

# The wider costs of large roads on health and wellbeing

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## 1 COMMUNITY SEVERANCE (BARRIER EFFECT)



- Road infrastructure and high motorised traffic levels and speeds reduce mobility of pedestrians
- Lack of methods to identify, measure, and monetize severance

## 2 A NEW METHOD TO MONETIZE SEVERANCE

### A. Direct effects (on pedestrians)

delay, collision risk, inconvenience of crossing the road

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### B. Wider effects (on travel behaviour)

- Do not travel → increased risk of social exclusion
- Do not walk → less physical activity
- Travel by car → external effects of motorised traffic

→ 4

## 3 DIRECT EFFECTS

### A. Stated preference survey

Traffic density: Low

Central reservation with no guard railing

In this scenario, which of the two options would you choose?

Option A	Option B
Cross at this point Saving 80p off your one-way ticket cost	Do not cross the road and pay the higher ticket cost

Option A      Option B

Each participant answers 8 questions, with different number of road lanes, median strip (Y/N), traffic levels, traffic speeds, and value of cost saving

### B. Random-effects logit model

Dep. var: probability of crossing the road vs. not crossing

Omitted categories: 2 lanes, medium strip, low density, speed<30

● Positive  
● Negative

	coeff.	→ Trade-off value with saving (£)
Constant	●	
Saving	●	
Lanes=3	●	1.63
No medium strip	●	1.47
Density=medium	●	1.10
Density=high	●	2.45
Speed=30mph	●	0.50

Ex: On average, people are willing to forego a saving of £2.45 in order to avoid crossing a road with high traffic density (one time)

## 4 WIDER EFFECTS

### A. Household survey

How do you usually travel to the following places?

	Walk	Cycle	Bus	Train, tram, tube	Car	Other	I don't go there
A local corner shop/newsagent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A supermarket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A park (or playing field)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A community centre or leisure centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A GP or health centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chemist or pharmacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A pub, restaurant or café	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

AND rate the amount of traffic on the busiest road near you

### B. Multinomial logit model

Dep. vars: probability of travelling by a given mode vs. not travelling

Omitted categories: shop, low traffic volume, not walking distance, etc.

Coefficients:

● Positive  
● Negative

Insignificant not shown

	Walk	Car	Public tr.
supermarket		●	
park	●	●	●
community centre	●	●	●
health	●	●	●
pharmacy	●	●	●
café	●	●	●
within walking distance	●		
age>65			●
lives alone	●	●	●
social housing		●	●
1 car	●	●	
2+ cars	●	●	●
full time work		●	
qualification: degree		●	
qualifications: none	●	●	
bad health	●		
mobility restriction	●		●
traffic density: medium	●	●	●
traffic density: high	●	●	●
constant	●		●

### C. Effect of high traffic levels on probability of each choice (vs. low traffic levels)

Place	Walk	Car	Other	Don't Travel
shop	-2.2%	1.4%	0.1%	0.6%
supermarket	-5.2%	4.8%	-0.2%	0.7%
park	-8.7%	1.5%	-1.1%	8.2%
community centre	-10.8%	0.6%	-1.7%	11.9%
health	-5.5%	3.5%	-0.2%	2.2%
pharmacy	-4.6%	2.8%	0.0%	1.8%
café	-7.0%	8.4%	-2.3%	0.8%

### D. Effect on number of trips (per year per person)

National travel survey (England) (avg. number of trips/ year/person)

	Walk	Car	Other
	-25	+15	+12
	*	*	*

### E. Costs

	Average health benefits of walking (applying WHO's HEAT tool, UK data)	External costs of car travel in the UK (noise, air pollution, etc.) (CE Delft et al 2011)	Trade-off between trips and income for someone at risk of social exclusion (Stanley et al 2012). (assuming unemployed are at risk)
	=	=	=
	£38.00	£1.98	£11.59

Ex: The health costs of the reduction of walking trips cause by high traffic densities (comparing with low densities) are £38/year/person

## 5 CONCLUSIONS

- People attach a monetary value to avoid crossing a busy road. That value is an indicator of the disutility caused by motorised traffic on pedestrians
- High traffic densities decrease the probability of walking and increase the probability of using car or not travelling. The monetary values of the resulting changes in the number of walking, car, and total trips are indicators of the impact of traffic on health, external effects, and social exclusion