



Measures of Noise Externalities

Urban noise is a persistent and growing problem for millions of people. Measures are taken to reduce noise, but these impose costs on society. The open question is whether the benefits of noise reduction strategies justify their costs. Day, Bateman and Lake (2007) use the Hedonic Price method to estimate the benefits of reducing urban noise levels in Birmingham, UK. This research was used to inform the UK Department for Transport's assessment methods for transport system investments. Data was collected on 10,848 house sales during 1997 and on the site attributes of each house sold (e.g. total floor area). Using GIS, variables were constructed measuring walking time to different amenities and dis-amenities (e.g. landfill sites), and local school quality. Digital noise maps were then used to summarize each property's exposure to road, railway and aircraft noise. Further neighbourhood variables were assembled measuring household wealth, ethnic minorities, age and number of households with children.

Eight different market segments were identified in the data, based on income, property size, ethnicity of district and number of children. For each of these segments, a separate hedonic price model was estimated. Road noise was found to significantly affect house prices in around half of all segments, although aircraft noise only had a significant effect in 2 out of 8 segments. They are then able to generate the following results for 1 decibel increases in road and rail noise above a baseline of 56 decibels:

Change in road noise	Annual benefits, £1997; rounded mean value and (95% confidence interval)
From 55 to 56 dB	31 (24-52)
From 60 to 61dB	43 (33-75)
From 65 to 66dB	55 (41-99)
From 70 to 71dB	67 (49-123)

Change in rail noise	Annual benefits, £1997; rounded mean value and (95% confidence interval)
From 55 to 56 dB	83 (43-461)
From 60 to 61dB	94 (49-519)
From 65 to 66dB	106 (55-580)
From 70 to 71dB	117 (61-654)

Notice that the costs of increases in railway noise are higher than those of equivalent increases in road noise. Also, the economic costs of a 1dB increase are higher the greater is the baseline from which this increase occurs. This paper is an excellent illustration of how complex hedonic price modelling can be.