

ANALYSIS OF TAXES AS A COMPONENT OF THE COST OF VEHICLE OWNERSHIP IN RUSSIA

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Abstract

The article looks at how transport taxes influence tax payers' decision as to whether to own and how to use a car. Types of taxes and fees imposed on the purchase and use of vehicles are described in detail. The underlying assumptions and principles of calculating the cost of owning a car are described. The article analyses how to reflect the annual decline in the car's selling price and depreciation resulting from the intensity of car use in the cost of owning. The structure of car ownership costs is analyzed. The focus of the study is the share of transport taxes in the cost of owning a car. Calculations are done for the amount of fixed transport taxes per day of owning a car regardless of the intensity of use, and the amount of variable transport taxes per kilometer of car travel. It is concluded that the share of transport taxes in the cost of owning a car does not exceed 10 to 13 percent regardless of the vehicle class. It is proven that low transport tax rates in Russia cannot have a noticeable regulatory impact on motorists' behavior as regards car ownership and the intensity of running a car.

Key words: transport taxes, cost of owning a car, calculating the cost of running a car.

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Introduction

Cars are an essential element of the transportation system of a country. Having a car makes one's life more comfortable, mobile and provides new recreation opportunities. At the same time, the dominant role of automobiles in the transportation system is a source of a whole number of negative tendencies. These include sustained dependence of the population on cars, a distorted structure of passenger transportation, the degradation of other means of public transit, urban land use imbalance and city landscape deformations, constant congestion, excessive noise and environmental issues. In most cases, the negative external costs are paid for by means of local taxes that are contributed by those who do not own a car, not only by motorists.

Apparently, an unconstrained growth in car ownership rates will only make these trends worse, fostering an unhealthy lifestyle and changing cities by making them less convenient to the community. Such a growth is possible unless the state implements targeted measures that restrict demand for owning and using a car.

The measures that prove to be the most effective are various fiscal instruments that increase the marginal costs of traveling by car to the level that matches the price of a similar trip by public transport. It is particularly appropriate to use a set of such tools in urban agglomerations with a limited capacity of the road network and limited parking space. In order to study the fiscal impact of the proposed instruments it is important to analyze the structure of car ownership because different mandatory payments induce different behavioral responses in individuals as regards the ownership and use of automobiles. (Easterly, 1993; Pucher, 2007). This study aims to design a method of analyzing the fiscal role of taxes in the cost of owning a car in Russia.

1 Taxes and levies paid by car owners

It seems appropriate to divide all transport taxes into fixed and variable ones with regard to the intensity of car use. (Litman, 2011; De Borger, 2013).

Fixed taxes and levies. The tax rates are not pegged to the intensity of car use, which means they do not directly involve the car owner in compensating for negative externalities. Yet their size is a determining factor in the affordability of a car; it influences the level of car ownership in society and the desire (of individuals in the first place) to own a vehicle. High fixed taxes could be used as an instrument of shutting out some people (usually those on lower incomes) from owning a car and, consequently, from driving one. Theory-wise, fixed taxes are essentially Ramsey taxes and ensure certain tax revenues for the government from car owners.

In Russia, fixed transport taxes include VAT, sales tax, registration fees, the recycling fee, and annually paid vehicle tax (Mayburov, 2015).

Variable transport taxes. The amount of variable taxes is determined by the intensity of car use. In this case, the size of transport taxes should reflect the tax price of negative externalities, while each car owner should pay an amount that is equivalent to the total of negative external costs inflicted by the operation of his/her car. A sophisticated system of variable taxes makes it possible to effectively administer the process of recovering marginal external costs while precisely factoring in all kinds of impact. From the theoretical perspective,

this group of taxes are Pigouvian taxes. In Russia, the only tax that is classified as variable is fuel excise duties. (Lindsey, 2010; Lakshmanan, 2001).

2 Research methodology

The car is in use for three years (before the warranty expires) in a large city in Russian for non-business activities. After that, the car is sold, thus enabling us to put the annual depreciation, which is the difference between the price of a new car and the price of an identical three-year-old vehicle, into calculations.

Data on the selling prices of three-year-old cars are borrowed from a PwC report. (Costs, 2015). Other expenses include the cost of buying winter tires and other consumables for the day-to-day operation of the vehicle. Parking fees are not factored in (we assume that free parking options are available in Russia at the moment).

To determine the annual amount of taxes paid at the moment of purchasing a car, we suggest performing the calculations in proportion to the depreciation of the car, assuming that the remaining part of taxes will be refunded to the owner once he/she sells the car. At the same time, writing off expenses in annual proportions is a conventionality.

The basic characteristics of automobiles that are important to the calculation of car ownership costs are outlined in Table 1.

Tab. 1: Comparison of cars' specifications

| Indicator | Compact car (Hyundai Solaris) | Compact crossover (RAV 4) | Business class (Mercedes E20) |
|--------------------------------|--------------------------------------|---------------------------|-------------------------------|
| Average price, thousand RUB. | 551.6 | 1135.2 | 2,276.5 |
| <i>including</i> | | | |
| VAT | 76.85 | 158.1 | 329.7 |
| Excise duty | 3.6 | 54.4 | 70.8 |
| Recycling fee | 44.2 | 44.2 | 44.2 |
| Taxation share in car price, % | 22.6 | 22.6 | 19.5 |
| Engine power, hp. | 98 | 149 | 194 |
| Engine size, cm ³ | 1,000 - 2,000 | | |
| Yearly mileage, km | 24,342 | 21,140 | 20,700 |
| Daily mileage, km | 66.7 | 57.9 | 56.7 |
| Fuel consumption, l/100 km | 6.8 | 7.5 | 7.0 |
| Depreciation in three years, % | 23 | 24 | 38 |
| Fuel excise duty | 5,530 thousand RUB/ton, 4.147 RUB /l | | |
| Registration fee | 3,000 RUB. | | |

Source: compiled by the authors

3 Structure of car ownership costs in Russia

The results of calculating the cost of owning a car are shown in Table 2.

Tab. 2: Structure of car ownership costs in Russia, thousand RUB

| Indicator | Compact car (Hyundai Solaris) | Compact crossover (RAV 4) | Business class (Mercedes E20) |
|---|-------------------------------|---------------------------|-------------------------------|
| Car depreciation | 42.3 | 90.8 | 288.3 |
| <i>including recycling fee</i> | 3.4 | 3.5 | 5.6 |
| VAT | 5.9 | 12.6 | 41.8 |
| <i>registration fee (per annum)</i> | 1.0 | 1.0 | 1.0 |
| <i>sales tax</i> | 0.3 | 4.4 | 9.0 |
| Fuel | 54.3 | 54.7 | 50.1 |
| <i>including excise duty</i> | 6.9 | 6.6 | 6.0 |
| Voluntary and mandatory insurance | 65.7 | 85.6 | 181.7 |
| Taxes, levies and other mandatory charges | 1.3 | 3.7 | 9.7 |
| <i>including vehicle tax</i> | 1.3 | 3.7 | 9.7 |
| Maintenance | 11.9 | 10.6 | 18.3 |
| Other costs | 8.5 | 14.3 | 16.4 |
| TOTAL | 184.0 | 259.7 | 564.6 |
| <i>taxes</i> | 18.7 | 31.8 | 73.0 |
| <i>taxation share in ownership cost</i> | 10.2 | 12.2 | 12.9 |
| Cost of owning a car per km, RUB/km | 7.6 | 12.3 | 27.3 |
| Cost of owning a car per day, RUB/day | 504.1 | 711.6 | 1546.7 |

Source: calculated by the authors

Some components of the car ownership cost are specified in Table 3.

Tab. 3: Structure of car ownership costs in Russia, %

| Indicator | Compact car (Hyundai Solaris) | Compact crossover (RAV 4) | Business class (Mercedes E20) |
|-----------------------------------|-------------------------------|---------------------------|-------------------------------|
| Car depreciation | 23 | 35.0 | 51.1 |
| Fuel | 29.5 | 21.1 | 8.9 |
| Mandatory and voluntary insurance | 35.7 | 33.0 | 32.2 |
| Maintenance | 6.5 | 4.1 | 3.2 |
| Vehicle tax | 0.7 | 1.4 | 1.7 |
| Other expenses | 4.6 | 5.5 | 2.9 |
| TOTAL | 100 | 100 | 100 |

Source: calculated by the authors

Analysis of the ownership costs shows that four major items of expenditure for car owners.

1) Depreciation. The more expensive the car is, the higher the depreciation is. For example of a compact car depreciation amounts to 23 percent, while of a business class automobile it grows to as much as 51 percent and becomes the defining item of expenditure in the total cost of car ownership. The problem is that this group of expenses has little influence on the car owner's behavior. The car owner instantaneously considers this group of expenses only in two cases: (1) when deciding to buy a car; (2) when deciding to sell the car and during the process of selling it. These expenses are not very distinct during the operation of a car and is not taken into account by the car owner when deciding whether to travel by car. In fact, this group of expenses forges neutral behavioral responses of car owners. When considering transit alternatives, a car owner compares the cost of driving the car and the cost of a trip by public transport. This group of expenses is not fitted in the calculation of the cost of a trip. Consequently, the volume of the costs has no impact on the intensity of car use.

2) Mandatory and voluntary insurance. The more expensive the car is, the lower the group of expense. In the case of a compact car insurance makes up 36 percent of total costs, while for a business class car it will be 32 percent. In Russia, mandatory and voluntary insurances are two types of annual payments that do not depend on annual mileage. Consequently, this area of expense also forges neutral behavioral responses in car owners and does not affect the intensity of car usage. Depreciation and insurance costs are the fixed costs incurred by car owners. Size-wise, they are the most significant ones, but have the least impact on the car owner's behavior. This is supported by the fact that the daily cost of owning a business class car is nearly RUB 1,500, which is an equivalent of 50 trips a day by public transport, and yet this amount of variable costs does not make the individual opt for public transit.

3) Fuel. This area of expense tends to be lower in the case of more expensive automobiles. This dependence is strongly convincing as the cost of fuel for a compact car makes up 30 percent of total costs, while in the case of a business class automobile it drops to merely 9 percent. The cost changes in line with mileage. Consequently, it is the cost of fuel coupled with the cost of maintenance that the car owner pays attention to when deciding whether to travel by car.

4) Maintenance. The more expensive the car, the lower the maintenance costs. This dependence is also quite obvious. For a company car maintenance costs are around 7 percent of total expenses, while for a business class car they are only 3 percent.

As a result, the behavioral responses of the car owner as to using a car vs public transport are influenced by the sum total of fuel and maintenance costs. These are variable costs

incurred by the car owner. It's noteworthy that the costs will have the biggest impact on the behavior of inexpensive automobiles. The influence will tend to decrease in line with the price of the car. The owner of an expensive car in Russia will never choose to travel by public transit because for him the cost of fuel and maintenance is insignificant. For example, variable costs incurred by a compact car are around 37 percent of total expenses, while for a business class car they are only 12 percent.

4 Analysis of taxation contribution to the cost of car ownership

The analysis results are shown in Tables 4 and 5.

Tab. 4: Taxes and mandatory levies on car ownership, thousand RUB/ year

| Tax | Compact car (Hyundai Solaris) | Compact crossover (RAV 4) | Business class (Mercedes E20) |
|---|-------------------------------|---------------------------|-------------------------------|
| Total amount of taxes and levies | 18.7 | 31.8 | 73.0 |
| <i>including</i> | | | |
| <i>One-off taxes paid at the moment of car purchase, thousand RUB</i> | 10.6 | 21.5 | 57.3 |
| <i>Annually paid taxes, thousand RUB</i> | 8.1 | 10.2 | 15.7 |
| <i>fixed taxes, thousand RUB</i> | 1.2 | 3.7 | 9.7 |
| <i>variable taxes, thousand RUB</i> | 6.9 | 6.6 | 6.0 |
| Specific amount of taxes | | | |
| Fixed taxes, RUB/day | 3.4 | 10.0 | 26.6 |
| Variable taxes per km, RUB/km | 0.3 | 0.3 | 0.3 |
| Daily amount of taxes per car, RUB/day | 22.2 | 28.0 | 43.0 |
| Taxes per car per km, RUB/km | 0.8 | 1.5 | 3.5 |

Source: calculated by the authors

Tab. 5: Structure of taxes in the costs of owning a car, %

| Indicator | Compact car (Hyundai Solaris) | Compact crossover (RAV 4) | Business class (Mercedes E20) |
|--|-------------------------------|---------------------------|-------------------------------|
| Fixed taxes | 6.4 | 9.7 | 11.9 |
| Variable taxes (fuel taxes) | 3.8 | 2.5 | 1.0 |
| TOTAL amount of taxes and mandatory charges in the cost of car ownership | 10.2 | 12.2 | 12.9 |

Source: calculated by the authors

The analysis indicates the predominance of one-off taxes that are paid at the moment of purchasing a car. The more expensive the car, the higher the one-off taxes. For a compact car the share of one-off taxes in the cost of owning the car is 5.8 percent, while in the case of a business class car it is 10.1 percent.

Taxes that are paid on a regular basis when using a car are significantly few in numbers and they have less impact on the cost of car ownership. regular taxes tend to be smaller in the case of more expensive cars. For a compact car, the share of regular taxes in the cost of ownership is 4.4 percent, whereas regular taxes on a business class car make up 2.8 percent of total costs. This means that rate of the vehicle tax, which is an epitome of regular taxes, is not progressive enough. Tax rates on crossovers and business class cars should be increased.

The analysis of the share of fixed and variable transport taxes shows that fixed taxes prevail for all automobiles. Fixed taxes tend to be higher in the case of a more expensive car. For a compact car the share of fixed taxes in the cost of owning the automobile is 6.4 percent, while for a business class car it is 11.9 percent. The more expensive the car, the lower the variable taxes. In the case of a compact car, the share of variable taxes in the cost of ownership is 3.8 percent, while for a business class car it is only 1 percent. At the same time, the tax burden on the ownership and usage of a car increases in the case of pricier cars: from 10 percent for a company car to 13 percent for a business class automobile.

Conclusion

The analysis of the cost of owning a car in Russia showed that fixed costs prevail. These costs do not influence the behavioral responses of the car owner as to whether to use his or her car or travel by public transport. The share of variable costs is much lower. Moreover, there is a distorted dependence between variable costs and the price of the car: the cheaper the car, the higher the variable costs. Consequently, variable costs have the most significant impact on the owners of inexpensive vehicles. Their influence fades away along as cars get pricier. The analysis of the structure of transport taxation showed that it is out of sync with modern trends towards discouraging the use of private cars. The share of transport taxes in the cost of owning a car is quite low and does not exceed 13 percent. The fiscal impact of transport taxes needs to be enhanced by introducing new forms of variable taxes and levies. It is necessary to expand paid parking zones in urban agglomerations, to introduce congestion charges and tolls for using federal motorways and local roads, tunnels and bridges. Applied together, such fiscal instruments could restrict demand for owning and using a car. There is no doubt that fiscal

discouragement of private car ownership should be accompanied by an improvement in the quality of public transport services.

References

Easterly, W., Rebelo, S. (1993). Fiscal policy and economic growth – an empirical investigation. *Journal of monetary economics*. Vol.32, Issue: 3, pp.417 – 458.

Pucher, J., Peng, Z.-R., Mittal, N., Zhy, Y., Korattyswaroopam, N. (2007). Urban transport trends and policies in China and India: impacts of rapid economic growth. *Transport Reviews*, Volume 27, Issue: 4, pp. 379-410.

Litman, T. (2011). *Using Road Pricing Revenue: Economic Efficiency and Equity Considerations*. Victoria Transport Policy Institute, Victoria, Canada.

De Borger, B., Proost, S. (2013). Traffic externalities in cities: the economics of speed bumps, low emission zones and city bypasses. *Journal of urban economics*. Vol.76, pp.53 – 70.

Mayburov, I., Leontyeva, Y. (2015). Implementation of the benefit principle in transport tax in Russia. *Proceedings of The 9th International Days of Statistics and Economics, Prague, September 10-12*, pp.1117-1127.

Lindsey, R. (2010). Reforming road user charges: a research challenge for regional science. *Journal of regional science*. Vol.50, Issue: 1, pp.471 – 492.

Lakshmanan, T.R., Nijkamp, P., Rietveld, P., Verhoef, E.T. (2001). Benefits and costs of transport: classification, methodology and policies. *Papers in Regional Science*. Vol. 80, Issue: 2, pp. 139-164.

Costs of car ownership in Russia. (2015). Retrieved from http://www.pwc.ru/en/automotive/publication/assets/e-ver_auto_2015-eng.pdf.

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