



## REVIEW ARTICLE

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# S. Yu. Witte – Originator of Railway Tariffs Theory. Part 1



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## ABSTRACT

Exactly 140 years ago, the most famous, in our opinion, work by Sergei Yu. Witte «Principles of railway tariffs for transportation of goods» was first published. It is difficult to overestimate the importance of this book. Our regular author, a well-known scientist, D. Sc. (Engineering), Academician of the Russian Academy of Natural Sciences Dmitry Levin, decided to share his thoughts after a new reading of this work, which has not yet lost its relevance. The encyclopedic views of S. Yu. Witte may be of interest both to economists and to sociologists, philosophers, scientists, and specialists in the theory of public administration. Many of S. Yu. Witte's judgments have not lost their scientific, theoretical

and practical significance to this day and in this sense turned out to be prophetic.

The methodology for constructing prices for transportation of goods, set out by S. Yu. Witte is not only of historical interest (especially in conjunction with the reviews and discussions that accompanied the appearance of his book), but remains important for the modern solution of newly arising issues of improving the tariff system under market transition. Not least of all, the methodology is connected with the cardinal question that arose even then: whether railways should be a natural monopoly or a commercial structure – a debate that continues today.

Keywords: S. Yu. Witte, railway, cargo transportation, railway tariffs.

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## BACKGROUND

S. Yu. Witte was never a professional economist, although he had a very high level of knowledge and awareness in economic literature. And he learned economics mainly through practice, serving on the railway and then heading the Ministry of Finance.

S. Yu. Witte's role in streamlining the tariff business, in which he was an outstanding specialist, was great. The well-known economist, expert in the railway business A. I. Chuprov considered Witte's developments on tariff problems to be «exemplary research», and his work, both in practice and in theory, was very successful. Thanks to the thoroughness of his calculations, the policy he pursued was distinguished by the scientific validity of tariff rates.

After the appointment of S. Yu. Witte as the head of operation of the South-Western Railways and moving to Kyiv, it began to depend on him to ensure favourable conditions for transportation of goods to the ports and the western border of Russia. The fall in bread prices in the early 1880s contributed to increased competition between railways transporting grain cargo. S. Yu. Witte was involved in resolving conflicts and concluding agreements with representatives of competing railroads. Together with the head of the tariff department of the Society of South-Western Railways, A. Shabunevich, he developed proposals for tariffs for 130 types of cargo.

During this period, the journalistic activity of S. Yu. Witte began. In the journal «Engineer» in 1883, his articles appeared on the tariff issue, which was practically new for the country. All Russian tariff literature was limited to newspaper articles written on various special cases, and S. Yu. Witte decided to systematise the materials of his articles in a book. Thus, in 1883, the «Principles of Railway Tariffs for Transportation of Goods» appeared. The first edition of the book attracted enormous attention from experts and the press and was a success. But the book aroused criticism and new independent works on the tariff case, which prompted S. Yu. Witte to prepare a second edition already the next year, 1884. The book was supplemented and expanded with paragraphs on schools in political economy and state regulation of the economy.

This work is notable for the fact that in it S. Yu. Witte showed himself not only as a specialist in tariff matters, but also as an economist with a broad outlook. In the preface

to the first edition, he emphasized that the theoretical side of the tariff matter follows «directly from the economic law of supply and demand, and in its further development presents results that depend on the interaction of elements of the economic, political and even mental life of the people. This interplay of influences is a highly interesting subject for the study of the thinker and economist».

Many years of management of railways inevitably led S. Yu. Witte to the study of a wide range of closely interrelated problems, such as the relationship between private and government operation of railways, the mutual influence of state customs policy and trade, and the balance of the pace of development of industry and agriculture.

S. Yu. Witte began his work with the statement that the price of every item and every service is determined by the law of supply and demand, including determination of tariff rates. To the possible objection that the general law of supply and demand does not regulate the cost of monopoly enterprises, he suggested a large number of examples of competition between railways and other modes of transport and among themselves. And even if we assume that the railways are a complete monopoly, then the law of supply and demand still applies to them.

For proof, a reference is made to the Charters of Russian Railways, which «oblige not to keep tariffs above the maximum standards» specified in the Charter of the Main Society of Russian Railways. In this Charter, all goods are divided into three categories, for each of which the maximum rates of freight charges are given, with a reduction for distances over 200 versts.

Witte proves the fallacy of the idea that the interests of the railway and users are opposed. The interest of the railway really lies in obtaining the highest possible payment for transportation, but at the same time it is important that the volume of transportation does not decrease. Likewise, it is incorrect to say that the benefit of users lies in receiving free transportation. Rail freight charges are only one of the components that determine the market value of a product, and therefore, there is no particular reason for it to be «destroyed preferentially before any others». «Consequently, the interests of reasonable operation of the railway in the field of tariffs, under the action of only one law of supply and demand, in most cases merges with the public interest».



From this the following principle follows: «It is necessary that the goods pay for transportation everything that they can pay». But this is possible when freight charges approach those that would result from the struggle between the opposing desires of forwarders and railways. That is, when freight charges will be regulated based on the law of supply and demand. This tariff provision, according to S. Yu. Witte, is «the most fundamental in the issue of railway tariffs».

Further, S. Yu. Witte argues that when setting tariffs, railways will not strive to reduce the ratio of costs to income, but to obtain the largest net income, i.e., the largest difference between gross income and expenses. And since neither gross income nor expenses depend on the fixed capital spent on repair and construction of railroads, then «the capital of construction of the railway has no influence on the price of transportation, and, consequently, on the tariffs».

The railway, left to free operation of the law of supply and demand, must, in its own self-interest, strive to obtain the greatest net income. From this, S. Yu. Witte draws the opposite conclusion: «The freight prices determined by the free action of the law of supply and demand provide the railways with the greatest net income. These freight prices do not at all depend on the capital of the railway construction».

Let us pay attention to the statement of S. Yu. Witte, what is the difference between trade and sale. Depending on the sale, the seller benefits not only from each unit sold, but also from the number of units sold. If the desires of the buyer and seller are opposite, then their commercial interest unites them. The ability to find techniques and combinations that can encourage this union and expand the possible results is where commercial intelligence manifests itself. Hence S. Yu. Witte simplified the tariff principle to the formula: «Railway tariffs should be set on the basis of reasonable commercial considerations».

Answering the question of what causes the movement of goods from one place to another, he highlighted the difference between prices at the origin and destination of goods. If these differences did not exist, then the need for movement would not arise. Hence, freight prices must correspond to these differences, i. e. obey the prices existing for this product at the points of departure and destination.

The value of a product is related to its need, i. e. an increase in the demand for cheap goods can occur faster and easier than for expensive

goods. On this basis, more valuable goods are transported more expensively than less valuable ones.

In addition to the ability to spread the consumption of goods, the railway must keep its competitors in mind when setting tariffs. And here the law of supply and demand affects railway tariffs. Hence, it is necessary to study the conditions for movement of goods along competing routes.

Since all tariff combinations of railways should contribute to an increase in net income, the railway, when setting tariffs, must take into account the costs caused by movement of goods, which determine the limit of possible tariff reductions. Transportation costs depend on the distance of transportation of goods, its weight, costs and conditions of transportation.

For practical confirmation of the theoretical conclusions made, S. Yu. Witte gave specific examples of established tariffs on the South-Western Railways.

In 1880, a petition was received from the Odessa manufacturer and a request from the Brest soap manufacturers to lower the tariff on soap, which were initially rejected. But a study of statistics on movement of soap on the South-Western Railways showed that it is very rarely sent by carload and the use of a carload tariff does not achieve the goal, because makes up less than 1 % of the total. Soap is sold by small traders who cannot transport it in whole cars. The reduction of the carload tariff to the per-pound tariff influenced the production of soap and provided a significant increase in the volume of soap transportation and the revenue of the road.

When the Southwestern Railway Society was formed in 1878, almost no beets were transported. Reasons: sugar refiners planted beet plantations near factories and delivered beets on carts; the low value of the goods made even minor consumption sensitive and did not allow transportation of this cargo over longer distances, i. e. the high tariff did not correspond to the conditions of production and consumption. In 1879, a refractive (reduced) tariff was established. Already in 1880, they began to transport several hundred thousand poods of beets per year. The tariff was further lowered, and in 1881 transportation of beets reached almost two million poods. It is clearly visible how, with lowering of the tariff, transportation of beets alone increased, not to mention another more serious benefit – the resulting increase in



transportation of sugar. Reduced costs for the purchase of beets made it possible for factories to increase their production. The increase in sugar production increased the profits of sugar refiners and the profitability of the railway, since sugar was transported by rail at a higher rate.

According to the general nomenclature of goods of all Russian railways, approved by the Ministry of Railways, there was a common tariff in domestic and direct traffic for grape wine in barrels. In 1881, 695102 poods of wine in barrels were transported along the Southwestern Railways, including 68,4 % from the stations of the Bessarabian branch (Razdelnaya – Ungheni), 14,6 % from Odessa and 17 % from other stations on the railway.

The poor quality of Bessarabian wine explained its low cost. In Bessarabia, from two to six million buckets of wine were produced, some of which remained for local consumption, some were bought by traders in the form of must and, after final aging and processing, went on sale. The accelerated sale of wine by winemakers in the form of wort, in addition to financial reasons, was explained by the lack of suitable cellars and the high cost of barrels. For an empty barrel they offered an amount of wine equal to the capacity of the barrel. Old wine barrels were even more valuable.

Bessarabian wine was almost never found outside the markets of Bessarabia. That is why the transportation of Bessarabian wine took place over short distances. At the same time, Bessarabian wine represented the most important item of transportation on the Southwestern Railways compared to other wines.

To increase the export of Bessarabian wine, a reduced tariff was established in 1880. After this, according to the zemstvo and statistical institutions of Bessarabia, in the next three years, 32 million grape bushes were planted and wine production increased by 58 %. The amount of Bessarabian wine transported along the Southwestern Railways over distances of over 300 versts, for which the tariff was reduced, increased. According to S. Yu. Witte, an even greater increase in transportation of wine over long distances can be achieved by increasing the tariff for short distances.

Flexible tariff policy has proven to be a very effective tool in competition. For example, tariffs on Donetsk coal introduced on the roads of the Southwestern Society led to an increase in its consumption in the region. Cheap English coal, delivered to Odessa as ballast on ships transporting wheat, ceased to be sold in the south of Russia.

Witte wondered why tariffs cannot be equal to freight prices? In response to the apparent contradiction, he pointed out that railways transport thousands of different goods between thousands of stations. The price of transporting each product between two stations may fluctuate daily, which does not always allow tariffs to be consistent with transportation prices.

In addition, the tariffs provided by the railways, to a certain extent, limit the freedom of action of users, but give stability to commercial transactions and systematize housekeeping. The need for tariffs for public railways is determined not only by their own benefits as commercial enterprises, but also



stems from their nature as institutions of state and public importance. The same conditions for using railway services for all consumers are achieved by publishing tariffs, which did not exist at that time. In this case, tariffs cannot express prices that fluctuate daily under the influence of supply and demand. But, nevertheless, tariffs must be rates corresponding to prevailing prices in each period of time. To do this, they must be regulated at these prices.

Based on extensive work experience, S. Yu. Witte argues that the tariff should depend on the weight, volume and distance of transportation of the shipment. The collection of freight prices in America, mostly on the basis of special agreements, is criticised, which, according to S. Yu. Witte, fundamentally undermines the equality of senders and the national usefulness of the railways. With such a system there cannot be mandatory regulation of tariffs, not only, for example, according to distance, but even according to prudent commercial principles, if these principles are not consistent with the personal benefit of some entrepreneurs.

In England, fares not only did not depend on distance, but it was accepted that the price between two intermediate stations could be higher than between outer stations on the same line. English tariff prices were based on station rates, which were set on the basis of purely commercial considerations.

Tariffs on French roads also did not depend on distance. For tariffication, conventional distances were used, determined at the discretion of the railways themselves. Many French and English road tariffs consisted of tables indicating the transport price for a given product between each two stations separately.

Tariffs of Italian and Austrian roads missed also constant correspondence between distances and freight prices.

A tariff law was passed in Germany at that time, but the German government allowed so many exceptions that it broke the stability and uniformity of tariffs throughout the empire.

In Russia, S. Yu. Witte pointed out: «... the network of Russian roads is not yet widespread enough... when the railways in Russia develop in appropriate quantities and spread in all the

outskirts,» the need to regulate freight prices by distance will disappear.

The incommensurability of the territories of Russia and European countries explains why in the West it is inappropriate to determine freight prices by distance. Russian tariffs for long distances should not be guided by established European norms. At the same time, S. Yu. Witte believed that differentiated tariffs, which, according to once determined formulas, decrease along with an increase in transportation distance, do not solve the issue. Examples are given to prove this: «... a rather limited area of distribution of Russian coal beyond the coal basins; the almost complete absence of transportation of hay over significant distances, despite the annual death of livestock from lack of feed; it is quite difficult to distribute salt over long distances, despite the abolition of the excise tax».

S. Yu. Witte noted «that between the market value of transportation, on the one hand, and the weight, equal to the volume of the goods, on the other hand, there cannot be any specific relationship, and therefore weight and volume, serving to express tariffs, do not may essentially serve to regulate them».

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