INTERACTION OF FORMAL AND INFORMAL INSTITUTIONS: EVIDENCE FROM ROAD SAFETY LEGISLATION

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ABSTRACT

Economic incentives based on rewards and penalties have a mixed record as far as inducing behavioural change is concerned. This has underscored the importance of the claim of institutional economists that enforcement and informal institutions (e.g. norms and beliefs) influence the efficacy of formal institutions (e.g. laws and rules). This paper presents evidence of such links between formal and informal institutions in the context of road safety arrangements. More specifically, it demonstrates the existence of significant set-theoretic connections among good road safety outcomes, strong formal institutions (e.g. traffic laws and the enforcement thereof) and specific informal institutions (norms supporting law abidance).

1 INTRODUCTION

The aim of many public policies is to induce specific kinds of behaviour. The traditional approach of economists to the design of such policies revolves around the creation of incentives based on rewards and sanctions. Hwang and Bowles (2014: 681) succinctly summarise this approach:

> The standard problem facing a social planner seeking to induce a target population to act more prosocially... is to select an incentive, the effect of

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> which will modify the material costs or benefits of the targeted activity so as to induce the desired behavior.

Such incentives have a mixed record: while many policies based on economic incentives have elicited the desired behaviour, others have failed to do (cf. Bowles and Polanía-Reyes, 2012; Gneezy, Meier and Rey-Biel, 2011). The new institutional economics (NIE) suggests two simple yet powerful explanations for the limited effectiveness of economic incentives: weak enforcement sometimes blunts the ability of sanctions to influence behaviour, and the conduct of economic agents sometimes is conditioned so strongly by their habits, values and norms that the incentives created by laws policies fail to induce the behaviour desired by policymakers. North (1994: 360), for example, argues that institutions "... define the incentive structure of societies" and links formal institutions, enforcement and informal institutions as follows when discussing policies for economic development:

> [T]he policies at our disposal are very blunt instruments. They consist of alterations in the formal rules only, when in fact the performance of an economy is an admixture of the formal rules, the informal norms, and their enforcement characteristics. Changing only the formal rules will produce the desired results only when the informal norms that are complementary to that rule change and enforcement is either perfect or at least consistent with the expectations of those altering the rules (North, 2005: 27-28).

Similar considerations may well apply in many other policy contexts. These include road safety frameworks: diligent enforcement and strong norms supporting adherence should enhance the effectiveness of formal traffic laws. This paper uses an international dataset compiled by the World Health Organisation (2013) and a set-theoretic analytical technique known as fuzzy-set qualitative comparative analysis (fsQCA) to demonstrate these links among the elements of road safety frameworks. The results of the analysis are significant in view of the scarcity of empirical evidence on the links among formal

institutions, enforcement and informal institutions.[2] A second contribution of the paper is the demonstration of the value of fsQCA as a technique for exploring such links.

The rest of the paper is structured as follows. Section 2 introduces fsQCA, while Section 3 outlines the set-theoretic model used in the analysis and the operationalisation of the variables. Section 4 presents and discusses the results. Section 5 comments on the broader implications of the results for policy analysis.

2 FUZZY-SET QUALITATIVE COMPARATIVE ANALYSIS

fsQCA is a comparative, case-oriented technique for identifying connections between outcomes and causal conditions in groups of cases (for detailed introductions to the techniques and its uses, see Ragin, 2000; 2008).[3] The technique is set-theoretic in nature: all the variables in fsQCA analyses – outcomes and causal conditions – are assigned values that indicate degrees of set membership. Given these values, fsQCA identifies set relations between outcomes and configurations of causal conditions.[4] The significance of such set relations indicates whether configurations of causal conditions are necessary or sufficient conditions for the outcomes. The technique also identifies configurations of causal conditions that constitute salient pathways to outcomes. While equally suitable for "large-N" analyses, fsQCA is used primarily for "intermediate-N" studies involving 15 to 100 cases (Berg-Schlosser, De Meur, Rihoux and Ragin, 2009: 4).

The notion of causation underlying fsQCA is known as "multiple conjunctural causation" (cf. Berg-Schlosser et al., 2009: 8-11). Two core principles of this notion are, first, that outcomes are usually associated with combinations of causal conditions and, second, that a particular outcome may result from more than one combination. Moreover,

[2] Narrative-based evidence of these links – such as that provided by Pejovich (1999) on prohibition, welfare reform, and female labour-force participation in the United States and the transition to market-based economic systems in Eastern Europe – remains much more common.

[3] Ragin (2008: 18) defines a causal condition as "... an. aspect of a case that is relevant in some way to the researcher's account or explanation of some outcome". Hence, causal conditions are possible causes of outcomes (as opposed to proven ones).

[4] "Configuration of causal conditions" is used throughout this paper as a collective term for individual causal conditions and combinations of causal conditions.

allowance is made for the possibility that contextual factors could determine whether an outcome is associated with the presence or the absence of a particular configuration of causal conditions.

This paper uses data from samples ranging from 34 and 67 countries to analyse the joint effects on road safety outcomes of traffic laws, the stringency of law enforcement and societal norms regarding adherence to such laws. fsQCA is an ideal technique for this purpose given that the analysis is configurational in nature and "intermediate-N" in scope.

3 THE MODEL AND THE DATA

This section outlines the specification of the set-theoretic model (which consists of an outcome and five causal conditions), the construction of quantitative measures of the elements of the model for the sample countries, and the conversion of these measures into calibrated fuzzy-set membership scores.

3.1 The outcome variable

The outcome variable for each country (henceforth *"Low road traffic death rate"*) is the estimated road traffic death rate per 100 000 of the population for 2010. These rates, which are published by the World Health Organisation (2013: 244-251), are tabulated in Appendix Table 1. Fatality rates are incomplete summary measures of road safety outcomes. These proxies have to suffice, however, because statistics on other outcomes (for example, numbers of non-fatal accidents and injuries as well as damages to vehicles and other property) are hard to come by and to compare across countries.

3.2 The causal conditions

As was indicated before, the model contains five causal conditions. This subsection defines these conditions and explains the construction of the variables representing each condition. Unless stated otherwise, the source of all the data is the statistical appendix in the *Global status report on road safety 2013* (World Health Organisation, 2013: 237-302).

It might be the case that international differences in road traffic death rates are unrelated to formal institutions (road safety legislation) and informal institutions (the norms, values and habits of road users). Such differences could reflect differences in traffic volumes instead. To allow for this possibility, the number of registered vehicles per 100 000 of the population in 2010 is used as the first causal condition. This condition is referred to as *"Low vehicle density rate"*. The vehicle density rates, which were calculated from the population and registered vehicle data in the *Global status report on road safety 2013* (World Health Organisation, 2013: 244-251, 296-303) are tabulated in Appendix Table 2.

The second causal condition, labelled *"Strong supporting conditions"*, is a summary measure of factors likely to enhance the effectiveness of laws regulating the behaviour of road users. These factors are the regularity of audits of the quality of roads, whether a country is a signatory to the World Forum on the Harmonization of Vehicle Standards, whether a country has specific safety requirements for all imported vehicles, whether a country has a national road safety strategy, and whether a country has a lead agency charged with the implementation of such a strategy. Table 1 shows the scoring systems for each element of "Strong supporting conditions", while Appendix Table 3 contains the country scores.

The scope of each country's road safety legislation is proxied by the third causal condition, which is referred to henceforth as *"Comprehensive road safety legislation"*. As is evident from Table 2, the elements included in the scores for this causal condition are the existence or non-existence of a penalty or demerit points system for traffic offences, national speed limits, a drinking-and-driving law, a helmet law for motorcyclists, a seat-belt law for vehicle occupants, a child-restraint law for passenger vehicles, and a law on the usage for mobile phones by drivers of vehicles. Appendix Table 4 contains the country scores.

The fourth causal condition is labelled *"Effective law enforcement"*. The *Global status report on road safety 2013* (World Health Organisation, 2013: 256-283) contains expert assessments – on zero to ten scales – of the effectiveness of the enforcement of each country's speeding law, drinking-and-driving law, helmet law for motorcyclists and seat-belt law for vehicle occupants. The country scores for *"Effective law enforcement"*

are the sums of these four assessment scores. Appendix Table 5 shows the scores for the various countries.

Table 1

Scoring systems for elements of "Strong supporting conditions"

Elements	Scores
1. Road audits:	
Are not undertaken	0.00
Are undertaken for new or existing roads	0.50
Are undertaken for new and existing roads	1.00
2. Vehicle standards:	
Not a signatory to the World Forum on Harmonization of Vehicle Standards	0.00
Signatory to the World Forum on Harmonization of Vehicle Standards	1.00
3. Legislation for imported new cars requires:	
Neither front and rear seatbelts nor airbags	0.00
Front and rear seatbelts or airbags	0.50
Front and rear seatbelts as well as airbags	1.00
4. A national road safety strategy:	
Does not exist	0.00
Exists, but is not funded	0.50
Exists and is funded	1.00
5. A lead agency on road safety:	
Does not exist	0.00
Exists, but is not funded	0.50
Exists and is funded	1.00

Source: Adapted from World Health Organisation (2013: 288-303).

Table 2

Scoring systems for elements of "Comprehensive road safety legislation"

Elements	Scores
1. A demerit/penalty point system:	
Is in place	0.00
Is not in place	1.00
2. Speed limits:	
Do not exist at the national level	0.00
Exist at the national level, and the limit in urban areas exceeds 50km/h	0.50
Exist at the national level, and the limit in urban areas does not exceed 50km/h	1.00
3. A drinking-and-riving law:	
Does not exist	0.00
Exists, but a maximum blood-alcohol content level is not specified	0.50
Exists, and a maximum blood-alcohol content level is specified	1.00
4. A national helmet law:	
Does not exist	0.00
Exists, and applies to drivers	0.50
Exists, and applies to drivers and adult passengers	1.00
5. A seatbelt law:	
Does not exist	0.00
Exists, and applies to front occupants	0.50
Exists, and applies to front and rear occupants	1.00
6. A child-restraint law:	
Does not exist	0.00
Exists	1.00
7. A law on mobile phone use while driving:	
Does not exist	0.00
Exists, and applies to hand-held phones	0.50
Exists, and applies to hand-held and hands-free phones	1.00

Source: Adapted from World Health Organisation (2013: 256-287, 296-303).

The fifth causal condition (*"Strong adherence-supporting norms"*) relates to the degree to which the norms and values of a country's population strengthen adherence to road safety laws. It is invariably difficult to quantify characteristics of informal institutions, and these norms and values are no exceptions. In view of the riskiness of relying on a single measure, the empirical analysis discussed in Section 4 includes three different proxies. Two of these are derived from country-level information in the *Global status report on road safety 2013* (World Health Organisation, 2013: 260-267, 276-283) about

the percentages of road deaths attributable to alcohol and the percentages of drivers wearing seat belts. In all likelihood, these percentages are affected by the effectiveness of law enforcement; as such, the raw figures in the report are not valid proxies for the strength of the norms and values that influence adherence to road-safety laws. Hence, the first proxy (henceforth "Norm 1") was derived from a scatterplot of the percentages of roads deaths attributable to alcohol and the enforcement scores for drinking-and-driving laws. A measure of norm-driven adherence to drinking-and-driving laws was then obtained for each country by calculating the differences between the actual percentages of roads deaths attributable to alcohol and the percentages predicted by the trend line of the scatterplot. In the same way, measures of norm-based adherence to seatbelt laws were obtained from a scatterplot of the actual percentages of drivers who wear seatbelts and enforcement scores for seatbelt laws. For each country, the degree of norm-based adherence to such laws was estimated by calculating the difference between the actual levels of seatbelt usage and the percentage levels predicted by the trend line of the scatterplot. Henceforth, this measure is labelled "Norm 2". The two scatterplots are reproduced as Appendix Figures 1 and 2, and Appendix Table 6 contain the country scores.

The third measure of the causal condition "Strong adherence-supporting norms" (henceforth "Norm 3") is a more general indicator of law abidance derived from the results of the *World values survey 2010-2014* (World Values Survey Organisation, 2014: 266-268). It is the average of the percentages of the respondents in each country stating that it is never justifiable to (i) steal property, (ii) avoid a fare on public transport, and (iii) cheat on taxes. The country scores for this measure are provided in Appendix Table 6.

The sizes of the samples of countries vary for the three measures for "Strong adherence-supporting norms". Hence, Section 5 shows separate results for analyses of the Norm 1 sample (67 countries), the Norm 2 sample (52 countries) and the Norm 3 sample (34 countries). A considerable number of countries feature in two or three of these sample, though.

3.3 Determination of fuzzy-set membership scores

Prior to undertaking a fuzzy-set qualitative comparative analysis, the scores for the outcome and the causal conditions should be converted to set membership scores ranging from zero to one. One of the distinctive feature of fsQCA is that it allows fine-grained categorisations of set membership: apart from the qualitative states of full membership and non-membership with scores of one and zero, respectively, fsQCA also permits partial membership of sets indicated by scores in the interval from one to zero (Ragin, 2000: 153-159; Ragin, 2008: 29-33).[5] Ideally, the final set membership scores should be calibrated – that is, adjusted to achieve conformance with external standards (Ragin, 2008: 72) – as opposed to simple rescaled versions of the raw scores. Calibration enhances the precision of quantitative measurements by adding important qualitative information: the precision brought by well-executed calibration is useful for distinguishing between relevant and irrelevant variation and for accurate placement of cases relative to one another (Ragin, 2008: 74). According to Ragin (2000: 154-155), calibrated fuzzy membership scales represent more refined forms of measurement than conventional ratio scales. Both have the features of interval-scale measurement, but conventional ratio scales have one fixed point (zero) while calibrated fuzzy membership scales have three anchors: full non-membership of a set (zero), the point of maximum ambiguity between set membership and non-membership (0.5) and full set membership (one).

The non-existence of commonly accepted external standards for calibrating aspects of road safety frameworks complicated this aspect of the fuzzy-set qualitative analysis. Hence, the simple principles outlined in Table 3 were used to calibrate each of the data sets used in the analysis. Only countries with populations of 1 million or more were used to determine scores for full membership and full non-membership of sets.

Table 4 contains the calibrated membership scores for the fuzzy sets associated with the outcome and each of the five causal conditions. These scores were generated by the

[5] An earlier version of the technique, which is known as crisp-set qualitative comparative analysis or csQCA, allows only two types of subset membership, namely non-membership (a score of zero) and full membership (a score of one) (cf. Ragin, 1987).

software package "fsQCA version 2.0" (Ragin, Drass and Davey, 2006). In principle, the membership scores of continuous fuzzy sets can assume any value from zero to one. However, the software package assigns fuzzy membership scores of 0.95 to cases with full membership of sets and 0.05 to those with full non-membership. Scores of 1.00 arise only when the raw scores significantly exceed the anchor point for full membership. The calibrated set membership scores in the table are used in Section 4 to identify set-theoretic connections among the elements of the model.

When undertaking set-theoretic analyses, the software package "fsQCA version 2.0" ignores cases with fuzzy membership scores on causal conditions of exactly 0.5, because efforts to analyse cases with this score are complicated by the rules governing the intersection of fuzzy sets (Fiss, 2011: 407). Hence, Ragin (2008: 131) recommends that the assignment of fuzzy membership scores of exactly 0.5 should be avoided if possible. Table 4 contains several membership scores of exactly 0.5. To avoid the exclusion of these cases from aspects of the set-theoretic analysis, constants of 0.001 were added to these three raw scores for purposes of the analysis discussed in Section 4.[6]

[6] Fiss (2011) also uses such small adjustments to overcome the difficulties caused by fuzzy membership scores of exactly 0.5.

Table 3

Principles for calibrating set membership scores

Model element	Full membership	Crossover point	Full non-membership
Low road traffic death rate (Estimated road traffic death rate per 100 000 of the population)	3.0 Lowest country rate	22.35 Midpoint between lowest and highest country rates	41.7 Highest country rate
Low vehicle density rate (Number of registered vehicles per 100 000 of the population)	109 Lowest country rate	49 748 Midpoint between lowest and highest country rates	99 386 Highest country rate
Strong supporting conditions (Existence and features of five conditions)	5 Highest country score	2.5 Midpoint between lowest and highest country scores	0 Lowest country score
Comprehensive road safety legislation (Existence and features of seven laws or legal provisions)	7 Highest country score	4.5 Midpoint between lowest and highest country scores	2 Lowest country score
Effective law enforcement (Sum of four enforcement scores based on expert opinions)	40 Highest country score	23.5 Midpoint between lowest and highest country scores	7 Lowest country score
Strong adherence-supporting norms (Unexpectedly low percentage of road deaths attributable to alcohol)	5.899 Largest positive difference between the actual and predicted percentages	-3.353 Midpoint between largest positive and negative differences	-12.604 Largest negative difference between the actual and predicted percentages
Strong adherence-supporting norms (Relatively high seatbelt wearing rate among drivers)	55.277 Largest positive difference between the actual and predicted percentages	4.202 Midpoint between largest positive and negative differences	-46.874 Largest negative difference between the actual and predicted percentages
Strong adherence-supporting norms (Relatively high aversion to breaking laws)	87.4 Highest average percentage	60.75 Midpoint between highest and lowest average percentages	34.1 Lowest average percentage

Table 4

Calibrated fuzzy membership scores for the outcome and causal conditions

Samples			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
X	X		Albania	0.77	0.90	0.86	0.92	0.77	0.75	0.46	—
X		X	Armenia	0.56	0.92	0.65	0.65	0.58	0.84	—	0.86
X	X		Austria	0.91	0.20	0.95	0.92	0.85	0.79	0.21	—
X		X	Azerbaijan	0.76	0.91	0.35	0.65	0.75	0.62	—	0.95
X	X		Bahrain	0.84	0.69	0.65	0.23	0.58	0.91	0.73	—
X		X	Belarus	0.71	0.64	0.86	0.65	0.86	0.70	—	0.18
X	X		Belgium	0.89	0.27	0.65	0.77	0.72	0.82	0.15	—
X	X		Bosnia & Herzegovina	0.67	0.84	0.77	0.92	0.67	0.85	0.89	—
X			Botswana	0.45	0.86	0.35	0.50	0.89	0.82	—	—
X	X		Brunei Darussalam	0.92	0.09	0.92	0.50	0.80	0.78	0.39	—
X	X		Bulgaria	0.86	0.59	0.65	0.92	0.57	0.84	0.39	—
X			Cambodia	0.69	0.91	0.77	0.77	0.39	0.83	—	—
X	X	X	Chile	0.83	0.86	0.50	0.65	0.43	0.81	0.45	0.64
X		X	China	0.57	0.89	0.65	0.77	0.23	0.78	—	0.15
X	X	X	Colombia	0.74	0.89	0.77	0.65	0.27	0.81	0.49	0.64
	X		Costa Rica	0.82	0.86	0.77	0.92	0.80	—	0.36	—

Table 4 (continued)

Calibrated fuzzy membership scores for the outcome and causal conditions

Samples			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
X	X		Croatia	0.86	0.58	0.50	0.92	0.80	0.65	0.73	—
X	X	X	Cyprus	0.91	0.23	0.77	0.92	0.69	0.64	0.31	0.85
X	X		Czech Republic	0.91	0.24	0.92	0.92	0.69	0.86	0.50	—
X	X		Denmark	0.94	0.41	0.65	0.92	0.23	0.86	0.03	—
X	X	X	Ecuador	0.33	0.93	0.86	0.92	0.52	0.78	0.52	0.51
X			Equatorial Guinea	0.85	0.95	0.77	0.65	0.23	0.57	—	—
X	X	X	Estonia	0.92	0.50	0.92	0.77	0.85	0.79	0.31	0.50
	X		Ethiopia	0.68	0.95	0.77	0.92	0.48	—	0.39	—
X			Fiji	0.92	0.92	0.65	0.92	0.31	0.87	—	—
X	X		Finland	0.94	0.05	0.92	0.92	089	0.74	0.33	—
X	X		Georgia	0.74	0.88	0.50	0.50	0.80	0.42	0.40	—
	X	X	Ghana	0.51	0.94	0.77	0.65	0.15	—	0.79	0.75
X			Honduras	0.63	0.90	0.65	0.77	0.73	0.80	—	—
X	X		Hungary	0.89	0.69	0.77	0.92	0.77	0.80	0.40	—
X	X		Iceland	0.95	0.07	0.77	0.92	0.85	0.81	0.36	—
		X	Iraq	0.19	0.91	0.23	0.23	0.61	—	—	0.18

Table 4 (continued)

Calibrated fuzzy membership scores for the outcome and causal conditions

Samples			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
	X		Italy	0.91	0.10	0.86	0.92	0.65	—	0.52	—
X	X		Jamaica	0.84	0.87	0.50	0.86	0.18	0.92	0.58	—
X	X	X	Jordan	0.48	0.88	0.77	0.50	0.52	0.90	0.56	0.89
X		X	Kazakhstan	0.52	0.86	0.86	0.35	0.65	0.84	—	0.34
		X	Kuwait	0.71	0.39	0.86	0.50	0.11	—	—	0.39
X		X	Kyrgyzstan	0.62	0.93	0.35	0.50	0.23	0.24	—	0.34
X			Latvia	0.86	0.70	0.86	0.92	0.73	0.78	—	—
X			Lithuania	0.85	0.39	0.50	0.77	0.77	0.71	—	—
X	X		Luxembourg	0.92	0.09	0.92	0.92	0.65	0.84	0.49	—
	X		Madagascar	0.65	0.95	0.65	0.35	0.11	—	0.19	—
X	X	X	Malaysia	0.40	0.22	0.92	0.77	0.27	0.61	0.10	0.35
X			Mongolia	0.67	0.90	0.35	0.86	0.20	0.63	—	—
X	X		Montenegro	0.76	0.77	0.86	0.86	0.39	0.59	0.29	—
	X	X	Morocco	0.66	0.92	0.77	0.65	0.65	—	0.85	0.83
X	X		Namibia	0.40	0.92	0.65	0.65	0.39	0.43	0.67	—
X	X	X	Netherlands	0.95	0.40	0.92	0.92	0.69	0.83	0.19	0.76

Table 4 (continued)

Calibrated fuzzy membership scores for the outcome and causal conditions

Sample			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
X	X	X	New Zealand	0.89	0.19	0.95	0.92	0.85	0.70	0.39	0.68
X			Nicaragua	0.63	0.93	0.05	0.65	0.20	0.92	—	—
X	X		Norway	0.94	0.29	0.92	0.92	0.77	0.83	0.31	—
X	X		Oman	0.22	0.78	0.77	0.50	0.77	0.85	0.40	—
	X	X	Pakistan	0.68	0.94	0.65	0.14	0.09	—	0.89	0.61
	X		Panama	0.78	0.88	0.77	0.92	0.85	—	0.36	—
		X	Peru	0.73	0.91	0.65	0.65	0.23	—	—	0.29
X	X	X	Poland	0.84	0.38	0.86	0.92	0.69	0.78	0.22	0.51
X	X		Portugal	0.84	0.13	0.86	0.77	0.85	0.61	0.37	—
X			Republic of Moldova	0.79	0.87	0.35	0.92	0.48	0.83	—	—
X	X	X	Russian Federation	0.64	0.76	0.92	0.65	0.52	0.79	0.32	0.17
X			Samoa	0.72	0.93	0.92	0.92	0.87	0.72	—	—
X			Serbia	0.90	0.82	0.77	0.95	0.35	0.88	—	—
X	X		Seychelles	0.76	0.87	0.50	0.23	0.35	0.43	0.80	—
X		X	Singapore	0.94	0.87	0.77	0.86	0.85	0.78	—	0.20
X			Slovakia	0.88	0.60	0.77	0.77	0.43	0.87	—	—

Table 4 (continued)

Calibrated fuzzy membership scores for the outcome and causal conditions

Samples			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
X	X	X	Slovenia	0.91	0.25	0.92	0.92	0.65	0.72	0.24	0.67
X	X	X	South Africa	0.19	0.86	0.86	0.86	0.11	0.05	0.12	0.05
X	X	X	Spain	0.93	0.26	0.92	0.92	0.73	0.81	0.28	0.66
X	X		St Kitts and Nevis	0.69	0.61	0.23	0.65	0.43	0.92	0.21	—
X	X		Swaziland	0.46	0.90	0.65	0.35	0.48	0.79	0.67	—
X	X	X	Sweden	0.95	0.41	0.92	0.65	0.57	0.88	0.20	0.42
X	X		Switzerland	0.94	0.93	0.77	0.77	0.69	0.85	0.27	—
	X		Syrian Arab Republic	0.48	0.92	0.86	0.50	0.80	—	0.47	—
X			Tajikistan	0.66	0.94	0.95	0.86	0.69	0.79	—	—
X	X	X	Thailand	0.08	0.63	0.77	0.50	0.35	0.26	0.55	0.63
X			The Republic of Macedonia	0.90	0.88	0.95	0.65	0.77	0.83	—	—
X		X	Tunisia	0.63	0.90	0.92	0.65	0.31	0.91	—	0.73
	X	X	Turkey	0.83	0.85	0.77	0.95	0.82	—	0.86	0.92
X	X		United Arab Emirates	0.82	0.77	0.86	0.50	0.85	0.83	0.49	—
X		X	Uruguay	0.53	0.67	0.35	0.65	0.35	0.30	—	0.85
X			Venezuela	0.09	0.90	0.65	0.77	0.09	0.78	—	—

Table 4 (concluded)

Calibrated fuzzy membership scores for the outcome and causal conditions

Samples			Countries	Scores							
1	2	3		Low road traffic death rate	Low vehicle density rate	Strong supporting conditions	Comprehensive road safety legislation	Effective law enforcement	Strong adherence-supporting norms		
									Alcohol	Seatbelts	Law abidance
		X	Zimbabwe	0.77	0.93	0.35	0.50	0.35	—	—	0.37

Source: Own calculations based on information in Appendix Tables 1 to 6.

4 ANALYSIS AND RESULTS

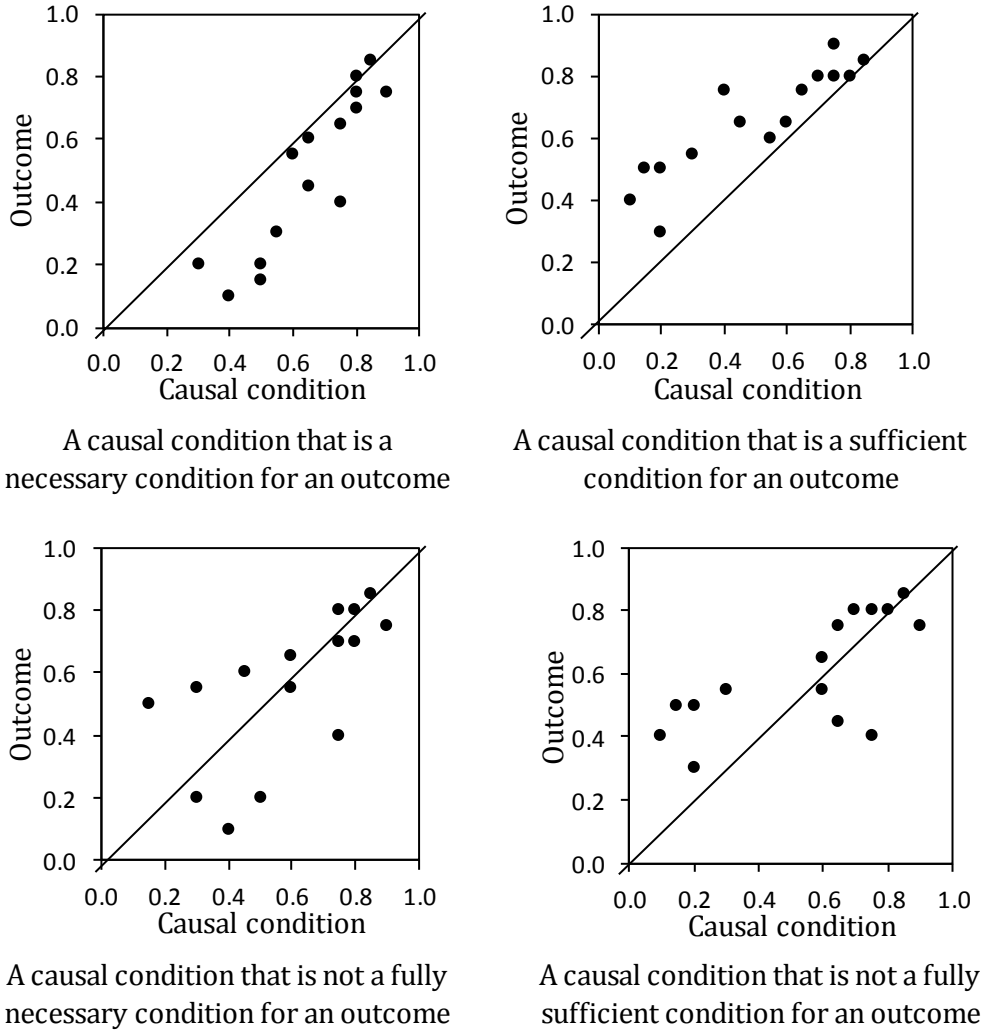
This section identifies and assesses set relationships between the outcome and various combinations of the five causal conditions.[7] The significance of these set relationships indicates whether the configurations of causal conditions are necessary and sufficient conditions for the outcome "Low road traffic death rates".

A configuration of causal conditions is a necessary condition for an outcome when that configuration is present in all cases that exhibit the outcome (Ragin, 2008: 20). For a group of cases, the requirement for a set relationship fully consistent with necessity is that all the membership scores on the configuration of causal factors should be equal to or larger than the corresponding membership scores on the outcome. Hence, all the points are on or below a 45-degree line from the origin when a set relationship fully consistent with necessity is shown in a scatterplot with membership in the outcome on the vertical axis and membership in the configuration of causal conditions on the horizontal axis. The upper-left panel in Figure 1 depicts such a superset relationship between an outcome and a configuration of causal conditions. In the same way, a configuration of causal conditions is a sufficient condition for an outcome when all cases in which that configuration is present also display the outcome (Ragin, 2008: 20). All the points are on or above a 45-degree line from the origin when a subset relationship fully consistent with sufficiency is depicted in a scatterplot with a similar axis structure, because in this case all the membership scores on the configuration of causal factors are equal to or smaller than the membership scores on the outcome. The lower-left panel in Figure 1 depicts such a subset relation.

[7] The fuzzy membership score of a case on a combination of causal conditions is obtained by applying logical "AND", which implies taking the smallest of its fuzzy membership scores on the causal conditions included in the combination (Ragin, 2008: 36-37).

Figure 1

Subset relationships consistent with sufficiency and necessity



A causal condition that is a necessary condition for an outcome

A causal condition that is a sufficient condition for an outcome

A causal condition that is not a fully necessary condition for an outcome

A causal condition that is not a fully sufficient condition for an outcome

Source: Adapted from Ragin (2008: 48, 54).

Set relations that are fully consistent with sufficiency or necessity are rare. Imperfect ("rough") set relations, such as those depicted in the upper-right and lower-right panels in Figure 1, are much more common. Ragin (2008: 44) proposes two measures for assessing less-than-fully consistent set relations between outcomes and configurations of causal conditions. Set-theoretic consistency, which is a measure of significance, shows how consistently configurations of causal factors are associated with specific outcomes (i.e. how closely the connections between outcomes and causal conditions approximate perfect subset relationships). The following formula measures the

consistency of a set relation between the scores on a combination of causal condition (X_i) and those on an outcome (Y_i) (Ragin, 2008: 52):

$$Consistency\ (X_i \leq Y_i) = \sum [min\ (X_i\ ,\ Y_i)] \ / \ \sum\ (X_i) \qquad [1]$$

The expression ''min'' indicates that the lower of the two values is chosen. Consistency scores range from zero to one. Ragin (2008: 136) points out that values below 0.75 indicate weak connections — especially in analyses of small numbers of cases — and suggests 0.85 as a benchmark for identifying strong set relations.

Set-theoretic coverage is a measure of the empirical importance of configurations of causal conditions that shows the extent to which such configurations account for instances of outcomes. The coverage of an outcome by a configuration of causal conditions is calculated after it has been established that the set relation meets the desired consistency threshold (the extent to which such a configuration accounts for instances of the outcome is irrelevant unless a reasonably consistent set relation exists between the configuration and the outcome). The following formula is used to calculate the coverage of a set relationship between the scores on a configuration of causal condition (X_i) and those on an outcome (Y_i) (Ragin, 2008: 57):

$$Coverage\ (X_i \leq Y_i) = \sum [min\ (X_i\ ,\ Y_i)] \ / \ \sum\ (Y_i) \qquad [2]$$

Coverage scores also range from zero to one, and the expression ''min'' again indicates that the lower of the two values is chosen. To obtain high consistency scores it is often necessary to specify combinations of several causal factors. Such complex combinations, however, typically account for relatively few instances of the outcomes and therefore have relatively low coverage scores.

4.1 Identification of necessary conditions

The first step in the set-theoretic analysis is to establish whether any of the causal conditions is necessary for the outcome "Low road traffic death rates" (i.e. if one or more of the causal conditions is present whenever this outcome occurs). This would be the case if the outcome is a subset of the cause (or, put differently, when a superset

relation exists between the outcome and the causal condition) (cf. Ragin, 2000: 91). As pointed out above, the requirement for the existence of a necessary condition is that each of the membership scores on the outcome should be smaller than each of the corresponding membership scores on the condition. Table 5 provides consistency scores that make it possible to identify necessary conditions for the outcome "Low road traffic death rates". The table also contains coverage scores that indicate the empirical importance of the various relations.

Table 5

Analysis of necessary conditions for the outcome "Low road traffic death rates"

Causal conditions	Sample 1[1]		Sample 2[2]		Sample 3[3]	
	Consist-ency	Cover-age	Consist-ency	Cover-age	Consist-ency	Cover-age
Comprehensive road safety legisla-tion	0.90	0.89	0.89	0.89	0.89	0.88
Strong adherence-supporting norms	0.89	0.89	0.52	0.90	0.69	0.87
Strong supporting conditions	0.85	0.87	0.90	0.87	0.90	0.82
Effective law enforcement	0.71	0.95	0.73	0.95	0.66	0.93
Low vehicle density rate	0.71	0.79	0.64	0.79	0.77	0.74

Notes:
1 Sample of 67 countries with set membership scores for the norm "Unexpectedly low proportion of road deaths attributable to alcohol".
2 Sample of 52 countries with set membership scores for the norm "Unexpectedly high proportion of drivers wearing seatbelts".
3 Sample of 34 countries with set membership scores for the norm "Strong values supporting law abidance".

Three conclusions follow from the information in Table 5:

- It is clear that a low vehicle density rate per se is not a necessary condition for a low road traffic death rate. This confirms the importance of appropriate institutions, whether formal (e.g. traffic laws) or informal (norms supporting law-abidance), for good road safety outcomes.
- It transpires from the consistency scores that all three samples display very strong superset relationships between "Low road traffic death rates" and "Comprehensive road safety legislation", and between "Low road traffic death rates" and "Strong supporting conditions". Moreover, the very high coverage

scores underscore the empirical importance of these set relationships. These findings are consistent with the claim that road safety outcomes are markedly improved by the existence of a comprehensive set of road safety laws and by supporting these laws with interventions such as regular audits of the quality of roads, introducing specific safety requirements for all imported vehicles, adopting a national road safety strategy and establishing a lead agency charged with the implementation thereof.

- The consistency score for only one sample (namely Sample 1), is indicative of a strong superset relationship between "Low road traffic death rates" and "Strong adherence-supporting norms". As was stated before, Sample 1 contains set membership scores for the norm "Unexpectedly low percentage of road deaths attributable to alcohol". Hence, the results for all three samples suggest that the significance of the superset relations between "Low road traffic death rates" and some of the formal elements of road safety frameworks exceeds those of the superset relations between "Low road traffic death rates" and the measures of norms that support adherence to traffic laws.

4.2 Subset analysis for configurations of causal conditions

A causal condition (or a combination of causal conditions) is sufficient for an outcome when it always produces that outcome (Ragin, 2000: 92). As explained in the introduction to this section, sufficiency is indicated by perfect subset relationships, that is, when all the set membership scores on a causal condition (or a combination of causal conditions) are smaller than or equal to the corresponding set membership scores on the outcome. Subset analysis is especially valuable for comparing the significance and empirical relevance of the relationships between the outcome and configurations of the causal conditions.

Table 6 contains the results of the subset analysis. The first panel in the table reports consistency and coverage scores for the individual causal conditions, whereas the remaining three panels contain scores for selected configurations of these conditions. Following Ragin (2008: 136), a consistency score of at least 0.85 is used throughout as the criterion for identifying significant subset relationships.

Table 6

Subset analysis for the outcome "Low road traffic death rate"

Causal conditions	Sample 1[1]		Sample 2[2]		Sample 3[3]	
	Consist-ency	Cover-age	Consist-ency	Cover-age	Consist-ency	Cover-age
Effective law enforcement	0.95	0.71	0.95	0.73	0.93	0.66
Comprehensive road safety legislation	0.89	0.90	0.89	0.89	0.88	0.89
Strong adherence-supporting norms	0.89	0.89	0.90	0.52	0.87	0.69
Strong supporting conditions	0.87	0.85	0.87	0.90	0.82	0.90
Low vehicle density rate	0.79	0.71	0.79	0.64	0.74	0.77
Comprehensive road safety legislation * Low vehicle density rate	0.88	0.65	0.88	0.56	0.88	0.69
Comprehensive road safety legislation * Strong supporting conditions	0.91	0.80	0.91	0.82	0.89	0.83
Comprehensive road safety legislation * Strong adherence-supporting norms	0.94	0.83	0.93	0.48	0.94	0.66
Comprehensive road safety legislation * Effective law enforcement	0.97	0.67	0.97	0.70	0.97	0.65
Comprehensive road safety legislation * Strong supporting conditions	0.91	0.80	0.91	0.82	0.89	0.83
Comprehensive road safety legislation * Strong supporting conditions * Strong adherence-supporting norms	0.95	0.75	0.94	0.47	0.95	0.63
Comprehensive road safety legislation * Strong supporting conditions * * Strong adherence-supporting norms * Effective law enforcement	0.98	0.63	0.96	0.43	0.96	0.53
Comprehensive road safety legislation * Strong supporting conditions	0.91	0.80	0.91	0.82	0.89	0.83
Comprehensive road safety legislation * Strong supporting conditions * Effective law enforcement	0.97	0.64	0.97	0.68	0.97	0.63
Comprehensive road safety legislation * Strong supporting conditions * Effective law enforcement * Strong adherence-supporting norms	0.98	0.63	0.96	0.43	0.96	0.53

Notes:

1 Sample of 67 countries with set membership scores for the norm "Unexpectedly low proportion of road deaths attributable to alcohol".

2 Sample of 52 countries with set membership scores for the norm "Unexpectedly high proportion of drivers wearing seatbelts".

3 Sample of 34 countries with set membership scores for the norm "Strong values supporting law abidance".

The top panel in Table 6 shows that none of the causal conditions is sufficient for the outcome “Low road traffic death rate”. Nonetheless, the consistency scores confirm the significance of the subset relations between “Comprehensive road safety legislation” and “Low road traffic death rates”, between “Effective law enforcement” and “Low road traffic death rates”, between “Strong adherence-supporting norms” and Low road traffic death rates” and, for two of the three samples, between “Strong supporting conditions” and “Low road traffic death rates”. By contrast, the subset relation between “Low vehicle density rate” and “Low road traffic death rate“ is insignificant. The significant subset relationships are all important from an empirical point of view: the coverage scores indicate that the causal conditions in question account for between 52 percent and 90 percent of the outcome. As was the case in the analysis of necessary conditions, the subset analysis points to the existence of significant and important empirical connections between road safety outcomes and relevant formal and informal institutions.

The second panel confirms these empirical connections. The subset relation between “Comprehensive road safety legislation” and “Low road traffic death rates” is not strengthened in any of the three samples by combining the former with “Low vehicle density rates”. By contrast, the consistency scores for the subset relations between “Comprehensive road safety legislation” and “Low road traffic death rates” are raised in all three samples by combining the former with causal conditions representing formal institutions (“Strong supporting condition” and “Effective law enforcement”) and informal institutions (“Strong adherence-supporting norms”). The coverage scores of each of these subset relations are indicative of important empirical connections. Given the topic of this paper, it is particularly notable that combining “Comprehensive road safety legislation” with “Strong adherence-supporting norms” and with “Effective law enforcement” yields markedly more significant subset relations with “Low road traffic death rates” in all three samples than those of “Comprehensive road safety legislation” on its own. These findings are consistent with the claim in the New Institutional Economics that good enforcement and norms supporting law abidance strengthen the effectiveness of laws and other formal rules. The notion that norms supporting law abidance can render formal rules self-enforcing and, in this way, partially substitute for good enforcement of such rules also finds some support in these results.

The latter claim can be explored further with the aid of the information in the third and fourth panels of Table 6. The coverage scores in these panels, too, confirm the empirical importance of the all the subset relationships: the various causal configurations account for between 43 percent and 83 percent of the outcome. Two conclusions follow from the consistency scores. The first is that combinations consisting of all the institutions-related causal conditions yield very strong subset relationships with the outcome "Low road traffic death rates". The consistency scores of the subset relationships between the causal combination "Comprehensive road safety legislation AND Strong supporting conditions AND Effective law enforcement AND Strong adherence-supporting norms" and "Low road traffic death rates" for the three samples are 0.96, 0.96 and 0.98. These scores approach full sufficiency, in the sense that this combination of causal conditions is almost always associated with achievement of the outcome.

The second conclusion is tentative support for the notion that norms supporting law abidance cannot fully substitute for good enforcement of such laws. The third and fourth panels show the evolution of the subset relationships between "Comprehensive road safety legislation" and "Low road traffic death rates" when the former is combined with other causal conditions representing institutions in specific sequences. In each panel, the first entry shows that the significance of the subset relations between "Comprehensive road safety legislation" and "Low road traffic death rates" is increased somewhat in all three samples by adding "Strong supporting conditions" to the former. The second entry in each panel indicates that the subset relationships with "Low road traffic death rates" are strengthened further (and, in general, more markedly) by adding either "Strong adherence-supporting norms" or "Effective law enforcement" to the two-way combination "Comprehensive road safety legislation AND Strong supporting conditions". In all three samples, the addition of "Effective law enforcement" strengthens the significance of the subset relationship between "Comprehensive road safety legislation AND Strong supporting conditions" and "Low road traffic death rates" somewhat more than the addition of "Strong adherence-supporting conditions" does. In addition, further small increases in the consistency scores are obtained for all three samples when "Effective law enforcement" is added to the three-way combination "Comprehensive road safety legislation AND Strong supporting conditions AND Strong adherence-supporting norms" in the third panel. In the fourth panel, by contrast, adding

"Strong adherence-supporting norms" to the alternative three-way combination "Comprehensive road safety legislation AND Strong supporting conditions AND Strong adherence-supporting norms" increases the consistency score in one sample and decreases the corresponding scores in the other two.

5 CONCLUSIONS

This paper presents the preliminary results of an attempt to expand the meagre empirical literature on the connections between formal and informal institutions. It uses a set-theoretic technique (fuzzy-set qualitative comparative analysis, or fsQCA) to analyse an international dataset with information on countries' road traffic death rates, the scope and enforcement of road safety laws and other formal provisions likely to affect road safety outcomes, as well as outcomes that make it possible to specify rough indicators of the strength of norms that support adherence to traffic laws. The results are consistent with two key predictions of the new Institutional Economics, namely that institutions matter for outcomes and that the effectiveness of formal institutions is influenced by the efficacy of their enforcement and the degree to which they are in harmony with informal institutions. More specifically, the results of the analysis confirm that strong supporting conditions, effective enforcement of traffic laws and the existence of norms supporting adherence to traffic laws strengthen the ability of strong road safety legislation to make roads safe. In addition, the analysis suggests that strong norms supporting adherence to traffic laws can partially, but not fully, substitute for effective law enforcement as far as enhancing the effectiveness of road safety laws is concerned.

The analysis might be improved by experimenting with alternative ways to quantify the outcome and causal conditions. Furthermore, in-depth case studies of carefully selected countries and, if the required data can be obtained, regression analysis can be used to assess the reliability of the results.

APPENDIX

TABLES

Appendix Table 1

Estimated road traffic death rate per 100 000 of the population (2010)

Samples[1]			Countries	Rate
1	2	3		
X	X		Albania	12.7
X		X	Armenia	18.1
X	X		Austria	6.6
X		X	Azerbaijan	13.1
X	X		Bahrain	10.5
X		X	Belarus	14.4
X	X		Belgium	8.1
X	X		Bosnia & Herzegovina	15.6
X			Botswana	20.8
X	X		Brunei Darussalam	6.8
X	X		Bulgaria	10.4
X			Cambodia	17.2
X	X	X	Chile	12.3
X		X	China	20.5
X	X	X	Colombia	15.6
	X		Costa Rica	12.7
X	X		Croatia	10.4
X	X	X	Cyprus	7.6
X	X		Czech Republic	7.6
X	X		Denmark	4.7
X	X	X	Ecuador	27.0
X			Equatorial Guinea	11.4
X	X	X	Estonia	6.5
	X		Ethiopia	17.6
X			Fiji	6.3
X	X		Finland	5.1
X	X		Georgia	15.7
	X	X	Ghana	22.2
X			Honduras	18.8
X	X		Hungary	9.1
X	X		Iceland	2.8
		X	Iraq	31.5
	X		Italy	7.2
X	X		Jamaica	11.6
X	X	X	Jordan	22.9
X		X	Kazakhstan	21.9

Appendix Table 1 (continued)

Estimated road traffic death rate per 100 000 of the population (2010)

Samples[1]			Countries	Rate
1	2	3		
		X	Kuwait	16.5
X		X	Kyrgyzstan	19.2
X			Latvia	10.8
X			Lithuania	11.1
X	X		Luxembourg	6.3
	X		Madagascar	18.4
X	X	X	Malaysia	25.0
X			Mongolia	17.8
X	X		Montenegro	15.0
	X	X	Morocco	18.0
X	X		Namibia	25.0
X	X	X	Netherlands	3.9
X	X	X	New Zealand	9.1
X			Nicaragua	18.8
X	X		Norway	4.3
X	X		Oman	30.4
	X	X	Pakistan	17.4
	X		Panama	14.1
		X	Peru	15.9
X	X	X	Poland	11.8
X	X		Portugal	11.8
X			Republic of Moldova	13.9
X	X	X	Russian Federation	18.6
X			Samoa	16.4
X			Serbia	8.3
X	X		Seychelles	15.0
X		X	Singapore	5.1
X			Slovakia	9.4
X	X	X	Slovenia	7.2
X	X	X	South Africa	31.9
X	X	X	Spain	5.4
X	X		St Kitts and Nevis	17.2
X	X		Swaziland	23.4
X	X	X	Sweden	3.0
X	X		Switzerland	4.3
	X		Syrian Arab Republic	22.9

Appendix Table 1 (concluded)

Estimated road traffic death rate per 100 000 of the population (2010)

Samples[1]			Countries	Rate
1	2	3		
X			Tajikistan	18.1
X	X	X	Thailand	38.1
X			The Republic of Macedonia	7.9
X		X	Tunisia	18.8
	X	X	Turkey	12.0
X	X		United Arab Emirates	12.7
X		X	Uruguay	21.5
X			Venezuela	37.2
		X	Zimbabwe	14.6

Note: 1 "X" indicates membership of the country samples for the three measures of values and norms supporting adherence to road safety legislation.

Source: World Health Organisation (2013: 244-251).

Appendix Table 2

Number of registered vehicles per 100 000 of the population (2010)

Samples[1]			Countries	Number
1	2	3		
X	X		Albania	13 104
X		X	Armenia	9 705
X	X		Austria	72 577
X		X	Azerbaijan	10 694
X	X		Bahrain	36 615
X		X	Belarus	39 907
X	X		Belgium	65 819
X	X		Bosnia & Herzegovina	21 681
X			Botswana	19 659
X	X		Brunei Darussalam	87 556
X	X		Bulgaria	43 831
X			Cambodia	11 688
X	X	X	Chile	19 724
X		X	China	15 350
X	X	X	Colombia	15 616
	X		Costa Rica	19 824
X	X		Croatia	44 729
X	X	X	Cyprus	70 176
X	X		Czech Republic	69 214
X	X		Denmark	56 016
X	X	X	Ecuador	7 186
X			Equatorial Guinea	1 214
X	X	X	Estonia	49 558
	X		Ethiopia	456
X			Fiji	9 020
X	X		Finland	99 386
X	X		Georgia	16 922
	X	X	Ghana	4 603
X			Honduras	12 944
X	X		Hungary	36 147
X	X		Iceland	92 610
		X	Iraq	10 707
	X		Italy	86 847
X	X		Jamaica	18 324
X	X	X	Jordan	17 382
X		X	Kazakhstan	20 279

Appendix Table 2 (continued)

Number of registered vehicles per 100 000 of the population (2010)

Samples[1]			Countries	Number
1	2	3		
		X	Kuwait	57 368
X		X	Kyrgyzstan	8 067
X			Latvia	35 810
X			Lithuania	57 479
X	X		Luxembourg	87 566
	X		Madagascar	802
X	X	X	Malaysia	71 084
X			Mongolia	13 279
X	X		Montenegro	29 757
	X	X	Morocco	8 735
X	X		Namibia	10 065
X	X	X	Netherlands	56 221
X	X	X	New Zealand	73 876
X			Nicaragua	7 705
X	X		Norway	64 194
X	X		Oman	28 904
	X	X	Pakistan	4 524
	X		Panama	17 402
		X	Peru	10 853
X	X	X	Poland	57 541
X	X		Portugal	81 784
X			Republic of Moldova	17 933
X	X	X	Russian Federation	30 306
X			Samoa	8 174
X			Serbia	24 549
X	X		Seychelles	17 692
X		X	Singapore	18 595
X			Slovakia	42 829
X	X	X	Slovenia	67 740
X	X	X	South Africa	19 125
X	X	X	Spain	67 465
X	X		St Kitts and Nevis	42 376
X	X		Swaziland	12 901
X	X	X	Sweden	55 776
X	X		Switzerland	7 235
	X		Syrian Arab Republic	10 144

Appendix Table 2 (concluded)

Number of registered vehicles per 100 000 of the population (2010)

Samples[1]			Countries	Number
1	2	3		
X			Tajikistan	5 203
X	X	X	Thailand	41 209
X			The Republic of Macedonia	17 235
X		X	Tunisia	14 207
	X	X	Turkey	20 749
X	X		United Arab Emirates	3 0086
X		X	Uruguay	38 204
X			Venezuela	13 981
		X	Zimbabwe	6 863

Note: 1 "X" indicates membership of the country samples for the three measures of values and norms supporting adherence to road safety legislation.

Source: World Health Organisation (2013: 244-251; 296-303).

Appendix Table 3

Country scores for "Strong supporting conditions"

Samples			Countries	Scores					
1	2	3		Road audits	Vehicle standards	Imports safety features	Road safety strategy	Lead agency	Total
X	X		Albania	1.0	0.0	1.0	1.0	1.0	4.0
X		X	Armenia	1.0	0.0	0.0	1.0	1.0	3.0
X	X		Austria	1.0	1.0	1.0	1.0	1.0	5.0
X		X	Azerbaijan	1.0	0.0	0.0	0.0	1.0	2.0
X	X		Bahrain	1.0	0.0	0.5	1.0	0.5	3.0
X		X	Belarus	1.0	1.0	0.5	1.0	0.5	4.0
X	X		Belgium	0.0	1.0	0.5	1.0	0.5	3.0
X	X		Bosnia & Herzegovina	1.0	0.0	0.5	1.0	1.0	3.5
X			Botswana	0.0	0.0	0.0	1.0	1.0	2.0
X	X		Brunei Darussalam	1.0	1.0	0.5	1.0	1.0	4.5
X	X		Bulgaria	1.0	1.0	0.0	0.5	0.5	3.0
X			Cambodia	1.0	0.0	0.5	1.0	1.0	3.5
X	X	X	Chile	1.0	0.0	0.5	0.0	1.0	2.5
X		X	China	0.5	0.0	0.5	1.0	1.0	3.0
X	X	X	Colombia	1.0	0.0	0.5	1.0	1.0	3.5
	X		Costa Rica	1.0	0.0	1.0	1.0	0.5	3.5
X	X		Croatia	1.0	0.0	0.5	1.0	0.0	2.5
X	X	X	Cyprus	1.0	0.0	0.5	1.0	1.0	3.5
X	X		Czech Republic	1.0	1.0	0.5	1.0	1.0	4.5
X	X		Denmark	1.0	1.0	0.5	0.5	0.0	3.0

Appendix Table 3 (continued)

Country scores for "Strong supporting conditions"

Samples			Countries	Scores					
1	2	3		Road audits	Vehicle standards	Imports safety features	Road safety strategy	Lead agency	Total
X	X	X	Ecuador	1.0	0.0	1.0	1.0	1.0	4.0
X			Equatorial Guinea	1.0	0.0	0.5	1.0	1.0	3.5
X	X	X	Estonia	1.0	1.0	0.5	1.0	1.0	4.5
	X		Ethiopia	1.0	0.0	0.5	1.0	1.0	3.5
X			Fiji	1.0	0.0	0.0	1.0	1.0	3.0
X	X		Finland	1.0	1.0	0.5	1.0	1.0	4.5
X	X		Georgia	1.0	0.0	0.0	1.0	0.5	2.5
	X	X	Ghana	1.0	0.0	0.5	1.0	1.0	3.5
X			Honduras	0.5	1.0	1.0	0.0	0.5	3.0
X	X		Hungary	1.0	1.0	0.5	1.0	0.0	3.5
X	X		Iceland	1.0	0.0	0.5	1.0	1.0	3.5
		X	Iraq	0.5	0.0	0.0	0.5	0.5	1.5
	X		Italy	1.0	0.0	1.0	1.0	1.0	4.0
X	X		Jamaica	0.0	0.0	0.5	1.0	1.0	2.5
X	X	X	Jordan	1.0	0.0	0.5	1.0	1.0	3.5
X		X	Kazakhstan	1.0	0.0	1.0	1.0	1.0	4.0
		X	Kuwait	1.0	0.0	1.0	1.0	1.0	4.0
X		X	Kyrgyzstan	1.0	0.0	0.0	0.0	1.0	2.0
X			Latvia	1.0	1.0	0.5	1.0	0.5	4.0
X			Lithuania	1.0	0.0	0.0	1.0	0.5	2.5

Appendix Table 3 (continued)

Country scores for "Strong supporting conditions"

Samples			Countries	Scores					
1	2	3		Road audits	Vehicle standards	Imports safety features	Road safety strategy	Lead agency	Total
X	X		Luxembourg	1.0	1.0	0.5	1.0	1.0	4.5
	X		Madagascar	1.0	0.0	0.0	1.0	1.0	3.0
X	X	X	Malaysia	1.0	1.0	0.5	1.0	1.0	4.5
X			Mongolia	1.0	0.0	0.0	0.0	1.0	2.0
X	X		Montenegro	1.0	1.0	0.0	1.0	1.0	4.0
	X	X	Morocco	0.5	1.0	0.5	1.0	0.5	3.5
X	X		Namibia	1.0	0.0	0.5	1.0	0.5	3.0
X	X	X	Netherlands	0.5	1.0	1.0	1.0	1.0	4.5
X	X	X	New Zealand	1.0	1.0	1.0	1.0	1.0	5.0
X			Nicaragua	0.0	0.0	0.0	0.0	0.0	0.0
X	X		Norway	1.0	1.0	0.5	1.0	1.0	4.5
X	X		Oman	1.0	0.0	0.5	1.0	1.0	3.5
	X	X	Pakistan	0.5	0.0	0.5	1.0	1.0	3.0
	X		Panama	1.0	0.0	0.5	1.0	1.0	3.5
		X	Peru	0.5	0.0	0.5	1.0	1.0	3.0
X	X	X	Poland	1.0	1.0	0.5	0.5	1.0	4.0
X	X		Portugal	1.0	1.0	0.5	0.5	1.0	4.0
X			Republic of Moldova	1.0	0.0	0.5	0.5	0.0	2.0
X	X	X	Russian Federation	1.0	1.0	0.5	1.0	1.0	4.5
X			Samoa	1.0	1.0	0.5	1.0	1.0	4.5

Appendix Table 3 (continued)

Country scores for "Strong supporting conditions"

Samples			Countries	Scores					
1	2	3		Road audits	Vehicle standards	Imports safety features	Road safety strategy	Lead agency	Total
X			Serbia	0.0	1.0	0.5	1.0	1.0	3.5
X	X		Seychelles	1.0	0.0	0.5	0.0	1.0	2.5
X		X	Singapore	1.0	0.0	0.5	1.0	1.0	3.5
X			Slovakia	1.0	1.0	0.5	1.0	0.0	3.5
X	X	X	Slovenia	0.5	1.0	1.0	1.0	1.0	4.5
X	X	X	South Africa	0.5	1.0	0.5	1.0	1.0	4.0
X	X	X	Spain	1.0	1.0	0.5	1.0	1.0	4.5
X	X		St Kitts and Nevis	1.0	0.0	0.5	0.0	0.0	1.5
X	X		Swaziland	1.0	0.0	1.0	0.0	1.0	3.0
X	X	X	Sweden	1.0	1.0	0.5	1.0	1.0	4.5
X	X		Switzerland	0.0	1.0	0.5	1.0	1.0	3.5
	X		Syrian Arab Republic	1.0	0.0	1.0	1.0	1.0	4.0
X			Tajikistan	1.0	1.0	1.0	1.0	1.0	5.0
X	X	X	Thailand	0.0	1.0	0.5	1.0	1.0	3.5
X			The Republic of Macedonia	1.0	1.0	1.0	1.0	1.0	5.0
X		X	Tunisia	1.0	1.0	0.5	1.0	1.0	4.5
	X	X	Turkey	1.0	1.0	0.5	0.5	0.5	3.5
X	X		United Arab Emirates	1.0	0.0	1.0	1.0	1.0	4.0
X		X	Uruguay	0.5	0.0	0.5	0.5	0.5	2.0
X			Venezuela	0.5	0.0	0.5	1.0	1.0	3.0

Appendix Table 3 (concluded)

Country scores for "Strong supporting conditions"

Samples			Countries	Scores					
1	2	3		Road audits	Vehicle standards	Imports safety features	Road safety strategy	Lead agency	Total
		X	Zimbabwe	1.0	0.0	0.0	0.5	0.5	2.0

Source: World Health Organisation (2013: 288-303).

Appendix Table 4

Country scores for "Comprehensive road safety legislation"

Samples			Countries	Scores							
1	2	3		Point system	Speed limits	Drinking and driving law	Helmet law	Seat-belt law	Child restraint law	Mobile phones law	Total
X	X		Albania	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X		X	Armenia	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
X	X		Austria	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X		X	Azerbaijan	1.0	0.5	1.0	1.0	1.0	0.0	0.5	5.0
X	X		Bahrain	0.0	0.5	1.0	1.0	0.5	0.0	0.5	3.5
X		X	Belarus	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
X	X		Belgium	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
X	X		Bosnia & Herzegovina	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X			Botswana	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5
X	X		Brunei Darussalam	0.0	0.5	1.0	1.0	0.5	1.0	0.5	4.5
X	X		Bulgaria	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X			Cambodia	1.0	1.0	1.0	0.5	0.5	1.0	0.5	5.5
X	X	X	Chile	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
X		X	China	1.0	1.0	1.0	1.0	1.0	0.0	0.5	5.5
X	X	X	Colombia	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
	X		Costa Rica	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Croatia	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X	X	Cyprus	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Czech Republic	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5

Appendix Table 4 (continued)

Country scores for "Comprehensive road safety legislation"

Sample			Countries	Scores							
1	2	3		Point system	Speed limits	Drinking and driving law	Helmet law	Seat-belt law	Child restraint law	Mobile phones law	Total
X	X		Denmark	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X	X	Ecuador	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X			Equatorial Guinea	0.0	1.0	1.0	1.0	1.0	0.0	1.0	5.0
X	X	X	Estonia	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
	X		Ethiopia	1.0	0.5	1.0	1.0	1.0	1.0	1.0	6.5
X			Fiji	1.0	1.0	1.0	0.5	1.0	1.0	1.0	6.5
X	X		Finland	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Georgia	0.0	0.5	1.0	1.0	0.5	1.0	0.5	4.5
	X	X	Ghana	0.0	1.0	1.0	1.0	1.0	1.0	0.0	5.0
X			Honduras	1.0	1.0	1.0	1.0	1.0	0.0	0.5	5.5
X	X		Hungary	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Iceland	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
		X	Iraq	0.0	0.5	1.0	0.5	1.0	0.0	0.5	3.5
	X		Italy	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Jamaica	1.0	1.0	1.0	1.0	1.0	1.0	0.0	6.0
X	X	X	Jordan	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5
X		X	Kazakhstan	0.0	0.5	0.0	1.0	1.0	1.0	0.5	4.0
		X	Kuwait	1.0	0.5	0.5	0.5	0.5	1.0	0.5	4.5
X		X	Kyrgyzstan	0.0	0.5	0.5	1.0	1.0	1.0	0.5	4.5

Appendix Table 4 (continued)

Country scores for "Comprehensive road safety legislation"

Sample			Countries	Scores							
1	2	3		Point system	Speed limits	Drinking and driving law	Helmet law	Seat-belt law	Child restraint law	Mobile phones law	Total
X			Latvia	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X			Lithuania	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
X	X		Luxembourg	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
	X		Madagascar	0.0	1.0	1.0	1.0	0.5	0.0	0.5	4.0
X	X	X	Malaysia	1.0	1.0	1.0	1.0	1.0	0.0	0.5	5.5
X			Mongolia	1.0	0.5	1.0	1.0	1.0	1.0	0.5	6.0
X	X		Montenegro	1.0	1.0	1.0	1.0	1.0	0.0	1.0	6.0
	X	X	Morocco	1.0	0.5	1.0	1.0	1.0	0.0	0.5	5.0
X	X		Namibia	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
X	X	X	Netherlands	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X	X	New Zealand	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X			Nicaragua	0.0	1.0	1.0	1.0	0.5	1.0	0.5	5.0
X	X		Norway	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Oman	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5
	X	X	Pakistan	0.0	0.5	0.5	1.0	0.5	0.0	0.5	3.0
	X		Panama	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
		X	Peru	1.0	0.5	1.0	1.0	1.0	0.0	0.5	5.0
X	X	X	Poland	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		Portugal	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5

Appendix Table 4 (continued)

Country scores for "Comprehensive road safety legislation"

Samples			Countries	Scores							
1	2	3		Point system	Speed limits	Drinking and driving law	Helmet law	Seat-belt law	Child restraint law	Mobile phones law	Total
X			Republic of Moldova	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X	X	Russian Federation	0.0	0.5	1.0	1.0	1.0	1.0	0.5	5.0
X			Samoa	1.0	1.0	1.0	1.0	0.5	1.0	1.0	6.5
X			Serbia	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7.0
X	X		Seychelles	0.0	1.0	1.0	1.0	0.5	0.0	0.0	3.5
X		X	Singapore	1.0	0.5	1.0	1.0	1.0	1.0	0.5	6.0
X			Slovakia	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
X	X	X	Slovenia	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X	X	South Africa	1.0	0.5	1.0	1.0	1.0	1.0	0.5	6.0
X	X	X	Spain	1.0	1.0	1.0	1.0	1.0	1.0	0.5	6.5
X	X		St Kitts and Nevis	0.0	1.0	1.0	1.0	0.5	1.0	0.5	5.0
X	X		Swaziland	0.0	0.5	1.0	1.0	1.0	0.0	0.5	4.0
X	X	X	Sweden	0.0	1.0	1.0	1.0	1.0	1.0	0.0	5.0
X	X		Switzerland	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
	X		Syrian Arab Republic	1.0	0.5	1.0	0.5	0.5	0.0	1.0	4.5
X			Tajikistan	1.0	0.5	1.0	1.0	1.0	1.0	0.5	6.0
X	X	X	Thailand	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5
X			The Republic of Macedonia	1.0	0.5	1.0	1.0	1.0	0.0	0.5	5.0
X		X	Tunisia	1.0	1.0	1.0	1.0	0.5	0.0	0.5	5.0

Appendix Table 4 (concluded)

Country scores for "Comprehensive road safety legislation"

Sample			Countries	Scores							
1	2	3		Point system	Speed limits	Drinking and driving law	Helmet law	Seat-belt law	Child restraint law	Mobile phones law	Total
	X	X	Turkey	1.0	1.0	1.0	1.0	1.0	1.0	1.0	7.0
X	X		United Arab Emirates	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5
X		X	Uruguay	0.0	1.0	1.0	1.0	1.0	1.0	0.0	5.0
X			Venezuela	0.0	1.0	1.0	1.0	1.0	1.0	0.5	5.5
		X	Zimbabwe	1.0	0.5	1.0	1.0	0.5	0.0	0.5	4.5

Source: World Health Organisation (2013: 256-287, 296-303).

Appendix Table 5

Country scores for "effective law enforcement"

Samples			Countries	Scores				
1	2	3		Speeding laws	Drinking and driving laws	Helmet laws	Seatbelt laws	Total
X	X		Albania	7	6	6	7	26
X		X	Armenia	5	6	1	7	19
X	X		Austria	7	9	8	6	30
X		X	Azerbaijan	8	7	5	5	25
X	X		Bahrain	5	4	7	3	19
X		X	Belarus	7	8	9	7	31
X	X		Belgium	6	5	8	5	24
X	X		Bosnia & Herzegovina	6	6	5	5	22
X			Botswana	8	7	10	8	33
X	X		Brunei Darussalam	6	9	10	6	31
X	X		Bulgaria	7	7	4	7	25
X			Cambodia	7	3	6	5	21
X	X	X	Chile	4	5	9	4	22
X		X	China	4	9	2	2	17
X	X	X	Colombia	3	4	6	5	18
	X		Costa Rica	8	8	8	7	31
X	X		Croatia	7	8	8	8	31
X	X	X	Cyprus	7	8	6	7	28
X	X		Czech Republic	7	5	8	8	28

Appendix Table 5 (continued)

Country scores for "effective law enforcement"

Samples			Countries	Scores				
1	2	3		Speeding laws	Drinking and driving laws	Helmet laws	Seatbelt laws	Total
X	X		Denmark	5	5	5	2	17
X	X	X	Ecuador	3	8	7	6	24
X			Equatorial Guinea	4	3	7	3	17
X	X	X	Estonia	8	8	9	8	33
	X		Ethiopia	5	3	6	9	23
X			Fiji	3	6	7	3	19
X	X		Finland	9	9	9	8	35
X	X		Georgia	8	8	6	9	31
	X	X	Ghana	4	3	4	3	14
X			Honduras	5	8	9	7	29
X	X		Hungary	7	8	8	7	30
X	X		Iceland	7	8	10	8	33
		X	Iraq	6	8	4	8	26
	X		Italy	7	7	7	6	27
X	X		Jamaica	6	3	1	5	15
X	X	X	Jordan	8	5	5	6	24
X		X	Kazakhstan	7	7	7	6	27
		X	Kuwait	2	7	2	1	12
X		X	Kyrgyzstan	3	3	3	8	17

Appendix Table 5 (continued)

Country scores for "effective law enforcement"

Samples			Countries	Scores				
1	2	3		Speeding laws	Drinking and driving laws	Helmet laws	Seatbelt laws	Total
X			Latvia	7	8	7	7	29
X			Lithuania	7	8	8	7	30
X	X		Luxembourg	6	4	9	8	27
	X		Madagascar	3	3	3	3	12
X	X	X	Malaysia	5	4	5	4	18
X			Mongolia	3	5	2	6	16
X	X		Montenegro	5	7	6	3	21
	X	X	Morocco	7	6	6	8	27
X	X		Namibia	5	5	5	6	21
X	X	X	Netherlands	7	7	7	7	28
X	X	X	New Zealand	8	7	9	9	33
X			Nicaragua	3	1	6	6	16
X	X		Norway	7	7	8	8	30
X	X		Oman	5	7	9	9	30
	X	X	Pakistan	3	3	2	3	11
	X		Panama	8	8	9	8	33
		X	Peru	3	5	2	7	17
X	X	X	Poland	5	8	9	6	28
X	X		Portugal	8	8	9	8	33

Appendix Table 5 (continued)

Country scores for "effective law enforcement"

Sample			Countries	Scores				
1	2	3		Speeding laws	Drinking and driving laws	Helmet laws	Seatbelt laws	Total
X			Republic of Moldova	6	6	5	6	23
X	X	X	Russian Federation	6	7	5	6	24
X			Samoa	7	9	8	10	34
X			Serbia	5	5	5	2	17
X	X		Seychelles	3	5	8	4	20
X		X	Singapore	7	9	9	8	33
X			Slovakia	6	5	7	4	22
X	X	X	Slovenia	6	7	7	7	27
X	X	X	South Africa	3	2	6	1	12
X	X	X	Spain	7	6	9	7	29
X	X		St Kitts and Nevis	6	3	6	7	22
X	X		Swaziland	3	6	7	7	23
X	X	X	Sweden	6	5	7	7	25
X	X		Switzerland	7	6	8	7	28
	X		Syrian Arab Republic	8	8	6	9	31
X			Tajikistan	8	9	7	4	28
X	X	X	Thailand	3	5	6	6	20
X			The Republic of Macedonia	7	8	7	8	30
X		X	Tunisia	4	3	6	6	19

Appendix Table 5 (concluded)

Country scores for "effective law enforcement"

Sample			Countries	Scores				
1	2	3		Speeding laws	Drinking and driving laws	Helmet laws	Seatbelt laws	Total
	X	X	Turkey	8	8	8	8	32
X	X		United Arab Emirates	9	8	8	8	33
X		X	Uruguay	3	7	5	5	20
X			Venezuela	3	5	1	2	11
		X	Zimbabwe	7	1	8	4	20

Source: World Health Organisation (2013:).

Appendix Table 6

Country scores for three measures of "Strong adherence-supporting norms"

Countries	Differences between actual and predicted values:		Percentages of World Values Survey respondents answering in the affirmative: It is never justifiable to:			
	Percent of road deaths attributable to alcohol (Norm 1)	Percent of drivers wearing seatbelts (Norm 2)	Steal property	Avoid public transport fares	Cheat on taxes	Average (Norm 3)
Albania	0.102	-1.474	—	—	—	—
Armenia	1.719	—	76.0	85.7	68.7	76.8
Austria	0.744	18.476	—	—	—	—
Azerbaijan	-1.835	—	85.1	92.8	84.4	87.4
Bahrain	3.666	-21.473	—	—	—	—
Belarus	-0.808	—	27.9	69.5	43.9	47.1
Belgium	1.287	25.027	—	—	—	—
Bosnia & Herzegovina	1.958	-40.574	—	—	—	—
Botswana	1.249	—	—	—	—	—
Brunei Darussalam	0.528	3.476	—	—	—	—
Bulgaria	1.841	3.526	—	—	—	—
Cambodia	1.646	—	—	—	—	—
Chile	1.098	-0.623	51.1	78.5	68.4	66.0
China	0.525	—	36.2	56.7	43.4	45.4
Colombia	1.047	-3.574	44.2	80.4	72.9	65.8
Costa Rica	—	5.526	—	—	—	—
Croatia	-1.468	-21.424	—	—	—	—
Cyprus	-1.608	9.426	68.5	85.7	73.4	75.9

Appendix Table 6 (continued)

Country scores for three measures of "Strong adherence-supporting norms"

Countries	Differences between actual and predicted values:		Percentages of World Values Survey respondents answering in the affirmative: It is never justifiable to:			
	Percent of road deaths attributable to alcohol (Norm 1)	Percent of drivers wearing seatbelts (Norm 2)	Steal property	Avoid public transport fares	Cheat on taxes	Average (Norm 3)
Czech Republic	2.278	-4.424	—	—	—	—
Denmark	2.372	55.277	—	—	—	—
Ecuador	0.603	-5.524	50.7	69.9	62.3	61.0
Equatorial Guinea	-2.442	—	—	—	—	—
Estonia	0.708	9.576	42.4	84.9	55.3	60.9
Ethiopia	—	3.625	—	—	—	—
Fiji	2.391	—	—	—	—	—
Finland	-0.058	7.576	—	—	—	—
Georgia	-4.361	2.625	—	—	—	—
Ghana	—	-27.073	64.5	77.3	69.1	70.3
Honduras	0.931	—	—	—	—	—
Hungary	0.928	2.726	—	—	—	—
Iceland	1.123	5.576	—	—	—	—
Iraq	—	—	43.6	67.1	31.8	47.5
Italy	—	-5.224	—	—	—	—
Jamaica	4.166	-9.973	—	—	—	—
Jordan	3.312	-8.524	76.8	85.0	75.9	79.2

Appendix Table 6 (continued)

Country scores for three measures of "Strong adherence-supporting norms"

Countries	Differences between actual and predicted values:		Percentages of World Values Survey respondents answering in the affirmative: It is never justifiable to:			
	Percent of road deaths attributable to alcohol (Norm 1)	Percent of drivers wearing seatbelts (Norm 2)	Steal property	Avoid public transport fares	Cheat on taxes	Average (Norm 3)
Kazakhstan	1.722	—	38.1	71.8	54.4	54.8
Kuwait	—	—	53.7	66.5	50.3	56.8
Kyrgyzstan	-6.930	—	44.2	66.9	53.6	54.9
Latvia	0.592	—	—	—	—	—
Lithuania	-0.648	—	—	—	—	—
Luxembourg	1.681	-3.424	—	—	—	—
Madagascar	—	20.327	—	—	—	—
Malaysia	-1.970	33.077	52.1	59.7	53.5	55.1
Mongolia	-1.743	—	—	—	—	—
Montenegro	-2.274	11.327	—	—	—	—
Morocco	—	-33.424	72.2	81.5	71.3	75.0
Namibia	-4.188	-15.974	—	—	—	—
Netherlands	1.446	20.426	62.6	88.2	62.3	71.0
New Zealand	-0.686	3.625	57.1	81.8	63.9	67.6
Nicaragua	4.168	—	—	—	—	—
Norway	1.581	9.576	—	—	—	—
Oman	2.044	2.625	—	—	—	—

Appendix Table 6 (continued)

Country scores for three measures of "Strong adherence-supporting norms"

Countries	Differences between actual and predicted values:		Percentages of World Values Survey respondents answering in the affirmative: It is never justifiable to:			
	Percent of road deaths attributable to alcohol (Norm 1)	Percent of drivers wearing seatbelts (Norm 2)	Steal property	Avoid public transport fares	Cheat on taxes	Average (Norm 3)
Pakistan	—	-40.673	63.2	64.7	66.1	64.7
Panama	—	5.576	—	—	—	—
Peru	—	—	34.2	68.7	55.9	52.9
Poland	0.574	17.076	55.5	75.2	52.9	61.2
Portugal	-1.975	5.176	—	—	—	—
Republic of Moldova	1.574	—	—	—	—	—
Russian Federation	0.775	8.476	28.4	69.9	41.0	46.4
Samoa	-0.500	—	—	—	—	—
Serbia	2.855	—	—	—	—	—
Seychelles	-4.188	-27.623	—	—	—	—
Singapore	0.579	—	39.3	54.5	51.3	48.4
Slovakia	2.607	—	—	—	—	—
Slovenia	-0.366	15.126	52.7	78.3	70.3	67.1
South Africa	-12.604	29.828	31.0	36.7	34.7	34.1
Spain	1.095	12.126	57.7	74.5	67.6	66.6
St Kitts and Nevis	4.381	18.526	—	—	—	—
Swaziland	0.663	-16.474	—	—	—	—

Appendix Table 6 (concluded)

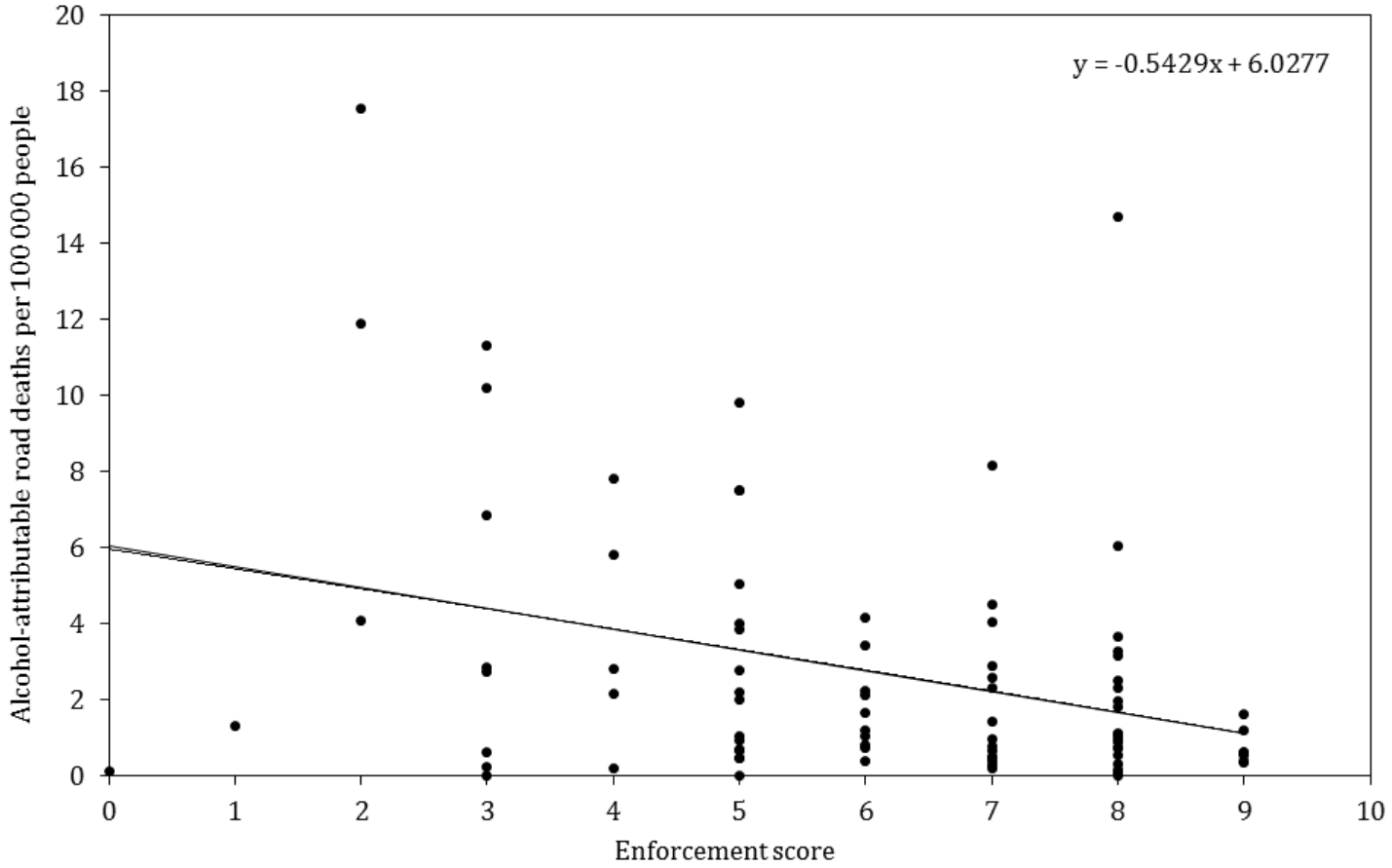
Country scores for three measures of "Strong adherence-supporting norms"

Countries	Differences between actual and predicted values:		Percentages of World Values Survey respondents answering in the affirmative: It is never justifiable to:			
	Percent of road deaths attributable to alcohol (Norm 1)	Percent of drivers wearing seatbelts (Norm 2)	Steal property	Avoid public transport fares	Cheat on taxes	Average (Norm 3)
Sweden	2.652	19.526	45.9	68.1	59.9	58.0
Switzerland	2.038	12.526	—	—	—	—
Syrian Arab Republic	—	-2.375	—	—	—	—
Tajikistan	0.796	—	—	—	—	—
Thailand	-6.518	-7.524	57.9	68.1	70.0	65.3
The Republic of Macedonia	1.604	—	—	—	—	—
Tunisia	3.759	—	55.4	91.9	61.1	69.5
Turkey	—	-34.424	72.8	88.4	86.0	82.4
United Arab Emirates	1.518	-3.424	—	—	—	—
Uruguay	-5.944	—	67.4	83.9	76.5	75.9
Venezuela	0.522	—	—	—	—	—
Zimbabwe	—	—	52.1	63.0	52.9	56.0

Sources: Own calculations; World Health Organisation (2013: 260-267; 276-283); World Values Survey Association (2014: 266-268).

Appendix Figure 1

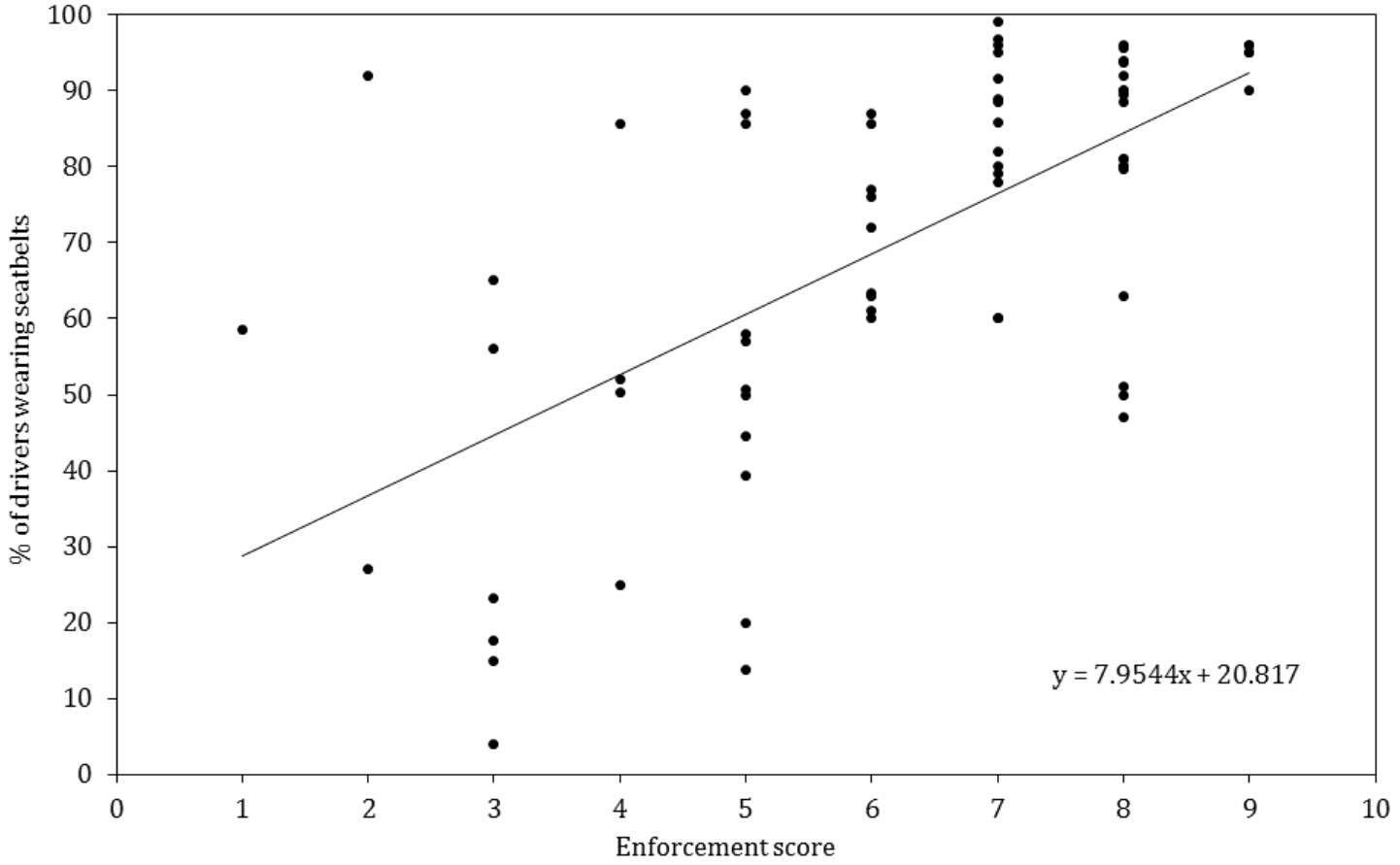
Scatterplot for prediction percentages of road deaths attributable to alcohol



Source: Own calculations using data in World Health Organisation (2013: 260-267).

Appendix Figure 2

Scatterplot for prediction percentages of drivers wearing seatbelts



Source: Own calculations using data in World Health Organisation (2013: 276-283).

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