Soviet Foreign Trade Earnings Revisited

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Abstract

Soviet statistics authorities attempted to incorporate foreign trade earnings into national income, based on a unique formula. First, we clarify that they must have applied the so called Burge-Geary system for trading gain or terms of trade to their specific accounting in a different context. Then we prove that this Soviet practice should have been corrected. Second, demonstrating our estimate of Soviet foreign trade earnings by using Soviet official data on foreign trade and input-output tables, we explore implications of our estimate. We further look at how present Russia has succeeded to the Soviet statistical and institutional legacies of foreign trade earnings in the national accounting.

Key words: Soviet Union, special foreign trade earnings, foreign trade tax, national accounting, input-output table

JEL codes: E01, P33, P51

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1.   Introduction

Soviet statistics authorities began to incorporate foreign trade earnings into national income, based on a unique formula, around 1960. As is known, the Soviet Union is the leader of Material Product System (MPS) on which former socialist economies constructed their national accounting systems. However, so far as we know, only the Soviet statistics office of all MPS countries employed a unique formula of foreign trade earnings arising from differential prices, which are described as "special foreign trade earnings (SFE)" (see Treml et al. 1972). It was not clear when this feature of foreign trade was introduced. Post-Soviet disclosure of statistics (archival database RGAE [Russian State Archive of the Economy] Fond No. 1562; CIS Statistics Committee 1998) suggests that it might have been introduced after 1960 because we can witness the fact that foreign trade revenues only at domestic prices were embedded into Soviet national income as not net exports but net imports in domestic prices for 1950–1957 (RGAE, ibid.). In addition, the first Soviet input-output table for 1959 was compiled in 1960. In this table, net domestic income on the expenditure side in the MPS framework clearly included net exports in domestic prices in place of net imports. However, Soviet net exports in domestic prices always suffered huge deficits irrespective of whether trade balances in foreign trade prices showed surpluses or deficits. The first Soviet input-output table revealed abnormal aspects of official national accounting of trade balances for the years 1950–1957 even though it was confidential. As the Soviet input-output table was entirely compiled in domestic prices, within this table, trade deficits in distorted domestic prices, subject to State budgetary needs, were inevitable. However, these huge deficits did not reflect actual trade balances. In order to resolve this drawback, Soviet authorities might

have introduced a unique concept of SFE into the national accounting. However, as is shown in this paper, this compromise brought about another drawback.

In this paper, first we look at the Soviet unique formula in comparison of the so called Burge and Geary system for trading gain or terms of trade (Burge and Geary 1957; the United Nations 1957; Silver and Mahdavy 1989). This comparison suggests that an origin of the Soviet formula must have been the Burge and Geary system despite differences in definitions of variables. Then we prove that the Soviet formula should have been corrected according to practices in other MPS countries as well as Western countries. Second, demonstrating our estimate of Soviet foreign trade earnings for 1966–1990 by using Soviet official published data on foreign trade and released input-output tables, we explore implications of our estimates. Lastly, we provide an outlook at how present Russia has succeeded to the Soviet statistical and institutional legacies of foreign trade earnings in the national accounting.

2.   Origin of Soviet Formula for Foreign Trade Earnings

Soviet input-output tables were precisely compiled in domestic purchaser or producer prices in the framework of MPS (see, for example, Treml 1989). Soviet 18-secotor input-output tables (MINECON 1994) for 1966, 1972 and 1975–1990 were constructed in current domestic purchaser prices. Some aggregated versions of these tables were published in the Soviet Statistics office's house journal in 1991. As was stated, the first Soviet benchmark input-output table for 1959 was constructed in 1960, followed by the 1966 benchmark table and then 1972, 1977, 1982 and 1987 benchmark tables. In

addition to benchmark tables with 111 endogenous sectors, Soviet statistics authorities constructed 18-sector small tables for 1975–1990 in current and constant prices. The sole source of official data on exports and imports in domestic prices, available then and now, may be Soviet input-output tables. In these tables, foreign trade and national income were treated in the MPS as follows:

$$D + NMP^{IO} = C + RI + NI + G + L + E_d + M_d, \tag{1}$$

where D = capital depreciations, NMP^{IO} = net national income or net material product (NMP) on the production side or NMP produced in the MPS input-output table, C = final consumption, RI = replacement investment and capital repair, NI = new investment, G = other expenditures, including defence expenditures, L = losses, E_d = exports in domestic prices and M_d = imports in domestic prices. NMP on the expenditure side or NMP used in the MPS input-output table is defined as

$$NMP^{IO}_{used} = C + (RI - D) + NI + G + L + E_d - M_d. \tag{2}$$

The term $(RI - D)$ consists of capital depreciations in the final demand sectors, including consumption and other expenditures (defence expenditures), in Soviet input-output tables. Then we have

$$NMP^{IO} = NMP^{IO}_{used}. \tag{3}$$

This identity is strictly confirmed by the input-output tables. As all imported goods for consumption and investment, included in C, NI and G are evaluated in domestic purchaser prices, Soviet input-output accounting looks perfect in the MPS framework. However, in the Soviet era, as in other countries, all foreign trade transactions were performed in not domestic prices but foreign trade prices. All revenues or rents arising from differences between foreign trade prices and domestic prices were monopolized as implicit export taxes or import duties by the State, while in the input-output table no foreign trade revenues arising from price differentiation was recorded. What was added to NMP^{IO} in order to correct this drawback was a special component in official national income produced, NMP, that is to say, SFE. Thus we have

$$\text{NMP} = \text{NMP}^{\text{IO}} + \text{SFE}. \tag{4}$$

This SFE was allocated to trade and distribution sector in the official publications of Statistical Yearbooks whereas it was not added to official NMP used. SFE from 1959 onwards is defined as follows:

$$\text{SFE} = (E_f - M_f) / \Pi - (E_d - M_d), \tag{5}$$

where $\Pi = \Pi_e = E_f / E_d$ if $E_f > M_f$, and $\Pi = \Pi_m = M_f / M_d$ if $E_f < M_f$. If Soviet actual trade balance is positive, it is adjusted by the export tax rate. If Soviet actual trade balance is negative, it is adjusted by the reciprocal of the import duty rate. If Soviet actual trade is

zero ($E_f = M_f$), equation (5) can be written as SFE = $E_d - M_d$, which was exactly the Soviet definition of foreign trade earnings in national income accounting for 1950–1957.[1]

Equation (5), introduced by Soviet statistical authorities, is reduced to the Burge-Geary system for trading gain if we consider ($E_f - M_f$) as the nominal trade balance, ($E_d - M_d$) as the trade balance in real terms and Π as the common deflator. In the Burge-Geary system, if the nominal trade balance is positive, Π is the export deflator. If the nominal trade balance is negative, Π should be the import deflator. Soviet authorities were likely to intend to reflect Soviet actual trade balance in foreign trade prices in the national income as Burge and Geary intended to reflect the nominal trade balance in the national accounting in real terms. Considering these similarities and Soviet membership of the United Nations, we may state that Soviet authorities must have applied the Burge-Geary system to their formula. However, Soviet formula concerns only nominal balances irrespective of whether they are in domestic or foreign trade prices. In particular, there is no rational reason to change an adjustment coefficient according to the sign of actual trade

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[1] CMEA Statistics Commission (1986) provided Soviet formula Eq. (5) for special foreign trade earnings with our Eq. (6). See also Treml et al. (1972) and Becker (1972). We have not yet found any official data on trade balance in domestic prices for 1958. Therefore, we cannot say whether SFE was introduced for the official 1958 national income. However, SFE was likely to be incorporated into the Soviet national income for 1959 as is shown by Treml et al. (1972). Their estimate of special foreign trade earnings for 1959 is still appropriate because they employed official trade balances in both foreign trade prices and domestic prices. The official trade balance in foreign trade prices, which they employed, is the officially revised version in light of the denomination as well as the new fixed foreign exchange rate introduced on January 1, 1961.

balance. This is also true for the Burge-Geary system (Silver and Mahdavy 1989), although the United Nations (1957) highly appreciated the Burge-Geary system. We also wonder if Soviet authorities strictly applied their formula in the national accounting, as is discussed in the next section. Anyhow, as Soviet formula may not exactly reflect actual State revenues from foreign trade, it may not be meaningful. Thus, even in the Soviet bloc's CMEA (the Council for Mutual Economic Assistance) countries, we could not find any follower of Soviet formula. Chinese statistical authorities also employed MPS until the beginning of 1990s, while they did not follow the SFE formula. As was practiced in other MPS countries, the adjustment coefficient Π in equation (5) should be always unity ($\Pi = 1$). Then equation (5) can be written as

$$SFE^* = (E_f - E_d) + (M_d - M_f), \tag{6}$$

The first term $(E_f - E_d)$ of the right hand side of this equation shows implicit export taxes, while the second term $(M_d - M_f)$, shows implicit import duties. Smirnov (1978) also proposed this treatment. Thus equation (1) corresponding to equation (4) is reformulated as

$$D + NMP = C + RI + NI + G + L + E_f - M_f, \tag{1'}$$

CIA rightly employed this equation for foreign trade in their estimation of Soviet GNP, converting $(D + NMP)$ and $(C + RI + NI + G + L)$ to estimated GNP concepts (CIA 1983; JEC 1990). However, needless to state, CIA could not make use of Soviet official

information of $(E_d - M_d)$ as well as D, G and L in their GNP estimation.[2] It is also noteworthy to learn that information of official SFE was disclosed partially in the end of the Soviet Union and completely after its collapse (IMF et al. 1991; PlanEcon 1992; CIS Statistics Committee 1998).

3.   Estimation of Foreign Trade Earnings in the Soviet National Accounting

Figure 1 demonstrates our estimate of SFE* and official SFE with official foreign trade balances in foreign trade prices and domestic prices. As can be seen, our estimate without any use of adjustment coefficients Π is very similar to official SFE with correlation coefficient of 0.9983. Figure 1 also shows that Treml and Kostinsky (1982) and CIA (1988) over-estimated SFE due to their over-estimation of trade deficits in domestic prices.[3]

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[2] Neither Soviet official national income nor CIA's GNP estimates considered net receipt from abroad. Soviet national income means net domestic income in the material sphere. Also, CIA's GNP provides GDP estimates.

[3] We also calculated SFE**, which is exactly based on the Soviet formula and official data on exports and imports, to verify Soviet accounts (see Table A1). We could not reach exact figures of official SFE despite our use of official data on exports and imports in foreign trade prices and domestic prices. The similarity (correlation coefficient of 0.9984) between official SFE and this SFE** is just slightly greater than that between official SFE and SFE*. Soviet authorities were likely to make further adjustments for official data on foreign trade revenues after their application of formula (5). Calculated SFE** for 1975, with large deficits in foreign trade prices

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The high similarity between our estimate SFE* and official SFE is not so surprising because both SFE* and SFE were dominated by not adjusted trade balance ($E_f - M_f$) in foreign trade prices but unadjusted trade imbalance ($M_d - E_d$) in domestic prices. Figure 2 shows the share of net imports ($M_d - E_d$) in domestic prices in foreign trade earnings SFE or SFE*. As can be seen, this share was very high at the average share of 97% (for official SFE) and 95% (for our estimate) for 1966–1990. For the years with trade deficits in foreign trade prices, 1975–1976 and 1989–1990, the share was over 100%.

What supported this abnormal system of foreign trade revenues were high implicit tax and duty rates for exports and imports as is demonstrated by Figure 3. The overall import duty rate was raised from 2 times (100%) in 1966 to 2.3 times (130%) in 1972. It was lowered down to 1.7 times (70%) in 1975 according to increases in the overall export tax rate from 0.7 times (−30%; a subsidy) in 1972 to 1.1 times (10%) in 1975. From 1975 onwards the import duty rate was stabilized around 1.5 times (50%). On the other hand, the export tax rate was further raised up to about 2 times (100%) until 1985 and then lowered down to 1.3 times (30%) in 1990. Movements of the overall export tax rate may well be explained by those of the oil & gas export tax rate, which was raised up to 5.8 times (480%) in 1981, noting the high correlation coefficient of 0.963 between the tax rate of overall exports and that of oil & gas exports.

[Figure 1 about here]

[Figure 2 about here]

($E_f < M_f$), is largely different from official SFE for the year. This suggests that Soviet authorities might have occasionally employed Π_e in place of Π_m irrespective of sign of trade balance in foreign trade prices because use of Π_e for 1975 makes the difference smaller.

Figure 4 summarizes our estimation in terms of GDP share, using current GDP estimated by an exploration (see Table A1). The share of estimated foreign trade revenues SFE* in the overall GDP increased from 2 % in 1966 to 8% in 1982–1985, and then fell down to about 6% in 1990. The SFE share of 8.1% in 1983 consisted of trade surplus in foreign trade prices, 1.1%, and trade deficits in domestic prices, 7%. As were amounts of SFE*, its share in GDP was also dominated by that of net imports in domestic prices.

Amounts of SFE* as well as its share in overall GDP can well be explained by changes in international prices. Exports of the oil & gas to the West were immediately reflected in SFE*, while those to the CMEA countries were reflected in SFE* with time lags of 5 years mainly due to the CMEA commitment that foreign trade oil prices should be determined based on their past 5-year average level. Considering lags, in Figure 4, we display a series of the 4-year moving average of international oil prices.

Let us confirm our statement by simple regressions. For a small set of 16 samples during the periods of 1975–1990, an estimator CCR (Canonical Cointegration Regression) yields the following result:

$$sfe* = 0.506 oil4 + 0.040 \text{trend} + 7.9; \text{Adj. } R^2 = 0.991, \qquad (7)$$

$$[42.6] \qquad [212] \quad [29.4]$$

where $sfe* = \log (SFE*)$, $oil4 = \log$ (4-year moving average of international oil prices), a trend= a linear trend, and [.] = t-statistic. Clearly, all of estimated coefficients and constant

term are significant at the 1% probability level. Equation (7) suggests that a 10% increase in international oil prices (4-year moving average) led to a 5% increase in estimated Soviet foreign trade earnings, SFE*, with the steady growth rate of 4%.

Similarly, for the same small set of samples, using CCR, we have

$$\underline{sfe}* = 0.45 oil4 + 0.526; \text{Adj. } R^2 = 0.957, \tag{8}$$

$$[29.7] \qquad [11.7]$$

where $\underline{sfe}$* = log (SFE*/GDP×100). All of the estimated coefficient and constant are significant at the 1% probability level. Equation (8) demonstrates that a 10% increase in international oil prices (4-year moving average) resulted in a 4.5% increase in the share of estimated Soviet foreign trade earnings, SFE*, in overall GDP without any underlying steady trend rate. It follows from equations (7) and (8) that, indeed, movements of Soviet foreign trade earnings were largely exposed to changes in international oil prices after oil shocks (for oil-poor countries) or oil windfalls (for oil-rich countries) in the 1970s.

Let us go to a sectoral analysis of foreign trade revenues arising from price differentials. We focus on the year 1982 which is the benchmark year for CIA (1990). Appropriate data on exports and imports of non-ferrous metals in foreign trade prices from 1976 onwards are missing in the official sources while those in domestic prices are clearly shown in our input-output tables (see Table A2 in the appendix). Data on imports of the oil & gas industry for 1976-1985 and data on the coal and other fuels industry from 1976 onwards are missing in the official sources while those in domestic prices are also shown in the input-output data. As for fuels, JEC (1990) considered only aggregated fuel's foreign trade in foreign trade prices. Here we also consider disaggregated oil & gas

exports in light of their importance for the Soviet economy without considering negligible oil & gas imports.

Figure 5 shows sectoral sources of export taxes and import duties as well in 1982. 83% of export taxes was generated from the oil & gas exports, followed by 24% from the machinery industry. On the other hand, almost 60% of overall import duties arose from the light industry, followed by about 30% from the food industry, 7% from the chemical industry and 6% from the agriculture sector.

Figure 6 presents sectoral rates of export taxes and import duties in 1982. The oil & gas industry showed the highest export tax rate, 4.2 times (320%), followed by the agriculture sector, 3.9 times (290%), the coal and other fuels sector, 1.65 times (65%) and the machinery sector, 1.58 times (58%). The light industry with 0.5 times (−50%), the wood, pulp and paper sector with 0.8 times (−20%), the food industry with 0.8 times (−20%) and the ferrous metal sector with 0.9 times (−10%) were subsidized for their exports.

Excepting the other branches sector with import duty rate of 4.4 times (340%), the light industry demonstrated the highest import duty rate, 4.1 times (310%), followed by the industry not elsewhere classified, 3.9 times (290%), the food industry, 2.1 times (110%), the wood, pulp and paper industry, 1.7 times (70%) and the chemical industry, 1.5 times (50%). The ferrous metal industry with import duty rate of 0.8 times (−20%) was subsidized for its imports.

The machinery industry was the largest importer in the Soviet Union. Its export share in terms of foreign trade prices amounted to 37% whereas that in domestic prices accounted for only 26.0% which was slightly less than the light industry's export share of 26.4% in domestic prices. In contrast to the light industry, the average import duty of

the machinery industry was merely 1.03 times (3%). Generally, most of the light industry products consist of consumer goods, while machinery industry products consist of consumer durables (TV etc.), production equipment and military goods as well. More disaggregated data would show import duty differentiations among consumer durables, production equipment and military goods.

[Figure 5 about here]

[Figure 6 about here]

From above observations we witness how the Soviet State "exploited" industrial producers for revenues from exports and private consumers for revenues from imports. The State purchased the oil & gas products from producers at low domestic prices and exported them at much higher international prices, given the official foreign exchange rate. The State imported the light industry products at international prices and sold them to Soviet consumers at much higher domestic prices, given the official foreign exchange rate.

Concluding Remarks

We pointed out a high probability that around 1960 Soviet statistics authorities applied the so called Burge-Geary system for trading gain to their specific accounting of foreign trade revenues in the Soviet context. We clarified that this Soviet accounting of foreign trade was not meaningful. Then, demonstrating our estimate of Soviet foreign

trade earnings by using Soviet official data on foreign trade and input-output tables, we explored implications of our estimate. With evidence, we witnessed how Soviet State "exploited" producers and consumers through foreign trade. How has today's Russia succeeded to the Soviet statistical and institutional legacies of foreign trade earnings in the national accounting? Immediately after the collapse of the Soviet Union, Russia liberalized most of domestic prices, foreign trade and foreign exchange market. Along with Russia's integration into the world markets, Russia abolished Soviet-type high import duty policy for consumer goods. National accounting was gradually converted from MPS to System of National Accounting (SNA). Soviet formula of equation (5) lost its position. However, when we look at Russian key industry, that is to say, the oil & gas industry, we find Soviet legacies in Russia's practices of SNA. With regard to the oil & gas industry, foreign trade revenues arising from price differentiation, measured by ($E_f -$ E_d), the first term of equation (6), have been generated. As was clarified by Kuboniwa et al. (2005), these revenues have been incorporated into the trade and distribution sector in the national accounting as was in the Soviet Union. This method is not likely to visualize the key industry's economic performance from lens of sectoral GDP. As State monopoly of foreign trade was abolished, oil & gas foreign trade revenues have been co-shared between the federal government and the oil & gas giants such as Gasprom, Rosneft, Lukoil and Transneft.[4] Export taxes on oil & gas have not yet been replaced by corporate income taxes on the oil & gas industry. Price liberalization introduced in 1992 induced

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[4] Kuboniwa (2016), for instance, focuses on the oil & gas industry's foreign trade revenues. In contrast, this paper attempts to clarify general characteristics of Soviet national accounting practice of macro and sectoral foreign trade revenues, exploring the origin and background of Soviet national accounting.

hyper-inflation, while governmental regulation on the domestic oil & gas prices remained. Thus, our historical study on Soviet foreign trade revenues would shed light on contemporary Russian oil dependency, national accounting system and tax policy.

Appendix

[Table A1 about here]

[Table A2 about here]

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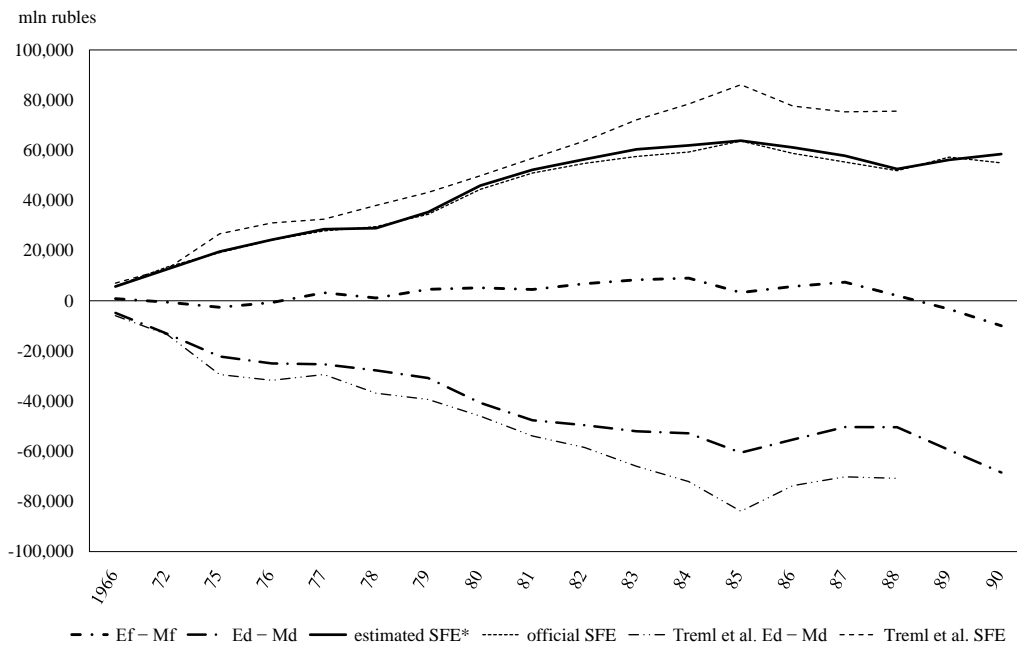
Figure 1. Soviet foreign trade balances and revenues in current prices

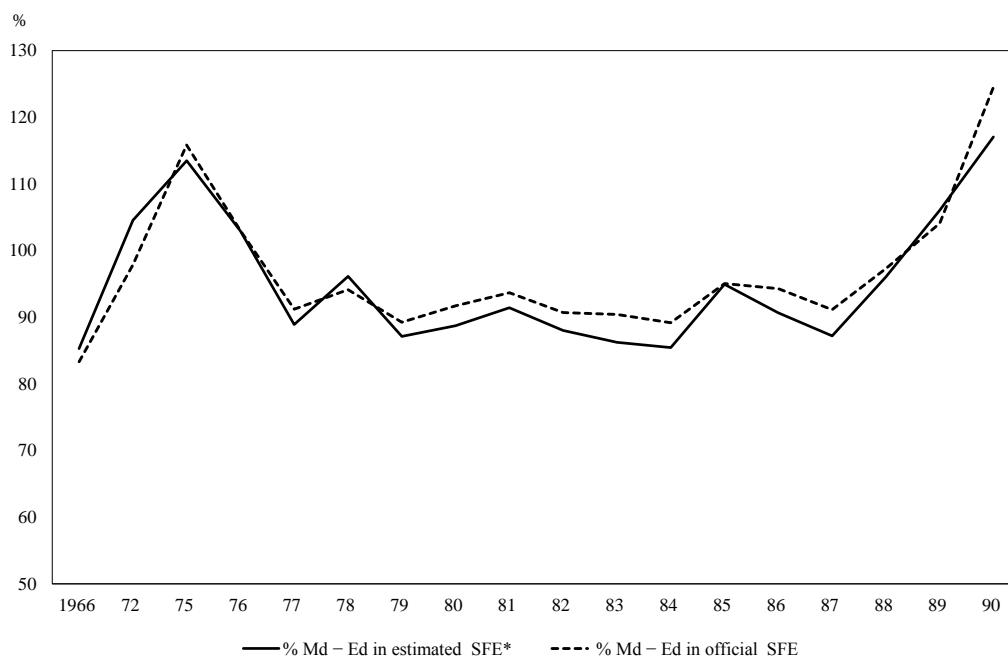Sources: Table A1 in the appendix.

Figure 2. Share of net imports at domestic prices ($M_d - E_d$) in SFE
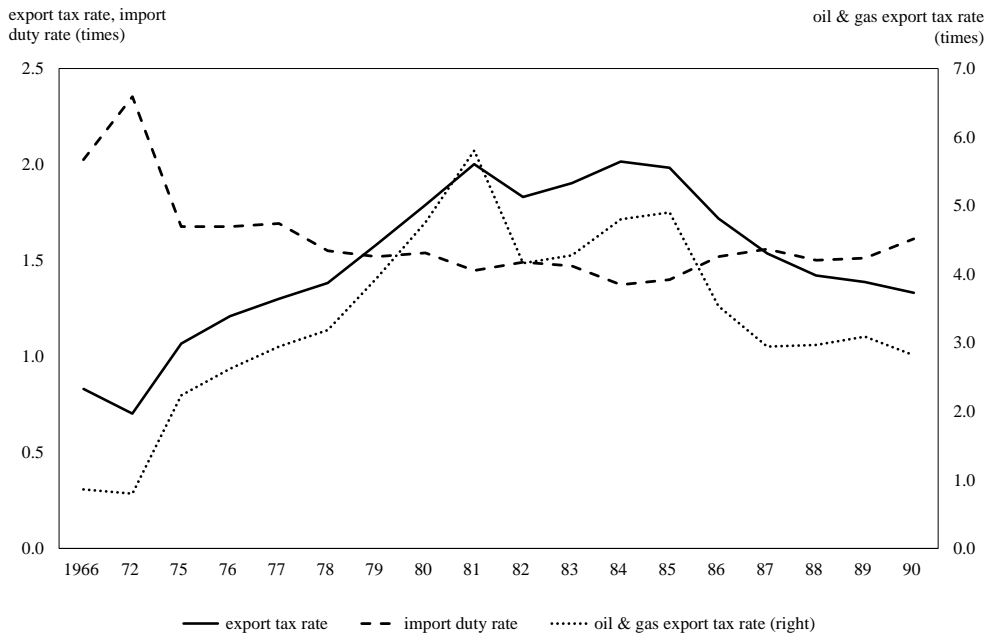
Sources: Table A1 in the appendix.

Figure 3. Soviet implicit tax rates for overall exports, imports and oil & gas exports

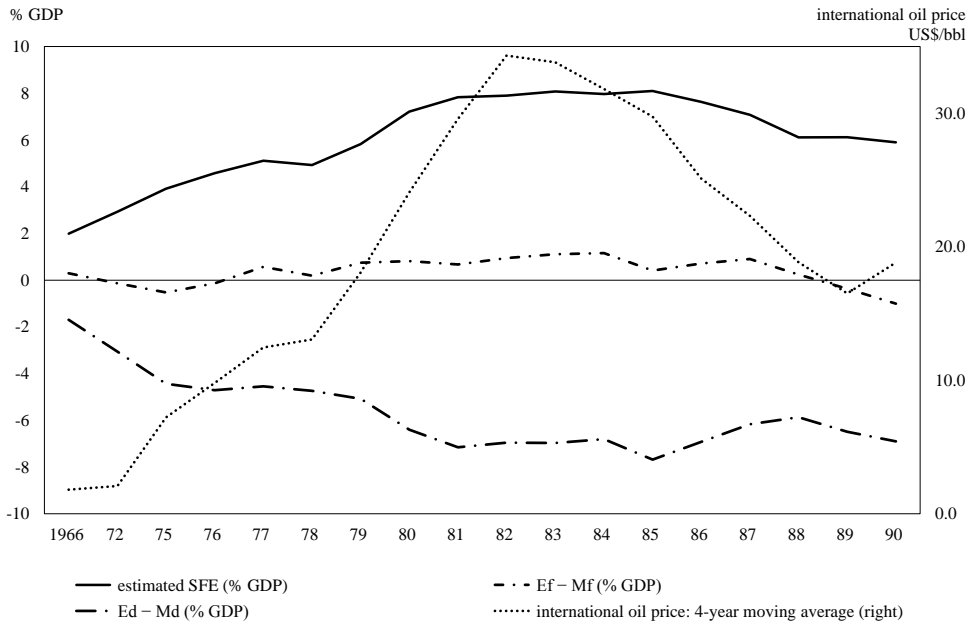Sources: Table A1 in the appendix.

Figure 4. GDP shares of Soviet foreign trade balances and revenues in current prices

Sources: Table A1 in the appendix and authors' estimates.

Notes: GDP is estimated by an exploration using CIA's GNP estimates and Soviet official NMP in current prices for 1980 and 1982.
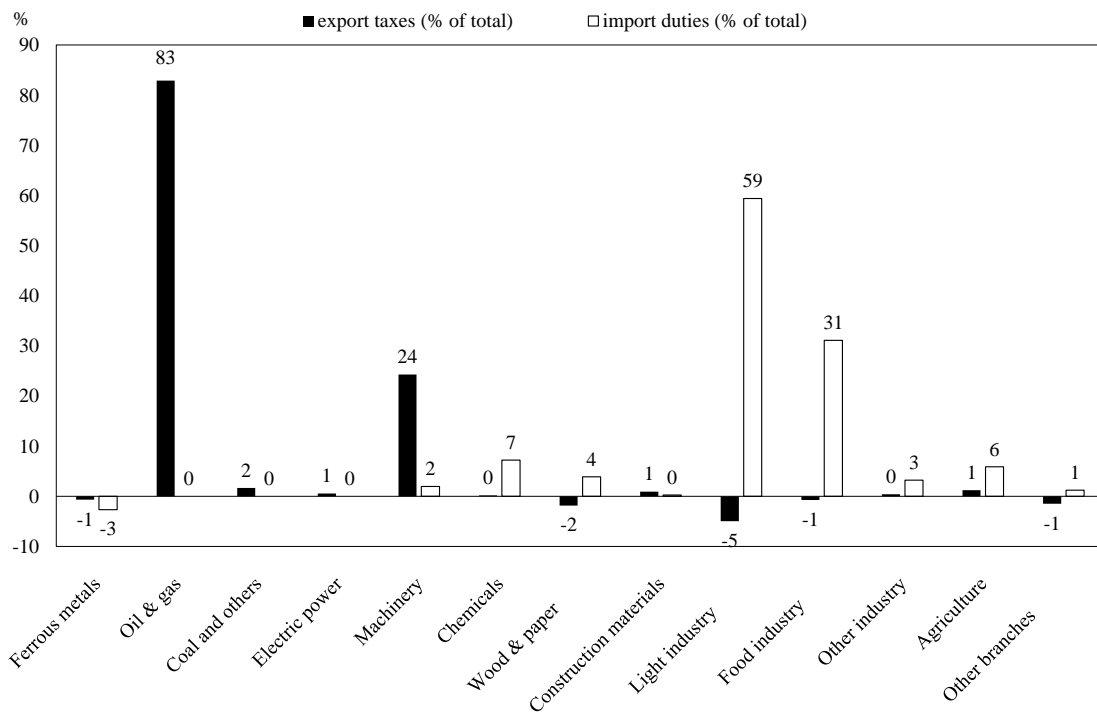
Figure 5. Sectoral sources of export taxes and import duties in 1982

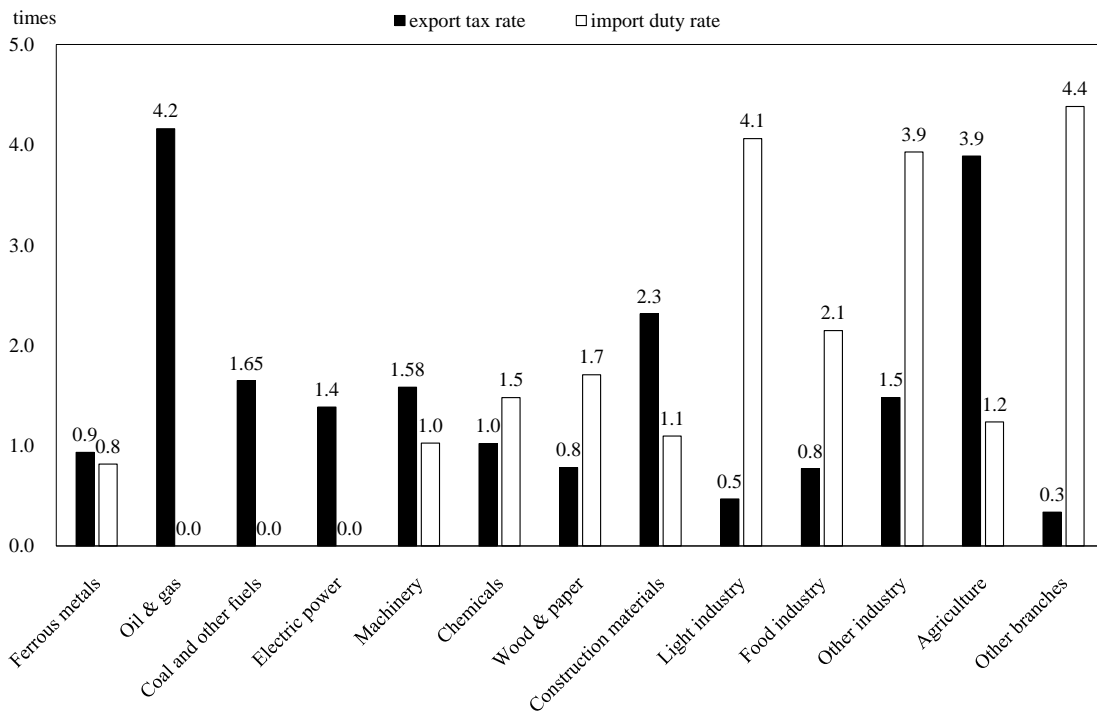Sources: Table A2 in the appendix.

Figure 6. Sectoral rates of export taxes and import duties in 1982

Sources: Table A2 in the appendix.

Table A1. Soviet foreign trade and special foreign trade earnings (SFE)

<div align="right">(current mln rubles except international oil prices)</div>

	Exports in foreign trade prices	Imports in foreign trade prices	Exports in domestic prices	Imports in domestic prices	Official SFE	Estimated using Eq. (6) ($\Pi=1$)	Calculated using Eq. (5)	Treml et al. using Eq.(5)	Overall GDP	Int'l oil price: 4-year mov. av.
	E_f	M_f	E_d	M_d	SFE	SFE*	SFE**	SFE Treml	GDP	US$/bbl
1966	7,957	7,122	9,581	14,423	5,812	5,677	5,848	7,000	285,496	1.8
1972	12,734	13,309	18,121	31,324	13,492	12,628	11,850	12,800	431,607	2.1
1975	24,034	26,671	22,524	44,723	19,165	19,562	17,777	26,700	500,046	7.2
1976	28,023	28,733	23,161	48,172	24,288	24,301	23,821	31,000	530,820	9.8
1977	33,255	30,093	25,574	50,944	27,812	28,533	27,802	32,500	558,245	12.5
1978	35,670	34,554	25,804	53,592	29,520	28,904	28,595	38,000	586,698	13.1
1979	42,426	37,881	26,798	57,582	34,487	35,329	33,655	43,200	606,324	18.1
1980	49,635	44,463	27,739	68,449	44,391	45,882	43,600	49,800	635,785	24.1
1981	57,108	52,631	28,530	76,203	50,897	52,150	49,910	56,800	666,223	29.6
1982	63,165	56,411	34,500	84,139	54,730	56,393	53,328	63,700	713,700	34.3
1983	67,891	59,589	35,676	87,711	57,546	60,337	56,397	72,100	746,848	33.8
1984	74,386	65,373	36,912	89,790	59,297	61,890	57,350	78,400	777,107	31.8
1985	72,664	69,429	36,642	97,202	63,704	63,794	62,191	86,100	788,032	29.8
1986	68,285	62,586	39,737	95,132	58,745	61,094	58,712	77,600	800,181	25.1
1987	68,142	60,741	44,350	94,731	55,289	57,782	55,197	75,300	816,821	22.3
1988	67,115	65,040	97,627	97,627	51,839	52,506	53,449	75,600	859,315	18.8
1989	68,742	72,137	109,108	109,108	57,238	56,177	54,436		917,694	16.5
1990	60,757	70,728	114,097	114,097	54,968	58,492	52,378		991,910	18.8

Sources: MINECON (1994), Soviet Yearbook of Foreign Trade (various years), Uegaki (2004), CIS Statistics Committee (1998), JEC (1990), CIA (1983; 1988), Treml et al. (1982), BP (2015) and authors' estimates.

Notes: Data in foreign trade prices: Soviet published official data and Uegaki (2004). Data in domestic prices: MINECON (1994). Official SFE: CIS Statistics Committee (1998). Treml et al. SFE: Treml and Kostinsky (1982) and CIA (1988). SFE* and SFE**: authors' estimate and calculation. Overall GDP: authors' extrapolation by using the proportion of CIA's GNP estimate (CIA 1983 and JEC 1990) to official overall net national income (NMP) in 1980 and 1982. We applied the 1980 proportion of 1.376 to GDP for 1966–1978, the 1982 proportion of 1.362 to GDP for 1983–1990 and the average proportion of 1.369 to GDP for 1981. International oil price (4-year moving average): Authors' estimate using historical oil price data in BP (2016).

Table A2. Soviet foreign trade by sector: 1982

	Exports	Imports	Exports	Imports
	in foreign trade prices		in domesstic prices	
Industry	62,479	49,443	33,736	75,209
Nonferrous metals	n.a.	n.a.	1,373	1,256
Ferrous metals	2,765	4,022	2,963	3,282
Oil & gas	31,287	2,481	7,521	323
Coal and other fuels	1,203		730	163
Electric power	545	0	394	0
Machinery	18,899	20,991	11,941	21,531
Chemicals	2,348	4,172	2,304	6,168
Wood, pulp, and paper	1,908	1,521	2,446	2,596
Construction materials	459	659	198	721
Light industry	1,253	5,377	2,684	21,842
Food industry	726	7,513	943	16,132
Other industry	352	304	238	1,195
Agriculture	470	6,869	121	8,497
Other branches	216	99	644	434
Residuals	734	2,403	0	0
Total	63,165	56,411	34,500	84,139

Sources: JEC (1990), p. 116. Soviet Yearbook of Foreign Trade for 1982, Uegaki (2004) and MINECON (1994).

Notes: Data in foreign trade prices: JEC (1990). A typo for other branches' exports in JEC (1990) was corrected. Data on oil & gas, coal & other fuels and ferrous metals are from Soviet published official data and Uegaki (2004). Imports of electric power were regarded as zero, judging from its imports in domestic prices and Soviet published foreign trade data. Residuals are calculated by authors. n.a. = not available. Data in domestic prices: MINECON (1994).