



East Asia's gas-market failure and distinctive economics—A case study of low oil prices



Xunpeng Shi ^{a,b,*}, Hari M.P. Variam ^b

^a Australia-China Relations Institute, University of Technology Sydney, Australia

^b Energy Studies Institute, National University of Singapore, Singapore

HIGHLIGHTS

- East Asian gas economics is distinctive due to exogenous oil-indexed pricing and specific factors.
- The distinctive economics has led to market failure and some unexpected behaviours.
- The distinctive economics explains co-existence of surplus and shortage when oil prices are low.
- The analytical framework based on the distinctive economics is useful to assess policy options for East Asia.

ARTICLE INFO

Article history:

Received 2 January 2017

Received in revised form 4 March 2017

Accepted 19 March 2017

Keywords:

Oil indexation

Hub

Gas economics

Liquefied natural gas (LNG)

Low oil prices

East Asia

ABSTRACT

This paper proposes that the gas economics in East Asia (including Southeast Asia and Northeast Asia) is different from standard economics due to its exogenous oil-indexed pricing and certain region-specific and industry-specific factors. Based on a hypothesis of distinctive economics, this paper proposes an analytical framework that studies East Asian gas markets. We demonstrate this framework through a case study of the effects of a low oil prices. The qualitative and quantitative results demonstrate that low oil prices, and subsequent oil-indexed gas prices, have affected gas supply and demand, and trade and pricing dynamics in ways that can be explained by the distinctive gas economics. This paper demonstrates that the distinctive economics may cause market failure and that the analytical framework based on the distinctive economics can be used to assess policy options to address these market failures.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The global market in liquefied natural gas (LNG) is undergoing seismic changes: markets are more globally integrating, gas and LNG pricing mechanisms and business practice in relation to contractual terms are changing, and unbalanced supply and demand in the past few years. The low oil prices in the past years add further complication to those changes. Over the past two years, oil prices have declined more than 70%—with Brent benchmarks dipping from US\$110 in June 2014 to below US\$30 a barrel in early 2016, and remaining at approximately US\$50 for most of 2016.

In this context, studying the effect of oil prices on natural gas in East Asia (including Southeast Asian and Northeast Asia) is important for East Asian and world gas markets for three principal reasons. First, the expected prolonged period of low oil prices has

affected global gas markets and will continue to do so for the foreseeable future. Studies have observed independent short-term fluctuation in gas prices with long-term interdependence (co-integrated processes) with oil prices [1–4]. Ramberg [2] found a statistically significant relationship between oil and gas prices in the short and long terms. According to Hartley et al. [4], oil and gas prices can decouple in the short term but the long-term dependence is hypothesised to continue due to technology interdependence. Even in the United Kingdom (UK) where gas prices are generated by hub, there is long-term relationship between oil prices and spot gas prices [5].

Second, fluctuations in the oil prices have a particularly significant effect on natural gas in East Asia because the region's imported gas and LNG are traded under oil-indexed contracts. The oil-indexed gas trade (both LNG and pipeline) in East Asia as a percentage of the region's total gas trade reached 83.7% in 2015, which is a great deal higher than the global average of 48.7% [6]. East Asia's natural-gas spot prices have declined along with oil prices, although with some time lag. In October 2016,

* Corresponding author at: Australia-China Relations Institute, University of Technology Sydney, Australia.

E-mail address: xunpeng.shi@gmail.com (X. Shi).

Japan's LNG import Cost, Insurance and Freight (CIF) price was less than US\$6 per MMBTU, which was down from more than US\$16/MMBTU in June 2016 [7]. The LNG spot prices then went to even lower levels. On 18 April 2016, the free-on-board Singapore Exchange (SGX) LNG Index Group (SLInG) prices for June 2016 fell below US\$4 per MMBTU [8].

Third, East Asia is a critical player in the global gas and LNG markets. East Asia possesses the world's fastest growth rate in natural-gas demand in recent years—a trend that is expected to continue in until 2035 [9]. Given that gas accounted for only 5% and 9% of the 2013 total primary energy supply in China and India, respectively, the demand of these countries for natural gas is expected to surge due to increasing pressure from their citizens to reduce air pollution immediately and mitigate climate change and coal emissions in the long term [10]. According to BP [11], East Asia's share of the global gas market is expected to increase from 18.8% in 2012 to 26.3% in 2035. Given that the overall scale of East Asia's demand for natural gas vastly outstrips intraregional supplies and most countries in the region (except for China and Singapore) have no pipeline imports, the region has relied heavily on LNG imports to satisfy gas demand. In 2015, 72% of globally traded LNG went to Asia, with the world's top three LNG importers (i.e., Japan, South Korea, and China) residing in the region and importing 56.5% of globally traded LNG, despite a decline in gas imports in Japan and South Korea for the first time since 2009 [12]. The International Energy Agency (IEA) predicts that Asia may absorb 80% of the incremental LNG imports over the medium term, with China alone absorbing 30% [13].

This paper analyses the extent to which gas prices, trade and production in East Asia is influenced by world oil prices with particular focus on the current scenario of low oil prices. The paper argues that East Asia's gas economics is different from standard economics due to East Asia's specific regional factors such as a prevailing oil-indexed gas-pricing mechanism, commercial practice, and national institutions. This distinctive economics and some sector-specific factors such as high capital intensity and long lead time provide a theoretical framework for assessing the effect of low oil prices on supply, demand and investments in natural gas in the East Asian region. Based on this hypothesised distinctive economics, a case study is employed to examine how low oil prices affect the gas sector using quantitative and qualitative research methods. The quantitative assessment is conducted using a world gas trading model. The study demonstrates that many market failures in the gas and LNG markets are explained by the proposed distinctive gas economics and associated sector-specific factors. This analytical framework coming from the distinctive economics provides a tool for policy makers and industry to assess policy options that can address these market failures.

This research makes three major contributions. First, the proposal of the existence of distinctive gas economics in East Asia is new to the literature. This hypothesis provides an analytical framework to explain many unexpected behaviours and is useful for the gas and LNG industry and East Asian policy makers in understanding future market dynamics that are critical for their decisions in related to gas business and policies, relatively. Second, given that the global integration of gas markets is hypothesised to bring closer movement of regional prices, but the distinctive economics in the East Asian market has seen gas prices departing from those in the European and United States (US) markets, further study of the unique factors for the East Asian market can make important contributions to the literature. Third, it is the first simulation analysis of the effect of low oil prices on East Asia's gas sector.

The paper proceeds as follows. Section 2 reviews the literature on debates in the East Asian gas market, and relationships between oil prices and the gas sector. Section 3 explains the methodology, and proposes the distinctive gas economics of East Asia as an ana-

lytical framework to assess the effect of oil prices on the East Asian gas sector. Section 4 analyses qualitatively the effect of low oil prices on the gas sector according to the framework identified in Section 3. Section 5 presents a simulation analysis of a scenario of lower oil prices and the effect this would have on global gas production, trade and prices. The final section concludes the paper with a discussion of policy implications.

2. Literature review

The relationship between oil and gas prices is a long traditional topic in the literature. Ji et al. [14] investigate a traditional issue in the oil and gas nexus: the co-integration of oil and gas prices in three major markets. The most popular tool for studying this relationship empirically is structural vector autoregression (VAR), for example, Jadidzadeh and Serletis [15]. The evolution of the literature often depends on the development of new econometrics techniques or the creation of more sophisticated data. For example, using a long dataset, a recent study [14] claims that oil and natural-gas prices may become decoupled, and that contrary to earlier research, natural gas prices may lead to crude-oil prices over a long sample. However, another recent study [16] uses a recently developed quantile autoregressive distributed lag (QARDL) model but yielded no new findings in the results. In addition, Brigida [17] allows multiple regimes when studying the co-integration relationship between natural-gas and crude-oil prices.

Even in the recent literature, there is no consensus on the relationship between oil and gas prices. Many studies have found departures in the relationship between oil prices and gas prices in the US and Europe due to supply changes (either through newer production technologies or the commissioning of significant production capacity), technology improvements and changes in contractual agreements. A recent analysis of Henry Hub prices and crude-oil prices with increased shale-gas production argued that the oil-gas long-term relationship ceased after 2009 [18]. Erdos [19] investigates US and UK natural-gas prices and crude-oil prices, finding a decoupling phenomenon around 2009, and that natural-gas prices in the US and UK appear to be separate from each other. In addition, Ji et al. [14] found that the oil-price shock is weak in North America, lags in Europe and is the most significant in Asia.

In contrast, many researchers argue that the two prices remain interdependent. For example, Villar and Joutz [20] found a co-integration relationship between Henry Hub natural-gas prices and WTI crude-oil prices. Asche et al. [21] found that European continental contracted gas prices are driven by oil prices, and that the new spot markets in Europe follow the same process of price determination as those in the UK gas market, meaning that all spot prices are determined by the oil price in the long term. However, this relationship is hypothesised to change due to start of US LNG exports, changes in price linkage in gas contracts and the development of spot trading in gas markets [1].

Another group of studies observes a different relationship between oil and gas prices in the short and long term. Hartley et al. [22] found that there are short-term departures from the long-term equilibrium between crude-oil prices and natural-gas prices. They argue that seasonal factors such as inventories, weather and supply shocks are the principal reasons for this short-term decoupling. Brigida [17] found that there exists a regime-switching mechanism, but that the prices of oil and gas are co-integrated and they faced a temporary shift rather than a permanent decoupling in the early 2000s.

While the dependence of natural-gas prices on oil prices in Europe and the US is weakening, this may not be the case in East Asia due to oil indexation. Therefore, it is important to simulate how the East Asian gas markets will respond to low oil prices.

Download English Version:

<https://daneshyari.com/en/article/4916522>

Download Persian Version:

<https://daneshyari.com/article/4916522>

[Daneshyari.com](https://daneshyari.com)