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Reform and amendment of Russian petroleum fiscal term: trends and implication to asset acquisition

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Abstract. This article analyzes reform and amendment of petroleum tax policy in Russia to investigate instability of tax regime which is one of the main concerns for decision making in asset acquisition. Historical and recent amendments of upstream fiscal terms in Russia are reviewed and studied in an attempt to understand the trends of reform. Tax burden of four different cases is modeled with the change of tax policy to analyze the effect of tax incentives. The recent “tax maneuver” of transferring export duty to Mineral Extraction Tax (MET) is studied in detail to analyze effects to upstream, refinery, and customers. Net present values of three field cases under previous tax regime and new Added Income Tax (AIT) regime are comparatively studied with cashflow modeling. The article concludes that recent “tax maneuver” has indirect influence on upstream sector but may lead to upward pressure on retail. New AIT regime introduces a universal taxation system and requires less government intervention, which may reduce aboveground risk of unstable fiscal regime and boost international investment in Russia. Also, key suggestions are summarized for international investors who are interested in oil and gas asset in Russia.

Nomenclature

P	Prices for Urals grade oil expressed in US dollars per barrel, which are determined as the sum of arithmetic purchase and sale prices on world crude oil markets (Mediterranean and Rotterdam) for all days of trading, divided by the number of days of trading in the relevant tax period	C_{rd}	The coefficient reflecting hydrocarbon reservoir
R	The exchange rate of the US dollar to the Russian Federation ruble which is established by the Central Bank of the Russian Federation	C_{can}	The coefficient reflecting the region of extraction and properties of oil
E_m	The indicator reflecting oil extraction factors	C_{ptds}	The increment reflecting export price of petrol and diesel fuel
C_p	The coefficient reflecting movements in world oil prices	N	Cumulative oil production, million tons
C_d	The coefficient reflecting the level of depletion of reserves of a specific subsurface site	V	Initial ABC1 + C2 recoverable reserve, million tons
C_r	The coefficient reflecting the level of reserves of a specific subsurface site	D	Export duty rate effective in the tax period
C_{de}	The coefficient reflecting the degree of difficulty of oil extraction	C_{man}	The coefficient applied to move MET to export duty
		C_{vo}	The coefficient reflects extraction of super viscous oil

1 Introduction

Russia produced 11 201 thousand barrels per day of crude oil and condensate and 64.8 Bcf per day of gas in 2018. It is one of the top oil producers in the world, alongside Saudi Arabia and the US. It holds the world’s largest volume of gas reserves and is the second largest gas producer globally, behind the US [1]. There is no doubt that

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Russia is rich in oil and gas, but abundant oil and gas resources does not persuade international investors to be active in Russian upstream market. The only one big deal of acquisition recently is *NOVATEK*'s Arctic LNG-2 in 2019.

Compared to other countries, oil and gas industry in Russia faces internal and external challenges such as sanction imposed by the US and EU [2, 3]. Also, unstable fiscal term might be one of the main concerns for decision making in asset acquisition. Some papers studied the tax regime of oil and gas industry in Russia. Alexeev and Conrad analyzed government took under the tax policy of Russia in 2008 and compared with tax regime in other countries such as Australia and Canada [4]. Fjaertoft and Lunden analyzed the policy of “tax maneuver” introduced in 2014 with real world field study, and concluded that it is poorly evaluated in terms of simplicity, flexibility, stability, and competitiveness [5]. Filimonova *et al.* conducted cluster analysis on tax burden of Mineral Extraction Tax (MET) and export duty from 2010 to 2017 and proposed suggestions for petroleum tax reform in Russia [6].

Recently, the Russian government reforms the tax regime again, gradually moves export duty to MET and introduces Added Income Tax (AIT). The objective of this article is trying to understand the challenges to international investors in perspective of unstable fiscal regime. The history of Russian petroleum tax policy is reviewed and analyzed with case and scenario study. Challenges and advantages of recent reform and tax code adjustment are studied.

2 Current petroleum tax regime in Russia

For cooperation of petroleum extraction in the world, the main fiscal regime could be divided as royalty and tax concession, Production Sharing Contract (PSC), and service contract. Except the only three operating PSCs in Russia, which are Sakhalin-1, Sakhalin-2, and Kharyaginskoye, nearly all of the oil and gas assets apply to royalty and tax concession. And this is the main tax regime discussed in this article.

The tax regime of concession in Russia is shown in Figure 1. For upstream oil and gas in Russia, most of the tax burden comes from gross taxes like Mineral extraction tax and export duty. Other taxes like 2.2% of property tax and 20% of profit tax are relatively stable, and some specific companies or assets such as arctic LNG project might benefit from incentives. Mineral extraction tax and export duty are gross tax, which is easy to monitor and collect but insensitive to costs and quickly distort investment decisions. Export duty is easy to administer, but leads to foreign/domestic price wedges and also insensitive to costs [5]. Smith divided the tax regime into frontend loaded tax regimes and back-end loaded tax systems [7]. Obviously, Russia becomes an impatient and risk-averse country which prefers frontend loaded tax regime and collect tax revenue through gross tax. The reason of being impatient and risk-averse may be that nearly 40–50% of government revenue relies on oil and gas industry [8].

2.1 Mineral extraction tax

According to the Tax Code updated in December 25th of 2018 [9], the calculation of MET is shown as following:

$$\text{MET (rub/ton)} = \text{MET Rate} \times C_p - E_m. \quad (1)$$

MET rate is set as 919 rub/ton from 2017.

$$C_p = (P - 15) \times R/261 \quad (2)$$

The indicator reflecting oil extraction factors (E_m) is calculated with equation (3):

$$E_m = C_{\text{met}} \times C_p \times (1 - C_d \times C_r \times C_{\text{de}} \times C_{\text{rd}} \times C_{\text{can}}) - C_c - C_{\text{ptds}} - C_{\text{man}} \times C_{\text{vo}}. \quad (3)$$

C_{met} is set as 559 rub/ton from 2017, and C_c is set as 357 in 2018 inclusively, and 428 for the period from 2019 to 2021.

C_d , C_r , C_{de} , C_{rd} , and C_{can} are five different coefficients for tax incentive, as shown in Table 1. The objective of these coefficients is to stimulate investment and maintain production. For brown fields that depletion rate higher than 80%, MET is reduced. And the depletion rate defined here is not consistent with the terminology in reservoir engineering, it equals the ratio of cumulative production and initial booked recoverable reserve, and probably higher than 100%. For scenario of recoverable reserve less than 5 million tons, low permeability and thin net pay, viscosity higher than 200 mPa s and field locates in specific region, the government reduces MET and encourages to invest in those fields with difficulty and high cost.

The coefficient C_{ptds} was introduced in 2018 and comes into effect from January 1st of 2019:

$$C_{\text{ptds}} = N_{\text{pt}} \times I_{\text{pt}} + N_{\text{ds}} \times I_{\text{ds}}, \quad (4)$$

where N_{pt} is a coefficient reflecting an increment for petrol and equals 125 for tax periods of 2019 inclusively, and 105 for tax periods commencing after January 1st of 2020. N_{ds} is a coefficient reflecting an increment for diesel fuel and equals 110 for tax periods of 2019 inclusively, and 92 for tax periods commencing after January 1st of 2020.

I_{pt} and I_{ds} are binary coefficients for petrol. If the average price of the export alternative for class 5 RON 92 Petrol or class 5 diesel fuel is higher than the notional value of the wholesale price in the territory of the Russian Federation, I_{pt} or I_{ds} shall equal to 1, otherwise shall be 0. The notional value of the wholesale price of class 5 RON 92 Petrol and class 5 diesel fuel is shown in Table 2.

C_{man} is the coefficient applied to move MET to export duty, and calculated with equation (5):

$$C_{\text{man}} = \text{ED} \times R \times C_{\text{adj}} - \text{FM}, \quad (5)$$

where C_{adj} is set as 0.167 in 2019, 0.333 in 2020, 0.500 in 2021, 0.667 in 2022, 0.833 in 2023 and 1 from 2024. And ED is calculated with the equation in Table 3.

C_{vo} is the coefficient reflects extraction of super viscous oil, and shall be set as 0.1 in the case of viscosity not less than 10 000 mPa s (under formation conditions). Otherwise, it shall be 1.

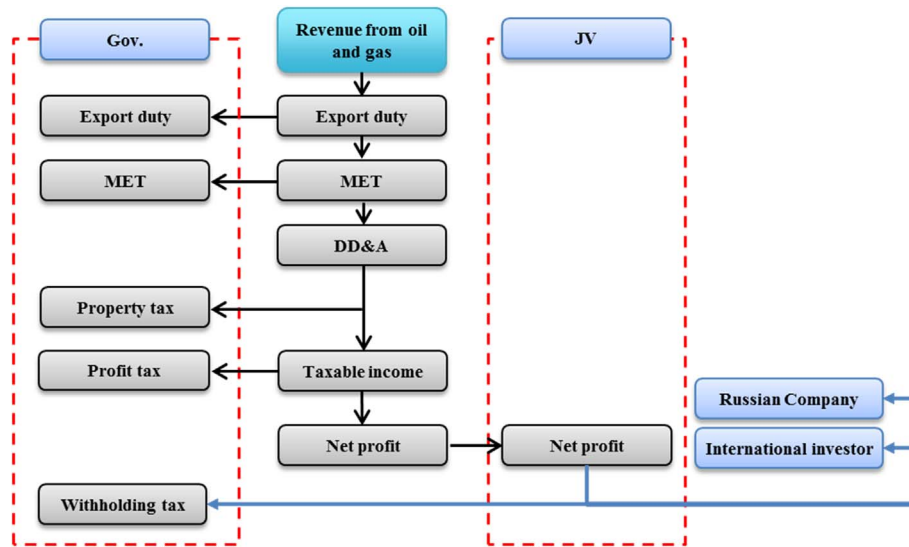


Fig. 1. Tax regime of concession in Russia.

Table 1. Coefficients for mineral extraction tax incentive.

Coefficient	Objective	Application
C_d	Depletion of reserves	1, if $N/V < 80\%$ $3.8 - 3.5 \times N/V$, if $N/V \geq 80\%$ 0.3, if $N/V > 100\%$
C_r	Level of reserves	$0.125 \times V + 0.375$, where V lower than 5 million tons and depletion less than 5% 1, others
C_{de}	Degree of difficulty	0.2, if permeability less than 2 mD and net pay less than 10 m 0.4, if permeability less than 2 mD and net pay more than 10 m 0.8, Tyumen formation 1, others
C_{rd}	Hydrocarbon reservoir	1, if $C_{de} < 1$, $N/V < 0.8$ for a reservoir $3.8-3.5 \times N/V$, if $C_{de} < 1$, $0.8 \leq N/V \leq 1$ 0.3, if $C_{de} < 1$, $N/V > 1$ C_{de} , if a reservoir with $C_{de} = 1$ and there are other reservoirs at the field with $C_{de} < 1$
C_{can}	Region of extraction and properties of oil	0, if viscosity greater than 200 mPa s and less than 10 000 mPa s (under formation condition) 0, for specified period of time or until cumulative production reaches a threshold (whichever occurs first), if oil produced from fields that lie wholly or partially in specified regions 1, others

Table 2. Notional wholesale fuel price in Russia.

	Class 5 RON 92 Petrol notional wholesale price, rub/ton	Class 5 diesel fuel notional wholesale price, rub/ton
2019	56 000	50 000
2020	58 800	52 500
2021	61 740	55 125

Table 3. Calculation of ED.

Urals crude oil price (Mediterranean and Rotterdam)	ED
Less than 109.5 USD/ton	0
109.5–146 USD/ton	$(\text{Urals} - 109.5) \times 35\%$
146–182.5 USD/ton	$(\text{Urals} - 146) \times 45\% + 12.78$
More than 182.5 USD/ton	$(\text{Urals} - 182.5) \times 30\% + 29.2$

The coefficient FM reflecting the occurrence of special circumstances shall be taken to be equal to zero for all tax periods by default. If clause 6.2 of Article 3.1 of the Law of the Russian Federation ‘‘Concerning the Customs Tariff’’ is put into effect, FM shall be calculated with equation (6), where D is export duty rate effective in the tax period.

$$\text{FM} = (D - \text{ED} \times (1 - C_{\text{adj}})) \times R \quad (6)$$

2.2 Current export duty

According to the Export Duty of the Russian Federation [10] in July 19th of 2018, the general formula of oil export duty for Urals price not less than 25 USD per barrel is shown below:

$$D = (29.2 + (\text{Urals} - 182.5) \times 30\%) \times (1 - C_{\text{adj}}). \quad (7)$$

The coefficient of C_{adj} defined here is the same in equation (5). It gradually moves equivalent tax rate from export duty to MET, even though the tax bases of MET and export duty are slightly different. For the case of Urals price less than 25 USD per barrel (182.5 USD per ton), the formula of unadjusted export duty stays the same with Table 3.

The law also establishes special formulas regarding to super viscous oil and other blocks with difficulty. For oil with viscosity more than 10 000 mPa s, the formula with tax incentive is set as:

$$D = 0.1 \times (29.2 + (\text{Urals} - 182.5) \times 30\%) \times (1 - C_{\text{adj}}). \quad (8)$$

For oil extracted at the blocks named in the Law ‘‘On Customs Tariff’’ (subitems 2 and 3 of item 5 of Article 3.1 of the Law), the formula with tax incentive is set as:

$$D (\text{not less than } 0) = (\text{Urals} - 182.5) \times 30\% - 56.57 - \text{Urals} \times 0.14. \quad (9)$$

At the same time, a ‘‘barrage’’ duty mechanism is introduced to increase duties on oil and oil products in the case that Urals price increase more than 15% in ruble per ton compared to the average price of 3 consecutive periods preceding the currently monitored period. And it shall be calculated as:

$$D = 29.2 + (\text{Urals} - 182.5) \times 45\%. \quad (10)$$

And the ‘‘barrage’’ duties can be established for the period not more than 6 months.

3 History tax amendments

The petroleum fiscal terms have been revised and amended for numerous times since introduction following the ending of Soviet Union. In the 1990s, the tax regime was field-specific and it was difficult to monitor cost at that special period. Reporting high cost was used by companies to reduce taxable profit, which leads tax revenue loss for government [11]. In the early 2000s, the government started to reform the tax regime and move the main tax burden to gross tax like MET and export duty. Other tax like profit tax and property tax was reserved from the old tax system [12]. Even though the government keeps amending the tax code every year, the current tax structure is still in line with it. With the reform of tax regime, the government received higher tax revenue, but it inevitably impeded the investment in oil and gas field with high cost. To stimulate production, various of incentives were introduced and became increasingly unstable and complicated.

The above described formula of MET and export duty at end of 2018 is very complicated with lots of special incentives and increment coefficient, rather than a fixed rate in other country. It has been amended and developed based on the simple tax structure in the early 2000s. The detailed amendments and developments of MET for crude oil since 2002 are listed in Appendix Table A1 [8].

The effective MET rate is defined as ratio of MET and Urals Price in this paper. It changes automatically depending on Urals oil price with equation of MET defined in equation (1). Figure 2 shows the history change of effective MET rate, and the effect here is a comprehensive result of automatic adjustments and government amendments. From 2002 to 2008, the effective MET rate has been gradually increased with the increase of oil price. For the regular base case, the effective MET rate is increased from 12.7% to 20.3%. With the collapse of international oil price in 2009, the federal government increases base Urals price to 15 USD per barrel in the MET formula which results in the effective MET rate reduced to 17.0%. However, when oil price recovers and bounces back, the effective MET rate gradually increases again. In 2014 and 2015, the oil price falls rapidly, but the federal government does not use the previous tactic. Contrary to previous adjustments, the MET rate is greatly increased and the percentage hit a new high of 38.8% in 2018. To balance the tax burden, the tax rate of export duty is greatly reduced as shown in Table 4.

Figure 3 shows the combined effect of MET and export duty for regular base case from 2011 to 2018. The effective tax rate of combined MET and export duty fluctuates with oil price and has great correlation with each other. In 2016,

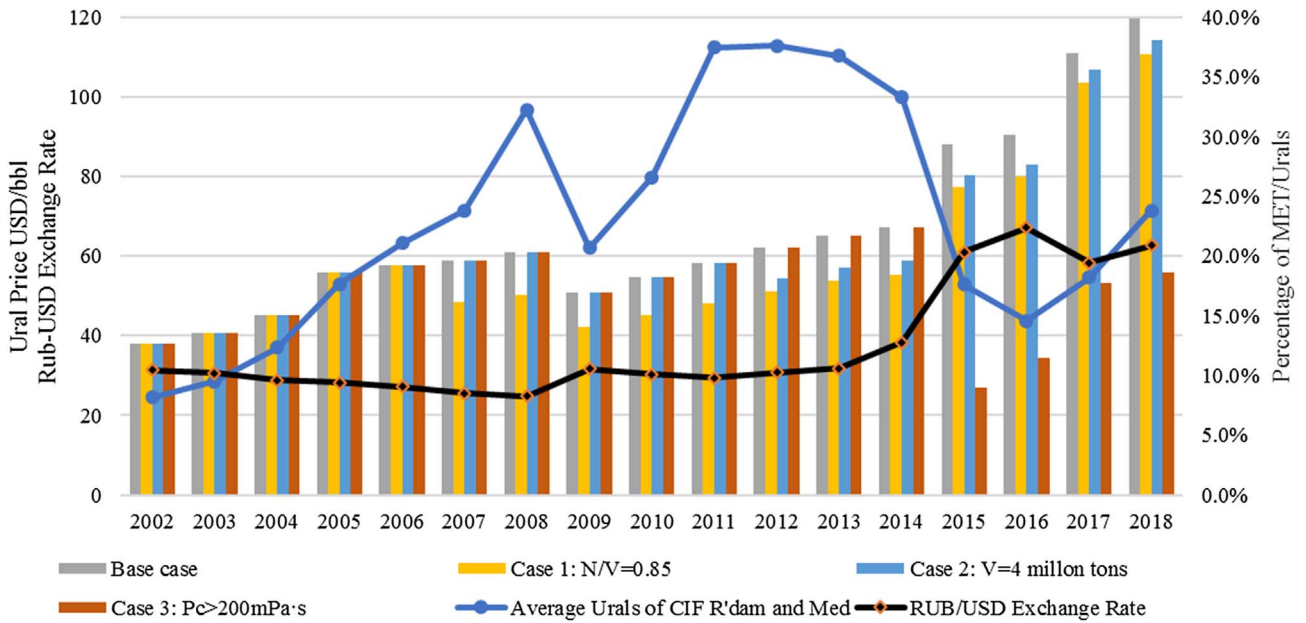


Fig. 2. History amendments of MET with fluctuation of oil price and exchange rate.

Table 4. History tax rate of export duty for Urals above 25 USD per barrel.

	2011	2012	2013	2014	2015	2016	2017	2018
Tax Rate	60%	60%	60%	59%	42%	42%	30%	30%
Formula	$ED = 29.2 + (Urals - 182.5) \times Tax\ Rate$							

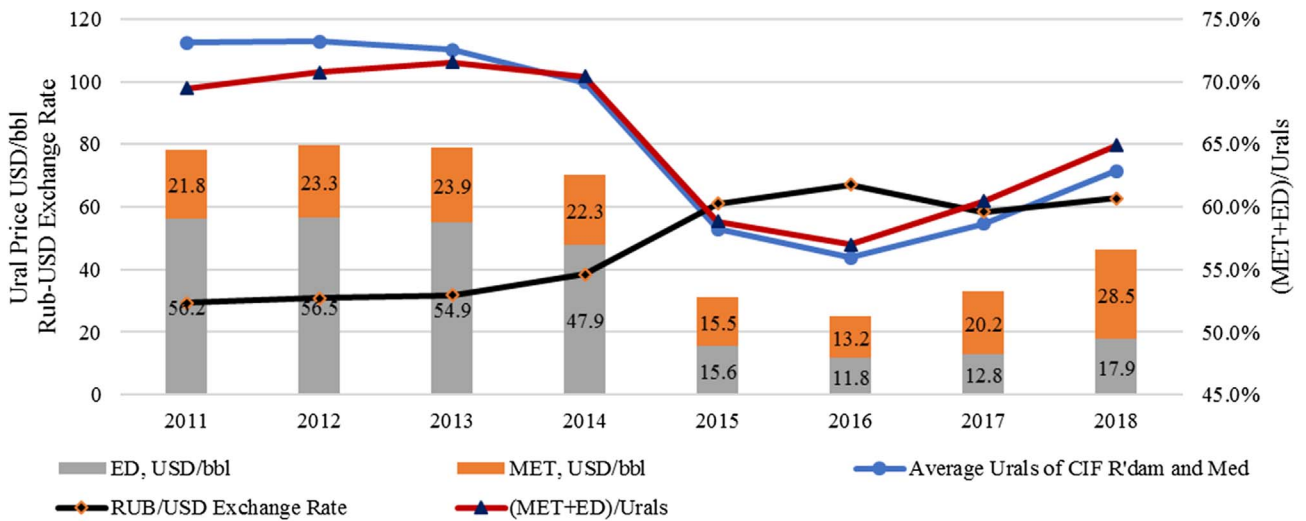


Fig. 3. History amendments of MET and export duty.

when Urals price drops down to 43.7 USD per barrel, the combined effective tax rate also reaches the new low of 57.0%, which would definitely ease the pain from revenue shrinkage for crude oil producers. While in 2013 when Urals price reaches 112.8 USD per barrel, the combined effective tax rate is also very high and up to 71.5%. Besides the automatic adjustment to oil price in tax equation, the federal

government adjusts the main gross tax either MET or export duty, which results in higher tax burden when oil price gets higher and lower tax burden when oil price gets lower. For valuation modeling of oil and gas assets with the fixed updated tax regime, oil price would not be that sensitive as simulated in the model. Figure 4 shows the positive linear correlation between combined effective tax rate

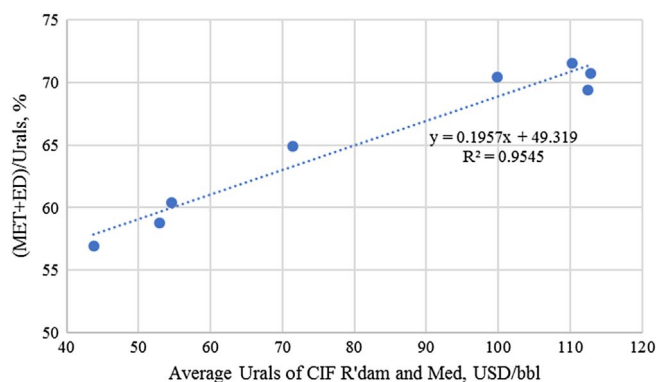


Fig. 4. Correlation of combined effective tax rate and Urals price.

and Urals price with the data of regular case from 2011 to 2018. The fitting formula is shown below:

$$\text{Combined tax rate (\%)} = 0.1957 \times \text{Urals} + 49.319. \quad (11)$$

Even though export duty only applies to crude oil being exported, bidding and selling of crude oil in domestic market usually linked to export prices like Argus Urals FIP West Siberia which lead to equivalent netback price in both markets. In this way, the correlation formula in equation (11) is applicable for crude oil sold in export and domestic market.

Turning back to Figure 2, it shows the history development of tax incentives in MET. From 2007, the government introduces different kinds of incentives for some specific fields. To take MET in 2012 for example, the base regular case shall be 20.7% of effective MET rate, and the case with 0.85 of depletion rate shall be reduced to 17.1%, the case with 4 million tons of initial recoverable reserve shall be reduced to 18.1%. These tax incentives stimulate investment and production in brown fields and those with relatively small reserves, but the unparalleled tax break for fields with viscosity higher than 200 mPa s is even more attractive. In 2015, the effective MET rate of base case is 29.3%, and it is only 9.0% for the case with viscosity higher than 200 mPa s. Note that the heavy oil here is conventional heavy oil with viscosity between 200 and 10 000 mPa s. Urals price on world crude oil markets (Mediterranean and Rotterdam) is referenced for MET and export duty for all scenarios including the case with viscosity higher than 200 mPa s. Also, there is no quality adjustment and price discount for crude oil sold in pipeline currently in Russia. Once injected into pipeline and mixed with other crude oil, the netback price will be linked to the mixed price like Urals, ESPO, and West Siberia Light. Selling heavy oil by railway and tank truck with price discount is not the main scenario discussed here.

Tax break or incentives are certainly good news for operators, it reduces tax burden and improve profitability. However, the asset buyers should stay clear the instability of tax code in Russia, and the asset with great tax incentives are always more exposed in fiscal regime risk. Asset evaluation and price negotiation is always based on current updated tax regime, but the buyer might lose a great part

of value once the government cancels the huge tax break like in the case of viscosity higher than 200 mPa s.

4 Transferring export duty to MET

From January 1st of 2019, export duty is gradually transferred to MET, which is the so called “tax maneuver”. As shown in equations (5) and (7), it moves equivalent tax rate from export duty to MET, and the export duty will be reduced to zero by 2024. C_{adj} in equation (5) is the gradually ascending transferring percentage from export duty, which is 16.7% in 2019.

Even though the bill is signed in August of 2018, this kind of “tax maneuver” reform actually starts from 2015. As shown in Table 4 and Table A1, the MET is improved with annual increase of MET rate, and export duty is reduced with adjustment of tax rate. The planned reduction of the crude oil export duty is frozen between 2017 and 2018 due to the dramatic fall in refinery margins with low oil price.

Export duty leads to foreign and domestic price wedges, and the lower price in domestic market benefits the refinery sector and consumers. Argus Urals FIP West Siberia is a very important benchmark for crude oil traded in domestic market, and the contractual price formula is usually linked to it with premium or discount. As shown in Figure 5, apart from the transportation cost, Argus Urals FIP West Siberia is 12.7 USD per barrel less than Urals traded in Mediterranean and Rotterdam in March of 2019, and the price wedge here is export duty.

However, the mechanism of “tax maneuver” is reducing export duty to zero and eliminating this foreign and domestic price wedge. Currently about 40% of crude oil in Russia is exported, which means only 40% of crude oil is levied on export duty. But by 2024, all export duty is equivalently moved to MET, so total tax burden is increased.

Who will pay for this extra tax? The simple logic is that oil producers will pass the increase in total MET payment to refineries, and refineries will pass this extra tax burden to retail sector, and finally the customers will pay for the increase. But the real situation is much more complicated.

For upstream oil producer, cashflow will be roughly stable as the sales price to domestic refineries will increase even though MET is increasing. The minor difference is that a coefficient of 0.75 is multiplied to transferred export duty for condensate, and additional MET in equation (4) is introduced when wholesale price of petrol and diesel fuel exceeds the target price in Table 2. The “tax maneuver” has little influence on netback price of crude oil for exporting because it is linked to international oil price. For the other about 60% of crude oil sold in domestic market, the situation may change. Argus Urals FIP West Siberia is usually benchmarked with premium or discount in monthly bidding of crude oil sold to domestic refinery. If the government carefully controls retail end price for political purpose, the profit margin of domestic refinery will fall. In this situation, the refinery cannot offer high premium, and it may indirectly decrease the revenue and profit of upstream company. Small independent producers who mainly focus on

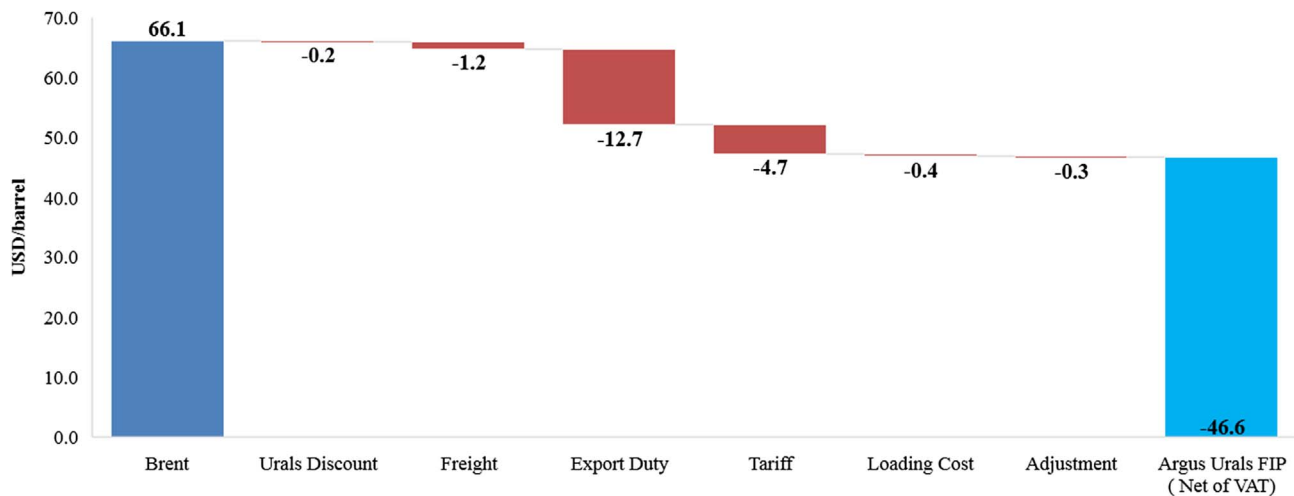


Fig. 5. Formula based Argus Urals FIP West Siberia (March of 2019).

domestic market may take losses and need to optimize the sales strategy and use the best of export quotas. There is an example of a small independent producer in Russia. The average premium to Argus Urals FIP West Siberia drops to 846 Ruble per ton in first half year of 2019, while the average premium is 1194 Ruble per ton in 2018. The price gap of 348 Ruble per ton may result from this indirect influence. But it also may result from the oil pollution issue from April of 2019, so we still need to keep observing the influence to small independent producers. Generally, it has indirect influence on upstream sector, but small independent producers may bear more losses.

For refinery sector, the story is more complicated. The existing “custom’s duty subsidy” covers the difference in export duty for crude oil and oil products. Refineries purchase crude oil at the domestic netback price close to Argus Urals FIP West Siberia, and sell oil products at domestic price or export them. The export duty for oil products such as gasoline and diesel are much less than crude oil export duty, which is only 30% of that. With benefit of this “custom’s duty subsidy” to refinery sector, the oil companies are encouraged to process crude oil domestically rather than exporting it. But it ends with the implementation of “tax maneuver” after 2024. The new subsidy “reverse excise on oil” is introduced to remedy the profit margin of refinery sector and stimulate deep refining. Those refineries who supply EURO 5 gasoline and diesel to the domestic market and Russian companies under EU/US sanctions are applicable to this benefit, which accounts for 90% of the refinery sector. To support refineries in remote location, a regional uplift coefficient is regulated to amplify reverse excise which varies from 1.05 to 1.50. Under this situation, small independent refineries with mainly heavy products are facing huge pressure with ending of “custom’s duty subsidy” and non-applicable “reverse excise on oil”.

As shown in Figure 6 and according to the estimates of Wood Mackenzie, the “tax maneuver” would increase 112 billion USD of MET from 2019 to 2024, and the government budget revenue would increase over 15% from it. Then, the government returns about 60% of tax increase

to domestic refinery with “reverse excise on oil”, and still gains compared to the previous tax regime. With extra tax in total, there would be upward pressure in retail of oil products, but this political sensitive issue should be carefully and smoothly dealt by the government.

5 Profit based AIT regime

In July of 2018, the AIT was passed in the State Duma of Russian Federation and was signed by V.V. Putin. The new AIT regime becomes effective from 2019 for fields meeting specific criteria which mainly green fields and about 5% of existing brown fields as shown in Table A2. The reform creates economic incentives for brown fields facing challenge of production decline and green fields with low profitability which requires high capital expenditure. According to the law, it is voluntary for this part of the fields to transfer from the original MET regime to AIT regime. Once the AIT regime is activated by notification, there is no option to switch back to the MET taxation regime.

AIT is calculated as:

$$\text{AIT} = (\text{Estimated revenue} - \text{Expenses}) \times 50\%. \quad (12)$$

Estimated revenue and expenses defined here are shown in Table 5. In case of selling gas to a third party, gas price here is contractual netback price. Gas production is net production after deduction of injection, and volume of associated gas is taken as 95% of its production. Estimated transport expense is the cost of transporting oil from the field to the world oil markets. Unused tax losses of previous tax periods are increased at a rate of 16.3% per annum in AIT tax regime. In addition, the amount of AIT tax cannot be less than the amount of minimum tax scenario with 7140 rubles per ton of unit CAPEX and OPEX from 2019 to 2020 and 9520 rubles per ton in subsequent periods.

Different from equation (1) in MET regime, the MET is reduced in the AIT regime.

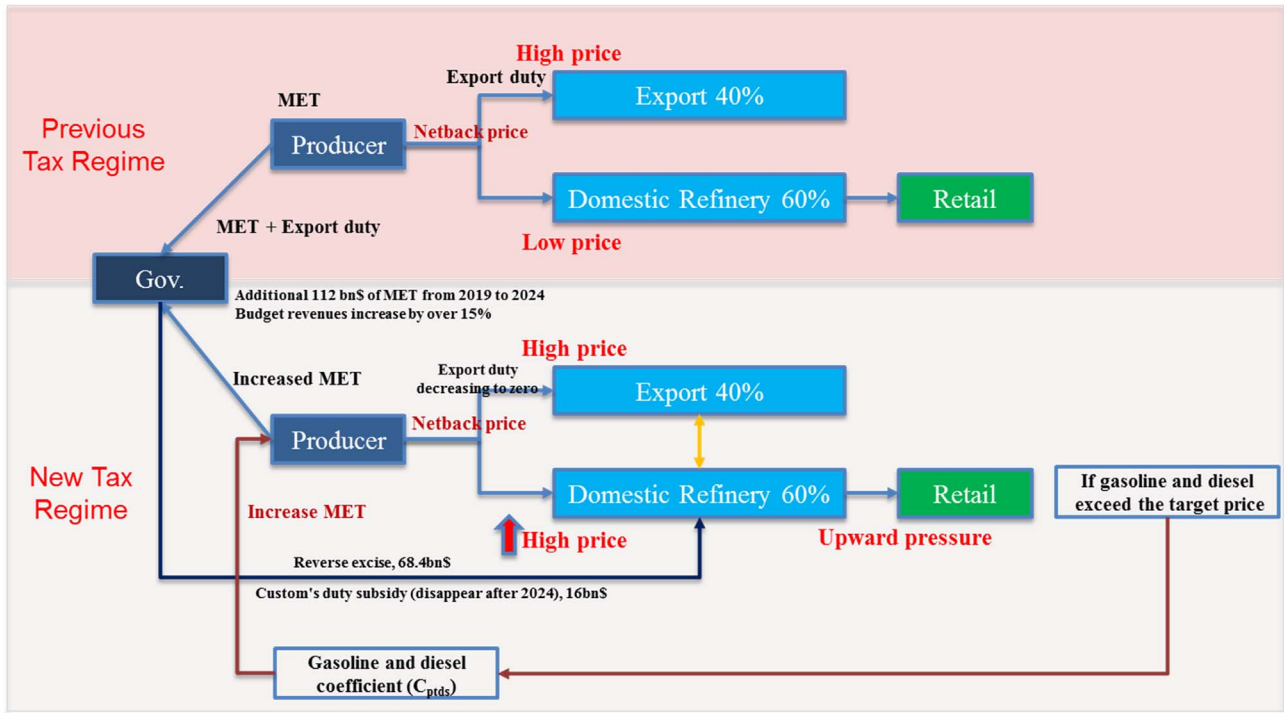


Fig. 6. Effects of “tax maneuver” to upstream and refinery sector.

Table 5. Definition in AIT formula.

Estimated revenue	Urals Price × Oil and Condensate Production + Gas Price × Gas Production
Expenses	OPEX + CAPEX + Estimated Transport Expenses + MET, Property Tax, Other Taxes + Estimated Export Duty + Losses of Previous Years

Table 6. Characteristics of fields selected.

	Field A	Field B	Field C
Production Plateau, million ton per year	2.1	4.8	4.5
Plateau Year	2023–2026	2022–2029	2017–2023
MET Exemption	Yes	No	No
Acc. Production since 2019, million ton	45.0	94.5	35.9
CAPEX, MMUSD	1129	3713	1442
NPV10 with MET regime, MMUSD	2138	3238	2837
NPV10 with AIT regime, MMUSD	2103	5798	3201

$$\begin{aligned}
 \text{MET (rub/ton)} = & (P \times 7.3 - 109.5) \times 0.5 \times K \\
 & \times R - \text{ED} \times R \quad (13)
 \end{aligned}$$

ED is the export duty described in Section 2.2, and K defined here is a privilege coefficient. For groups 1 and 2 in Table A2, K is set as 0.4 before the expiration of the first 5 years of commercial production, 0.6 in 6th year, 0.8 in 7th year and 1.0 since 8th year. For group 4, K is set as 0.5 in the first year of commercial production, 0.75 in 2nd year, 1.0 since 3rd year.

To analyze the effect of transferring tax regime to AIT, three oil fields are modeled and compared as shown in Table 6. Oil price, exchange rate and inflation are assumed according to Wood Mackenzie, and economic date is set as January 1st of 2019. The Field A is neutral to optional tax regime switching, because it already benefits from MET exemption. The Field B nearly doubled value after switching to AIT, which requires high capital expenditure before 2022. The profit based AIT and reduced MET greatly improve the cashflow in next few years for Field B. The Field C is a

producing field during plateau, and it has moderate positive effect to tax regime switching.

As described in Section 2, the main tax burden comes from MET and export duty, which are gross tax. Reducing MET and introducing a profit based AIT is great news for green fields like Field B. Tax burden is greatly reduced in early stage, and cashflow is improved. If the AIT regime proves a success, the government may extend it to all fields in West Siberia. It introduces a universal taxation system that requires no government interventions in case of changes in economic environment and accounts for projects' individual economic and operational features. This might reduce ground risk of unstable fiscal regime in Russia.

6 Conclusion and implication

The tax regime of upstream oil and gas industry were constantly amended by the government over the past decades. This above ground risk for international investors becomes one of the challenges to acquire Russian upstream assets. Based on the analysis of history amendments and recent reform of tax regime, the conclusions and suggestions are summarized as following:

1. The current prevailing MET tax regime keeps amending to fit for the financial situation, but this tax structure applicable for most of the fields will be in line with the tax regime reformed in early 2000s in the foreseeable future.
2. Besides the automatic adjustment to oil price in tax equation, the federal government adjusts the main gross tax either MET or export duty. For upstream assets evaluation in Russia, oil price would not be that sensitive as simulated, when modeling with current fixed tax regime. A comprehensive correlation formula is provided for further modeling study.
3. The recent adjustment of MET and export duty has indirect impact on the upstream sector, but may lead to upward pressure in retail of gasoline and diesel. Small independent producers who focus on domestic market may take losses indirectly. Small independent refineries with mainly heavy products are also facing great pressure with ending of "custom's duty subsidy" and non-applicable "reverse excise on oil".
4. The new introduced AIT tax regime is a great try to develop a universal taxation system that may require no government interventions in case of changes in economic environment and account for projects' individual economic and operational features. This

might reduce above ground risk of unstable fiscal regime and boost international investment in Russia.

5. It is suggested that asset buyers should stay clear the instability of tax code in Russia, and assets with great tax incentives are always more exposed in fiscal regime risk. If asset evaluation and price negotiation are based on current fixed tax regime, buyers should consider the risk and uncertainty of canceling tax break. Inter-government agreement to ensure the stability of tax incentives might be one of the options.

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Appendix

Table A1. History amendments of MET for crude oil.

No.	Year	MET equation	MET rate (rub/ton)	Base Urals price (USD/bbl)	C_p	Field depletion coefficient C_d	Reserve coefficient C_r	C_{met}	C_c	Oil extraction factors E_m
1	2002– 2003	MET Rate $\times C_p$	340	8	$(P - 8) \times R/252$	–	–	–	–	–
2	2004	MET Rate $\times C_p$	347	8	$(P - 8) \times R/252$	–	–	–	–	–
3	2005– 2006	MET Rate $\times C_p$	419	9	$(P - 9) \times R/261$	–	–	–	–	–
4	2007– 2008	MET Rate $\times C_p \times C_{FD}$	419	9	$(P - 9) \times R/261$	3.8 – 3.5 $\times (N/V)$	–	–	–	–
5	2009– 2011	MET Rate $\times C_p \times C_{FD}$	419	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	–	–	–	–
6	2012	MET Rate $\times C_p \times C_{FD} \times C_{RS}$	446	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	–	–	–
7	2013	MET Rate $\times C_p \times C_{FD} \times C_{RS}$	470	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	–	–	–
8	2014	MET Rate $\times C_p \times C_{FD} \times C_{RS}$	493	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	–	–	–
9	2015	MET Rate $\times C_p - E_m$	766	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	530	–	$C_{met} \times C_p \times (1 - C_d \times C_r \times C_{de} \times C_{rd} \times C_{can})$
10	2016	MET Rate $\times C_p - E_m$	857	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	559	–	$C_{met} \times C_p \times (1 - C_d \times C_r \times C_{de} \times C_{rd} \times C_{can})$
11	2017	MET Rate $\times C_p - E_m$	919	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	559	306	$C_{met} \times C_p \times (1 - C_d \times C_r \times C_{de} \times C_{rd} \times C_{can}) - C_c$
12	2018	MET Rate $\times C_p - E_m$	919	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	559	357	$C_{met} \times C_p \times (1 - C_d \times C_r \times C_{de} \times C_{rd} \times C_{can}) - C_c - C_{man} \times C_{vo}$
13	2019	MET Rate $\times C_p - E_m$	919	15	$(P - 15) \times R/261$	3.8 – 3.5 $\times (N/V)$	$0.125 \times V + 0.375$	559	428	$C_{met} \times C_p \times (1 - C_d \times C_r \times C_{de} \times C_{rd} \times C_{can}) - C_c - C_{ptds} - C_{man} \times C_{vo}$

Table A2. Criteria of AIT regime.

Group	Location	Depletion of reserves on 01.01.2017	Additional terms
1	The Republic of Sakha (Yakutia) Irkutsk region Krasnoyarsk region NAO YaNAO (north of 65° of latitude) Caspian Sea	1) $K \leq 5\%$ 2) Initial reserve booking later than 01.01.2017	Automatic application to apply AIT regime with single right of refusal (notice due by 31.03.2019)
2	The fields specified in Note 8 in common customs tariff of Eurasian Economic Union on 01.01.2018		Optional transition to AIT regime before 01.01.2020
3	Tyumen region KhMAO YaNAO The Republic of Komi	1) $20\% \leq N/V \leq 80\%$ 2) $10\% \leq N/V \leq 80\%$ and $N/V > 1\%$ on 01.01.2011	Pilot projects as a result of requests from subsoil users with production of crude oil and condensate in 2016 less than 15 million tons
4	Tyumen region KhMAO YaNAO The Republic of Komi	$K \leq 5\%$	Pilot projects as a result of requests from subsoil users with initial recoverable crude oil reserves on 01.01.2017 not more than 10 million tons and initial recoverable crude oil and condensate total reserves on 01.01.2017 not more than 51 million tons