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Would it be more effective to sanction traffic violations by day-fines? - Law and Economics considerations¹

Introduction

Does the same amount of fine incentivise appropriately the drivers of different wealth? The ideas that are appraisable as the imaging of a general societal intuition in the terrain of traffic law enforcement encompass the domestic press and the public discourse for a long time. Should the rich pay more? In the present paper, I attempt to present the background of the problem, and to seek pragmatic solutions that are not exaggerated, but deter as required the wealthier drivers too.

But do the rich really infringe traffic rules more? The Ministry of Transportation and Communications of Taiwan conducted research in 2009 about the sex and age of the drivers, their education, their income, their yearly driven kilometres, their most frequent driving purpose, and the number of their speeding tickets². This survey is one of the deepest analyses of the international literature on the topic examining the collective effect of the acting factors by linear regression.

It was inferred from the obtained data that the factors of the strongest correlation are age and gender among the examined factors that are the most strongly correlated with the propensity to follow traffic rules: a young

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² Tseng, C. (2013): Speeding violations related to a driver's socio-economic demographics and the most frequent driving purpose in Taiwan's male population. *Safety Science*, 57, 53-59. Source: <https://doi.org/10.1016/j.ssci.2013.02.005>,

person is more likely to commit a traffic offence than a middle-aged or elderly person, and a man is more likely to commit a traffic offence than a woman. In terms of social status, the analysis of the data shows that the effect of education on the propensity to obey traffic rules is very significant: the most educated drivers (college or higher) accounted for the largest proportion of traffic offenders (20.2%), although this effect does not appear to be uniform. The survey reports that those with the highest incomes committed the highest per capita offences (0.3 offences per capita) and describes the effect of the reason for driving as being very significant: commuters for work and business are much more likely to commit a traffic offence than those who drive for shopping, family or leisure.

However, the results show that income has a strong effect, and this is supported by other similar studies: on Hong Kong's roads, high-income earners were found to be much more likely to commit offences³. But if the rich do indeed break the rules more, the state must create a traffic enforcement environment that discourages them from breaking the rules.

My research question is how to better encourage drivers with higher wealth to follow traffic rules. To answer this question, I chose to use economics because it provides a good model of the decisions that drivers have to make, including whether to obey or break a rule. The problem cannot, of course, be approached using economics alone, but this approach can be very useful to understand it better.

Current rules on traffic fines in Hungary

The traffic rules to be observed on Hungarian roads are set out in the Joint Decree 1/1975 (II. 5.) of the Minister of Transport and Post and of the Minister of Interior (hereinafter: KRESZ). The Act I of 1988 on Road Traffic (hereinafter: Kkt.) and the KRESZ establish jointly the rules of traffic.

³ Chen, T. – Sze, N. N., Saxena, S. – Pinjari, A. R. – Bhat, C. R. – Bai, L. (2019): Evaluation of penalty and enforcement strategies to combat speeding offences among professional drivers: a Hong Kong stated preference experiment. *Accident Analysis and Prevention*, 135. Source: <https://doi.org/10.1016/j.aap.2019.105366>

While the Kkt. lays down the basic conditions of road traffic and the rights and obligations of persons and organisations involved in it (1. §), the KRESZ regulates traffic on public roads and private roads not closed to public traffic (§ 1 (1)). The 20. § (1) k) point of the Kkt. provides that, among the road traffic offences, the offender who exceeds the maximum speed limit and the offender who violates eight other traffic rules shall be liable to a fine. The fine is imposed by the designated law enforcement body in administrative authority proceedings, so that no infringement proceedings may be initiated in these cases.

The 48. § (3) a) point of the Kkt. empowers the Government to determine the scope of traffic offences subject to administrative fines, the amount of fines that may be imposed for infringements of the provisions on these activities and the detailed rules for the imposition of fines and the use of the fines collected. The Government has made use of this power in Government Decree 410/2007 (XII. 29.)⁴, which sets out in its annexes the amounts of the fines for certain traffic offences. This does not give the enforcer the discretion to determine the amount of the fine under Article 11 of the Act on Infringements but obliges him to impose the fine specified in the Government Decree.

The introduction of the so-called *objective fine* in Hungarian traffic law enforcement has eliminated the consideration of liability elements from the process of fining. The complicated procedure of the old Act on Infringements, the slowness of the procedure, the simultaneous increase of motor vehicle traffic and the deteriorating accident statistics in the early 2000s made certain measures necessary in Hungary as well⁵. The legislator decided to remove the burden from the shoulders of the law enforcement

⁴ Government Decree No 410/2007 (XII. 29.) on the scope of traffic offences subject to administrative fines, the amount of fines that may be imposed for infringements of the provisions on these activities, the procedure for their use and the conditions for cooperation in control

⁵ Kovács, Gy. (2023): A közlekedési szabályszegések szankciórendszere [The system of sanctions for traffic offences]. Jogi Forum.

Source: https://www.jogiforum.hu/wp-content/uploads/2023/05/kovacs-gyorgy_-kozlekedesi-szabalyszegesek-szankciorendszere_cimlappal.pdf Accessed: 20.10.2023

authorities to investigate who committed the traffic offence and whether they were at fault, and instead defined the cases in which the operator or, where applicable, the actual driver of the vehicle cannot be held liable.

By this act, the legislator has also removed the possibility for the law enforcement authorities to consider the amount of the fine to be imposed, considering the circumstances of the case and the personal and financial circumstances of the offender. In all cases, the amount of the fine was set at the amount laid down in the Government Decree, which was fixed proportionally. For example, in the case of exceeding the maximum speed limit, this means that the annexe to the Regulation specifies that if the driver exceeds the maximum speed limit within a given speed limit, he is liable to pay a given fine, so that, for example, if the maximum speed limit is 50 km/h and the speeding is above 15 km/h but up to 25 km/h, the offender is liable to pay a fine of 39 000 HUF⁶.

The economics of traffic fines

The economics of criminal sanctions

The economic analysis starts from the rational offender, i.e., it assumes that the offender considers the expected benefits and risks of committing the crime before acting, and in doing so, also considers the nature and the level of the punishment for breaking the rule. The fundamental question is what sanctions can be used to encourage latent offenders to respect the law. From an economic point of view, three types of punishment can be distinguished in the theory of punishment: imprisonment, stigma, and fines. In his study, Ákos Szalai explains the costs that each gender of punishment imposes on society⁷.

⁶ Effective 11 October 2023

⁷Szalai, Á. (2018): A büntetőjog közgazdasági elemzése [Economic analysis of criminal law]. Pázmány Law Working Papers, 2018/16

In general, prison is clearly the costliest for society of all the sentencing genders. It requires buildings, which are very expensive to build and properly equip, and the state must pay prison guards and staff who organise the detention, as well as the costs of providing care for the prisoners. Although the primary concern of prisons since the introduction of the Auburn system has been to make prisoners work and to work efficiently, experience shows that prisons are financially unprofitable. When analysing the social costs, it is also important to take into account stigmatisation: given that imprisonment is generally associated with a serious breach of basic social norms, the social perception of ex-offenders is very strongly influenced by their past, to the extent that the States are regularly challenged to organise rehabilitation and integrate ex-offenders into society.

In essence, stigmatisation is a reduction in the reputation of the person being punished. Legislation embodies the common will of society through the indirect democratic legitimation of the legislative process, and citizens who behave in a non-compliant manner are associated by the community with the information that they do not wish to abide by the rules of co-existence. Given that society associates imprisonment with more serious offences, stigma is a clear secondary punishment to imprisonment, whereas, in the case of fines, the gravity of the offence is also considered. Most traffic offences, if they do not cause an accident, are not usually associated with stigmatisation. The direct costs of stigma to society are relatively low: the costs incurred are all costs of transmitting information, but the indirect costs can be enormous. The diminished esteem makes it more difficult for the individual to cooperate with the rest of society, and this manifests itself in all aspects of his life: it is more difficult to find work, assert oneself in social relationships, etc. It is important to stress that stigma is not a formal sanction but a side effect of the perpetrator's social image, although the law can facilitate or even hinder its enforcement by shaping the rules of publicity.

As far as fines are concerned, the social costs of this type of punishment are clearly the lowest. If the amount of the fine is higher than the cost of collection, the fine generates a net revenue for society and is, therefore, the

most desirable form of punishment. However, a counterargument is that the distribution of wealth in society is very unequal, so the better-off may be able to buy off the opportunity to commit an offence. On this basis, it can therefore be said that, from the point of view of social costs, fines are primarily desirable.

It can be said that imprisonment is a time-based punishment and a fine is a money-based punishment: the offender sentenced to imprisonment is deprived of time by the state, while one sentenced to a fine is deprived of a part of assets. In addition to their social costs, it is also worth briefly considering the deterrent effects of the different types of punishment. Given that punishment deprives the offender of some scarce resource, the deterrent effect of punishment can be understood in terms of how the individual values the resources that are deprived.

How do time and money value each other? Baum and Kamas explained it briefly in an American journal⁸. In general, the distribution of money is much more dispersed than the distribution of time among people: the average difference between an individual's wealth from the average wealth in a country is expected to be much larger than the average difference of an individual's age from the average age. The implication is that members of society are expected to value the utility of their time much more accurately than the utility of their wealth since the distribution of the latter is much more stochastic than the distribution of the former.

However, it is also worth pointing out the interesting problem that, on the contrary, imprisonment penalises the rich much more than the poor, and fines penalise the poor much more than the rich. If the rich, by some ability, earn much more money at a given time, the imprisonment penalty entails a much greater potential loss of wealth for the rich. If the poor, for some reason, can earn less money each time, the fine penalises them much more severely in terms of time, since they have to work much longer to earn the

⁸ Baum, S. – Kamas, L. (1995): Time, Money and Optimal Criminal Penalties. *Contemporary Economic Policy*, 13(4), 72-79. Source: <https://doi.org/10.1111/j.1465-7287.1995.tb00733.x>

amount of money they have. The question arises as to which type of fine is fairer: the one that deprives the recipient of a proportionate share of the wealth of the offender i.e., the same expected amount of time, or the one that deprives the recipient of a well-defined amount of money but from a different number of hours of work. I think it is important, however, to mention the practical aspect that the commission of an offence punishable by a uniform penalty becomes much easier to buy. But what is the purpose of these penalties? The presumed, but not clear, legal policy objective of these offences suggests that, in addition to the classical objectives of punishment, such as specific prevention or general prevention, there is also a strong emphasis on accident prevention. In my view, this is also a presumed aim of the legal policy, since, in accordance with the gravity of the offence, neither prevention nor accident prevention requires the State to remove the offender from his social environment: the primary - and preventive - aim is to ensure that the driver does not cause an accident while driving.

The regulations in countries around the world basically use two methods of calculating fines, one of which is the *fixed fine*. In the case of a fixed fine, the penalty is imposed according to some system of sanctions, based solely on the offence.

Another typical calculation method is the use of a daily fine, the *day-fine*. The fine is calculated in two steps. In the first step, the law enforcer determines the number of days for the fine, i.e., the number of days the offender should be fined for the offence, and in the second step, the amount of the fine per day. The amount of the fine will be the product of these two factors.

It is worth comparing these to choose one of the methods of calculating the fine. Furthermore, in light of the research question, it is important to consider the problem of diminishing marginal utility of assets that I describe before the comparison.

The problem of the diminishing marginal utility of money

The typical penalty for traffic offences worldwide is a fine. But does a fine have a deterrent effect? Among the economists, Gossen formulated the concept of how individuals value the goods at their disposal in the light of the achievement of their goals. "*The magnitude of enjoyment decreases if enjoyment is continued without interruption until satiation occurs.*" - states his first law, which is the cornerstone of the microeconomic principle of diminishing marginal utility. But if this is also true for money, it means that the resource taken away when money penalties are applied is valued less by the rich than by the poor.

To prove this, I use the model of two Israeli researchers⁹. In this model, people's subjective well-being depends on two factors: the monetary value of their wealth and the monetary value of the way they spend their time. The latter may be the driving incentive for traffic offences: drivers do not drive within the limits to reach their destination faster, as they can then spend their time on other, more useful activities. Since he can always choose the best of these activities, we can assume for simplicity that the utility of his time is constant.

First, for simplicity's sake, let's assume that the identity of the perpetrator will be revealed. The individual chooses to commit the offence or not to commit the offence: if he does, he increases the likelihood of having an accident (inconvenience), exposes himself to fines and derives some personal benefit from getting somewhere faster. It can be assumed that a driver becomes an offender if, and only if, the benefit derived from the reduced amount of the wealth and the additional leisure got from the basic leisure and the leisure gained by committing the offence exceeds the benefit of the wealth and the more leisure the driver would have gained if had not committed the offence. Given that both sides of the inequality outlined above

⁹ Moshe, B. N. – Zvi, S. (2002): On the social desirability of wealth-dependent fine policies, *International Review of Law and Economics*, 22(1), 53-59. Source: [https://doi.org/10.1016/S0144-8188\(02\)00068-6](https://doi.org/10.1016/S0144-8188(02)00068-6)

reflect the benefit that the individual derives if he does not commit the offence, this can be disregarded. Therefore, it can be said that when the offender is certain to be caught, he commits the offence if and only if the combined benefit of his wealth, reduced by the fine, and the leisure exceeds the benefit of his wealth if he does not commit the offence.

Now, let's examine the more realistic scenario where it is uncertain whether the driver who is violating the rules will be caught. Mathematically, this means that the probability that the offender will be fined lies between the probability of the impossible event and the probability of the certain event. In this case, if he rationally considers whether to violate traffic regulations and if he is risk-neutral, his expected utility can be written as the sum of two components according to the laws of event algebra: the expected utility of being caught in the act and the expected utility of avoiding a penalty are the expected utilities of committing the violation. The offender, if rational and risk-neutral, will commit the offence if this expected utility is greater than the utility of his current wealth and comfort level. Applying the laws of probability variation and the usual notation of economics, this formally means that the offender commits the act if and only if:

$$p * [v(w - F) + L + H] + (1 - p)[v(w) + L + H] > v(w) + L, \text{ so that} \\ pU(w - F, L + H) + (1 - p)U(w, L + H) > U(w, L),$$

where p is the probability of being sanctioned, w is the wealth the offender has before committing the offence, F is the size of the fine, L is the value of the additional leisure, and H is the value of the leisure if the driver does not break the traffic rules. Mathematically rearranging the above inequality and applying the knowledge of the marginal utility of money, we obtain the following:

$$\frac{H}{p} > v(w) - v(w - F)$$

At this point, Bar-Niv and Safra point out that this inequality is particularly useful, given that the fundamental difference between individuals is the size of their wealth. It follows that there exists a wealth w for which the utility inequality sketched is equal to H/p and this implies that the owner of any wealth in excess of this wealth w will commit the act in question. Researchers put it this way: *"if an individual at a certain level of wealth chooses to commit an illegal activity, then all richer individuals will also choose to commit the same activity; if an individual at a certain level of wealth chooses not to commit an illegal activity, then all poorer individuals will also choose not to commit the same activity"*, *ceteris paribus*, that is, if we consider only the fine. It also follows that for every act that is fined, there is a wealth level above which, if the individual has more wealth, the fine no longer provides an incentive to comply with the norm, and hence for every wealth level, a sufficiently high fine amount should be sought to provide a sufficient deterrent.

The economics of day fines

The amount of the day fine is calculated by taking the number of days for which the offender is responsible and multiplying it by the amount of money for one day.

Thanks to this fining technique, the offender does not have to pay a pre-determined fine, but a relative share of the wealth, so that the fine does not allow the offender to "buy" the infringement.

At present, several countries apply the fining technique: Hungary in criminal cases; Finland, since 1921, although their system was reformed in 1974 because of excessive fines; Sweden, since 1927, Germany since 1975, Austria since 1975, Portugal since 1995, Czech Republic since 2009, etc. The introduction of the technique was mostly justified by the need to reduce

the number of prisoners or by the fact that equal punishment was considered unfair from a social point of view¹⁰. However, there are also some problems with the application of the daily penalty system.

The information asymmetry between the addressee of the norm and the law enforcer poses a problem when examining the applicability of day fines and in terms of the design of the regulation: there is a large margin for error when applying the penalty technique, and it is difficult to determine the correct multiplication factors.

The current Hungarian legislation leaves the determination of these amounts to the judge in criminal cases: according to Article 50 of the Criminal Code, when determining the number of days, the judge must consider the material gravity of the offence, and when determining the daily amount, the judge must consider the offender's wealth, income, personal circumstances, and lifestyle.

Jakub Drápal examined the prevailing judicial practice in the Czech Republic and found that the ratio of punishment to income, which should be constant (the number of days) is much higher for lower-income offenders: poor people receive 5.4 times as much punishment as rich people in terms of income¹¹. The author has argued that judges need to be given a set formula for calculation for the system to work well because judges cannot apply the sentencing technique properly. Czech judges consider the amount of fines above a certain amount to be excessive, so often, given that they have no information on what should be used to determine the number of days, they usually allocate the smallest amount of days and assume income conditions to impose a fair sentence on the offender.

In Hungary, the Police is responsible for detecting traffic offences and imposing penalties. The Police have far less information to make decisions

¹⁰ Bögelein, N. – Nagrecha, M. (2021): Money as Punishment: A Review of "Day Fines in Europe". In: Kantorowicz-Reznichenko, E. – Faure M (Eds.), *Day fines in Europe: Assessing Income-Based Sanctions in Criminal Justice Systems*. Cambridge University Press. 428-434 Source: <https://doi.org/10.18716/ojs/krimoj/2021.4.5>,

¹¹ Drápal, J. (2018): Day fines: a European comparison and Czech malpractice. *European Journal of Criminology*, 15(4), 461-480
Source: <https://doi.org/10.1177/1477370817749178>,

than the courts, and the patrols on duty on the roads may have even less information on the ground than the Police. Accordingly, under the day-fine penalty scheme, they cannot be expected to impose the fine: because of the information asymmetry, it may be worth limiting their role to recording the fact of the offence on the spot and taking any other enforcement action, in the same way as is currently done for speed cameras.

The purpose of introducing the day fines is to increase deterrence in a reasonable way, i.e., to increase the deterrent effect without requiring disproportionate cost expenditure. I will now briefly outline the issues that should be considered when drafting the daily penalty regulation, starting with the number of daily items. I see two basic options for determining the number of daily items in the calculation of the fine: one is to leave the number of daily items to the discretion of the police service, with a lower and upper limit on the number of daily items. The other, and in my opinion more fortunate solution that I propose, is that the legislator should not set the amount of the fine in the government decree on the level of the administrative fine, but should set the number of daily units assigned to the traffic offence - as in the current solution - in a band, proportionately, and leave the determination of the number of daily units to the police body deciding on the individual case.

And what should the amount of the one-day lot be? In states that apply a daily penalty, income is typically determined based on self-declaration, with the tax authorities randomly checking the veracity of the declarations, or by checking the income of the offender against the tax records. Personal income tax is levied in Hungary on a self-declaration basis, but some types of income are not subject to the declaration: this means that if the legislator were to opt for the option of assessing income from tax records when introducing a broad daily penalty, it would be forced to declare income that it does not wish to tax, such as pensions, scholarships or income from simplified employment. It is worth noting that this solution is not entirely alien to Hungarian financial law: there are currently situations where income that is not taxable must be declared, for example, personal income tax for those under 25. In principle, a register of income could be produced from other

existing databases which include this data; from this register, these fines could be easily calculated: creating this register or changing the tax practice could also be a useful tool for judges dealing with criminal cases.

However, for proper regulation, it is essential to consider how the number of days and the amount of money per day should be related. To do this, it is worth briefly considering the differences in the impact of the day fines and the fixed fine. While the fixed fine is the same for everyone, the day fine not only increases the amount of fines imposed on the rich but also reduces the amount of fines imposed on the poor, since in this case, the fine is a function of increasing wealth. It is also worth aiming to ensure that fines also provide an appropriate incentive for those on lower incomes.

There are two theoretical alternatives for a lower limit: in one case a minimum penalty is set for zero wealth, and in the other case the daily penalty is purely income-dependent. In favour of the former is the tradition of domestic judicial practice, which does not require the offender to have assets or income at the time of the offence¹² to impose a fine, and the fact that in this case, the problem of under-incentivising the poor does not arise, provided that this minimum fine is sufficiently dissuasive. In this case, the amount of the fine should be increased by at least as much as the marginal cost of the fine does not decrease, i.e., the subjective reduction in utility due to the penalty should be kept constant. In this case, the amount of the fine is the sum of the minimum fine and the pro rata share of the income. In the other case, i.e., where the daily penalty is purely income-related, the deterrent for low-net-worth drivers will not be sufficient, although, assuming that there are no drivers without income (since aids can be included in the aforementioned assets register or even in the personal income tax return), this problem can be counterbalanced by setting the number of daily items and the amount per item per day appropriately.

Where offences are sanctioned by a fixed penalty, all drivers pay the same amount of fine. For the sake of simplicity, let's assume that this fine

¹² BH 2015. 25

is just enough to deter the average driver from committing a traffic offence! In the case where the fine imposed on the offending driver is directly proportional to his income, this means that until the offender's income reaches the average income, he will have to pay a lower fine than the average driver would have to pay if he were to commit the same offence. We must ask: how many units less will a driver with just above average income be deterred by the amount of the fine that would deter the average driver from committing the offence? It is very important to find an answer to this question since a fine of a given amount can be imposed if the number of daily items is low but the proportion of income per daily item is high, or if the number of days is higher but the proportion of income per day is lower. In the former case, the penalty imposed as a proportion of income reaches the amount that would deter the average driver from committing a traffic offence, *ceteris paribus*, much sooner than in the latter case. If the deterrence of drivers decreases at a lower rate than the increase in their wealth, it may be beneficial to set the number of daily offenses at a higher rate and the proportion of income per daily offense at a lower rate. This is because if the amount of the fine increases too quickly compared to the reduced deterrence associated with income, the fines will rise unnecessarily fast. As has been observed in the Czech Republic, this may lead to the legal system excluding these penalties.¹³ However, if deterrence decreases at a higher rate than wealth increases, it may be worthwhile to set the number of daily offences at a lower rate and the proportion of income per daily offence at a higher rate, as this may prevent many lower-income drivers from being under-incentivised as fines increase rapidly. The tradition of upper and lower limits is also reflected in national daily fine practice: Article 50 of the Criminal Code sets lower and upper limits for the amount of the fine, so it would not be alien to our legal system to set lower and upper limits for the

¹³ Drápal, J. (2018): Day fines: a European comparison and Czech malpractice. *European Journal of Criminology*, 15(4), 461-480.

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penalties to be imposed, and between them to calculate the daily fine based on a formula.

Conclusion

In this paper, I tried to draw attention to the problem of diminishing marginal utility of income in the context of objective fines. Using the tools of economics, I have sought to answer the question of what influences whether a driver violates a traffic rule or keeps it. Additionally, I have considered how the size of the expected penalty can be manipulated to provide a more effective incentive to encourage drivers to keep the rule. I have briefly presented the economics of the daily penalty, the limitations of its application, the practice of the states that have applied it so far and tried to offer solutions to these problems.

In conclusion, it can be concluded that the introduction of a daily penalty scheme as a sanction for traffic offences could provide an effective incentive for wealthy offenders. However, given the potential dangers of daily fines, the preparation of such a domestic measure requires further research on the driving habits of domestic drivers and studies on the relationship between changes in deterrence and changes in income. In my view, to reduce the number of rich people breaking the rules on the roads, it is worth considering the imposition of day fines in traffic.