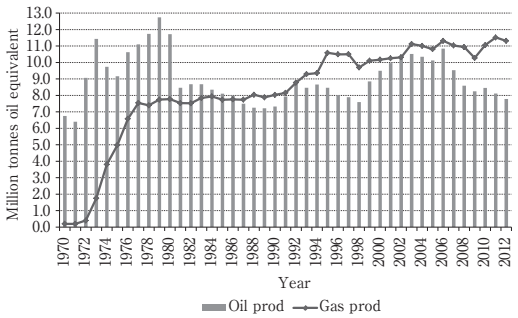
Gas production in Brunei began with the exploration exercise and production in the South West Ampa field in 1965. Gas from the Fairley and Champion fields in 1972 significantly increased gas production in Brunei. When the South West Ampa field was found to contain large quantities of natural gas, there were a limited number of options available for Brunei Shell. The scope for exporting to local markets was limited; demand in Brunei was small. The best market, Japan, could hardly be tapped given the costs of a pipeline of over 4,000 km. The use of gas liquefaction techniques remained a possibility. The technology had developed in the 1950s with the first large-scale gas liquefaction plant being built at Arzew, Algeria in 1964. The Brunei liquefaction plant was to have about 5 times the capacity of the Arzew plant and required major capital invest-

Table 2: Oil and Natural Gas Production in Brunei 1970 to 2012
(Million tons oil equivalent)

Oil production (mtoe)			
Year	Oil	Year	Oil
1970	6.7	1991	7.9
1971	6.4	1992	8.8
1972	9.1	1993	8.5
1973	11.4	1994	8.7
1974	9.7	1995	8.5
1975	9.2	1996	8.0
1976	10.6	1997	7.9
1977	11.1	1998	7.6
1978	11.7	1999	8.9
1979	12.7	2000	9.5
1980	11.7	2001	10.0
1981	8.5	2002	10.3
1982	8.7	2003	10.5
1983	8.7	2004	10.3
1984	8.4	2005	10.1
1985	8.1	2006	10.8
1986	8.0	2007	9.5
1987	7.5	2008	8.6
1988	7.3	2009	8.3
1989	7.2	2010	8.5
1990	7.3	2011	8.1
		2012	7.8

Natural gas production (mtoe)			
Year	Gas	Year	Gas
1970	0.2	1991	8.2
1971	0.2	1992	8.8
1972	0.4	1993	9.3
1973	1.8	1994	9.4
1974	3.8	1995	10.6
1975	5.0	1996	10.5
1976	6.6	1997	10.5
1977	7.5	1998	9.7
1978	7.4	1999	10.1
1979	7.7	2000	10.2
1980	7.8	2001	10.3
1981	7.5	2002	10.3
1982	7.5	2003	11.1
1983	7.8	2004	11.0
1984	7.9	2005	10.8
1985	7.7	2006	11.3
1986	7.8	2007	11.0
1987	7.7	2008	10.9
1988	8.0	2009	10.3
1989	7.9	2010	11.1
1990	8.0	2011	11.5
		2012	11.3

Source: *BP Statistical Review of World Energy June 2013* (Historical data workbook).
Available at http://www.bp.com/statisticalreview



Source: Based on data from *BP Statistical Review of World Energy 2013* (Historical data workbook).
Available at http://www.bp.com/statisticalreview

Figure 1: Oil and Gas Production of Brunei, 1970-2012

ment in plant and technology (Cleary and Wong 1994, pp. 44-45).

It was in 1968 when the Brunei Shell Petroleum approached Mitsubishi Corporation of Japan with an investment proposal for constructing the liquefaction plant in Brunei. The investment amount by Mitsubishi Corporation under the joint investment proposal was estimated and expected to be around 100 to 150 million US dollars. In 1970, Mitsubishi Corporation decided officially to participate in the Brunei LNG Project – a project requiring a massive investment of unprecedented scale. Mitsubishi Corporation finally decided to invest 125 million US dollars.

The LNG plant at Lumut was opened in 1973 and, at the time, was the largest plant of its kind in the world. Since then the LNG plant has produced and exported LNG to Japan under long-term supply contracts signed between Brunei and Japan. However, in 1994 Brunei sold a number of spot cargoes of LNG and signed a short term contract with Korea for the supply of smaller quantities of LNG. Since it started operation in 1972, Brunei LNG has delivered more than 5,000 cargoes, mostly to Japan (since 1972), but also to Korea (since 1994), Spain and the United States (in 2002).

All the LNG exports to Japan go to three public utility companies – Tokyo Gas, Tokyo Electric and Osaka Gas. Brunei was a pioneer of the LNG trade in the ASEAN region. In 1968, when plans were developing to build the Lumut plant, it signed an agreement with the three companies named above to deliver LNG by tanker under a twenty-year contract. In Japan, terminals at Negishi, Sodegaura and Senboku were built to receive the LNG tankers which were leased and later owned by Brunei Shell Tankers. In December 1972, the first LNG cargo from Brunei was delivered by SS Gadinia to Senboku Terminal of Osaka Gas (see Islam and Odano 2010 for details).

IV Effects of LNG Production on the Economy

Over the past years the LNG production has made a variety of contributions to the economy of Brunei. These have included its contribution to exports, to Gross Domestic Product, to Government revenues; to local energy supply, and to the creation of employment opportunities for Bruneians.

4-1 Contribution to Export Earnings

The natural gas sector in Brunei has since its inception been dominated by the production and export of LNG. Brunei was the first country in Asia to export gas as LNG. Gas is a significant export earner for Brunei. It currently provides about 48 percent of total export earnings of Brunei. In 2012, exports of LNG provided export revenue of around $7,706 million. In 2012, Brunei produced 970,065 million Btu LNG per day, and exported 957,647 million Btu per day (98.72% of production) at the weighted average price of US$17.6857 per million Btu (Table 3).

LNG exports from Brunei are largely bound for Japan and South Korea under long-term supply contracts. The first LNG cargo was exported to Japan in 1972. Subsequently, in 1973, a 20-year contract was signed with the Japanese buyers for 5.14 million tons of LNG annually. This contract with Tokyo Electric, Tokyo Gas and Osaka Gas expired in March 1993. It was

Table 3: Export of LNG from Brunei, 1986 to 2012 (in millions of Brunei dollars)

Year	LNG	Crude oil	Garments	Others	Total Export	LNG as % of export	LNG & Oil as % of export
1986	2110.7	1619.9	–	259.5	3990.1	52.9	93.5
1987	1772.1	1954.0	–	279.5	4005.6	44.2	93.0
1988	1718.0	1460.3	5.2	253.0	3436.5	50.0	92.5
1989	1645.9	1719.3	10.1	297.3	3672.6	44.8	91.6
1990	1605.4	2040.4	17.8	346.6	4010.2	40.0	90.9
1991	1896.9	2024.6	31.1	314.4	4267.0	44.5	91.9
1992	1562.2	2036.2	31.3	283.7	3913.4	40.0	92.0
1993	1591.4	1785.6	39.1	216.2	3632.3	43.8	93.0
1994	1412.7	1549.8	45.2	282.8	3290.5	42.9	90.0
1995	1561.4	1475.8	60.0	291.1	3388.3	46.1	89.6
1996	1582.7	1702.1	68.5	316.3	3669.6	43.1	89.5
1997	1859.5	1650.1	81.4	379.7	3970.7	46.8	88.4
1998	1557.1	1149.9	147.2	339.9	3194.1	48.7	84.8
1999	1632.6	1875.9	205.4	611.2	4325.1	37.7	81.1
2000	2532.1	3352.2	363.4	485.8	6733.5	37.6	87.4
2001	2814.9	2893.5	285.8	527.6	6521.8	43.2	87.5
2002	2603.5	3139.6	383.3	502.3	6628.7	39.3	86.6
2003	2964.5	3748.5	398.4	582.4	7693.8	38.5	87.3
2004	2914.2	4912.6	308.8	427.1	8562.7	34.0	91.4
2005	3257.7	6536.4	303.4	300.2	10397.7	31.3	94.2
2006	3514.1	8157.5	207.7	237.8	12117.1	29.0	96.3
2007	3484.2	7626.5	175.6	270.1	11556.4	30.2	96.1
2008	6666.9	7948.5	121.0	205.5	14941.9	44.6	97.8
2009	5049.1	4974.5	62.9	348.4	10434.9	48.4	96.1
2010	5415.5	6112.2	9.6	580.3	12117.6	44.7	95.1
2011	7006.4	7957.1	7.6	707.5	15678.5	44.7	95.4
2012	7706.1	7824.4	6.6	683.6	16220.7	47.5	95.7

Source: Brunei Government, *Brunei Darussalam Statistical Yearbook*, 1998, 2002, 2006, and 2011 editions. Data for 2012 are obtained from Statistics Department of the Department of Economic Planning and Development, Prime Minister's Office, Bandar Seri Begawan.

then renewed for another 20 years from 1993 to 2013 for 5.54 million tons of LNG annually. From 1998 until 2013 the contractual volume was 6.01 million tons annually. This second contract also expired in March 2013. Japan has renewed another supply contract agreement with Brunei for another 10 years. Under the new contract Brunei will deliver some 3.4 million metric tons of LNG annually.

Now 40 years have passed since the first LNG cargo from Brunei arrived in Japan. Over the decades, LNG from Brunei has contributed to the Japanese industrial development as well as serving as a reliable source of energy in Japan. Today, LNG from Brunei accounts for approximately 10 percent of Japan's LNG imports (Mitsubishi Corporation 2012).

A long-term agreement spanning 16 years was also reached with Korea Gas Corporation (KOGAS) in 1997. This contract of KOGAS with Brunei LNG to import approximately 0.7 million metric tons per year also expired in March 2013. But Korea has not signed any further contract with Brunei. The reason is perhaps the high prices that Korea has been paying to Brunei LNG compared with what it was charged by other suppliers. Platts – a global provider of energy, petrochemicals, metals and agriculture information – recently published a report stating that South Korea's most expensive LNG imports in March were from Brunei, at an average of US$1,019.92 per metric ton (equivalent to US$19.61 per million British thermal unit, edging up 0.4 percent from February's (*Brunei Times*, 17 April 2013).

4-2 Contribution to Gross Domestic Product

The Gross Domestic Product (GDP) of Brunei is also dependent on LNG and oil production and their prices. Consequently, GDP fluctuates with the level of the production and with the price of oil and gas. Currently LNG contributes 11 percent of Brunei's GDP. The LNG output contributed B$2,331 million out of a total GDP of B$21,185 million in 2012. Total activities related to the oil and gas sector

Table 4: Contribution to GDP by LNG and Oil and Non-oil &-gas, 2000 to 2012 (in millions of Brunei dollars at current prices)

Year	Manufacture of LNG	Oil & gas mining	Non-oil &-gas sector	Total GDP	LNG share of GDP (%)
2000	1,331	4,619	4,396	10,346	12.86
2001	1,343	4,009	4,683	10,036	13.38
2002	1,309	4,223	4,932	10,463	12.51
2003	1,451	5,080	4,894	11,424	12.70
2004	1,494	6,742	5,069	13,306	11.23
2005	1,672	8,868	5,324	15,864	10.54
2006	1,723	10,768	5,735	18,226	9.45
2007	1,729	10,604	6,126	18,458	9.37
2008	2,628	11,672	6,098	20,398	12.88
2009	2,027	7,390	6,194	15,611	12.98
2010	1,890	8,572	6,406	16,867	11.21
2011	2,294	12,047	6,656	20,996	10.93
2012	2,331	11,804	7,051	21,185	11.00

Source: Brunei Government, *Annual National Accounts*, 2005, 2007 and 2010 editions, Department of Statistics, Department of Economic Planning and Development, Prime Minister's Office. Data for 2011 and 2012 are from the same department.

Notes:

1. Data prior to 2000 are not available according to the classification used in this table. LNG and oil data are reported as oil sector (see *Brunei Darussalam Statistical Yearbook 2005*).
2. Data shown in this table are new GDP estimates based on the latest international guidelines as outlined in the 1993 System of National Accounts (1993 SNA). The new GDP estimates are now adopted in Brunei as official estimates to replace the previous series. The previous GDP series followed the 1968 SNA.

Table 5: Production and Exports of Oil and Gas of Brunei, 1990-2011

Year	Oil production(000 b/d)	Oil export(000 b/d)	Average oil price (US$/b)	Gas production (MMscf/d)	LNG export(Tbtu)	Average LNG price (US$/MMbtu)
1990	152	147	23.46	916	276	3.58
1991	162	162	20.72	940	275	3.75
1992	182	176	20.73	953	276	3.45
1993	175	170	18.82	965	286	3.33
1994	179	174	17.05	993	283	3.14
1995	175	168	18.28	1079	323	3.39
1996	165	161	21.97	1073	321	3.67
1997	160	152	21.48	1072	319	3.85
1998	157	151	13.43	1037	305	2.92
1999	182	174	18.57	1082	323	3.22
2000	193	189	29.70	1124	333	4.53
2001	195	n.a	24.70	n.a	n.a	4.41
2002	203	198	25.33	1143	966	4.17
2003	207	199	30.18	1231	1014	4.54
2004	208	196	41.83	1209	998	4.87
2005	201	193	57.72	1185	977	5.67
2006	219	201	69.59	1244	1032	5.91
2007	194	173	79.09	1215	996	6.30
2008	174	153	100.99	1202	1000	12.93
2009	167	148	64.54	1140	920	10.46
2010	170	155	79.27	1208	935	11.64
2011	166	155	116.13	1256	985	16.51

n.a = not available

Source: *Brunei Darussalam Seventh National Development Plan 1996-2000*, Tables 3a and 3b; *Brunei Darussalam Eighth National Development Plan 2001-2005*, Tables 4b and 4c; *Brunei Darussalam Statistical Yearbook* 2006, 2008 and 2011 editions.

occupy more than two thirds of the Brunei GDP (Table 4).

As shown before, GDP growth of Brunei for 2012 was only 0.9 percent compared with 3.4 percent a year ago. The slower growth was due to a drop in oil and gas output together with sluggish activities related mostly to the LNG business (see Islam and Zawawi 2012 for details).

International prices of oil and LNG are also responsible for GDP changes. When prices are high, the contribution of the LNG output to the economy shows a positive correlation, as evident in 2008 and 2009. The LNG shares of GDP in 2008 and 2009 were 12.88 and 12.98 percent respectively, with the average LNG price per million British thermal unit (MMBtu) at US$12.93 and 10.46 respectively. When prices were low, as in 2006 and 2007, for example (Tables 4 and 5), the LNG contribution to GDP became weaker. The correlation of gas and oil contribution to GDP is shown elsewhere (Islam and Zawawi 2012).

4-3 Contribution to Government Revenue

The LNG industry pays royalties and taxes to the Government of Brunei. Royalties and company income taxes paid by the LNG and oil industry increased (LNG industry data is not separately available) from B$2704 in 2000 to B$4053 in 2009/10 (the latest available data). The LNG and oil sector contributed 93 percent to total revenue with a value of B$12,020 million in the fiscal year 2011-12 (April-March). Consequently, revenues fluctuate with oil and gas production and prices, and the profitability of the oil and gas industry. Oil and gas sector revenue as a share of total revenue increased from 83 percent in 2000 to 93 percent in 2011-12 (Table 6).

Brunei has no personal income tax or sales tax. The corporate income tax rates are 55 percent for petroleum companies and natural gas companies, both of which pay taxes on a quarterly basis, and 30 percent[2)] for all other companies that are not included under tax exemption schemes (WTO 2008, p. 7).

Brunei levies both a tax and a royalty on the production of oil and gas. The rate of tax is currently 55 percent. Royalty rates vary between 12.5 percent onshore to 10 percent close to the shore and 8 percent in remote offshore areas. There are no limits on the recovery of costs. The government's share of oil production is between 75 and 85 percent, depending upon the location of the field, with more remote locations attracting the concessional rate (IEA 1996, p. 110).

Table 6: Distribution of Oil and Gas Revenue in Brunei, 2000 to 2011-12 (In millions of Brunei dollars)

Fiscal year	Oil & gas production companies income tax	Oil & gas royalties	Dividend paid by oil companies	Oil & gas sector revenue	Oil & gas as a percent of total revenue
2000	2,256	448	1,552	4,227	83
2001	2,125	389	1,109	3,623	86
2002	2,116	384	1,198	3,697	87
2003-04	3,151	634	1,764	5,550	87
2004-05	3,439	662	1,714	5,815	91
2005-06	4,980	854	1,941	7,775	92
2006-07	5,300	942	2,360	8,602	92
2007-08	6,029	992	1,820	8,841	88
2008-09	7,105	1,089	2,356	10,551	93
2009-10	3,326	727	1,537	5,590	87
2010-11	na	na	na	8,089	88
2011-12	na	na	na	12,020	93

n.a = not available
Source: Brunei Government, *Brunei Darussalam Statistical Yearbook 2011* (Table 7.1); International Monetary Fund, *Brunei Darussalam: Statistical Appendix*, IMF Country Report No. 12/193 (July 2012) and IMF Country Report No. 06/428 (December 2006).
Note: From 2004, fiscal year of Brunei changed from a calendar year to April-March. Financial year 2003-04 is from January 2003 to March 2004.

4-4 Contribution to Local Energy Supply

In addition to the export of LNG to foreign markets, LNG production also contributes to the local energy supply in the form of liquefied petroleum gas (LPG). LPG is produced as a by-product in the LNG manufacturing process. LPG is bottled into canisters and sold as domestic cooking gas.

Domestic demand for gas in Brunei is dominated by the power sector which currently takes around 92 of all the gas consumed in the country. The remaining 8 percent is used in the residential sector (Brunei LNG website www.bruneilng.com/home.asp) where it has been used since 1986, principally for cooking. In the

2) Currently, the corporate income tax rate is 22 percent (Oxford Business Group 2011, p. 204)

eastern part of the country LPG (produced as a byproduct at the LNG plant) is bottled and is available to consumers in canisters. In the western part of the country, in the Kuala Belait and Seria area, there is a well developed gas distribution system. The gas distribution grid is owned by the Government and operated by the Public Works Department.

4-5 Generating Jobs for Bruneians

Employment creation for Brunei citizens is another important contribution of LNG manufacturing. Directly employed in the production of LNG are more than 683 people, of whom 92 percent Bruneians (BLNGema, Quarter 2, 2012). Employment figures in other companies related to LNG, gas production and export are not separately available. However, large-scale employer such as Brunei Shell Petroleum (oil and gas production company) follow the Government's "Bruneianization" policy, which encourages companies to give preference to Bruneians in their employment policies, and which was put in place to reduce unemployment among Bruneians.

V Risk Effects Embedded in LNG Dominance

Brunei prosperity derives from the fact that LNG and oil exports have been an abundant financial resource for boosting its economy. As shown in Table 3, about 92 percent of the value of exports of Brunei comes from LNG and oil exports. Large incomes generated by these exports have brought economic benefits to Brunei. A high per capita income provides every family a comfortable standard of living. But a recent study conducted by World Economic Forum states that "petro-states", which depend on oil and gas exports heavily, may run the risk of "Dutch disease" (WEF 2012, p. 28).[3] Brunei, Saudi Arabia, the United Arab Emirates, Qatar, Iraq, and Kazakhstan, among others, are categorized by the WEF study as petro-states.

Another study conducted by the World Bank (2005, p. 119) notes that countries that receive large incomes and foreign exchange generated by exports of oil and gas may face the problem of "resource curse" – a paradoxical situation in which countries with an abundance of oil, gas and minerals experience stagnant growth or even economic contraction. A commonly cited example of the resource curse is the Dutch disease, a situation which occurred in the Netherlands following a large natural gas find in the 1970s.[4] The essential elements of the Dutch disease include: 1) skilled workers from other sectors transfer to the resource sector; 2) other industries especially the manufacturing sector, begin to suffer; and 3) higher wages make the national currency less competitive (Corden and Neary 1982; Connolly and Orsmond 2011; Larsen 2004).

Using all those three indicators, one study (Othman 2012) finds the prevalence of Dutch disease in Brunei. He argues that there is a lack of development of the manufacturing sector in Brunei, a decline in the absolute size of its agricultural sector and an increase in Government administrative services. These are all indicative of the Dutch disease. In contrast, Tisdell (1997) suggests that it is not clear whether Brunei has suffered the syndrome of "Dutch disease". Another study (Lawrey 2010) notes that it is still unclear whether oil and gas is a blessing or a "curse" for the development of Brunei. These authors have not considered the dependence

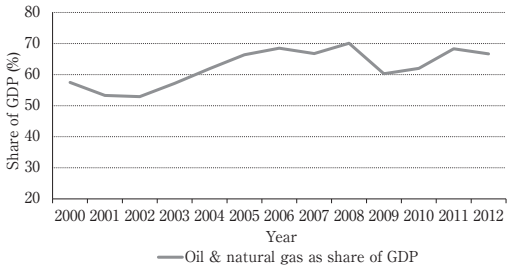
3) The phrase Dutch disease was first used in an article of the weekly magazine the Economist in 1977. This article focused on the fact that the discovery of a large natural gas field in the Netherlands in 1959 had served to weaken the manufacturing sector eventually.

4) Resource curse is also known as the "paradox of plenty".

effect of Dutch disease as stated in the literature. For this reason, the focus of this section is on the dependence effect of the Dutch disease in the context of the Brunei economy.

Under the dependence effect, whether or not a country is suffering from the Dutch disease depends on the definition of it (Larsen 2004). One definition for suffering from the Dutch disease may simply involve the level of the oil and gas share of economic activity, i.e. the condition that oil and gas revenues comprise a large share of Gross Domestic Product. In Brunei, that fraction is large (Figure 2).

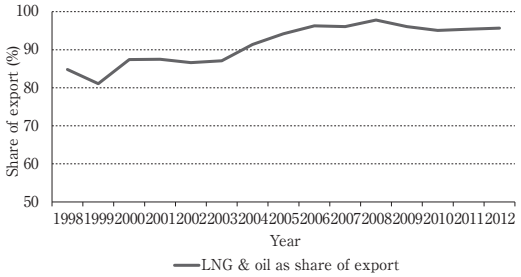
The value of LNG and oil production increasingly dominated GDP until 2012 when it almost represented 67 percent of all economic activity. The value of LNG and oil production was 70 percent of GDP in 2008. Thus the reliance on LNG and oil revenues, symptomatic of Dutch disease, is present in the economy of Brunei.



Source: Based on data from *Brunei Darussalam Statistical Yearbook* 2005 and 2011 editions. Data for 2012 are from Statistics Department of the Department of Economic Planning and Development at the Prime Minister's Office, Bandar Seri Begawan.

Figure 2: Oil & Natural Gas Production as Share of GDP, Brunei 2000-2012 (Current prices)

Another definition for suffering from the Dutch disease includes the LNG and oil's share of exports over the period. From Figure 3 we observe that the value share of LNG and oil exports was 96 percent for 2012. Of course, the value of oil and gas exports critically depend on the world prices of oil, and these prices fluctuate. Nevertheless, we do observe over the 1998-2012 period that high or low prices, the value share is very high and increasing, indicative of the presence of the Dutch disease.



Source: Based on data from *Brunei Darussalam External Trade Statistics 2008; Brunei Darussalam Statistical Yearbook* 2011. Data for 2012 are from Statistics Department of the Department of Economic Planning and Development at the Prime Minister's Office, Bandar Seri Begawan.

Figure 3: LNG & Oil as Share of Export, Brunei 1998-2012

In order to avoid Dutch disease "petro-states" like Brunei will have to look at ways of diversifying their economies as stated in a study conducted by World Economic Forum (2012, p. 28). Depending substantially on just one or two export commodities becomes obviously risky, because changes in the international price of that commodity can generate a dramatic effect on the economy. Brunei is well aware of this, especially since the oil price downturn of the 1990s. In the year 1990, the price of oil was US$23.46 per barrel. It decreased to US$ 13.43 in 1998, then increased to US$100.99 in 2008 and US$ 116.13 in 2011. Similarly the price of LNG also fluctuated – US$3.58 per MMBtu in 1990, US$2.92 in 1998, US$ 12.93 in 2008 and

US$16.51 in 2011 (as shown in Table 5). With the changes in the prices of oil and LNG, the GDP of Brunei has also fluctuated (Islam and Zawawi 2012).

To avoid the Dutch disease, the Government of Brunei is looking to diversify the economy. But critics say the efforts at diversifying its economy have yet to see success with statistics showing that the non-oil and non-gas industry contributed little to the Gross Domestic Product of Brunei. Efforts to diversify the economy were included in the Second National Development Plan of 1962-1966 and continue until today. If we refer to 2011 statistics, the total Gross Domestic Output of Brunei at current prices was B$20.6 billion and $14 billion or 68 percent of the total was contributed by the oil and gas industry. Meanwhile, the contribution of the non-oil and gas industry was $6.6 billion, or 32 percent of the total gross output. Therefore, based on these statistics, and also from the fact that government efforts to diversify the economy are still included in the present Tenth National Development Plan, it shows that the "Brunei economy is still heavily dependent on oil and gas and efforts to diversify the economy have not been successful as of yet". This statement is from the Minister of Industry and Primary Resources (Brunei Times, 27 March 2013).

VI Summary and Concluding Remarks

As a small open economy, the effects of Brunei LNG production have been noteworthy, especially in terms of government revenues and the contribution of these commodities to the national income. In the last three decades the Brunei economy relied unquestionably on LNG and oil related activities, especially earning a lot from external trade operations. The contribution of LNG to export earnings reached 48 percent of the total external proceeds in 2012.

The LNG contribution to Government revenues has enabled higher public expenditure, a wide range of welfare services and a large number of construction and public works projects. In 2012, the LNG plant alone employed more than 683 personnel, of whom about 92 percent were Brunei citizens. This industry is helping Brunei to implement the Bruneianization policy currently orchestrated by the Government. LNG and gas production has helped to reduce fuel and electric costs in Brunei. For example, the LNG plant produces petroleum gas (LPG) as a by-product which domestic consumers use as a cooking fuel.

The LNG and oil industry guarantees a very comfortable and stable lifestyle for the entire Brunei population by providing enough financial resources. Nevertheless, many economists start worrying that prolonged dependence on a single sector by itself has its disadvantages. As already argued above, LNG and oil are the primary sources for both the government's budget and foreign exchanges. If the long-lasting stage of the overwhelming dependence on LNG and oil is continued as a matter of course, this will eventually generate a certain risk concern.[5] One such risk element identified in this paper is the symptom of the so-called Dutch disease. To avoid the Dutch disease the Government of Brunei has to make every effort to diversify the economy to mitigate the current excessive dependency on the LNG and oil sectors.

5) Price turbulence or uncertainty of the commodity is another risk concern. Authors of this paper are planning to tackle this issue in the coming research project.

The Government has acknowledged this fact and has started to meet such challenges. Unfortunately a recent WTO study (2008, p. 11) concluded that the diversification policy of Brunei has met with little success. Despite the emphasis of the government on diversification, non-oil and gas manufacturing remains weak and underdeveloped. Some observers identified that the economy seems to have become even more dependent on the oil and gas sectors. Therefore, if a more balanced development is to be advanced in the country, increased diversification of the economy has to be pursued more rigorously. Without tackling these challenges, Brunei may face in the long term more complicated and tougher hurdles in order to sustain its established welfare state and high income status. For further economic advancement, it is necessary to work out an appropriate and well-coordinated industrial policy if Brunei is to remain resilient in an uncertain future.

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Economic Development in a Small Open Economy with a Rich Resource Endowment

The Case of Brunei

Sumimaru Odano
Saiful Islam

LNG and oil production and exports have become important aspects of the small state of Brunei. Over the past four decades, natural gas production in the country increased dramatically and has exceeded oil production since 1987. LNG production of Brunei was the first of its kind in Asia and the plant has successfully operated and delivered its LNG commitment for the past 40 years. A major buyer of LNG from Brunei is Japan.

This article looks at the effects of natural gas production on the economy of Brunei. Using data for the period 1986 to 2012, this paper finds that the effects of LNG production have been significant, especially in terms of export earnings, government revenues and the contribution of LNG to the national income. For example, LNG production alone provided 48 percent of export earnings for Brunei in the year 2012. Large incomes and foreign exchange generated by LNG and oil exports have provided funds to finance the economic development of Brunei. LNG production contributed 11 percent of the Gross Domestic Product (GDP) of Brunei in 2012. LNG and oil companies paid 93 percent of government revenues in 2012. Based on the data for the 2000s, this article also finds that the heavy dependence on LNG and oil exports has created symptoms of the so-called Dutch disease in the economy of Brunei.