

ULTrA: Unified Land-use/Transport Appraisal



Objective

Conventional economic analysis of the benefits arising from transport investment assumes that land-use effects arising in response to transport change modify the form but not the level of benefits. Such analysis cannot be used to measure the benefits arising from changes in land-use policy which may be adopted in conjunction with transport investment, and therefore cannot assess the benefits of “integrated land-use/transport planning” over and above transport planning alone. “Dependent development”, as a particular category of land-use policy change related to transport plans, can be assessed by considering the associated uplift in land value, but it is recognized that this is a partial measure and only appropriate for relatively small developments that do not affect the wider market.

DSC have been working with TfL for a number of years to develop an alternative method of appraisal which can explicitly consider the consequences of land-uses responding to transport change and of changes in land-use policies. This method, now known as ULTrA (for Unified Land-use/Transport Appraisal), also seeks to give a clearer picture than conventional transport appraisal of the forms that benefits will take, to whom they will accrue and (where appropriate) where they will accrue.

Approach

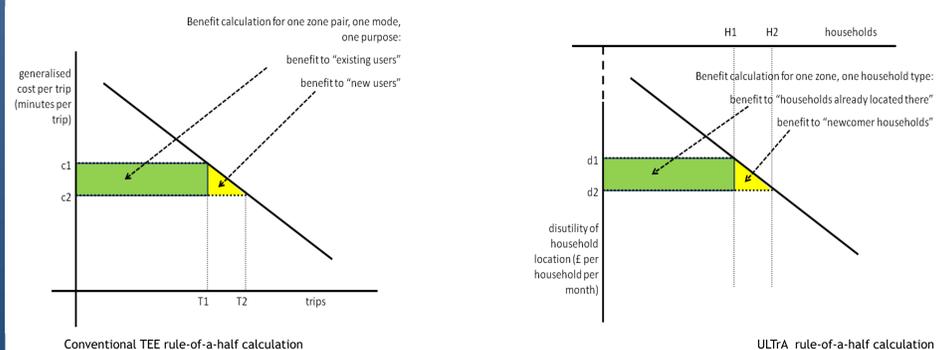
The approach is one of seeking to measure the gross benefits of each kind to each of five categories of actors or agents:

- households
- firms
- property owners and developers
- government (all levels)
- other.

The first three categories are all identified by zone (and potentially in more detail e.g. type of household). All households and firms are treated as renting property, the rents going to the property owners and developers. The “other” category captures benefits which cannot be clearly attributed to any particular group or location e.g. those of reducing greenhouse gas emissions and (arguably) of regeneration or rebalancing.

Method

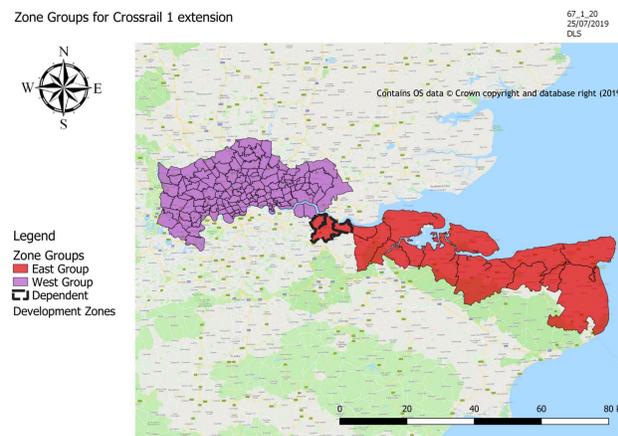
The core of the method (outlined in a 2012 ETC paper) is to measure changes in consumer surplus using conventional rule-of-a-half calculations, as in standard transport appraisal, but here based on the “disutility” of living in any particular zone as the “price” variable and the number of households of each living in that zone as the “quantity” variable.



This calculation is done for each household type, for each zone, for each year. Equivalent calculations are carried out for producers and property-owners/developers. Transfers between each category and the government sector are calculated.

Demonstration

For the purposes of demonstrating ULTrA we have used the LonLUTI model to test the impacts of a very simple representation of extending Crossrail (currently being completed) to Ebbsfleet, and allowing substantial additional housing (approx. 50,000 dwellings) in the zones served by the extension.



The results from the transport test, the development test and a test combining both elements are shown below. Note that the tables do not include the cost of the transport investment; the costs of the housing development are included as costs to the property owning and development sector.

CZE Demo Tests	Transport Demo (L-K-JH)		Dep Devt Demo (L-L-JH)		Transport+DD Demo (L-M-JH)	
	Total	Independent Development Zones	Total	Independent Development Zones	Total	Independent Development Zones
Households	2,701	789	608	-292	3,472	709
CS: Accessibility						
CS: Car ownership costs	7	0	-139	48	-118	49
CS: Income	633	78	2,304	-2,640	3,230	-2,613
CS: Leisure time	-47	-14	-494	659	-594	658
CS: Housing quality	2	0	1,016	931	1,024	938
CS: Household consumption	-67	-95	3,399	1,031	3,235	943
CS: Commuting cost	118	22	-552	417	-676	456
Households total	3,347	780	6,143	153	9,572	1,139
Firms	403	41	28	1	421	43
PS: Accessibility						
PS: Costs	-138	-53	-4	-35	-133	-93
PS: Production	1,166	1,104	167	364	1,425	1,521
Corporation tax savings	-299	-229	-40	-69	-358	-308
Firms total	1,132	863	151	261	1,354	1,163
Developers	6	0	-2,578	-2,958	-2,581	-2,958
Rental income	511	372	-3,322	5,977	-2,752	6,435
Property owners' tax savings	-8	-21	62	-725	49	-752
Developers total	509	352	-5,838	2,294	-5,284	2,725
Public sector	459	171	171	594	594	594
Income tax revenue						
VAT revenues	88	27	27	110	110	110
Unemployment benefit savings	121	17	17	130	130	130
Council tax revenues	10	-334	-334	-318	-318	-318
Business rates revenues	41	2	2	43	43	43
Tax on profit	299	40	40	358	358	358
Property owners' tax revenues	0	-62	-62	-49	-49	-49
Development revenues	0	0	0	0	0	0
Public sector total	1,025	-139	-139	869	869	869
Present value of benefits (PVB)	6,012		317		6,511	

A number of points can be drawn from the appraisal, notably that

- the return to the public sector would make a significant contribution to recovering the cost of the transport investment;
- the housing development would be highly beneficial to its developers and to households as occupiers, but not to property owners elsewhere (owner-occupiers will of course be in both categories);
- the value of benefits from the housing development and the transport development combined is greater than the sum of the benefits if they were carried out separately, i.e. there is some synergy between the two elements. These could certainly be improved by refinement of the transport and planning components.

Conclusions

The approach provides, for the first time, a method of appraising the benefits of transport schemes taking explicit account of land-use impacts, and of appraising the benefits of integrated transport and land-use planning proposals. The method has so far been applied only to London and only using one particular land-use/transport interaction model, but should be entirely applicable to other cities where models are available to represent the housing and other property markets and the actors in those markets.

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