Evaluation of the Mutual Influence of Foreign Investment and the Development of the Oil and Gas Complex of Russia

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Abstract. This paper is devoted to a comprehensive analysis of the impact of foreign investment on the development of the oil and gas sector in Russia, which includes both directions: the impact of foreign direct investment inflows on the production and economic indicators of the oil and gas sector of Russia, and the effect of these indicators on foreign investment inflows. Foreign investments are the driving force in the development of the Russian oil and gas complex and the economy as a whole. So it was until 2014, today's situation has changed somewhat: the influx of foreign investment in the energy sector of is complicated not only by imposed sanctions, but also the main obstacle - the instability of world energy prices. The current price environment, as well as the supply and demand situation are pushing foreign investors to reduce the investment proposal. Today, the fuel and energy complex, and especially OGC, plays a huge role in the socio-economic development of the country and the increase in GDP, which determines the purpose and objectives of this study.

1. Introduction

Foreign investments are the driving force in the development of the Russian oil and gas complex and the economy as a whole. So it was until 2014, today's situation has changed somewhat: the influx of foreign investment in the energy sector of is complicated not only by imposed sanctions, but also the main obstacle - the instability of world energy prices. The current price environment, as well as the supply and demand situation, are pushing foreign investors to reduce the investment proposal [4, 10].

Investment projects in the oil and gas sector differ in that they are heavily dependent on the global economic environment, which affects their profitability and, as a result, on economic efficiency. The risks inherent in such projects also differ in a wider range than in other industries and are able to have a decisive impact on the economic parameters of the investment transaction. One of the significant risks in this industry is the financial risk, which, in turn, is related to the underfunding of projects - this is a direct result of the lack of direct foreign investment and the outflow of capital from the country, which amounts to significant amounts today in Russia [18].

This is confirmed by information from EPFR - Emerging Portfolio Fund Research, an organization specializing in the collection and analysis of information on inflows and outflows of funds in investment funds. So, according to data for January-March 2015, all funds investing in the Russian market experienced capital outflows of $ 56 million. The net outflow of capital from Russia in 2017 amounted to 31.3 billion US dollars [17].
Today, the fuel and energy complex, and especially OGC, plays a huge role in the socio-economic development of the country and the increase in GDP, which determines the purpose and objectives of this study. The aim of the research is to assess the impact of foreign investment on the development of the oil and gas industry in Russia [1-3].

The novelty of the work is to create a methodical approach to a comprehensive analysis of the impact of foreign investment on the development of the oil and gas sector in Russia, which include both directions: the impact of foreign direct investment inflows on the production and economic indicators of the oil and gas sector of Russia, and the effect of these indicators on foreign investment inflows [5-9, 11-16, 19-20].

Also, the novelty is reflected in the following:

1. Use of new data and obtaining current results;
2. Expansion of existing regression models to assess the impact of foreign investment on the oil and gas economic and production indicators and to assess the impact of these indicators on the inflow of foreign direct investment by incorporating new factors.

2. Data

This study is conducted using data that is publicly available. The source of data for foreign direct investment is Federal State Statistics Service, a collection of materials "Investments in Russia" (gks.ru).

The sources of data for production variables (production of oil and gas, refining) used in calculations are Russian magazines "Fuel and Energy Complex of Russia". The sources of data for increase of oil and gas reserves (replenishment) are open data of the Ministry of Natural Resources and Environment of the Russian Federation. The sources of data for export of oil and gas used in calculations are Federal customs statistics (for LNG), the Ministry of Energy of the Russian Federation, data reporting of oil and gas companies.

The sources of data for economic variables used in the calculations are Consolidated financial statements of Russian oil and gas companies prepared in accordance with International Financial Reporting Standards (IFRS), Consolidated financial statements prepared in accordance with US GAAP.

Data on foreign direct investment and production & economic indicators of the oil and gas industry were collected for 12 years from 2006 to 2017.

3. Methods

To achieve the goal of the study, a methodical approach was created, which consists of the following blocks (see Fig. 1).

**Figure 1.** Methodological approach to a comprehensive analysis of the impact of foreign direct investment on the development of oil and gas industry in Russia.

There are assumptions that any FDI factor is effecting the production and exports of OGR industries and hence all the intercept points and parameters and other independent variables that are supposed to have an effect on FDI inflow would materialize their effect in the present study. Therefore, for the significance of the effects of these variables, results are presented in which all independent variables lag behind FDI.
The model of the analysis of foreign investment impact on the production indicators of oil and gas industry is specified and formulated as follows (1):

\[
\begin{align*}
PCO_j &= f(FDI_{j-1}) \\
PNG_j &= f(FDI_{j-1}) \\
RC_j &= f(FDI_{j-1}) \\
STO_j &= f(FDI_{j-1}) \\
STG_j &= f(FDI_{j-1}) \\
XCO_j &= f(PCO_j, RC_j, FDI_{j-1}) \\
XNG_j &= f(PNG_j, FDI_{j-1}) \\
FDI_j &= f(PCO_{j-1}, PNG_{j-1}, RC_{j-1}, STO_{j-1}, STG_{j-1}, XCO_{j-1}, XNG_{j-1})
\end{align*}
\]

Where:
- PCO – production of crude oil; FDI – inflow of FDI; PNG – production of natural gas; RC – refinery capacity; STO – reproduction of the oil resource base; STG – reproduction of the gas resource base; XCO – exports of crude oil; XNG – exports of natural gas; J denotes year.

The model of the analysis of foreign investment impact on the economic indicators of oil and gas industry is specified and formulated as follows (2):

\[
\begin{align*}
TR_j &= \lambda_0 + \lambda_1 FDI_{j-1} + e \\
Pr_j &= \omega_0 + \omega_1 FDI_{j-1} + e \\
OPEX_j &= \pi_0 + \pi_1 FDI_{j-1} + e \\
CAPEX_j &= \xi_0 + \xi_1 FDI_{j-1} + e \\
Tax_j &= w_0 + w_1 FDI_{j-1} + e \\
Eq_j &= c_0 + c_1 FDI_{j-1} + e \\
BC_j &= v_0 + v_1 FDI_{j-1} + e \\
FDI_j &= \sigma_0 + \sigma_1 TR_{j-1} + \sigma_2 Pr_{j-1} + \sigma_3 OPEX_{j-1} + \sigma_4 CAPEX_{j-1} + \sigma_5 Tax_{j-1} + \sigma_6 Eq_{j-1} + \sigma_7 BC_{j-1} + e
\end{align*}
\]

Where:
- TR – oil and gas industry revenue; FDI – inflow of FDI; Pr – oil and gas industry net profit; CAPEX – capital expenditures; OPEX – operating expenses; Tax – tax burden; Eq – equity; BC – borrowed capital; J denotes year; e – random variable or error term.

Time series data is used in this study. The model applies on data related to oil and gas sector indicators selected and estimated the parameters to analyze the significance and direction of the relation between FDI and other variables (PCO, PNG, RC, STO, STG, XCO, XNG, TR, Pr, CAPEX, OPEX, Tax, Eq, BC).

4. Result and discussion

According to the analysis of the designed model, it can be concluded that the inflow of foreign investment significantly affects oil production, gas processing and tax burden, while indicators such as oil production, reproduction of the oil and gas resource base, oil and gas exports, revenue, capital expenditures significantly affect FDI inflows.

The dependence of oil production on the FDI inflow is significant, that can be explained by the fact that the oil and gas industry is characterized by a high need for borrowed funds, especially foreign ones, for the implementation of oil and gas projects, and when the inflow of foreign direct investment increases, oil production increases in subsequent years.

There is a relatively weak negative relationship between the volumes of gas processing and the inflow of FDI, this is due to the investment lag: this year they are shrinking, which means that the investment in the refining project is ending, and the following year the gas processing level is growing thanks to new processing facilities.
Considering the impact of performance indicators on FDI, oil production is significant - in the current conditions, when most large Russian fields are depleted, and new discoveries are mostly small, the situation of a decrease in oil production leads to the need of companies to get more borrowed funds to expand existing projects or implement new ones. In addition, there is a competitive competition in the oil market, when each company wants to maintain oil production at the same level and higher. The impact of gas production on FDI inflows is insignificant, which can be explained by the fact that the Russian gas market is contracted and noncompetitive, mainly state-owned. At the same time, the increase (replenishment) of the oil resource base is a factor of investment attractiveness and increases FDI inflows. Some companies even overestimate their reserves to attract investment.

Oil export is a factor of investment attractiveness for foreign investors; therefore, with an increase in oil exports, the inflow of foreign direct investment grows. With the growth of gas exports, FDI falls, as is the case with the increase in the gas resource base replenishment, because after ensuring a normal flow of exports and restoring reserves, investors reduce the investment supply significantly.

The impact of foreign direct investment is insignificant for most financial indicators of the oil and gas industry in Russia, with the exception of the tax burden indicator, which is closely related to the growth of hydrocarbon production, this is due to the high share of MET in the tax burden (about 40%).

At the same time, the entire model of the impact of all selected economic indicators on FDI inflows turned out to be insignificant, so a model was developed in which the main factors — income, profit, capital expenditures and loan capital — where income and capital expenditures were significant. If revenue falls, companies need to develop the material base and new projects, respectively, to attract money for them. Capital expenditures in large projects (as a rule, in the oil and gas industry, only such projects are realized from profitability and economy of scale) occupy a significant part of the investment - they require long money, preferably at low interest rates, which cannot be found in Russia. Also, oil and gas companies receive revenues in foreign currency (dollar). That is why foreign investment depends on the number of large investment projects in the country that can attract foreign capital and which have a high proportion of capital expenditures.

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