



Bus stop, property price and land value tax: A multilevel hedonic analysis with quantile calibration



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ABSTRACT

Based on a multilevel and quantile hedonic analysis regarding the local public bus system and the prices of residential properties in Cardiff, Wales, we find strong evidence to support two research hypotheses: (a) the number of bus stops within walking distance (300–1500 m) to a property is positively associated with the property's observed sale price, and (b) properties of higher market prices, compared with their cheaper counterparts, tend to benefit more from spatial proximity to the bus stop locations. Given these statistical findings, we argue that, land value tax (LVT), albeit a classic political idea dating back to the early 20th century, does have contemporary relevance and, with modern geographic information technologies, can be rigorously analysed and empirically justified with a view to actual implementation. Levying LVT will not only generate additional fiscal revenues to help finance the development and maintenance of local public infrastructures, but will also ensure a more just distribution of the economic welfare yielded by public investment.

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Introduction

In recent years, the United Kingdom (UK) has witnessed a revival of public interests in land value tax (LVT).¹ The original idea of LVT dates back to George (1879), an American political economist, who, partly inspired by Smith (1863), posits that the value of land, ultimately, comes from the adjacent infrastructures and amenities invested by the whole community. Increments in land value due to public investment, thus, ought to be re-captured through LVT. The earliest political attempts to legislate LVT took place in the late Edwardian Britain (Short, 1997, Chapter 2). LVT was officially proposed in the 1909 finance bill (also known as “People's Budget”), when David Lloyd George served as Chancellor of the Exchequer as a member of the governing Liberal party. However, the then Conservatives-dominated House of Lords, though passing the general budget in 1910, managed to veto the LVT proposal. A similar story happened later with the 1931 Finance Act, which contained

a LVT initiative passed by the ruling Labour party but was rejected again by the Tory government in 1934 (Wenzer, 2000). One of the latest efforts to seek legislation of LVT was in 2012 by Carolyn Lucas, a Green party member of the UK parliament (The UK Parliament, 2012).

Although LVT was never implemented in Britain, its traces can be observed in many other places around the world, such as in the cities of Pittsburgh and Harrisburg in the American State of Pennsylvania and a number of countries such as Australia, Denmark, Estonia, Russia, and New Zealand (Andelson, 2000; Bourassa, 1990; Dye and England, 2010; Wyatt, 1994). While the actual policy practice varies among these international cases, LVT has been increasingly justified as a way to finance the construction and maintenance of public transport infrastructures. The basic rationale remains quite the same as per George original (1879), that publicly invested transport network can promote the values of nearby privately owned land plots, given their improved accessibility. From a political economy perspective, this part of added land value, if substantiated, becomes a kind of positive externalities which can be offset or captured through LVT. Otherwise, general tax payers (who generate government revenues) are essentially subsidising landowners who “quietly” extract the values of public transport infrastructures. Making this free-ride problem even more pressing is the undersupply and underfunding of public transport in the

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¹ For the examples of Labour's Land Value Campaign (<http://www.labourland.org/>) and the Liberal Democratic Party's Action for Land Taxation and Economic Reform (<http://libdemsalter.org.uk/>).

present-day UK, which has resulted in a series of social exclusion issues, faced typically by the lower income population who have difficulties affording private transport (Lucas, 2006).

In this paper, we explore the viability of levying land value tax to finance the maintenance and development of local public transport infrastructures within a contemporary UK context. Our empirical study focuses on the public bus system owned by Cardiff city council in south Wales, which saw a £0.6 million funding cut in the financial year of 2012, leading to a second increase in bus fares since October 2011 (Wales Online, 2012). Employing a conventional ordinary least square (OLS) hedonic regression approach, we firstly examine the relations between the sale prices of circa 10,000 residential properties across 12 electoral wards in central Cardiff from 2000 to 2009 (see Fig. 2), and the number of bus stops within the radii of 300 m, 400 m, 500 m, 750 m, 1000 m and 1500 m of each property, based on the 2007 National Public Transport Access Nodes (NaPTAN) dataset (Department for Transport, 2007). We then further refine the OLS results, respectively, within a multilevel modelling (Jones and Bullen, 1994) and quantile regression framework (Koenker, 2005). Our multilevel analysis suggests the OLS estimates to be unbiased with respect to the influence of bus stop locations on the implicit land values of nearby properties. Likewise, our quantile bivariate post hoc tests confirm the overall robustness of the OLS outcomes. A policy implication of these statistical findings is to exercise a two-tier progressive local land value taxation scheme in helping Cardiff council finance the local bus system. Our estimation, based on the number of bus stops within a 1500 m radius of every individual property included in our sample data, suggests that, for a property priced below circa £195,000, every additional bus stop contributes to a circa 0.11% marginal increase in property price through land value betterment. The corresponding figure is 0.22% for a property in the second tier with a market price above £195,000.

The remainder of this paper is organised as follows. The next section “Land value tax: from Edwardian to contemporary Britain” reviews the literature on land value tax and the related planning practices, mainly within a UK context. This is followed by the design of this research in “Research design” section, which studies the case of Cardiff Bus, by following an OLS and multilevel hedonic regression approach supplemented by a quantile calibration. The data and model results are reported in sections “The case of Cardiff bus” and “Model results”, respectively, before the study’s policy implications are discussed in “Policy implications” section. The conclusions are summarised in “Conclusion and future research” section, alongside the directions of future research.

Land value tax: from Edwardian to contemporary Britain

The Edwardians

The latest global economic recession has forced many countries to cut public spending. This is particularly the case in the UK, with the coalition government aiming to reduce public expenditure by as much as £6.2 billion between 2010 and 2011 (Her Majesty’s Treasury, 2010). Since budgetary stringency continued into 2012 and 2013, public finance has become a top challenge confronting the Westminster parliament, which is seeking new sources of tax income, for example, by proposing a further rise in value-added consumption tax (VAT) from 20% to 25% (The Telegraph, 2012).

A century ago, the Edwardian politicians were similarly faced with a public finance challenge to fund the emerging welfare state programmes, including an embryonic pension scheme (Hattersley, 2004). David Lloyd George, during his Chancellorship of the Exchequer as a member of the governing Liberal party, proposed to tax on tobaccos, luxurious goods, and most important of all,

land, in the 1909 finance bill. These taxation measures were not only intended to balance the government budget, but also to tackle widespread political and economic inequalities faced by the British society. Given its populist flavour, the 1909 budget was often called People’s Budget (Short, 1997). However, the then Conservatives-dominated House of Lords, though reluctantly passing many initiatives included in People’s Budget one year later in 1910, managed to veto the land value tax (LVT) proposal.

The original idea of LVT actually came from the other side of the Atlantic. George (1879), an American political economist born in Philadelphia, Pennsylvania, once wrote:

“The tax upon land values is, therefore, the most just and equal of all taxes. It falls only upon those who receive from society a peculiar and valuable benefit, and upon them in proportion to the benefit they receive. It is the taking by the community, for the use of the community, of that value which is the creation of the community.” (George, 1879, Chapter 33)

George’s central tenet is that the value of land, ultimately, comes from the adjacent infrastructures and amenities invested by the local community. Increments in land value due to public investment therefore ought to be re-captured through LVT. This argument resonates with the ground rent theories by Smith (1863), Ricardo (1891), and even Marx (1867). The tax on land value can also be considered a kind of Pigovian (1920) tax, if one sees the added land value accruing from the positive externalities yielded by community investment (Petrella, 1988).

The Contemporaries

The Pigovian aspect of LVT is perhaps best featured in its contemporary practice, as LVT has been more and more exercised as a way to support the financing of public transport infrastructures (Ryan, 1999; Rybeck, 2004; Smith and Gihring, 2006; Al-Mosaind et al., 1993; Bollinger and Ihlanfeldt, 1997; Bowes and Ihlanfeldt, 2001; Debrezion et al., 2007, 2011; Hess and Almeida, 2007). Underpinning this policy practice is a theoretical conjecture that publicly invested transport facilities adds significant values to the nearby privately owned land plots by improving their spatial accessibilities to the transport network. This kind of public-investment-triggered private land value betterment is a typical instance of positive externalities that could be offset through proper government intervention (Pigou, 1920).

Nonetheless, land value taxation remains unimplemented within the UK, even though some closely associated fiscal interventions do exist in the British town planning practice. For example, section (106) of the 1990 Town and Country Planning Act allows local planning authorities to charge developers, on a case-by-case basis and often by negotiation, a so-called section (106) payment to compensate for the potential negative externalities (e.g., congestion and crowdedness) of new development on the local community (The UK Parliament, 1990). Later, the Barker Review of Land Use Planning (2006) was largely critical of section (106) for its vagueness in concept and inconsistencies in practice. The community Infrastructure levy (CIL) was introduced in the 2008 Planning Act to partially replace section (106) (The UK Parliament, 2008).

Like land value tax, section (106) and CIL are both public financial measures intended for externalities, hence Pigovian by nature. However, LVT differs from section (106) and CIL in being a betterment tax, which tries to capture the positive externalities of community investment in local public infrastructures (Lee et al., 2013). By comparison, the two types of planning charges are employed to compensate for the potential negative externalities of new property developments with respect to the local housing and infrastructure capacities. They are thus essentially the same

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