Tax Reform in the oil sector of Russia – A POSITIVE ASSESSMENT

Viktor Subbotin

Economic Expert Group

1. Introduction

Recently there has been a vivid discussion about the level of taxes appropriate for the Russian oil sector. Much of it was focused on the consequences of the tax reform implemented in 2002. Then changes were made in all the three principle group of taxes imposed on oil producers. First, export duty scale became 'steeper': export duties, which depend on the world price on oil, increase more rapidly with that price after the reform. Three resource payments: royalty, the tax for mineral resources reproduction and the excise tax on oil were replaced by a single extraction tax (ET). The important feature of ET is that it has clear and easily controlled base (the physical amount of oil), and simple formula for the tax rate (a function of the world price of oil). Among the taxes replaced by ET only the excise tax had had these properties[1]. The other two abolished taxes had depended on the domestic oil price, which in practice could be set virtually arbitrary by the oil producers[2]. Unlike ET, both taxes had had differentiated tax rates depending on geological conditions and duration of extraction. Apart from these changes, particular for the industry, oil extracting enterprises enjoyed the profit tax rate reduction (from 35% to 24%) and other adjustments in the profit tax legislature in effect since 1 January 2002[3]. As a result, the total registered liabilities for the export duties, resource payments and the profit tax expressed in U. S. dollars per ton of oil increased by 27% in 2002[4], inducing harsh critique by oil companies and some more liberal government officials of the unbearable tax burden on the sector.

In this paper we analyze the effects of the reform on the tax burden on Russian oil extracting enterprises. We seek to answer four questions:

1. What was the tax burden before 2002 and what it became in 2002?
2. Why government revenues increased in 2002?
3. Is some of the oil rent still left to the oil producers?
4. Is the newly introduced ET economically inefficient in that it leads to additional losses compared to profit-based taxes generating the same incomes for the government?

---

[1] A detailed description of taxes on oil extraction prior to 2002 may be found e. g. in [Chernavskiy, 2001, pp. 190-203].

[2] Because in Russia it is usually the same vertically-integrated company that extracts and processes oil. Therefore, there only exists an open domestic market for oil products, not for the oil itself. Opportunities for transfer pricing to reduce resource payments in the oil sector under the First Part of the Tax Code (adopted in 2001) are analyzed in [Bobylev, 2001, pp. 50-51].

[3] For a discussion of the profit tax reform see e. g. [Vasilieva, Gurvich, Subbotin, 2003].

[4] In 2001 and 2002 the average world price of «Urals» was practically the same ($23.0 and 23.7 per barrel, respectively).

Our major conclusions are that the reform did not change much the nominal tax burden on enterprises, but increased the efficiency of tax collection. The latter explains higher fiscal revenues since 2002. Some of the natural rent still remains in the industry; therefore, its existence and growth is not in the immediate danger. The extraction tax, which is responsible for the improvement of tax collection and is theoretically more harmful than a profit-based tax, does not lead to substantial additional dead-weight losses in the industry.

Empirical justification of these statements relies on two observations concerning domestic market prices and crude oil supply. The first observation, introduced and verified in Sections 2 and 3, is that price parity exists between the world and domestic markets. The second one, discussed in Section 6, is that the price elasticity of oil production in Russia is low. Using these findings we answer the four questions in sections 4, 5 and 6. Section 7 summarizes.

2. The hypothesis of price parity between the world and domestic oil markets

We define the tax burden on enterprises as the loss in their net profits resulting from introduction of taxes. To estimate this burden, therefore, one needs to find the net profits as a function of tax rates. In Section 6 we show that the short run relation between the oil supply and profitability of extraction is fairly weak for the range of prices and taxes observed in the recent past. Thus we can confine our static analysis to the tax burden per one physical unit of oil (one ton), i. e., to the effects of the taxes on the producer prices[5] of oil.

The producer price of exported oil is immediately calculated as the difference between the F.O.B. price and the export duty. Under the assumption that the world price is independent of the Russian tax system, oil companies have no power to shift taxes on the foreign oil consumers. The situation is different, however, for the domestic market. If the domestic price of oil increases with taxes, then the tax burden is partly shifted from producers on domestic consumers.

In our analysis we test a hypothesis which helps to identify the taxes decreasing the net profits of oil companies, and the ones lowering the well-being of oil product consumers with no impact on producers' profits. This is the hypothesis of price parity between the domestic and world markets. Specifically, it is natural to assume that enterprises will not sell oil at the domestic market with lower profits than the profits

[5] Here and below by the producer price we understand the price net of the indirect taxes: VAT, the sales tax and export duties, and of transportation costs and trade margins. In the case of oil products, which are partly sold as final goods in the domestic market, we will also exclude the excise taxes. In the case of crude oil, however, the excise tax is not excluded but treated as the other taxes with the same base (e. g. ET). In the case of oil products this definition coincides with that of Goskomstat, although Goskomstat reports producer prices for domestic consumers, while we will apply this term to foreign consumers as well. We will also talk about producer prices at a particular location, meaning that the costs of transportation to that location are included. By contrast, consumer prices are the prices that final consumers pay, including all taxes, transportation costs and trade margins.

they would have on the world market. So, if p_d is the producer price for domestic consumers, p is the world price, and φ is the export duty then one would expect the following inequality:

$$p_d \geq p - \varphi - \Delta c_{tr}.$$

Here Δc_{tr} denotes the potential additional transportation costs which the enterprises will face if they decide to redirect their oil from the domestic to the foreign market. The inverse inequality may not be true. Due to the substantial costs of transporting oil from abroad to Russia, the domestic price may be the one which will bring domestic demand in equilibrium with the domestic supply as if there were no outside world. Denoting this latter price as p_d^* one can write down for the domestic price the equality

$$p_d = max \{p_d^*; p - \varphi - \Delta c_{tr}\}.$$

Our hypothesis is that, in fact,

$$p_d = p - \varphi - \Delta c_{tr},$$

i. e. that the price p_d^* was lower than the alternative world price (net of extra costs and duties) for the world prices which dominated during the recent past.

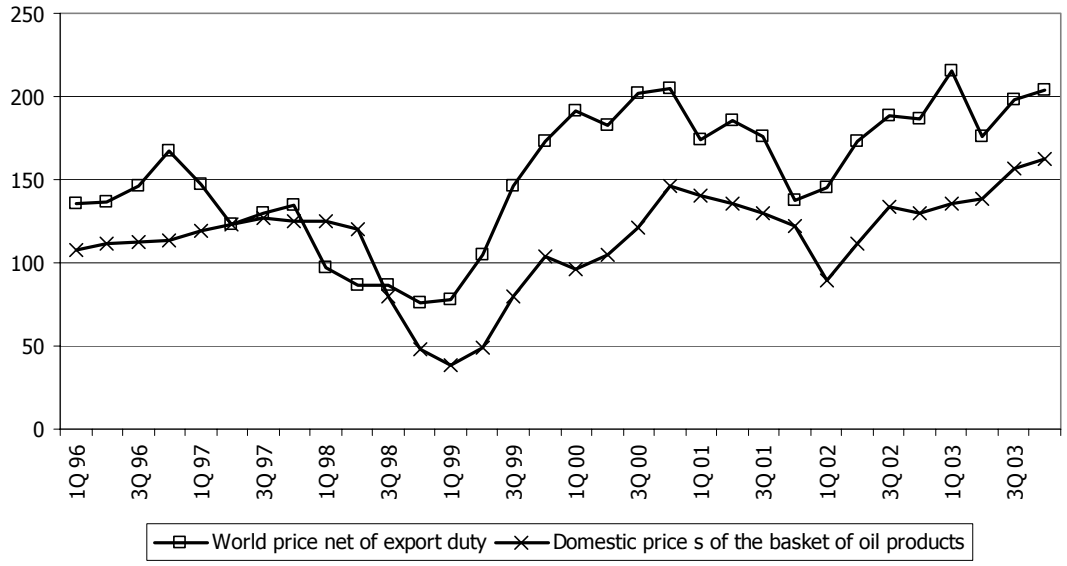
Our verification of this hypothesis is twofold. Through the rest of this section we check it econometrically. Namely, we show that the domestic price closely followed the world price, being indifferent to the situation in the domestic market. In the next section we compute the actual difference between the domestic price and the F.O.B. price for 2002 and compare it with estimated alternative transportation costs. These potential costs explain well why the domestic price of oil was lower than the world price.

As it was pointed out in the introduction, there is virtually no domestic market for oil in Russia, nor any registered domestic *market* price of oil. As an approximation for the latter we employ the difference between the producer price s of the basket of oil products obtained from one ton of oil and the unit processing costs c_{pr}:

$$s - c_{pr} = p - \varphi - \Delta c_{tr} \qquad (1)$$

The historical series of s is shown in Figure 1.

Figure 1.World price of "Urals" and domestic price of oil products ($/t)



To check our hypothesis econometrically in the longer run we applied the standard cointegration technique for non-stationary processes [see, e. g., Enders, 1995, Davidson, Mackinnon, 1993]. Generally one would expect that the domestic price s may be influenced by the profitability of exports, duties and alternative transportation costs, and by the factors affecting the isolated market price p_d^*. To account for the latter we used the real domestic demand assuming that a rise in the aggregate demand should induce growth in demand for oil products as well leading to a positive change in the price p_d^*. Thus we estimated the following regression model:

$$log\ s_t = c_o + c_1\ log\ (p_t - \varphi_t) + c_2\ log\ p\_rw_t + c_3\ log\ dem_t + \varepsilon_t,$$

with p_rw_t denoting (the alternative transportation) railway costs expressed in U. S. dollars per ton, and dem_t being the seasonally adjusted real domestic demand (the sum of the final consumption and gross investment in the SNA).

Under our hypothesis we should obtain $c_1 \approx 1$, and $c_3 \approx 0$. In terms of cointegration analysis this may be expressed as the following three conditions:

1º. There is exactly one cointegration relation between the series $log\ s_t$ и $log\ p_t$ (including, possibly, a constant and the railway tariffs);

2º. The series $log\ s_t$ and $log\ dem_t$ are not cointegrated;

3º. There is exactly one cointegration relation involving $log\ s_t$, $log\ p_t$ and $log\ dem_t$.

Conditions 1º and 3º establish that there is a long run connection between the world price of oil and the domestic price of oil products, to which the domestic demand add little (i. e., $c_3 = 0$). Condition 2º rejects the alternative explanation of cointegration in 3º, namely, that $c_1 = 0$ and $c_3 > 0$. It follows from conditions 1º and 2º that the domestic demand is not cointegrated with the oil price. Thus it contains some extra information

about the Russian economy (over what there is in the world oil prices), but this information is not important for the behavior of the domestic prices.

Table 1 reports the results of Johansen's test for cointegration performed on quarterly data for the period 1997:1-2003:4 (intercept everywhere included):

Table 1.Output of Johansen's cointegration test

Set of variables	Hypothesis of no cointegration:	Estimated number of cointegration relations *
$log\ s_t,\ log\ (p_t - \varphi_t)$	Rejected**	1
$log\ s_t,\ log\ (p_t - \varphi_t),\ log\ p\_rw_t$	Rejected**	2
$log\ (p_t - \varphi_t),\ log\ p\_rw_t$	Rejected*	1
$log\ s_t,\ log\ dem_t$ [6]	Not Rejected*	0
$log\ s_t,\ log\ (p_t - \varphi_t),\ log\ dem_t$ [8]	Rejected*	1

* For 5%-size test.

** For 1%-size test.

The data, therefore, support all three conditions 1º-3º, suggesting the price parity between the world and domestic markets in the longer run. To check that domestic demand did not affect the domestic oil price even in the shorter run, we estimated the error correction representation of the model:

$$\Delta log\ s_t = a_o + a_1\ \Delta log\ (p_t - \varphi_t) + a_2\ \Delta log\ p\_rw_t + a_3\ \Delta log\ dem_t$$

$$+ a_4\ (log\ s_{t-1} - c_1\ log\ (p_{t-1} - \varphi_{t-1})) + \nu_t,$$

where Δ denotes the difference operator: $\Delta x_t = x_t - x_{t-1}$ and the value of c_1 describing the long-run equilibrium was taken from the Johansen's test output ($c_1 = 0.955$). If the hypothesis is true, one will have $a_1 = 0$ (no deterministic trend in prices), $a_1 > 0$, $a_3 = 0$, and a_4 lying between -1 and 0. The OLS method produces the following coefficients (standard errors in parentheses): $a_0 = 0.02$ (0.03), $a_1 = 0.27$ (0.13), $a_2 = 0.56$ (0.18), $a_3 = 0.83$ (0.97), $a_4 = -0.35$ (0.14) ($R^2 = 0.67$). Again all the consequences of the price parity hypothesis are supported by the data. Thus we have it maintained econometrically both in the longer and in the shorter run.

3. Price disparity in 2002

[6] Since the railway tariffs turned out to be cointegrated with the world oil prices, they were not included into the last two sets of variables.

In this section we compare the domestic and world oil prices in 2002. Apart from confirming the price parity hypothesis for a particular year, we will obtain quantitative estimates of the parameters entering the price parity equation (c_{pr} and Δc_{tr}), which will be used later to calculate the profits and remaining rent in the oil industry.

The comparison is carried out in Table 2. Note that adequate examination of the processing costs should take into consideration, along with the operational costs and wages, the "normal" profit of oil-refining enterprises (the cost of capital used in refining). To do this we employed the actual reported net profits in oil-refining in 2002 (per 1 ton of processed oil). Although it is generally unwise to interchange these quantities, having compared profitability of oil-refining with other, "less rent-endowed", Russian industries, we concluded that reported profits could serve as a good approximation to the economic profit in oil-refining in 2002. For our analysis it is also important to eliminate the value of the processed oil itself and intermediate oil products from the reported costs of production. At the aggregate level this may be done using the data of input-output tables. The last edition available was for 2000, so we used Goskomstat's indices of costs of oil-refining to get the figure for 2002.

Table 2**.** Producer prices of exported and domestically processed oil in 2002
(U.S. dollars per ton)

Producer Price of Exported Oil	
World price of "Urals"	174
"Transportation costs from the border" [7]	13
Export price (F.O.B.)	161
Export duty	23
Producer price (at the border)	**138**
Producer Price of Domestically Processed Oil	
Domestic price of the basket of oil products obtained from 1 ton of crude oil	110
o/w:	
Gasoline (per 1 ton)	157
Diesel oil and other light products (per 1 ton)	149
Heating oil (per 1 ton)	70
Other products (per 1 ton, estimated)	117

[7] The difference between the world price and the F.O.B. price. Historically, the F.O.B. price for exports in the non-CIS countries followed closely the world price of "Urals". Although we do not explore the origin of the discrepancy here, compare it with the freight rates at Russian seaports. According to the data of *Argus FSU Energy* the sum of the freight rate, port and custom charges amounted to $12.3 per ton in February 2002 at Primorsk and $6.5 per ton at Novorossiysk, the data for August 2002 were $5.6-5.7 per ton for both ports [Argus Media Ltd., 2002].

Processing costs	12.7
Producer price (at the oil refinery)	**98**
Price Disparity	***41***

According to Table 2, exporters obtained $138 per ton of oil at the border, while the market price for the domestic oil refinery would only have been $98 per ton. Thus, there existed a price gap of $41 per ton between the world and the domestic markets.

This disparity, however large, may be explained by technological limitations of the Russian oil transporting system. If producers could have redirected domestically processed oil to foreign consumers by pipelines their additional transportation costs[8] would have been just $4 per ton, and the price disparity we have calculated would not have been sustainable. Suppose, however, that the capacity of pipelines was already fully employed and the alternative was the railroad. Then the alternative transportation costs would rise to $24 per ton if the oil was shipped to the Russian sea ports. If these were fully used, too, then the remaining possibility was to ship the oil to the Ukrainian and Baltic seaports, with the alternative costs increasing to $66 to be paid to the Russian railroads only. This by far surpassed the price differential. Note that the alternative transportation costs would be $51 per ton (including the Russian and foreign railway tariffs) if the oil company chose to resell the oil on exports from the location of oil refinery, having transported it to the refinery by pipelines. This figure gets already very close to the estimated price disparity.

Thus the discrepancy between the domestic and export oil prices, which existed in 2002, may be identified as the "transport barrier", whose existence is due to insufficient Russian pipelines and seaports capacity. Given the railway tariffs, the domestic oil price should follow the world price, just as we have concluded in the preceding section.

4. Tax burden on oil extraction under the price parity hypothesis. The effects of the reform of 2002

Under the condition of price parity one can render concrete the notion of the (static) tax burden on enterprises and evaluate it as a function of world oil prices. The pre-tax profit of an oil-extracting enterprise, per 1 ton of oil, is given by:

$$\pi = (1 - \alpha)\,(p - \varphi) + \alpha\,(s - c_{pr}) - \tau - c_0 - c_{tr},$$

[8] Here and below the estimates of tariffs are for transporting oil from Nizhnevartovsk to the western border of Russia. Note that the Urals Federal District, in which Nizhnevartovsk is located, is by far the largest Russian net producer of oil. The *additional* or *alternative* transportation costs are given over the costs of transporting oil from Nizhnevartovsk to domestic oil refineries by pipelines. All the estimates are those of the author and are based on the official tariffs published by Russian Railways.

where α denotes the share of oil sold in the domestic market, and the last three terms are the production costs (c_0), transportation costs (c_{tr}), and taxes (τ) included into the cost price[9].

When (1) holds, the expression reduces to:

$$\pi = p - \varphi - \alpha \Delta c_{tr} - \tau - c_0 - c_{tr}^{10}.$$

It follows that under the price parity condition the tax burden on enterprises consists of the taxes included into the cost price (τ), export duties (φ)[11], and the taxes paid out of profits – the profit tax and the property tax[12, 13]. Note that the indirect taxes, namely, VAT, excise taxes on oil products and sales tax, do not affect the producer price on oil. These taxes do not detract from the net profits of oil producers, but are altogether shifted to consumers.

Figure 2.Nominal tax burden on oil enterprises in 2001 and 2002

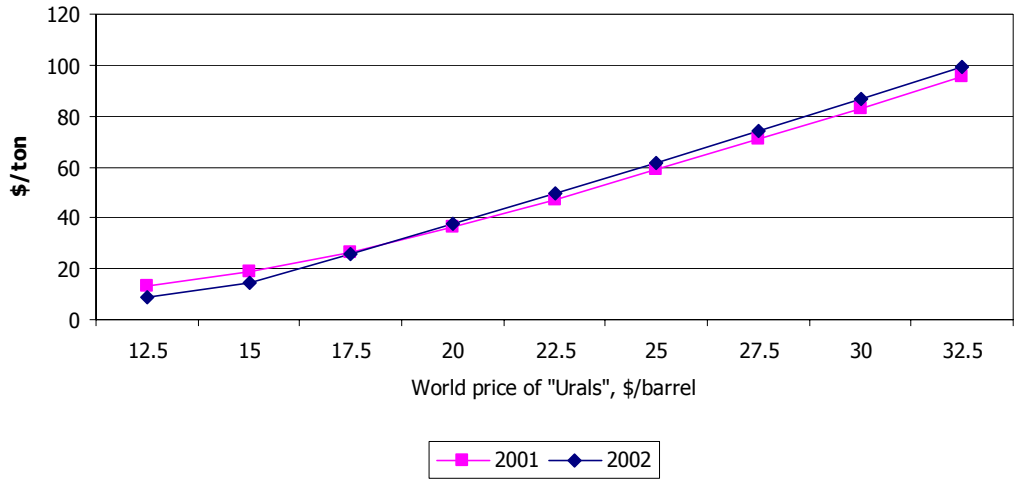


Figure 2 represents the nominal[14] tax burden as a function of world oil prices before and after 2002. The reform produced both increasing and decreasing effects on it, but on balance, as the chart suggests, the nominal tax scale was not dramatically altered. In fact, the deviation did not exceed $4 per ton at the extremes,

[9] Consisting of resource payments (including, in the case of oil production, the excise tax on oil), the railroad tax, some other taxes and payments proportional to the volume or value of produced oil and paid regardless of the market in which the oil is sold.
[10] In the actual calculations three markets were considered: the domestic market, exports to CIS countries, and exports to non-CIS countries. For the sake of brevity we omit the CIS market in the general discussion.
[11] Note that the export duty lowers the profits from selling oil in both the foreign and domestic markets. In this the tax burden differs from the tax revenues of the state.
[12] The property tax and the road tax are quantitatively insignificant with respect to other taxes involved.
[13] Assuming inelastic labor supply, we treat the unified social tax, as well as the other payroll taxes, as labor costs and do not include them into the tax burden. Note that in oil extraction payroll taxes are relatively small, so whatever of them is shifted on enterprises (if the labor supply is elastic) may be neglected for our purposes.
[14] I. e. the tax burden for 100% tax compliance. Note, however, that it is not clear what full compliance could have meant in the case of the tax for mineral resource reproduction and the royalty tax, whose bases were defined before 2002 as the (transfer) domestic price of oil. In our estimates we identified the actual revenues and the nominal liabilities, leaving the problem of evasion from these taxes outside the scope of this paper.

while the burden itself was about $50 per ton at average world prices. What did change significantly was the structure of the nominal tax burden. Particularly, the share of the profit tax diminished from 31-33% in 2001 to 16-17% in 2002 at the world price of "Urals" above $20 per barrel (see Figures 3 and 4).

Figure 3.The structure of nominal tax burden on enterprises in 2001

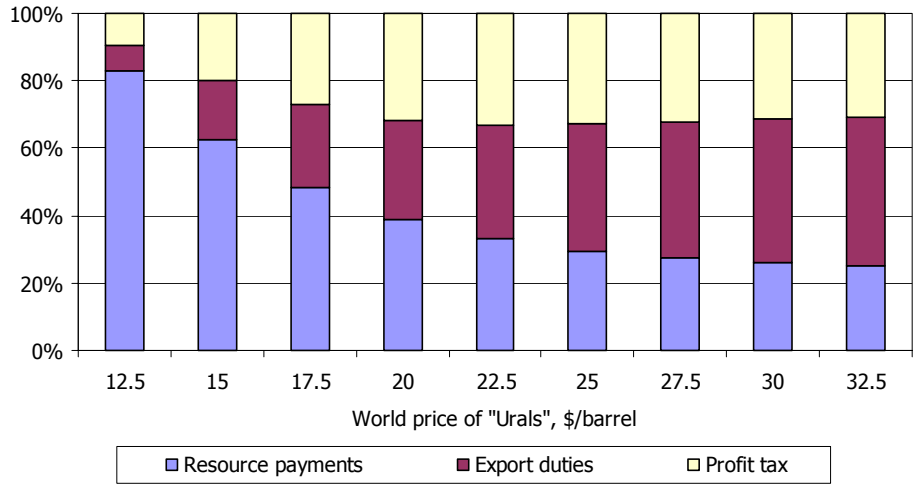
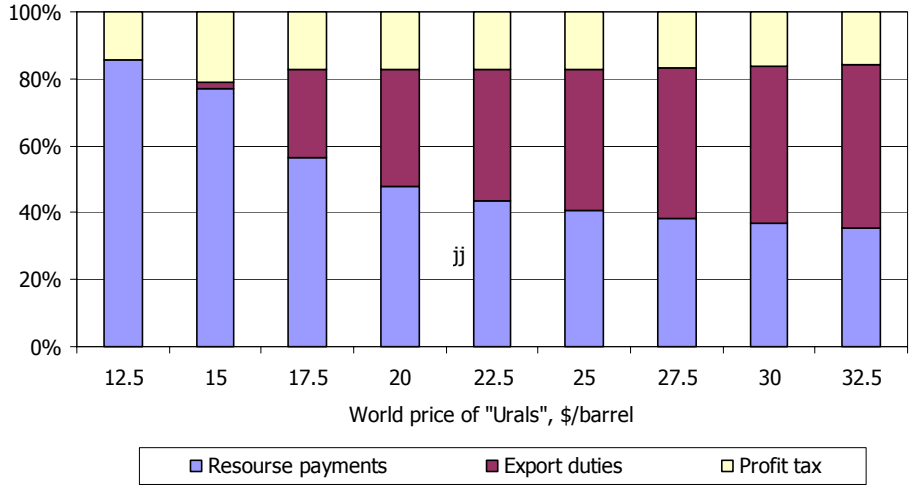


Figure 4.The structure of nominal tax burden on enterprises in 2002



It may be interesting to compare the value and structure of the nominal tax burden with the actual realization in 2001-2002. In 2002 the estimated actual tax burden per ton of oil became $45.4, $9.3 more than in 2001. The share of the profit tax, which had been 19% in 2001, accounted for only 6% in 2002, staying far below the estimated nominal level. Both phenomena may be explained by the higher evasion from the profit

tax compared to that from resource payments and export duties. After the reform the share of efficiently collected taxes went up, and so did the actual tax burden.

To illustrate this idea we assessed the tax compliance (the ratio of actual revenues to estimated liabilities) in oil extraction in 2002. For the extraction tax and export duties the calculation is straightforward and gives 97%, and 93%, respectively. The situation is more difficult with the profit tax, whose base is often underreported and is not adequately estimated by official statistics even at the aggregate level. To hide profits an enterprise may understate revenues and (or) overestimate costs. Starting from the market prices of oil products we can deduce how much of the profits are concealed due to revenue underreporting. According to official data, net[15] profits of large and medium oil extracting enterprises were equal to $10.3 per ton in 2002, which corresponds to $2.5 per ton of the profit tax (by the nominal rate of 24%). Meanwhile, using available data on *market* prices, costs, taxes, etc., we arrive at the net profits of $39.5 per ton, of which $9.5 of the profit tax. Consequently, only 26% of the potential liabilities were registered and paid in oil extraction in 2002. Certainly, some payments were made in other sectors of economy, such as trade, where part of the profits came to the surface. It may still be suspected that much of them remained undiscovered by the fiscal system, suggesting a huge profit tax evasion in the industry.

Thus the reform of 2002 did not increase the tax burden on enterprises by much, but changed its structure in favor of better controlled taxes. That was the main reason of higher state revenues from oil extraction in 2002.

5. Natural rent remaining in oil extraction

To find the remaining natural rent one needs to compare the actual and the "normal" profits of enterprises. Here the latter term is used to mean such annual profits which will make the investment projects in the oil industry competitive at the domestic and foreign capital markets. This quantity was estimated at the Economic Expert Group by E. Gurvich and A. Vasilieva. Comparing profitability of capital assets in some of the more successful rent-free Russian industries (such as food processing), on the one hand, and the profitability of assets of the largest foreign oil companies, on the other hand, with that of the Russian oil production, these authors obtained a range of normal profits of $25.8-35.6 per ton. Combining the figures with the price and cost data in Table 3 gives a range of rent volumes which remain in oil industry after the taxes have been paid.

Table 3. Revenues, profits and remaining rent in oil extraction in 2002
(U.S. dollars per ton)

[15] Here the term "net" is used for the gross profit after the depreciation deduction.

Producer's revenues at the location of oil extraction	**103.6**
Operational costs (excl. taxes) and wages (incl. payroll taxes)	34.2
ET, road tax and other taxes included into cost price	23.2
Pre-tax gross profits	**46.2**
Depreciation deduction	5.8
Property tax	0.9
Actually paid profit tax	2.5
Estimated profit tax liabilities	*9.5*
After-tax gross profits (net of actually paid profit tax)	**42.8**
After-tax gross profits (net of estimated profit tax liabilities)	*35.8*
Normal after-tax gross profits (E. Gurvich, A. Vasilieva)	**35.6-25.8**
Remaining rent in oil extraction	**7.2-17.0**

Three important conclusions may be drawn from the evidence. First, the lower bound for the remaining rent is a positive number significantly different from zero. In other words, investors in the Russian oil sector should get higher profits than the competitive level even by multinational oil companies' standards. Second, the lower bound is rather low with respect to the nominal and actual tax burden on enterprises, suggesting that much of the rent is already being extracted by the fiscal system. Thirdly, if the profit tax were fully paid by the oil industry, the minimum estimate for the remaining rent would become zero. This implies that the industry is able to pay 100% of the profit tax, but further increase of the tax burden may be harmful for it.

6. Is the extraction tax much worse than a profit tax?

In the previous sections we have observed the major advantage of the extraction tax – the efficiency with which its base and rate are controlled by the fiscal system. In this, it differs markedly from both the profit tax and the pre-reform resource payments. The shortcoming of ET, inherently connected to its simplicity, is the total insusceptibility to unequal opportunities for oil extraction. In fact, the tax is good for confiscating the natural rent, but what about the enterprises which produce oil without gaining any rent due to particularly harsh conditions they work in? On the contrary, a profit tax would have allowed better for varying profitability of oil fields, and would be preferable to the leveling ET were it collected better. It is clear that here the state faces a trade-off between efficiency of control and ability to differentiate of the taxes. In this section we examine the trade-off and conclude that in Russia ET is a better choice than a profit tax.

From the point of view of economic efficiency, a key difference between ET and a profit tax is that the former has a distorting effect on the prices that producers observe, while the latter does not. Consider the short run profit-maximizing problem of an oil-extracting enterprise:

$$(1-\gamma)\,\pi = (p\,q - c(q) - \tau_0 - \tau\,q) \to max_q \quad (2)$$

where γ denotes a profit tax rate, τ_0 is a lump-sum tax and τ is a *specific* tax rate, i. e. the rate of a tax which is levied on the physical amount of produced oil. Note that all the three rates may depend on the oil price p. The costs $c(q)$ are assumed to be a growing convex function: $c(q)' > 0$ and $c(q)'' > 0$. If the level of maximizing output q in (2) is positive, than it will satisfy the first order condition

$$c'(q) = p - \tau \quad (3)$$

Denote by q_0 the solution of (2) for $\gamma = \tau_0 = \tau = 0$. As is well known, this level of output also maximizes the combined revenues of the state and the enterprise:

$$max_q \{\pi + \tau_0 + \tau\,q\} = max_q \{p\,q - c(q)\} = p_0\,q_0 - c(q_0),$$

however, for zero tax rates all the gains will go to the enterprise. If the state chooses to raise taxes and sets $\gamma > 0$ and (or) $\tau_0 > 0$, the output q_0 will be unaffected, and the combined revenues will still be at their maximum. If, instead, the state chooses to confiscate profits through the specific tax ($\tau > 0$), then, as condition (3) necessitates, the output will go down to $q_1 < q_0$, and the combined revenues will diminish by the value of the deadweight-loss:

$$DWL = (p\,q_0 - c(q_0)) - (p\,q_1 - c(q_1)).$$

Note that the deadweight loss may be estimated from above as

$$DWL = -p\,\Delta q + c(q^*)'\Delta q \le -p\,\Delta q + c(q_1)'\Delta q = -\tau\,\Delta q. \quad (4)$$

(Here the Taylor expansion was used, $q_1 < q^* < q_0$, $\Delta q = q_1 - q_0 < 0$).

In other words, introducing a specific tax rate leads to distorted price information in (2)-(3), creating deadweight losses in combined revenues of the state and enterprise. This makes a tax like ET inferior to a profit-based tax. On the other hand, a profit tax requires considerably more information about the production activity and is much more likely to be dodged than a specific tax. Given our understanding of the dimension of the tax evasion, the question of efficiency comes down to quantitative evaluation of the right-hand side of (4). This may be done by econometric estimation of the aggregate oil supply q as a function of the after-tax price $p_{at} = p - \tau$. In fact, if the elasticity of q with respect to p_{at} is known, then one can find the foregone output Δq as

$$\Delta q = -\frac{q}{p_{at}}\frac{\partial \log q}{\partial \log p_{at}}\,\tau.$$

Finally, the upper bound of the deadweight loss as a ratio to tax revenues will be

$$\frac{DWL}{\tau q} = \frac{\tau}{p - \tau} \frac{\partial \log q}{\partial \log \mathrm{p_{at}}}.$$

Thus the value of the deadweight loss depends on how strongly oil output reacts on changes in the after-tax price of oil. Our estimates show that this dependence was fairly weak during the last few years. In fact, we have found that the price elasticity of oil production is less than 0.06[16]. For the world prices between $20 and $30 per barrel the ratio of specific taxes (oil duty, ET and road tax) to the after-tax price lies between 27 and 50%. Thus the deadweight loss associated with these taxes will be no more than 3% of the tax revenues. For the huge collection improvement that these taxes offer over the profit tax, choosing a specific tax as a means for natural rent extraction seems to be a very fortunate solution of the trade-off between economic and fiscal efficiency.

7. Conclusion

In this paper we analyzed the system of taxes imposed on the oil sector of Russia before and after the reform of 2002. We started with establishing a price parity relation explaining the price gap between the world and domestic markets through export duties and alternative transportation costs. Its immediate consequence is that indirect taxes (VAT, the sales tax and excise taxes on oil products) do not decrease the net profits of oil producers, but are totally shifted onto oil products consumers. Accordingly, the tax burden on producers consists of the export duties, the taxes included into the cost price (e. g. resource payments) and taxes paid out of profits (the profit and property taxes). Further examination showed that the reform did not change the nominal scale of the tax burden so much as it affected its structure. After the reform the share of efficiently collected taxes went up leading to higher total tax revenues. Nonetheless some of the rent remained in the industry. We noted, however, that imposing 100% profit tax compliance may reduce the remaining rent to zero and further increase in taxes may be destructive. Attributing the much improved efficiency of tax collection to the newly introduced extraction tax, we estimated the extent to which this tax is less economically efficient than a more differentiating profit tax. We concluded that the deadweight loss caused by ET is only a small fraction of the generated tax revenues. Thus ET is a better choice for extracting the natural rent in the Russian oil sector than the poorly controlled profit tax. On the whole, this evidence depicts the reform of oil taxation in 2002 as a big step forward of the Russian fiscal system.

References

1. Argus Media Ltd. (2002): Argus FSU Energy, issues on 22 February 2002, 9 August 2002.

2. Bobylev Yu. N. (2001): Reformirovanie nalogooblojeniya mineral'no-syrievogo sectora *// Nauchnye trudy Instituta ekonomiki perehodnogo perioda.* № 35P.

[16] Details will be given in another publication.

3. Chernavskiy S. Ya. (2001): Nalogovyje i strukturnyie instrumenty makroekonomicheskoi politiki v energeticheskom sektore *// Instrumenty makroekonomicheskoy politiki dlya Rossii: Sbornik statei*. – Moscow: TEIS.

4. Davidson R., Mackinnon J. G. (1993): Estimation and Inference in Econometrics. Oxford University Press.

5. Enders W. (1995): Applied Economic Time Series. Iowa State University.

6. RIA TEC (2003): TEC Rossii: neftepererabatyvayushchaya promyshlennost' v 2002 godu. Prilojenie k jurnalu "MinTop" - Moscow.

7. Vasilijeva A. A., Gurvich E. T., Subbotin V. E. (2003): Effekt reformirovanija naloga na pribyl. // 1000 luchshih predprijatiy Rossii: informatsionno-analyticheskoe izdanie. – Moscow.