

## What should be the role of land and property values in the appraisal of transport infrastructure?

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This paper presents a theoretical and empirical investigation of the role (or roles) of land and property values in the appraisal of transport infrastructure. This is topical because there have been some carefully-considered changes in appraisal practice by national authorities (e.g. DfT, 2014/18a; CLG, 2016) in the direction of using 'land value uplift' to measure certain types of benefits from investment. At the same time there has been an increase in interest in Land Value Capture, including much closer attention to the practical constraints and the need for quantification (e.g. Suzuki et al., 2015; TfL, 2017; Salon et al., 2017). There has also been some theoretical debate about the case for further extending the role of land value, encroaching on the role that is currently played by user benefits in transport investment appraisal – advocated by Metz (2017) and refuted by Mackie et al. (2018).

The paper first seeks to shed light on the underlying theoretical issues, bringing together the main components of a theoretical framework, building on the literature. One important component is the measurement of the total social benefits from a transport improvement. Mohring's original position based on his theoretical work was that: "Changes in land values are a pecuniary externality... To count land value increases and ... user benefits would be to double count" (Mohring, 1993). Rietveld and Bruinsma (1998) found that it cannot be taken for granted that the benefits will be passed through fully – or at all – into land value uplift. The relationship depends on various conditions, including the substitution elasticity between land and other consumption goods. Arnott and Stiglitz (1981) notably found that there is no clear-cut or general relationship in theory between the change in land rents and the initial change in transport costs. Martinez and Araya (2000) extended the theoretical framework to relax some of the more restrictive assumptions (e.g. allowing location externalities) and concluded that, in equilibrium, part of users' benefits are retained by users and the rest are capitalised into land rents, so the property market provides only a partial measure of the total benefits. Overall, this body of theory provides some useful insights, and undercuts Metz' (2017) arguments for relying on land value change as the benefit measure. However for real interventions, determining the share of user benefits that will be passed through into the land and property markets remains a challenging empirical question – and the theory (so far) does not provide a clear justification for carrying out the analysis.

Turning to other important components of the social welfare calculation, the Cost may be more relevant for land value changes than the Benefits. Given scarce public resources, the net impact on public finances is one side of the public sector's optimisation problem – the 'C' in the BCR or 'Benefit:Cost Ratio' (DfT, 2018b; Nellthorp, 2017). Land Value Capture – if it is achievable – represents a negative contribution to C, and given the magnitude of the contribution (14-98% of project cost in the examples cited by Salon et al., 2017) the implications for the ranking of projects based on BCR may be large. It follows that the ability to quantify and predict, *ex ante*, the land value change and to understand the proportion of it that can be captured using available instruments, can be an important part of project design and optimisation.

Taking a wider view of transport infrastructure investment, some additional impact pathways for land value change come into play. Recently, a special case of 'dependent development' has been identified and included in UK appraisal guidance (DfT, 2014/18a), in which imperfections in the land & property market are recognised as a source of some additional benefit, if transport investment can be shown to overcome those imperfections – e.g. by allowing the planning authority to grant permission for housing development that would not otherwise be permitted; by overcoming land supply restrictions due to concentrated ownership (imperfect competition); or by overcoming co-ordination failure among developers. The paper will explore the inclusion of this case in the theoretical framework, and discuss the issues raised.

Sometimes transport investment is in fact part of a multi-sectoral package including, for example, housing, commercial property development and area renewal. Land value uplift has been adopted as the basis for valuation of these other investments in recent practice (CLG, 2016). Reconciliation of this with the dependent development case will be provided. Distributional impacts are another dimension of the social welfare calculation for infrastructure projects that will be considered.

Finally, the empirical implications will be explored, using a recently-completed model of transport and the property market in the North of England (Nellthorp et al., 2019) with rail network improvements as the intervention. The results will be compared with recent findings in London for Crossrail 1&2 and other interventions (TfL, 2017). Conclusions will be drawn regarding the scope and limits of land and property market analysis as part of the appraisal of transport infrastructure investment, and for mixed packages of interventions.

#### References:

- Arnott, R.J. and Stiglitz, J.E. (1981). "Aggregate land rents and aggregate transport costs". *Economic Journal*, 91(362), 331-347.
- DCLG (2016). *The DCLG Appraisal Guide*. London: DCLG.
- DfT (2014). *TAG Unit A2.3 Transport Appraisal in the Context of Dependent Development*. London: DfT.
- DfT (2018a). *TAG Unit A2.1 Wider Economic Impacts Appraisal*. London: DfT.
- DfT (2018b). *TAG Unit A1.1 Cost-Benefit Analysis*. London: DfT.
- Mackie, P., Batley, R. and Worsley, T. (2018). Valuing transport investments based on travel time savings—a response to David Metz. *Case Studies on Transport Policy*, 6(4), 638-641.
- Metz, D. (2017). Valuing transport investments based on travel time saving: Inconsistency with United Kingdom policy objectives. *Case Studies on Transport Policy*, 5(4), 716-721.
- Mohring, H. (1993). "Maximizing, measuring and not double counting benefits: a primer on closed- and open-economy cost benefit analysis". *Transportation Research*, 27(6): 413-424.
- Nellthorp, J. (2017). The principles behind transport appraisal, Chapter 12, pp.176-208. In: Cowie, J. and Ison, S. eds. *The Routledge Handbook of Transport Economics*. London: Routledge.
- Nellthorp, J., Ojeda-Cabral, M., Johnson, D., Leahy, C. and Jiang, L. (2019). Property value impacts of rail investment and other policies: a synthesis of findings from cross-sectional and time series models. Paper presented at the International Transportation Economics Conference, Paris, 12-14 June 2019.
- Rietveld, P. and Bruinsma, F. (1998). *Is Transport Infrastructure Effective? Transport Infrastructure and Accessibility: Impacts on the Space Economy*. Berlin: Springer.
- Salon, D., Sclar, E. and Barone, R. (2017). Can Location Value Capture Pay for Transit? Organizational Challenges of Transforming Theory into Practice. *Urban Affairs Review*, 55(3), 743–771.
- Suzuki, H., Murakami, J., Hong, Y-H., and Tamayose, B., (2015). *Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries*. Urban Development Series. Washington, DC: World Bank.
- Transport for London (TfL) (2017). *Land Value Capture, Final Report*. London: TfL