Annex C

SCHEMATIC REPRESENTATION OF THE EFFECTS OF SMEED RELATIONSHIP ROTATION

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Chapter 3 discussed the Smeed relationship with respect to developing and developed countries. The Smeed relationship relates vehicle ownership rates to the annual number of fatalities per licensed vehicle, and takes the form:

$$\log \frac{F}{V} = i + g \log \frac{V}{P}$$

Where F = fatalities per annum
V = number of licensed vehicles
P = population
I = constant (y-axis intercept)
g = gradient

In the context of this discussion it was shown that for developing countries the Smeed relationship is rotating about the y-axis intercept over time. It was argued that this implies a degradation of the road safety situation for these countries. The logic behind this argument is outlined below:

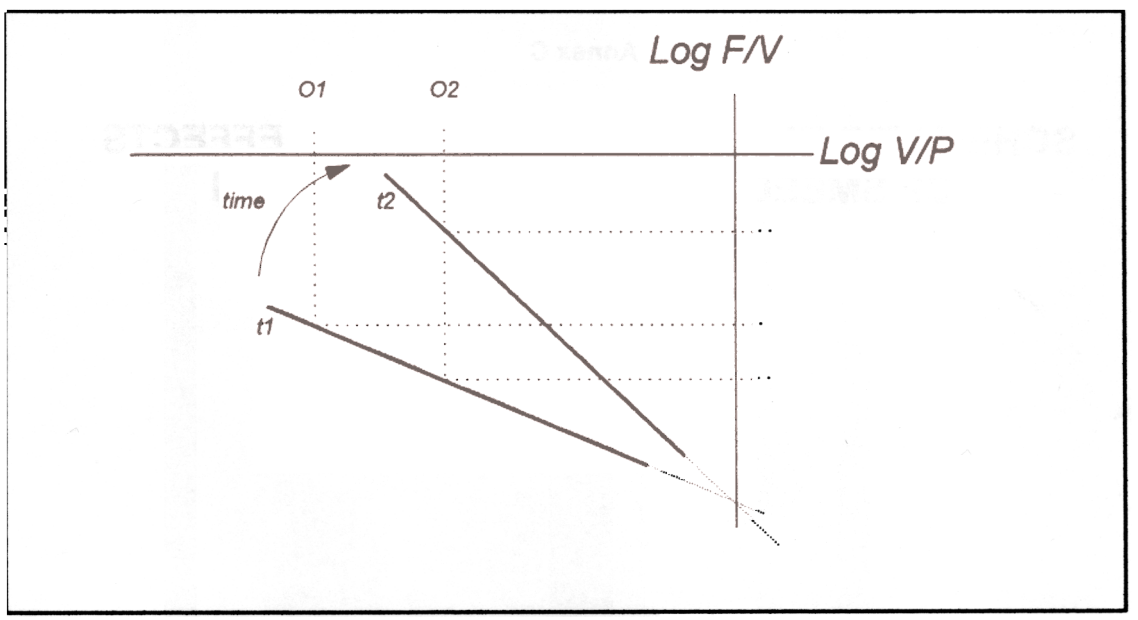

Figure A.C.1: Graphical Representation of the Effects of Smeed Relationship Rotation (Schematic)

Figure A.C.1 represents the rotation of the Smeed relationship between time **t1** and a later time **t2**. At **t1**, one particular country has a vehicle ownership rate **O1**, and an associated fatality rate of **b**. At **t2**, the country has an increased vehicle ownership rate of **O2**. With a stable Smeed relationship, we would therefore expect to see a decrease in fatality rate, from **b** to **c**. Due to the rotation, however, the country actually experiences an increase from **b** to **a** in fatality rate. The road safety situation has therefore deteriorated.

This relationship can be expressed as a straight line as follows:

$$\log\frac{F}{V} = -3.52 - 0.63 \log\frac{V}{P}$$