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Estimating GDP and Foreign Rents of the Oil and Gas Sector in the USSR then and Russia now

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Abstract

A Soviet legacy for present-day Russia is found in its resource dependency as well as its implicit exposition of resource rents from foreign trade in the national accounting. Estimating rents from the foreign trade of oil and gas, we demonstrate how large the GDP of the oil and gas sector had been in the Soviet Union and has been in present-day Russia, as well.

Key words: Soviet legacy, oil and gas, rent, GDP

JEL codes: E01, P33, P51

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1 Introduction

Soviet legacies for present-day Russia are found in its resource dependency as well as its implicit exposition of resource rents from foreign trade in the national accounting. We demonstrate that, in the USSR then as well as Russia now, the major part of resource rents has been derived from foreign trade in which rents arise from the differences between foreign trade prices and domestic prices of oil and gas. Here “oil and gas” means crude oil, oil products (gasoline, diesel, etc.), and natural gas. This is one of the Soviet legacies related to natural resource rents in the USSR and present-day Russia. Another Soviet legacy is that rents from exports of oil and gas are not incorporated into the value-added of the oil and gas sector but rather into the distribution sectors in the official national accountings. These rents should be recorded in the value added and GDP of the oil and gas sector, which generates rents as the sole source sector, so that Soviet and Russian resource dependency could be measured correctly. We have already provided an estimate of Russian rents and GDP of the oil and gas industry (Kuboniwa, Tabata, and Ustinova, 2005; Kuboniwa, 2015). However, in spite of its importance, there is little data of Soviet rents and value added of the oil and gas sector, so we have had to make an estimate.¹ Presented here is our estimate of Soviet rents and the value added in the oil and gas sector, using 18-sector input-output tables (IOT) of the USSR at current domestic prices for 1966, 1972, and 1975–1990 (MINECON, 1994) in addition to official published data on foreign trade in foreign trade prices (Uegaki, 2004). Our estimate of Soviet rents

¹ As for specific features of Soviet foreign trade statistics, see Becker (1972). Treml et al. (1972) provided preliminary considerations of Soviet rents of oil and gas from exports.

and the GDP of the oil and gas sector could be regarded as the first systematic attempt ever made public in the literature. We also provide an updated estimate of Russian rents and GDP of the oil and gas sector for 1995–2015, employing official Russian data on domestic “producer prices” and foreign trade prices of the oil and gas to synthesize Russian rents. In Soviet and Russian price statistics, “producer price” implies “factor cost” or “basic price” in usual Western statistics, excluding net taxes on products or indirect taxes. This is also a Soviet legacy in the official statistics.

2 Methodology and data

Methodology

In the USSR as well as present-day Russia, rents, or foreign rents, of the oil and gas industry from exports are measured by the differences between exports of oil and gas in foreign trade prices and those in domestic prices.² Denoting R^* , P_f , P_d , and Q as rents, foreign trade prices, domestic prices, and quantity of oil and gas exports, respectively, we have

$$R^* = P_f \times Q - P_d \times Q = (P_f - P_d)Q. \quad (1)$$

In the USSR, these rents were fully absorbed into the State budget as net taxes on exports because of the State-monopolized institution of foreign trade, while they were added to the value-added or national income of the trade sector in the national accounting based

² We ignore imports of oil and gas because they are negligible in the USSR and present-day Russia.

on the MPS (material product system). In present-day Russia, rents arising from exports are absorbed into (a) net taxes on exports and (b) oil and gas companies' net income from exports, whereas they are incorporated into the value added of trade or transportation sectors in the national accounting based on the SNA (system of national accounting). This similarity of Soviet and Russian practices is regarded as a Soviet legacy in the institutions of the national accounting statistics and taxation in present-day Russia. Although export taxes can be considered to belong to a category of taxes on products or indirect taxes, here we consider export taxes as corporate income taxes, and rents (oil and gas giants' net income for foreign trade as well as export taxes) as components of the oil and gas sector's value added, according to the usual practice in most oil-exporting countries, including Norway. This exposition is essential for capturing the right scale of the oil and gas GDP when export taxes or rents are extremely large. Denoting the GDP^* and the GDP^o as the oil and gas GDP to be estimated and official oil and gas GDP, respectively, our task is to estimate

$$GDP^* = GDP^o + R. \quad (2)$$

Data for the USSR, then

All published data regarding Soviet foreign trade are expressed in foreign trade prices (rubles). Soviet exports of oil and gas in foreign trade prices are from the *Soviet Yearbook of Foreign Trade* and Uegaki's database (2004). Soviet foreign trade data in domestic prices, net national income, and depreciation of oil and gas are available only in Soviet input-output tables. We employ *Input-Output Tables of the USSR, 1966, 1972, and 1975–1990* for current domestic prices, which were released in MINECON (1994).

Gross value added (GVA) in the material sphere of the oil and gas sector at market prices (“established prices” in CIA terminology) is given by

$$GVA = NMP + D \cong GDP^o, \quad (3)$$

where *NMP* is net national income in the material sphere or net material product at market prices or established prices, and *D* is a capital depreciation excluding unamortized write-off parts. As conversion from the MPS to the SNA does not significantly influence the measurement of oil and gas GVA, the oil and gas GVA at market prices approximates the official oil and gas GDP, *GDP^o*. The overall Soviet GDP is extrapolated by using the proportion of the CIA’s GNP estimate (CIA, 1983; JIC, 1990) to the official overall net national income (NMP) in 1980 and 1982. We apply the 1980 proportion of 1.376 for 1966–1978, the 1982 proportion of 1.362 for 1983–1990, and the average proportion of 1.369 for 1981. All data are converted to terms of current US\$ by using official exchange rates for 1966–1990 (Bank of Russia’s website; www.cbr.ru).³ Large appreciations of Soviet official exchange rates for 1986–1990 are likely to be inconsistent with large declines in international oil prices, while they are consistent with large appreciations of European major currencies, including German Mark, against US\$ for the same period. Therefore, Soviet official exchange rates should be employed to evaluate amounts of Soviet foreign trade. It should also be noted that domestic prices in Soviet input-output

³ There are the United Nations estimates for 1985–1990 (AMA exchange rates given in National Accounts Main Aggregate Database; <http://unstats.un.org/>). These estimates may reflect values of non-tradable goods, and black market rates in consumer markets during the Gorbachev era with large fiscal deficits. However, they do not reflect large appreciations of major European currencies against US\$ for 1985–1990 (the United Nations *ibid.*). Therefore, they are not appropriate for the evaluation of exports of oil and gas.

tables employed here are purchaser prices.⁴ Exports in Soviet domestic purchaser prices do not include any rents, trade margins, or turnover taxes, while they include large transport margins for 1988–1989, which amount to approximately 20% of the oil and gas exports in domestic purchaser prices (see Table A2 in Appendix 1). If exports in basic prices or factor costs (in Soviet terminology, “producer prices”) are employed, Soviet rents of oil and gas may increase by approximately 0.2 percentage points in their share of overall GDP over cases using exports in purchaser prices for 1988–1989.

Data for Russia, now

Exports of oil and gas in foreign trade prices for 2000–2015 are taken from foreign trade data in US\$ (websites of Customs Services/FTS, Rosstat, and the Bank of Russia; www.customes.ru and www.gks.ru) while those for 1995–1999 are from Russian input-output tables⁵ in purchaser prices. Unlike those in Soviet tables, exports in purchaser prices in Russian tables fully include foreign rents. Exports of oil and gas in domestic prices or basic prices are calculated by the official data on annual export

⁴ So far as we know, the 1988 Soviet input-output table in “producer prices” is available in Trembl (1989).

⁵ Published input-output tables and supplementary tables (matrixes of imports, trade margins, transport margins, net taxes on products) for 1995–2003 are obtained from ROSSTAT (1999–2006). Tables for 1998–2003 are on Rosstat’s website, www.gks.ru. ROSSTAT (2010) provides a full set of input-output tables and supplementary tables for 2005, which was compiled upon request of the Institute of Developing Economies, JETRO for BRICs international input-output table for 2005. Rosstat also released data on the GVA of oil and gas, and total net taxes on the oil and gas products for 2004 and 2006.

quantities (ton or cubic meter) and annual averages of monthly “Russian producer prices.” For present-day Russia, domestic prices equal basic prices or “producer prices.”

Official data on the GVA of the oil and gas sector at basic prices for 2003–2015 are calculated from the crude oil and natural gas GVA *plus* the oil product GVA in the disaggregated GVA data on the Rosstat website. The data for 1995–2002 are from the sole source, that is to say, Russian input-output tables for 1995–2002. The “official GDP of the oil and gas sector” is estimated from the official published GVA at basic prices *plus* net taxes (excise taxes and value-added taxes) on oil and gas, excluding exports. Here “official” indicates data based on the official methodology in which the oil and gas sector is not engaged in foreign trade activities. Net taxes on oil and gas, excluding exports for 1995–2006, are obtained from Russian input-output data (matrix tables of net taxes on products or released data), while those from 2007 onward are extrapolated by using the average proportion, 0.3514, of the GVA of the oil products sector to its net taxes on products, excluding exports for 2005–2006, and its official GVA data for 2007–2015. Net taxes on products, excluding exports in present-day Russia, categorically correspond to turnover taxes in the USSR. Export taxes on oil and gas are paid by oil and gas giants from their export revenues. Data regarding export taxes on oil and gas are available from websites of the Russian Ministry of Finance and its related organizations (www.minfin.ru and www.roskazna.ru). Although export taxes can be regarded as a category of taxes on products or indirect taxes, we here consider taxes on oil and gas exports as corporate income taxes, in accordance with the usual practice in most oil-exporting countries. All relevant data are converted to US\$ using annual foreign exchange rates on the websites of the IMF/IFS/CEIC.

3 Results of estimations

Results for the USSR, then

Figure 1 shows our estimate of the Soviet oil and gas GDP and rents for 1966–1990 in terms of the percent of overall GDP. Figure 2 shows those in terms of current US\$ (for detailed data, see Table A1 in Appendix 1).

[Figure 1 here]

[Figure 2 here]

As can be seen from Figure 1, with rising international oil prices, the share of Soviet oil and gas rents in the overall GDP showed continuous increases from 0.7% in 1975 to 2.7% in 1980 and 3.9% in 1984. Then it showed continuous contractions and accounted for 1.4% in 1990. Concurrently, the share of Soviet oil and gas GDP in the overall GDP also showed continuous increases from 3.9% in 1975 to 6.4% in 1980 and 8.2% in 1984. Then it showed continuous decreases and to 5.1% in 1990.

As shown by Figure 2, rents in current US\$ also increased from 4,861 million US\$ in 1975 to 37,298 million US\$ in 1984, and then fell to 23,395 million US\$ in 1990. The estimated oil and gas GDP increased from 27,019 million US\$ in 1975 to 78,125 million US\$ in 1984 and declined to 73,858 million US\$ in 1985. However, it increased again from 1986 onward and came up to 86,984 million US\$ in 1990 due to large appreciations (more than 40%) of official exchange rates of ruble against US\$ which rightly reflected large appreciations of European major currencies against US\$. These

changes in rents and GDP of oil and gas may not be consistent with those of international oil prices for 1986–1990, while they rightly reflect the remarkable devaluation of US\$ for the same period.

Results for Russia, now

Figures 3 and 4 present our estimates of the Russian oil and gas GDP and rents for 1995–2015 in terms of the percent of overall GDP and US\$, respectively (for detailed data, see Table A3 in Appendix 1).

[Figure 3 here]

[Figure 4 here]

As can be seen from Figure 3, with a rapid rise of international oil prices, the share of Russian oil and gas rents in the overall GDP increased from 6.5% in 1998 to 13.4% in 2000. Then it fluctuated in a range between 9% (2013–2014) and 11% (2008) for 2001–2014. In 2015, with a rapid decrease in international oil prices, it contracted to 7.7%. Concurrently, the share of Russian oil and gas GDP in the overall GDP also showed a rapid increase from 13.2% in 1998 to 22.9% in 2000. Then it changed in a range between 17.7% and 23.6%. However, unlike rents, the share of Russian oil and gas GDP in the overall GDP did not decrease much in 2015, due to constantly high shares of the official oil and gas GDP. Visually, the correlation between the shares of the oil and gas GDP and Urals oil prices is rather low (adjusted $R^2 = 0.297$).

As can be seen from Figure 4, rents, in current US\$, increased from 18,148

million in 1998 to 24,498 million in 2000. Then they increased continuously until the 2009 Lehman shock. After 2010, they revived well while, with a sharp drop in Urals oil prices, it showed a large contraction to 153,562 million US\$ in 2015. The Russian GDP of the oil and gas sector in current US\$ showed movement parallel with rents due to increases in international oil prices as well as domestic oil prices. It jumped from 35,788 million US\$ in 1998 to 59,348 million US\$ in 2000. Then they showed continuous increases until 2009. After 2010, its level was restored well. However, a sharp drop in Urals oil prices, associated with a large depreciation of the foreign exchange rate of the ruble, brought about a large contraction and accounted for 256,081 million US\$ in 2015. Unlike facts in terms of GDP shares, the correlation between amounts of oil and gas GDP and Urals oil prices is very high (adjusted $R^2 = 0.974$).

Observations across the USSR, then, and Russia, now

Figure 5 shows average shares of estimated GDP and rents of the oil and gas sector and rents in the overall GDP of the USSR and present-day Russia. Average shares of the estimated rents and GDP of the oil and gas sector in the overall GDP in the USSR are 2.3% and 6.2%, respectively, for 1975–1990; meanwhile, in Russia, they are now 9.4% and 19.0%, respectively, for 1995–2015. The Soviet-estimated 6.2% is 1.6 times its official GDP, while the Russian-estimated 19% is twice the official share of 9.6%. These results are rather intuitive. On the other hand, the estimated share for present-day Russia is approximately three times that for the USSR. Both the USSR and Russia have been exposed to, and dependent on, exports of the oil and gas sector, considering that the average shares of oil and gas exports in total exports at foreign trade prices in the USSR

for 1975–1990 and Russia for 1995–2015 are 41% and 49%, respectively. However, obviously, Russia’s oil dependence is much stronger than that of the USSR, in terms of GDP share. This result may not be so intuitive. We need further analyses of the Soviet GDP in terms of current US\$ or rubles, which is derived by applying the single state-regulated exchange rate to tradable goods and non-tradable goods.

[Figure 5 here]

[Figure 6 here]

Our estimate of the Soviet GDP of the oil and gas sector with foreign rents is the first attempt to ever appear in the literature. Our estimate of the Russian share of the GDP of the oil and gas industry presented here is slightly smaller than the results in Kuboniwa, Tabata, and Ustinova (2005), Ustinova (2010), and Kuboniwa (2012) based on input-output tables, which include additional domestic activities of the oil and gas industry into their estimations. Due to the lack of disaggregated input-output tables with supplementary tables from 2006 onward, our simple method may be appropriate. It should also be noted that our estimate only considers formal activities of the oil and gas sector. However, our methodology is rather robust because it can always be reproduced from systematic official evidence. The results may also provide partial evidence of the resource rents suggested by Gaddy and Ickes (2013, 2015).

Figure 6 shows the estimated rents and GDP of the oil and gas sector in 2015 US\$, considering CPI-based deflators of current US\$, which are derived from current oil US\$ prices and 2015 US\$ prices for 1975–2015 as cited in BP (2016).

First, in terms of 2015 US\$, the average oil price, 60 US\$/bbl for the USSR, approximately equals that for present-day Russia. Second, in terms of 2015 US\$, the estimated oil and gas GDP for present-day Russia, 197,042 million US\$, is 1.2 times or 20% larger than that for USSR, 161,680 million US\$, whereas the estimated rents for present-day Russia, 102,741 million US\$, is 1.8 times those for the USSR, 58,841 million US\$. However, it is noteworthy to find that the official GDP of the oil and gas sector in the USSR, 102,840 million US\$, is slightly larger (8%) than that in Russia, 94,301 million US\$. In terms of 2015 US\$, oil dependence of the USSR is close to that of Russia. An adverse difference between the official GDP in the USSR and present-day Russia may reflect the fact: for the USSR there were two major sources of taxes on products—turnover taxes and rents—and all rents are absorbed by the State. In contrast, for present-day Russia, the major source is taxes on exports, and other taxes on products are rather secondary, while rents were shared with the oil and gas giants and the federal government. In any event, an intertemporal comparison of the USSR with present-day Russia using CPI-based 2015 US\$ rather than current US\$ may be useful for better understanding the Soviet legacy in present-day Russia.

Let us look at the official Soviet GVA factor costs by sector, which the CIA(1990) preferred (For details, see Table A4 in Appendix 2). The average share of official Soviet oil and gas GVA at factor costs in the overall GDP for 1975–1990 was 2.3% less than that of the official GDP, 3.8%, by the average share of net turnover taxes in the overall GDP, 1.5%. Net turnover taxes on oil and gas dominated 40% of the official GDP of the oil and gas sector.

The average share of the official Russian oil and gas GVA at basic prices in the overall GDP for 1995–2015 was 8.3% less than that of the official GDP, 9.6%, by the

average share of net taxes on products other than oil and gas exports, in the overall GDP, 1.3%. Net taxes on oil and gas, except for exports, occupied only 13% of the official GDP of the oil and gas sector. The average share of net taxes on oil and gas except for exports in the overall GDP for the same period amounted to 4.1%. The relative importance of net taxes on domestically used oil and gas products has diminished in present-day Russia, as compared with the USSR.

Even though we may witness many Soviet legacies or path-dependencies in present-day Russia, we may also see key differences in Soviet and Russian ownership of rents. In the USSR, rents had been totally centralized into the State budget, while they have been decentralized into the federal government budget and oil and gas companies' incomes in present-day Russia. The average rent-GDP ratios of the federal government and oil and gas giants for 1995–2015 were 4.1% and 5.3%, respectively. This implies that the federal government's average share of total rents for the same period was 42.5% less than that of the oil and gas giants. However, for 2005–2014, the federal government's average share was approximately 60%, irrespective of growth fluctuations. With sharp declines in oil prices and the dramatic depreciation of the ruble, the federal government's share of rents fell from 65% in 2014 to 44% in 2015.

4 Concluding remarks

We estimated the GDP of the oil and gas sector, including rents from exports, in the USSR and present-day Russia to synthesize a fundamental question: how large is the GDP of the oil and gas sector in the USSR, then, and Russia, now? The estimation of such oil and gas GDP for the USSR may be the first attempt in the literature. We also updated

our estimate of the Russian oil and gas GDP, focusing on exports. We demonstrated that estimated measures of the oil and gas GDP are much larger than its official measures in the USSR, then, and Russia, now. This result is intuitive. However, it may not be intuitive that the share of the oil and gas GDP in the USSR was much smaller than it is in Russia now. This may be partly because of an overvaluation of the total GDP through applying the single official exchange rate to tradable and non-tradable goods in a non-hard currency world. To correct this unintuitive outcome, we demonstrated the Soviet oil and gas GDP in 2015 US\$ for comparison. Needless to say, resolving these issues will require further investigation.

Appendix 1

[Table A1 here]

[Table A2 here]

[Table A3 here]

Appendix 2

[Table A4 here]

References

- Alexeev M. and Shlomo W. (eds.) (2013) *The Russian Economy* (Oxford University Press, Oxford and New York).
- Becker A. (1972) “National Income Accounting in the USSR,” in Treml V. and Hardt J. (eds.).
- BP (2016) *BP Statistical Review of World Energy 2015* (London, BP).
- Central Intelligence Agency [CIA] (1983) “Soviet Gross National Product in Current Prices, 1960-80: A Research Paper,” *Sov 83-10037*.
- Gaddy C. & Ickes B. (2013) “Russia’s Dependence on Resources,” in Alexeev M. and Shlomo W. (eds.).
- Gaddy C. & Ickes B. (2015) “Putin’s Rent Management System and the Future of Addiction in Russia,” in Oxenstierna S. (ed.).
- Joint Economic Committee [JEC] (1990) *Measures of Soviet Gross National Product in 1982 Prices*, US Government Printing Office, Washington DC.
- Kuboniwa M. (2012) “Diagnosing the ‘Russian Disease’: Growth and Structure of the Russian Economy,” *Comparative Economic Studies*, 54(1), pp. 121–48.
- Kuboniwa M. (2015) “The Impact of Oil Prices, Total Factor Productivity and Institutional Weakness on Russia’s Declining Growth,” in S. Oxenstierna (ed.).

- Kuboniwa M., Tabata S., & Ustinova N. (2005) "How Large is the Oil and Gas Sector of Russia? A Research Report," *Eurasian Geography and Economics*, 46, 1, pp. 68–76.
- Oxenstierna S. (ed.) (2015) *The Challenges for Russia's Politicized Economic System* (Routledge, London & New York).
- Russian Ministry of Economy [MINECON] (1994) *Input-Output Tables of the USSR, 1966, 1972 and 1975–1990 and Supplementary Tables for 1987–1989 in Current and Constant Prices* (Moscow).
- ROSSTAT (1999–2006) *System of "Input-Output" Tables of Russia for 1995–2003* (Moscow).
- ROSSTAT (2010) *System of "Input-Output" Tables of Russia for 2005* (Moscow).
- Treml V. (1989) "The Most Recent Input-Output Table: A Milestone in Soviet Statistics," *Soviet Economy*, 5, 4.
- Treml V. & Hardt J. (eds.) (1972) *Soviet Economic Statistics* (Durham, North Carolina, Duke University Press).
- Treml V. et al. (eds.) (1972) *The Structure of the Soviet Economy* (Praeger, New York).
- Uegaki A. (2004) "Conversion of Soviet Foreign Trade Statistics to SITC rev.3," *Hi-Stat Discussion Paper Series No.34*, Institute of Economic Research, Hitotsubashi

University.

Ustinova N. (2010) “Oil and Gas Sector in Russian Supply and Use Tables,” Paper presented to the 18th International Input-Output Conference, Sydney, Australia, June 20–25, 2010.

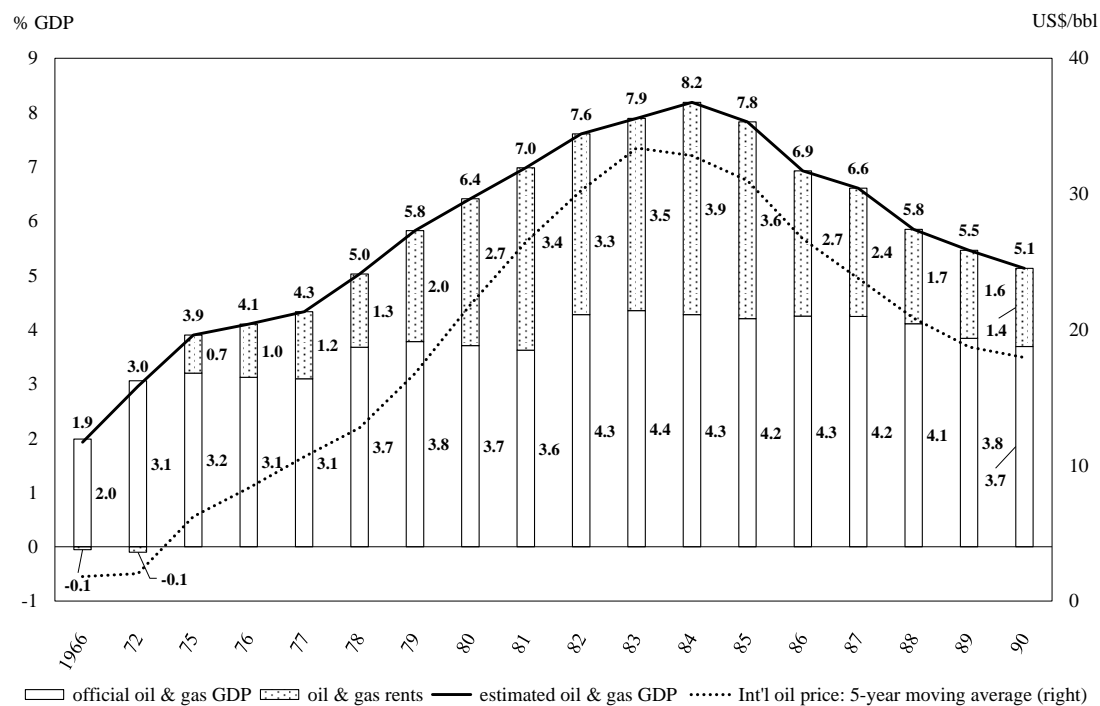


Figure 1. Estimates of Soviet oil & gas GDP in per cent of overall GDP

Sources: Table A1 in Appendix 1.

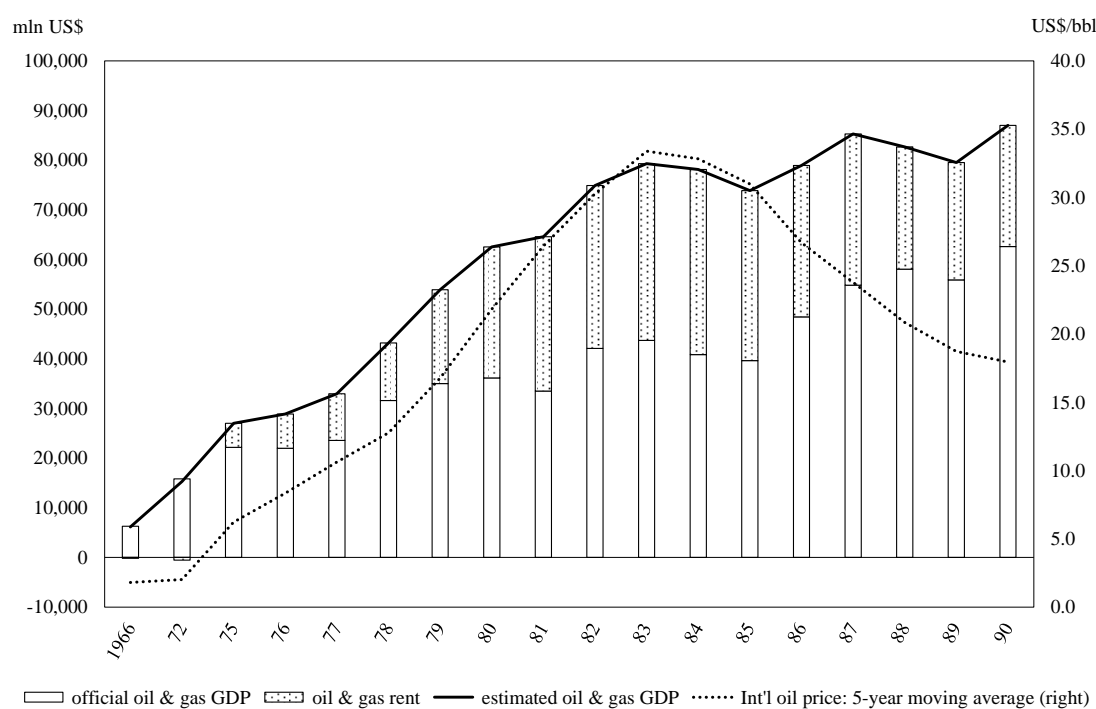


Figure 2. Estimates of Soviet oil & gas GDP in current US\$

Sources: Table A1 in Appendix 1.

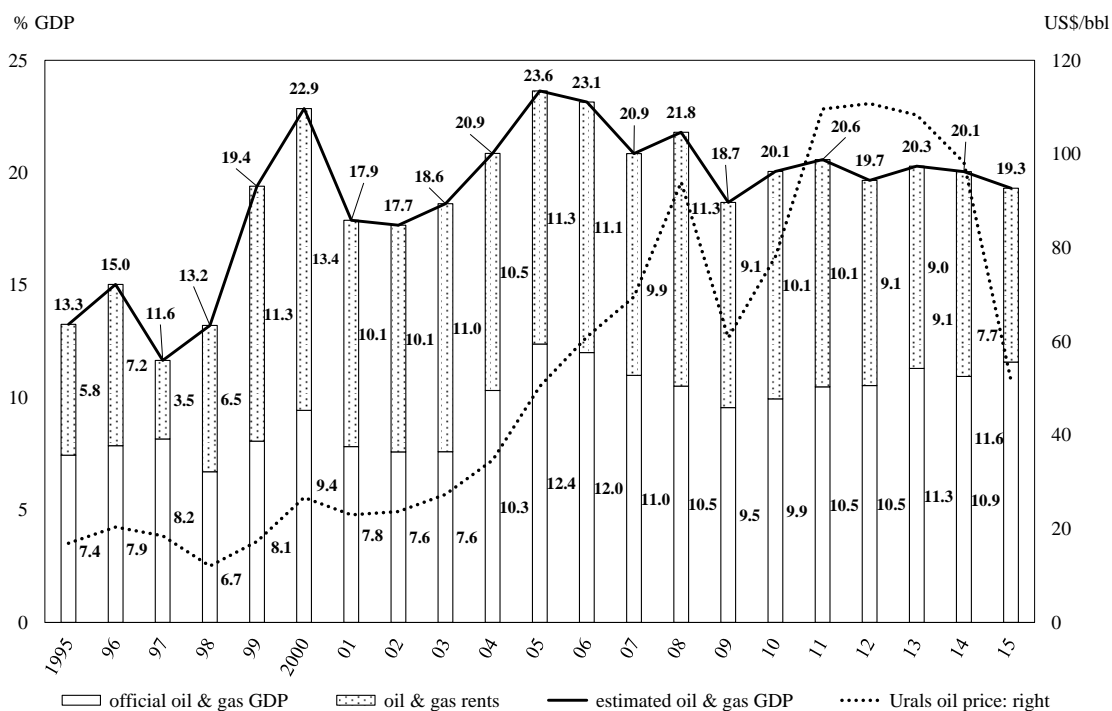


Figure 3. Estimates of Russia's oil & gas GDP in per cent of overall GDP

Sources: Table A3 in Appendix 1.

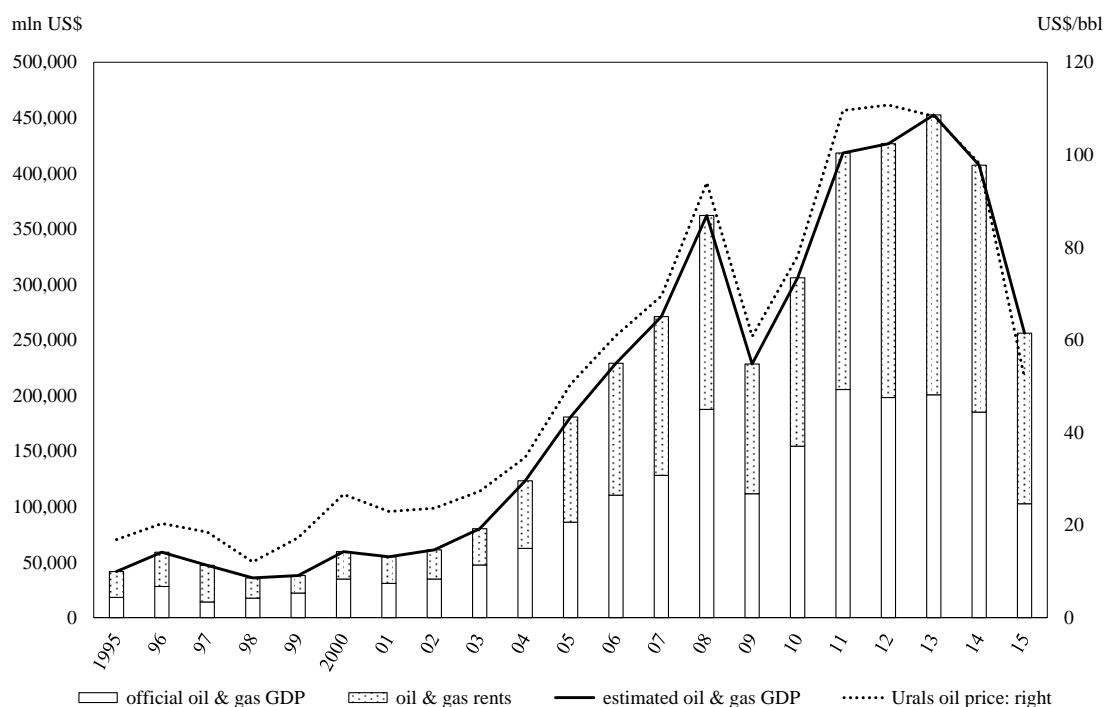


Figure 4. Estimates of Russia's oil & gas GDP in current US\$

Sources: Table A3 in Appendix 1.

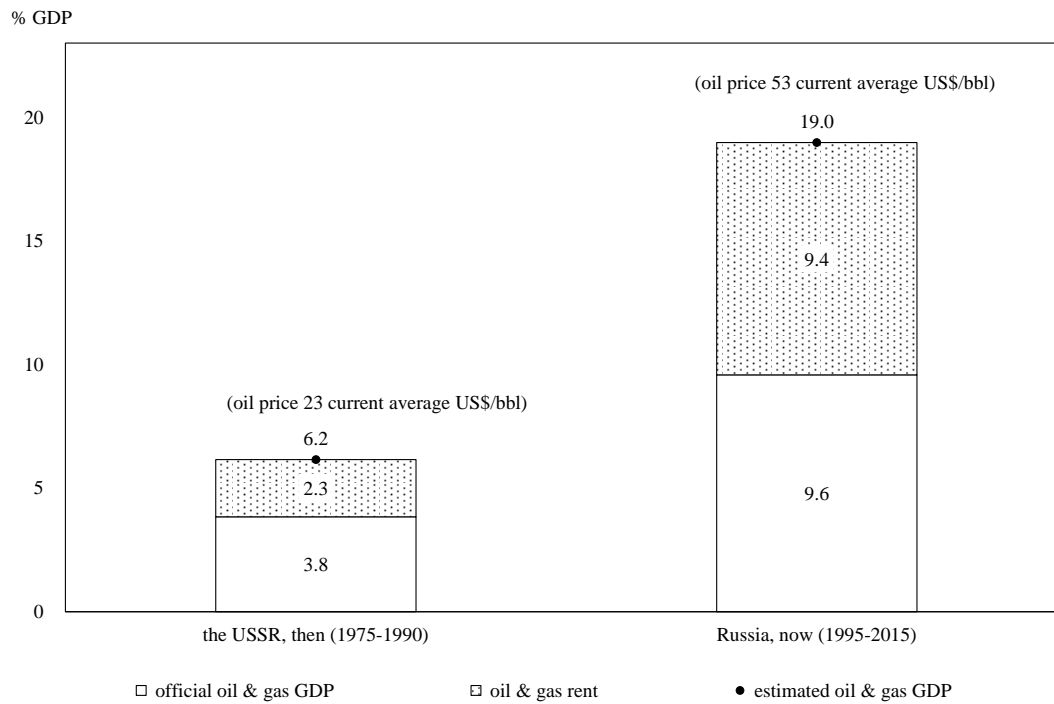


Figure 5. Annual average shares of the estimated GDP and rents of the oil & gas sector in overall GDP in the USSR, then and Russia, now.

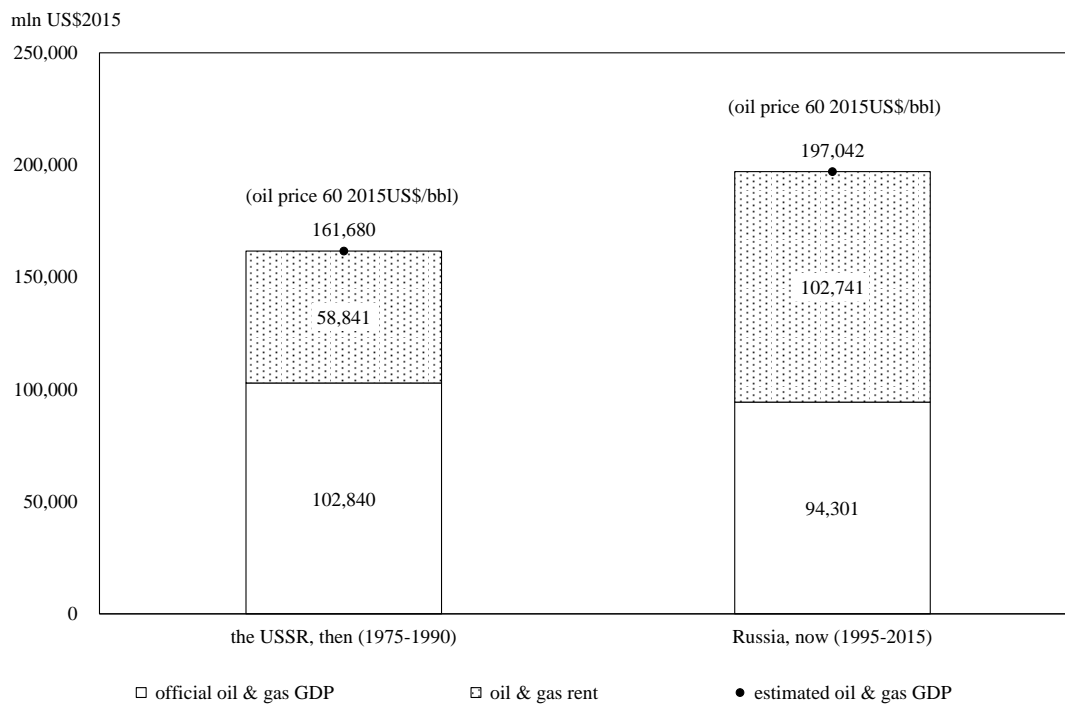


Figure 6. Annual average amounts of the estimated GDP and rents of the oil & gas sector in US\$ 2015 in the USSR, then and Russia, now.

Table A1. Estimates of the Soviet oil & gas GDP and rents

	Oil & gas exports		Oil & gas rents	Oil & gas GDP		Overall GDP	Int'l oil price: 5-year moving average	FOREX
	at foreign trade prices	at domestic prices		Official measure	Estimated measure			
	mln US\$	mln US\$	mln US\$	mln US\$	mln US\$	mln US\$	US\$/bbl	ruble/US\$
	(1)	(2)	(3) = (1) - (2)	(4)	(5) = (4) + (3)	(6)	(7)	(8)
1966	1,071	1,244	-174	6,290	6,116	317,218	1.8	0.900
1972	2,076	2,602	-526	15,832	15,306	517,514	2.0	0.834
1975	8,809	3,948	4,861	22,158	27,019	692,664	6.2	0.722
1976	11,154	4,257	6,896	21,973	28,870	703,979	8.3	0.754
1977	14,217	4,828	9,390	23,579	32,968	761,507	10.6	0.733
1978	16,882	5,301	11,581	31,595	43,176	859,448	12.8	0.683
1979	25,356	6,438	18,918	35,003	53,921	925,810	16.8	0.655
1980	33,404	7,028	26,375	36,149	62,524	975,423	21.8	0.652
1981	37,559	6,471	31,088	33,508	64,596	925,045	26.4	0.720
1982	43,167	10,377	32,790	42,094	74,883	984,681	30.3	0.725
1983	46,434	10,864	35,570	43,715	79,285	1,004,646	33.4	0.743
1984	47,112	9,814	37,298	40,827	78,125	954,446	32.8	0.814
1985	42,978	8,769	34,209	39,649	73,858	943,466	31.0	0.835
1986	42,481	12,014	30,467	48,448	78,915	1,139,866	26.7	0.702
1987	46,172	15,686	30,486	54,806	85,293	1,291,240	23.8	0.633
1988	42,028	17,431	24,596	58,068	82,664	1,413,750	20.8	0.608
1989	39,280	15,639	23,641	55,883	79,523	1,455,711	18.7	0.630
1990	37,817	13,421	24,395	62,589	86,984	1,696,386	17.9	0.585

Sources: MINECON (1994), Yearbooks of Soviet Foreign Trade (various years), Uegaki (2004), CIA (1983), JEC (1990), CIS Statistics Committee database, BP (2015), Bank of Russia, the United Nations and author's estimation.

Notes: Colum (1)–(8) are explained in the text of this paper. Column (7) is author's estimation by using BP's historical data on oil prices.

Table A2. Soviet exports of oil & gas in domestic prices for 1987–1989

	Exports in domestic purchaser prices	transport margins	re-exported imports	Exports in domestic factor costs (basic prices)
1987	9,922.7	49.1	nr	9,873.6
1988	10,595.2	1988.3	521.9	8,085.0
1989	9,859.0	1842.9	nr	8,016.1

Sources: Supplementary tables for 1987-1989 in MINECON (1994).

Notes: For 1988, the last column of Table A2 provides the data in Trembl (1989, Table 1).

nr = not recorded.

Table A3. Estimates of Russian oil & gas GDP and rents

	Oil & gas exports		Oil & gas rents	Oil & gas GDP		Overall GDP	Urals oil price
	at foreign trade prices	at domestic prices		Official measure	Estimated measure		
	mln US\$ (1)	mln US\$ (2)		mln US\$ (3) = (1) – (2)	mln US\$ (4)		
1995	31,096	12,860	18,237	23,304	41,541	313,331	16.9
1996	42,055	13,942	28,113	30,819	58,932	392,090	20.4
1997	30,038	15,914	14,124	33,049	47,173	404,941	18.5
1998	27,989	10,349	17,640	18,148	35,788	270,953	12.0
1999	31,303	9,087	22,216	15,788	38,004	195,908	17.3
2000	52,835	17,984	34,851	24,498	59,348	259,718	26.6
2001	52,135	21,279	30,856	23,976	54,832	306,618	23.0
2002	56,264	21,453	34,810	26,209	61,019	345,487	23.6
2003	73,720	26,269	47,451	32,676	80,126	430,348	27.3
2004	100,167	37,845	62,322	60,942	123,264	590,941	34.6
2005	148,915	62,928	85,987	94,595	180,582	764,017	50.4
2006	190,761	80,502	110,259	118,822	229,081	989,931	60.9
2007	218,568	90,387	128,181	142,823	271,004	1,299,706	69.5
2008	310,140	122,620	187,520	174,551	362,070	1,660,846	94.0
2009	190,710	79,074	111,636	116,758	228,394	1,222,644	60.8
2010	254,010	99,694	154,316	151,552	305,868	1,524,917	78.1
2011	341,812	136,425	205,387	212,875	418,262	2,031,771	109.6
2012	346,807	148,630	198,177	228,530	426,707	2,170,146	110.8
2013	349,054	148,381	200,673	251,918	452,591	2,230,628	108.3
2014	324,391	139,342	185,049	222,169	407,217	2,030,973	98.2
2015	198,885	96,366	102,520	153,562	256,081	1,326,015	51.6

Sources: Russian Customs Service, Russian Ministry of Finance, Bank of Russia, ROSSTAT, IMF, CEIC, BOFIT (Bank of Finland) and author's estimation.

Notes: Column (1)–(6) are explained in the text. Column (7) is taken from BOFIT (Bank of Finland) Database including Urals oil prices provided by Bloomberg and Thomson Reuters.

Table A4. Oil & gas GVA at factor costs or basic prices

			% of GDP					
The USSR, then			Russia, now					
Year	Turnover taxes on oil & gas	Official oil&gas GVA at factor costs	Year	Official oil&gas GVA at basic prices	Net taxes on oil&gas products except for exports	Official oil&gas GDP	Net taxes on oil&gas exports	Oil & gas companies' net income from exports
1966	1.2	0.8	1995	5.6	1.9	7.4	0.4	5.5
			1996	5.9	2.0	7.9	1.9	5.3
1972	1.4	1.7	1997	5.8	2.4	8.2	1.0	2.4
			1998	5.1	1.6	6.7	1.3	5.2
1975	1.4	1.8	1999	6.5	1.6	8.1	1.9	9.4
1976	1.3	1.8	2000	7.8	1.6	9.4	3.0	10.4
1977	1.3	1.8	2001	6.7	1.1	7.8	3.9	6.2
1978	1.8	1.8	2002	6.6	1.0	7.6	3.0	7.1
1979	2.0	1.8	2003	6.4	1.2	7.6	3.3	7.8
1980	1.9	1.8	2004	8.9	1.4	10.3	3.6	6.9
1981	1.8	1.8	2005	11.4	1.0	12.4	6.1	5.2
1982	1.4	2.9	2006	10.9	1.2	12.0	6.9	4.2
1983	1.5	2.8	2007	10.0	1.0	11.0	5.4	4.5
1984	1.5	2.8	2008	9.5	1.1	10.5	6.8	4.5
1985	1.5	2.7	2009	8.7	0.9	9.5	5.2	3.9
1986	1.4	2.8	2010	9.1	0.8	9.9	5.3	4.8
1987	1.5	2.8	2011	9.5	0.9	10.5	6.1	4.0
1988	1.4	2.7	2012	9.6	0.9	10.5	6.1	3.1
1989	1.4	2.5	2013	10.2	1.1	11.3	5.7	3.3
1990	1.5	2.1	2014	9.9	1.0	10.9	5.9	3.2
			2015	10.6	1.0	11.6	3.4	4.4

Sources: Tables A1 and A3.

Notes: The USSR, then: The estimated GDP = Official GDP + Rents; Official GDP = GVA at factor costs + turnover taxes; Rents = export taxes. Russia, now: The estimated GDP = Official GDP + rents; Official GDP = GVA at basic prices + net taxes on products excluding exports; Rents = export taxes + companies' net income from exports.