Section 1: Overview

Learning-by-doing (i.e., an increase in efficiency or a decrease in unit cost with an increase in experience) has been argued in many literature as a source of productivity and economic growth. Empirical studies of learning-by-doing in various industries have also appeared in the economic literature. To name a few, Irwin and Klenow (1994), Thornton and Thompson (2001), and Conley and Udry (2010) find empirical evidence of the learning-by-doing effect in the semiconductor, shipbuilding, and agriculture industries. In the oil and gas industry, Kellogg (2011), Osmundsen et al (2012), and Redlinger (2015) find empirical evidence of learning-by-doing in Texas, Norwegian Continental Shelf and Bakken. However, none of these studies have explored the impact of changes in institutional design of a sector/industry to the learning-by-doing effect. By exploring the changes in oil governance in Indonesia, this paper looks at the impact of changes in institutional design to learning-by-doing in offshore exploration drilling.

In 2002, Indonesia changed the institutional design of the oil and gas sector (oil governance) by enacting Law No. 22/2001, which created a separate regulatory entity (BPMIGAS) from the national oil company (Pertamina). The main task of BPMIGAS was to regulate the upstream oil and gas sector by entering and managing production sharing contracts (PSC) with oil companies, including Pertamina. Thurber, Hults and Heller (2011) argue that the separate regulatory entity has the ability to capture knowledge from oil companies and create positive knowledge spillover effect (or positive knowledge externalities) across oil companies. However, they do not provide empirical evidence to support this. Therefore, this study aims to answer the following research question: Do changes in institutional design enhance learning-by-doing by an agent/company or spillover effect across agents/companies?

This study will contribute to the learning-by-doing literature by being the first to provide empirical evidence of the impact of changes in institutional design on the learning-by-doing effect in the oil and gas industry. This study will also contribute to the oil governance literature by providing empirical evidence to support the argument proposed by Thurber, Hults and Heller (2011).

Section 2: Research Approach

To answer the research question, we observe offshore exploration drilling data in South East Asia Region at year of 1992-2012 and run econometric models which contain an interaction term between institutional design dummy and learning variables.

Section 3: Results

This study finds that changes in institutional design enhance learning-by-doing specific to the rig as well as knowledge spillover across oil companies within a basin. After a separate regulatory entity was created in Indonesia at year of 2002, a doubling increase in cumulative drilling by the rig reduces the number of days needed to drill one meter of a well by 24.1%, and a doubling increase of cumulative drilling in a basin reduces the time to drill one meter of a well by 18.7%. These results are statistically significant and robust to various model specifications.

Section 4: Conclusions

The results of this analysis show that the creation of BPMIGAS in Indonesia at the year of 2002 enhances learning-by-doing effect by the rigs such that a doubling increase in experience reduces days to drill a meter of well by 24.1%. It also enhances the positive knowledge spillover effect within a basin such that a doubling increase in experience reduces days needed to drill a meter of well by 18.7%. From further econometric exploration, this study builds an inference on learning spillover mechanism. Big oil companies who have more experience than small oil
companies learn from their own experience in a basin. Then, the regulatory entity captures the knowledge created by big oil companies and creates spillover effect to small oil companies. The result is important because it shows that policy which creates separate regulatory entity from national oil company enhances learning-by-doing and learning spillover. It can provide guidance to government in oil producing countries who is seeking for an appropriate policy to sustain its oil production by increasing efficiency through learning.

References


