

## What Have We Learned from Longitudinal Methods So Far?

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## Aggregate Elasticity - Fuel

Elasticities wrt Fuel Price per Litre  
Literature Review

	short term	long term
fuel consumption	-0.25	-0.60
traffic volume	-0.10	-0.30

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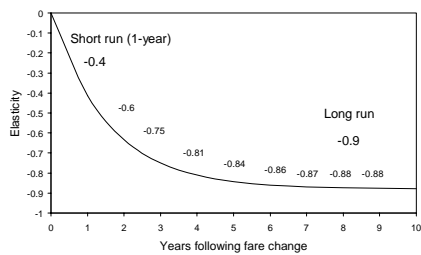
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## Aggregate Elasticity - Fares

Dynamic Bus Fare Elasticity



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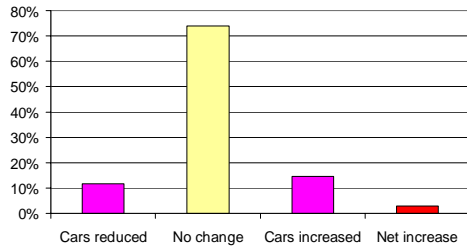
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Trends show the *net* effect of a churn:  
but individuals change in *either* direction

Proportion of people in households whose  
car ownership increased or reduced



Source – 1988 and 1991 South Yorkshire Panel surveys

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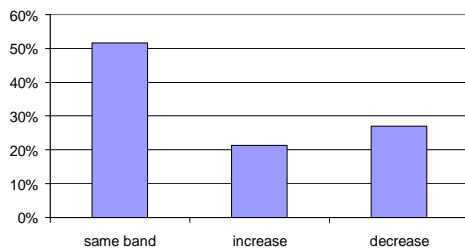
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Trip rates also can increase or reduce

% of people in groups with similar  
numbers of trips per person



Source – London Panel Survey Spring and Autumn 1976

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All the time, people are changing  
the method of transport they use

Main Commuting Mode, % of commuters

	rail	tube	bus	m/cyc	car driver	car pass.	cycle	walk
ave. yr	3.3	1.4	6.2	1.5	66.9	7.4	3.3	9.7
at least n years								
1	7.8	3.9	16.5	4.7	83.1	25.0	9.4	22.1
2	5.6	2.6	11.5	3.1	79.3	13.9	6.2	16.4
3	4.9	1.9	8.4	2.2	76.3	9.4	3.9	12.9
4	3.4	1.6	6.7	1.5	73.4	7.2	3.4	10.6
5	2.9	1.2	5.4	0.9	70.8	5.3	2.8	8.5
6	2.5	0.9	4.4	0.7	67.8	4.5	2.3	7.4
7	2.0	0.6	3.6	0.7	63.9	3.5	1.7	6.5
8	1.6	0.4	2.7	0.5	58.7	2.6	1.3	5.6
9	1.2	0.4	1.8	0.4	53.4	1.9	1.2	4.3
10	1.1	0.2	1.4	0.2	42.4	0.9	0.9	2.4

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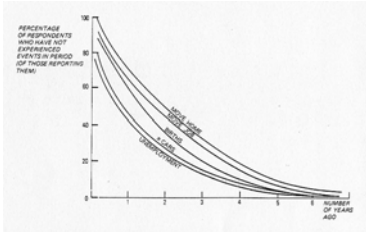
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## How fast does behaviour change?

The early research:  
Frequency of life events enabling choice




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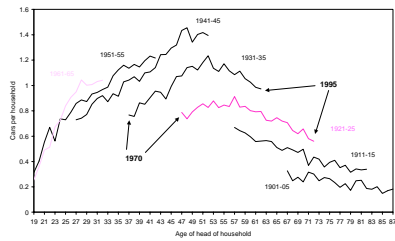
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## Even relationships change (eg between car ownership and age)

Household Car Ownership by Cohort




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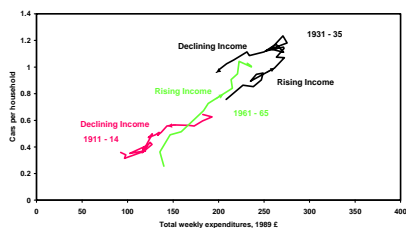
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## And between car ownership and income

Relationship between  
Car Ownership & Income




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## Conclusions - Empirical

- Long term effects different from short term effects (and usually larger)
- The incidence of behaviour change at the individual level is greater than aggregate
- Response time scales in the order of 2-5 years (sometimes 10), probably associated with life-events
- Dynamic change does not 'track' along cross-section relationships

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## Conclusions – Forecasting & Appraisal

- Cross-section data are not usually in equilibrium at the point when they are collected
- Therefore equilibrium models are mis-specified
- There is a definite character to the biases which result – depending on history and pathway

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What Have We Learned from Longitudinal Methods So Far?

They make a difference

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