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Assessing the efficiency of priorities for traffic law enforcement in Norway

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ABSTRACT

This paper assesses the efficiency of priorities for traffic law enforcement in Norway. Priorities are regarded as efficient if: (1) enforcement ensures a sufficient level of deterrence to keep down the rate of violations; (2) selection of target violations for enforcement is based on the risk attributable to them; and (3) an optimal level of enforcement is selected, i.e. the marginal benefits of enforcement in terms of preventing accidents equal the marginal costs of enforcement. The efficiency of current traffic law enforcement in Norway is assessed in terms of these criteria. It is found that the risk of apprehension varies considerably between different traffic violations. These variations do not reflect the risk attributable to the violations, i.e. it is not the case that the risk of apprehension is higher for violations that make a large contribution to fatalities and injuries than for violations that make a smaller contribution. In principle, shifting priorities so as to increase the risk of apprehension for some violations and reduce it for other violations could make police enforcement slightly more efficient. The main finding, however, is that the current level of enforcement is too low. Cost-benefit analyses show that substantially increasing the amount of police enforcement is cost-effective.

1. Introduction

Violations of road traffic law are a major road safety problem in all highly motorised countries. Considering the fact that many traffic violations are widespread, there is reason to ask whether current traffic law enforcement is ineffective or insufficient to deter violations. Is enforcement targeted at offences that only make minor contributions to traffic fatalities or injuries, while the enforcement of violations making major contributions to traffic fatalities and injuries is neglected? Is the total amount of enforcement insufficient to deter violations? This paper explores these issues. The following main questions are discussed:

1. Is the current level of enforcement and risk of apprehension for traffic violations sufficient to keep the rate of violations low?
2. Does the risk of apprehension vary in proportion to the contribution various violations make to fatalities and injuries, i.e. is there a higher risk of apprehension for violations making a large contribution to traffic injury than for violations making a small contribution to traffic injury?
3. Is it cost-effective to increase the level of enforcement or is the current level close to optimal?

The discussion is based on a study of traffic law enforcement in Norway (Elvik, 2010a). The study surveyed the incidence of traffic law violations, the current level of enforcement and risk of apprehension, and driver perceptions of the risk of apprehension. The contribution of various violations to traffic injury was also estimated.

2. Deterrence of traffic law violations in Norway

The true rate of violations is unknown for most traffic law violations. In Norway, estimates of the rate of violations at more than one point in time exist only for speeding, drinking and driving and not wearing seat belts (Sakshaug, 1986; Elvik and Christensen, 2004, 2007; Muskaug, 1985, 2008; Glad, 1985; Glad and Vaas, 1994; Gjerde et al., 2008). The rates of speeding, drinking and driving and not wearing seat belts in the three periods 1980–1984, 1993–1999 and 2004–2006 are shown in Table 1. These were the periods for which data were available.

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Table 1
Percentage of traffic in Norway violating speed limits, blood alcohol limits and mandatory seat belt wearing.

Type of violation	Percentage of vehicle kilometres of driving above speed limits, with illegal BAC and without seat belts		
	1980–1984	1993–1999	2004–2006
Speeding (%)	41.7	44.7	49.0
Drinking and driving (BAC > 0.05) (%)	0.27		0.17
Drinking and driving (BAC > 0.02) (%)[a]	0.58		0.37
Driver non-use of seat belts (%)	18.7	14.5	10.2

[a] The legal BAC limit was lowered from 0.05% to 0.02% in 2001. Estimates of drinking and driving are from roadside surveys in 1981–1982 and 2005–2006.

The percentage of vehicle kilometres above speed limits has been estimated to be about 42% in 1980–1984, about 45% in 1993–1999 and 49% in 2004–2006 (annual mean values for the three periods). The rate of drinking and driving was estimated in two roadside surveys, one in 1981–1982 (Glad, 1985; Glad and Vaas, 1994); the other in 2005–2006 (Gjerde et al., 2008). The rate is very low and has declined from an estimated level of 0.58% of traffic with blood alcohol content (BAC) of more than 0.02% in 1981–1982 to 0.37% of traffic in 2005–2006. The BAC-limit in Norway was lowered from 0.05% to 0.02% in 2001. The rate of seat belt wearing by drivers has been monitored since 1973 (Muskaug, 2008). Violations have been reduced. Driver non-wearing of seat belts was reduced from 19% in 1980–1984 to 10% in 2004–2006.

Speeding is by far the most widespread violation and the only one that shows an increasing rate over time. Has the risk of apprehension for speeding been reduced over time? Fig. 1 shows the risk of apprehension for speeding in Norway in the 1980s, 1990s and after 2000. The risk of apprehension is stated as the number of citations for speeding per million kilometres driven above speed limits. Most citations are fixed penalties (fines at fixed rates), but the most serious violations are brought to court.

The risk of apprehension has increased from 9.67 citations per million kilometres driven while speeding in 1980–1984 to 12.26 citations per million kilometres driven while speeding in 2004–2006. This is entirely due to an increased use of speed cameras. The risk of being apprehended by a police officer has declined. As speed cameras only have a local effect on the roads where they have been installed, this means that on most roads the risk of apprehension for speeding has declined. There are currently about 360 speed cameras in Norway; all are signposted. According to a study reported in 2002 (Ragnøy, 2002), the mean speed of traffic in the close vicinity of the cameras (from about 100 m upstream of a camera to 100 m downstream of it) is reduced by about 4–6 km/h. Speed is reduced even further away from the cameras; the study found that an effect of a speed camera can be detected for a distance of about 4 km. If, based on this study, it is assumed that each camera influences speed on a 4 km section, the cameras will influence speed on about 1440 km of road (360 × 4). The total length of public roads in Norway is 93,240 km. Speed cameras are installed on roads with a high traffic volume. If traffic volume on roads with speed cameras is assumed to be 10 times higher than the average volume for all roads, one can roughly estimate that about 14% of all vehicle kilometres in Norway are driven on roads where speeds are influenced by speed cameras. For the remaining 86% of traffic, enforcement by police officers is the only factor that generates a risk of apprehension, and this risk has declined sharply in recent years.

As far as drinking and driving and not wearing seat belts are concerned, the rate of violations has been reduced over time. The risk of apprehension for drinking and driving has also been reduced from 1981–1982 to 2005–2006 (Elvik, 2010a); therefore the reduced incidence of drinking and driving cannot be attributed to an increased risk of apprehension. It should be noted, however, that the number of kilometres driven with a blood alcohol concentration above 0.02% has been estimated to 114 million vehicle kilometres in 1981–1982 and 137 million vehicle kilometres in 2005–2006. Thus, the amount of drinking and driving has increased, but less than the general increase in traffic volume, leading to a reduction of the violation rate (i.e. the share of traffic performed by drinking drivers). There are strong social norms against drinking and driving in Norway, and these may have been reinforced over time (Assum, 2010). Seat belt enforcement, and the attendant risk of apprehension, increased considerably from 1980–1984 to 2004–2006; it is likely that this in part explains the reduced rate of violations (Elvik and Christensen, 2004, 2007).

3. The risk of injury attributable to traffic law violations and the risk of apprehension

Traffic law enforcement contributes to road safety by deterring, i.e. reducing the incidence of, violations that contribute to fatalities and injuries. The effect of various traffic law violations on the number of road accident fatalities and injuries is indicated by the

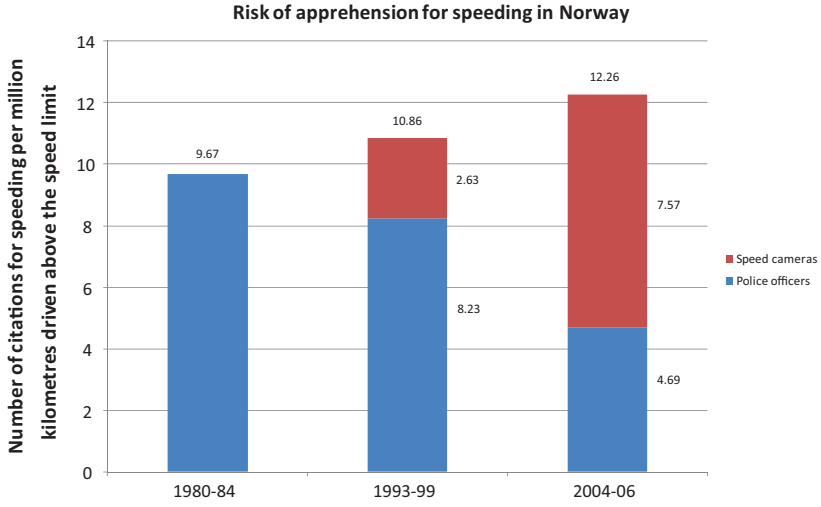

Fig. 1. Risk of apprehension for speeding in Norway – number of reactions against speeding per million kilometres driven above the speed limit.