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Notes and comments

### The economic valuation of train horn noise: A US case study

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### Abstract

This paper provides a property value-based estimate of the dollar cost of train horn noise in a residential neighborhood in a small town, Wormleysburg, Pennsylvania, US. Residential property values are found to decrease by about \$4800, or 4.1%, per 10db of added noise exposure, for an aggregate total of \$4,088,799 in 2004 dollars. The primary study was supplemented with information from a neighborhood survey. Dollar value estimates of train horn costs could prove useful in facilitating balanced benefit-cost analyses of horn noise abatement policies such as quiet zones, wayside horns, underpasses, or street closures.

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### Introduction

The elimination of train horn noise is the primary benefit to be derived from the establishment of quiet zones for railroads. While the long period of experimentation with quiet zones led to a great deal of information about their effects on safety (Federal Railroad Administration, 1995, Federal Railroad Administration, 2000, Zador, 2003), the benefits of the elimination of train horn noise have received very little attention beyond studies of residents' annoyance levels (Gent et al., 1998). Therefore this

paper may begin to fill a need in the analysis of train horn noise and quiet zone policy decisions.

This paper is derived from a more general benefit-cost analysis of a proposed highway-rail underpass in a residential neighborhood in Wormleysburg, Pennsylvania, a small town directly across the Susquehanna River from Harrisburg. Wormleysburg is divided into a narrow 100 year flood plain near the river and a more elevated section to the west, and into northern and southern sections by a local limited access highway. The rail tracks are somewhat elevated relative to the riverfront neighborhood but are well below the crest of the bluff that leads to the western side of the town. Based on a survey of Wormleysburg residents, the riverfront area is highly impacted by train horn and other noise, while most of the higher elevation area is not.

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## Section snippets

### Resident survey

While the primary estimate of the dollar cost of train horns is based on an analysis of property values presented later, the study also benefits from the findings of a survey distributed to Wormleysburg residents in the summer of 2005. This survey asked about perceived loudness and annoyance levels from train horns and train movement, the impact of horn noise on daily activities such as sleep and outdoor activity, and a hypothetical question regarding residents' willingness to pay to eliminate...

### Train horn noise and property values

One approach to providing a dollar estimate for the cost of noise uses regression analysis to estimate the one time increase in property value due to the elimination of a noise source. This study utilizes a set of 192 residential properties in Wormleysburg sold between 1980 and 2004. Sales prices were adjusted for housing price inflation using the housing price index for the Harrisburg metropolitan area. In addition to the property's estimated exposure to horn noise, other variables such as lot ...

## Conclusions

Access to a dollar valuation of the cost of train horn noise will allow a more balanced analysis of the net benefits of quiet zones, stationary horns, underpasses, or other horn noise reduction methods. This paper attempts to provide such an estimate using a property value or revealed preference method, supplemented by a resident survey. According to these estimates, the property value effect of

train horns averaged approximately \$4800 per 10db of added noise exposure, or 4.1% of the sales...

## Acknowledgements

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