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Indonesian Petroleum Industry and Development: A Centennial Survey and Future Prospects

Muhammad Kholid Syeirazi¹, Eko Prasojo², Muh Aziz Muslim²

¹ Doctoral student, Faculty of Administrative Science, University of Indonesia, Depok, Indonesia ² Faculty of Administrative Science, University of Indonesia, Depok, Indonesia

Correspondence: Muhammad Kholid Syeirazi, Faculty of Administrative Science, University of Indonesia, Depok, Indonesia. E-mail: mksppurban79@gmail.com

Abstract

The contribution of oil and gas to development is a classic debate among scholars. Some believe that oil and gas are positively related to development, while others believe the opposite. This study examines the contribution of oil and gas to development in Indonesia. Historical analysis of long-term data series, extracted from statistical documents since the colonial era, shows a positive relationship between oil and development in Indonesia. Although its contribution fluctuates, oil and gas have contributed to growth and welfare. However, the future of Indonesia's oil and gas industry is at stake. Declining reserves and production and shrinking upstream investment due to declining competitiveness amid the green energy transition agenda threaten the sustainability of Indonesia's oil and gas industry in the future.

Keywords: Oil and Gas Development, Ups and Downs, Future Prospects

1. Introduction

The relationship between oil and development has been the subject of classic debate. Some economists believe oil contribute positively to development and prosperity (Ginsburg, 1957; Rostow, 1961; Drake, 1972; Balassa, 1980). Other scholars found oil to be negatively related to development. Producing countries, which depend on oil for their revenue, are less prosperous than non-producing countries. Studies by Nankani (1979), Corden & Neary (1982) and Alan Gelb (1988) show that mineral rents fail to capitalize on long term self-sustaining growth and development. Some of them are even worse off. They are poorer than resource-poor countries and suffer from the so-called resource curse (Auty, 1993; Sach & Warner, 1995, 1999, 2001) or the paradox of plenty (Karl, 1997).

The resource curse thesis explains the entry of the curse through three channels: economic, political and social. From the economic channel, the curse begins to work when policy makers begin to rely on natural resource rents rather than collecting taxes derived from the development of the manufacturing and industrial sectors (Iimi, 2007; Wood & Berge, 1997; Gylfason et al., 1999; Gylfason, 2001). Instead of exercising fiscal discipline, the

availability of 'easy money' makes politicians and bureaucrats wasteful and inefficient. This makes producer countries poorer, regardless of their income levels (Heal, 2006). They spend natural capital faster than they form other capital, hence their savings are limited (Atkinson & Hamilton, 2003; Gylfason & Zoega, 2006; Dietz et al., 2007; Boos & Holm-Müller, 2013). Another factor is price volatility that triggers instability and development failure (Davis & Tilton, 2005; Frankel, 2010; Vander Ploeg & Poelhekke, 2009a, 2009b; 2010).

From the political channel, the curse enters when oil becomes a source of conflict, corruption and rent-seeking and the birth of authoritarianism (Aslaksen, 2010; Dunning, 2008; Haber & Menaldo, 2011; Ross, 2001, 2012; Bannon & Collier, 2003; Ross, 2001). Managed without public accountability, mineral rents become a source of inequality that ignites conflict among stakeholders and fuels horizontal tensions (Sarraf & Jiwanji, 2001; Sala-i Martin & Subramanian, 2012; Davis & Tilton, 2005; Bodea et al., 2016). Oil rents are used to fund political patronage, silence opposition and consolidate autocratic rule (Dunning, 2005; Nting, 2019). Some mineral rents are used to expand the state machine that grows out of the established bureaucracy (Wälde, 1984). From the social channel, the curse sets in when natural resource rents reduce incentives to accumulate human capital due to high levels of non-wage income or natural resource-based wages (Gylfason, 2001; Stijns, 2006; Daniele, 2011; Blanco & Grier, 2012; Shao & Yang, 2014).

However convincing, the curse thesis has provoked sharp criticism. A number of scholars cast doubt on the claimed linear relationship between natural resource wealth and the development curse (Manzano & Rigobon, 2001) and strongly criticized the notion that the curse is an endogenous factor in natural resource wealth (Wright & Czelusta, 2004). James (2015) calls the curse thesis developed by Sach & Warner a statistical mirage because the sampling was done during a period when commodity prices were slumping on the world market. Looking at a longer time interval, the period 1970-2000 was characterized by positive growth in non-extractive sectors such as manufacturing and services. The crux of the problem is not the curse of natural resources, but the speed at which countries diversify into non-resource industries, whether commodity prices rise or fall. The effect of natural resources (Stijns, 2005). Natural resources can be a blessing or a curse depending on their use and the quality of institutions that determine their utilization in promoting economic growth (Antonakakis et al., 2017). Rather than a curse or a fate, natural resource rents can spur economic development if combined with knowledge accumulation for economic innovation (Lederman & Maloney, 2007).

Reaffirming the stance of classical economists, natural resource wealth is a blessing for development and not a curse. Greater abundance leads to better institutions and more rapid growth (Brunnschweiler & Bulte, 2008). Despite some negative consequences such as widening income inequality, mineral wealth is not a curse and its effects are positive for long-term economic growth (Alexeev & Conrad, 2009). Natural resources increase growth in stable countries, but make volatile countries more unstable which erodes growth prospects (Van der Ploeg & Poelhekke, 2010). Natural resources have a positive effect on growth, but are eroded by volatility. Therefore, the source of the curse is not natural resources and natural resource rents, but the notorious commodity price volatility (Van der Ploeg & Poelhekke, 2009a, 2009b).

What about Indonesia? Although not free from corruption and political patronage, various studies say Indonesia has managed to escape the natural resource curse (Sovacool, 2010). Diversification of the non-hydrocarbon sector ensured growth sustainability when the oil boom era passed and Indonesia avoided Dutch disease (Gelb, 1988). Effective fiscal policy allowed Indonesia to escape the natural resource curse as some of the oil rents were channeled into expanding rural infrastructure and developing a labor-intensive agricultural sector (Auty, 2007). The conservative response of technocrats to the oil boom in the 1970s and a series of deregulation policies pursued in the 1980s allowed Indonesia to escape the Dutch disease (Usui, 1997). Only after Indonesia's revolutionary populist forces were defeated, according to Rosser (2007), capitalist-oriented social groups have pushed Indonesia away from the natural resource curse with open economic policies that opened access to foreign aid, markets, technology and investment. Other scholars mentioned that elements of the Dutch disease were still found in the period 1970-1996, but were successfully eroded after *Reformasi* with three policies, namely fiscal decentralization with 'Revenue Sharing Funds' (*Dana Bagi Hasil*), promotion of the manufacturing sector and improved governance (Taguchi & Khinsamone, 2018).

This paper reinforces the thesis of the positive relationship between petroleum and development. Oil and gas play an important role in Indonesia's development history. Despite the ups and downs of its contribution to development, oil is an important part of Indonesia's post-independence development history. The windfall from rising world oil prices in the first (1973-1975) and second (1980-1981) oil boom was a blessing that made Indonesia more prosperous. A mixture of luck and good management made Indonesia reclaim what Booth (1998) calls 'the history of lost opportunities.' Indonesia carved out a success story of oil-facilitated development, but was able to maintain growth rates when oil prices collapsed and the country developed increasingly outwardlooking economic policies (Van Zanden & Marks, 2012: 28).

This paper will analyze the contribution of oil and gas to Indonesia's development over time. The indicators that will be used are economic growth, oil and gas contribution to GDP and social welfare. To explore the prospects of the oil and gas industry in Indonesia, this paper will capture the performance of the oil and gas sector in terms of reserves, production, consumption, exports and imports. Long time series data will provide a full picture of the ups and downs of Indonesia's petroleum industry, its contribution to development and its prospects in the future, including in relation to the energy transition agenda.

2. Method

This study is a qualitative historical analysis of the development of the oil and gas industry in Indonesia based on statistical data extracted from primary sources in the period 1893-2023. These data were obtained from colonial statistical documents published by the Centrale Commissie voor de Statistiek (CCS) (1893-1898), Centraal Bureau voor de Statistiek (CBS) (1899-1923), Centraal Kantoor voor de Statistiek, Departement van Landbouw, Nijverheid and Handel (CKS-DLNH) (1924 s.d. 1933), Centraal Kantoor voor de Statistiek, Department van Economische Zaken (CBS-DEA) (1934-1941), Central Bureau of Statistics, Department of Economic Affairs (CBS-DEA) (1941-1984), *Biro Pusat Statistik* (Central Bureau of Statistics) (1984-1997) and *Badan Pusat Statistik* (BPS Statistics Indonesia) (1998-now). Other sources were extracted from documents of the Ministry of Energy and Mineral Resources (MEMR), BP Migas/SKK Migas, Statistical Review of World Energy and others. These documents are needed to obtain a whole picture, in a long time series, of governance and its impact on the performance of the oil and gas industry and development, especially its ups and downs. Since 1899 until now, Indonesia has experienced five governance regimes, namely concessionary regime (1899-1960), Contract of Work regime (1960-1966), Production Sharing Contract regime (1966-2001), Cooperation Contract regime (2001-2012), and Cooperation Contract regime, with Production Sharing Contract and Gross Split variants since 2017 (2012-2022). The data obtained will be processed and displayed in figures.

3. Result and Discussion

Indonesia's oil and gas industry dates back to the first exploration in 1860 at Mount Ciremai, Cirebon, and commercial production began two decades later. During the period 1890-1900, production came from oil fields in Telaga Said (North Sumatra), Perlak (Aceh) and Sanga-Sanga (East Kalimantan). As drilling activity increased, the colonial government issued the Indische Mijnwet Staatsblad 1899 No. 214. Production continued to increase from thousands of barrels per day to tens of thousands to hundreds of thousands of barrels per day. Production reached its peak during the New Order, averaging 1.3 million barrels per day from 1967-1998 (Figure 1). Indonesia joined OPEC and enjoyed windfall profits from any increase in world oil prices. After the New Order fell, and Law No. 8 of 1971 was overhauled with Oil and Gas Law No. 22 of 2001, Indonesia's oil and gas industry went into decline. This was characterized by declining reserves and production and rising imports due to increased consumption (Figure 2). Since 2004, Indonesia has officially become a net importer of oil and decided to withdraw from OPEC membership in 2008.



Figure 1: Oil Production, 1900-2022

(Thousand Barrels of Oil per Day)

Source: Statistisch Jaaroverzicht, Indisch Verslag, Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.



Figure 2: Oil Production vs Consumption (Thousand Barrels of Oil per Day)

Source: Indisch Verslag, Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.

Natural gas, which began to be produced in 1920, saw production rise from 1975 and continued to increase during the 1980s-1990s. Since 2002, natural gas production has overtaken oil production in oil barrel equivalents. The combined production of oil and gas helped create a surplus of production over consumption. However, for the first time in history, oil and gas production was overtaken by total oil and gas consumption since 2012. Oil and gas production grew by an average of 3 percent annually during 1967-2022, while consumption grew by 6 percent (Figure 3). The double growth of consumption over production changed Indonesia's status as a net importer.



Figure 3: Oil and Gas Production vs Consumption (Thousand Barrels of Oil Equivalent per Day)

Source: Indisch Verslag, Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.

As with production, oil and gas reserves continue to decline. Oil reserves fell by an average of 3 percent over the period 1980-2001 and 4 percent over the period 2002-2022. In 1980, oil reserves were still 11.6 billion barrels, then fell to 5.1 billion barrels in 2001 and plunged to 2.1 billion barrels in 2022. Gas reserves rose by an average of 2 percent during the 1980-2001 period, but fell by an average of 3 percent during the 2002-2022 period. In 1980, gas reserves reached 28.2 TCF, equivalent to 16.6 billion BOE, rose to 91.8 TCF or 21.4 billion BOE in 2001, then fell to 41.6 TCF or 9.5 billion BOE in 2022 (Figure 4). The oil and gas reserves-to-production (R/P) ratio is fifteen years. This means that, assuming no giant new reserve discoveries, Indonesia will have no more oil and gas reserves to produce in the next one and a half years.



(Billion Barrels of Oil Equivalent) Source: BP Statistical Review of World Energy

Declining reserves and production have made Indonesia increasingly dependent on imported oil to supply its domestic needs. Oil was once a mainstay export commodity that allowed Indonesia to benefit from any increase in world oil prices. Along with declining production and rising consumption, imports began to overtake exports since 2004. Indonesia drains more foreign exchange for imports than foreign exchange earned from exports.

Starting in 2008, the gap has widened since 2008 until now (Figure 5). The oil and gas trade deficit contributed to the trade balance deficit, which led to the depletion of foreign exchange reserves and the weakening of the rupiah exchange rate (Figure 6).



Figure 5: Oil Exports vs Imports (Thousand Barrels of Oil per Day)

Source: Statistisch Jaaroverzicht voor Nederlandsch-Indië, Meerjarige Overzichten van de In- en Uitvoer van Indonesië, Statistisch Zakboekje voor Nederlandsch-Indië; Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.



Figure 6: Export vs Import Value of Oil and Gas (Million US\$)

Source: Statistisch Jaaroverzicht voor Nederlandsch-Indië, Meerjarige Overzichten van de In- en Uitvoer van Indonesië, Statistisch Zakboekje voor Nederlandsch-Indië; Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.

Starting to fade, oil and gas were once an important component of growth, especially during the New Order. The contribution of oil and gas is shown by the contribution of oil and gas to GDP and the contribution of oil and gas to the state budget. The contribution of oil and gas to GDP during the 1900-1960 period averaged 6.4 percent, then rose to 17.3 percent during the 1960-2001 period, then fell to 4.4 percent during the 2002-2022 period. During the New Order (1967-1998), the contribution of oil and gas to GDP averaged 18 percent (Figure 7).



Figure 7: GDP from oil and gas (at current prices) (%)

Source: 1900-1982 data taken from Van der Eng (2010) estimation, 1983-2022 data processed from BPS, Statistics Indonesia, various years.

In terms of revenue, oil and gas accounted for an average of 11.7 percent of government revenue during the 1900-1960 period, with an average amount of IDR 400 million. The ratio rose to 33.5 percent during the 1960-2001 period, with an average amount of IDR 9.8 trillion. During the 2002-2022 period, the ratio dropped to 16.7 percent, but the nominal prorata rose to IDR 173.6 trillion (Figure 8). By 2022, as revenue sources grow and diversify, the ratio of oil and gas revenue to total state revenue will be 8 percent (Figure 9). This shows the transformation of the Indonesian economy, which no longer relies on oil and gas as the prima donna. Oil and gas revenues rose nominally, but fell in percentage terms.



Figure 8: Oil and Gas Revenue, 1900-2022 (Billion IDR) Source: Indisch Verslag, Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.

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Figure 9: Ratio of Oil and Gas Revenue to State Revenue, 1900-2022 (%) Source: Indisch Verslag, Statistical Pocketbook of Indonesia, Statistics Indonesia, various years, processed.

The most notable contribution of oil and gas to development occurred during the New Order era. Indeed, some of the oil money was eaten up by Soeharto and his cronies in a corruption octopus that almost bankrupted Pertamina in 1976. However, others were allocated effectively and transformed into thousands of Inpres primary schools (SD Inpres), thousands of health centers (Puskesmas), and improved agricultural infrastructure that led Indonesia to achieve rice self-sufficiency in 1984. In the post-reform era, along with the shrinking share of oil and gas to GDP and state revenue, oil and gas is no longer a social asset to leverage welfare, but an instrument to maintain fiscal balance and macroeconomic stabilizers. Oil money is no longer managed centrally, but shared with the regions following the principle of fiscal decentralization. Unfortunately, oil money was increasingly eroded to pay for subsidies and fuel compensation that were not well targeted. The amount of fuel subsidies and compensation erodes state revenue from the oil and gas sector. In 2020 and 2021, fuel subsidies eroded 91 percent and 75 percent of oil and gas revenues. In 2022, oil and gas revenues were not even enough to support the fuel subsidy and compensation budget, the ratio of which reached 218 percent (Figure 10).



Figure 10: Fuel subsidies and compensation (IDR Trillion)

Source: LKPP (Central Government Financial Statements), various years, processed

4. Conclusion

Oil and gas had an important contribution to Indonesia's development, especially during the New Order era. Oil money undeniably contributed to alleviating poverty and making Indonesia more prosperous. Unfortunately, oil money is increasingly being eroded to pay for subsidies and fuel compensation that are not well-targeted. This has slowed down the poverty alleviation agenda and widened the gap.

Indonesia's oil and gas industry is in a declining stage. For decades, Indonesia has not discovered giant reserves like the Rokan Block in Riau and the Mahakam Block in East Kalimantan. The oil reserves that are found are small, which are depleted within a few months of production. Exploration found more gas than oil, in the east, offshore and in increasingly deep areas. Fortunately, Indonesia discovered the Cepu Block in 2005, which increased the reserves to production (R/P) ratio.

The decline of Indonesia's oil and gas industry is partly due to technical reasons, but mostly due to non-technical factors. Upstream oil and gas investment has become increasingly complicated, convoluted and bureaucratic, eroding Indonesia's competitiveness in the eyes of investors. In the midst of an energy transition agenda that reduces fossil energy investment, Indonesia could be left behind by investors who choose other countries that promise more ease of doing business. Without an investor-friendly institutional and fiscal design overhaul, Indonesia must not only bury its hopes of boosting oil production to 1 million barrels per day by 2030, but must prepare to see its oil sector collapse even sooner.

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