6 Why we need a green land value tax and how to design it

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A model green land value tax (LVT) can resolve conflicts among meeting climate goals, equity and housing affordability, while reducing inter-generational injustice. Land prices, reflected in house prices relative to incomes, are near all-time records, pricing the young out of home-ownership and affordable rents. The OECD confirms that annual property taxes linked to recent market values can improve macroeconomic stability and also boost long-run growth. The green LVT – effectively a split-rate property tax – would consist of a charge on the land plus a charge on the building minus a discount depending on its energy usage. Regular revaluations discourage speculation and avoid cliff-edge changes. To protect cash-poor but land-rich households, everyone would have the right to defer the tax. To avoid complex interest charges, the tax authority would register a proportionate claim at the land registry equal to the unpaid tax for each year deferred, settled upon the property's transfer or sale.

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6.1. Introduction

At COP27, UN Secretary General Antonio Guterres said: “Greenhouse gas emissions keep growing, global temperatures keep rising and our planet is fast approaching tipping points that will make climate chaos irreversible”. According to the UNEP (2020[1]), “When adding emissions from the building construction industry on top of operational emissions, the sector accounted for 38 per cent of total global energy-related CO_2 emissions.” Around 28 per cent comes from the operation of buildings mainly in the form of heating, providing hot water and air conditioning, and 10 per cent from new construction. In Europe, according to the European Commission, the percentages are even higher. As buildings have long lives, allowing their initial energy inefficiency to persist is a major obstacle to moderating the climate crisis. The reform of annual property taxes to incorporate discounts for energy-efficient buildings, together with subsidies and stronger building regulation, should be high on the agenda of every government. Conventional property taxes based the market value of buildings provide a considerable disincentive to green investing, which raise the value of buildings, for example, in the form of retrofitting better insulation or installing rooftop solar panels. Green discounts are therefore an important corrective. In principle, discounts related to the *carbon-efficiency* of buildings would be preferable to discounts purely based on energy efficiency. However, with fossil fuel sources of energy used in buildings still so dominant, the two are strongly related. Moreover, as a practical matter, the use of Energy Performance Certificates is widespread and EPCs, which sometimes include information relevant for checking the carbon footprint of buildings as well as their energy efficiency, offer the only currently available tag for offering green discounts.

As OECD (2021[2]) demonstrates, complex links tie housing and environmental quality. Environmentally related transport policies and infrastructure decisions affect housing. Links include land-use policies and regulation, taxes and subsidies to reduce the carbon footprint of construction and improve the energy efficiency of the existing building stock. The report points out that: “In 2018, 2/3 of countries still lacked mandatory building energy codes. High-performance buildings, such as near-zero energy buildings, still make up less than 5% of new construction”.

Alternative energy technologies are already cheaper than fossil fuels in many applications and will become cheaper across almost all applications. If we accelerate the transition, they will become cheaper faster, resulting in a virtuous cycle whereby the net zero agenda boosts living standards rather than being seen as a cost (Way et al., 2022[3]; Sharpe, 2023[4]). More generally, new regulations, taxes and subsidies should speed the adoption of new technologies, bringing down costs in the medium term. But in the short run, they potentially increase affordability problems, social exclusion and inequality. The green LVT would represent a significant change from current property tax systems in most countries, but serves as an ideal model for achieving multiple policy goals. While appealing in concept, the feasibility of implementation for many countries not already using land value taxes would need to be tested.

The OECD’s Building Back Better report (2021[2]) and its reports on property taxation (OECD, 2021[5]; OECD, 2022[6]) make a strong efficiency case for shifting away from transactions taxes on property, which impede labour mobility and consumer choice, to recurrent annual taxes. After the massive fiscal interventions due to the global pandemic and Russia’s large-scale war against Ukraine, most governments’ fiscal capacity has deteriorated. Broadening the tax base has become a high priority. As these crises have had the most extreme impact on those with the lowest resources, those with the broadest shoulders should carry most of the burden of extending the tax base. Moreover, as the poorest households tend to have the highest expenditure shares for domestic energy, regulation and carbon taxes should not disproportionately disadvantage these households, see the OECD Building Back Better report, volume 2 (2023[7]). This is why discounts for energy-efficient homes, which could give an advantage to the more affluent, need to be embedded in a progressive property tax structure. And home insulation for lower-income households needs to be supported by a subsidy.

Green discounts can be applied to any recurrent property tax. The next section of the paper expands on the urgency to implement green property taxes, to pursue multiple objectives of good tax design and to implement green discounts.

A key objection to recurrent property taxes, usually most vociferously made by the wealthiest property owners, is that cash-poor households in expensive properties can face hardship. This is easily addressed by permitting deferral of payment until the property is sold or transferred. The following section discusses the issue and why the take-up of deferral is often low. A simple design proposal for deferral is put forward that addresses the causes of low take-up.

Several countries have a mix of conventional property taxes and taxes based on land value, including split-rate taxes, though many have only the former. The subsequent section discusses the pros and cons of land value taxation, including issues of valuation, data issues around estimates of land in national balance sheets, and political feasibility. The final sections conclude and address issues of the transition from existing property tax regimes to green split-rate regimes in which buildings and land are taxed at different rates.

6.2. Criteria for property tax design

6.2.1. The urgent need to act

Climate scientists fear catastrophic tipping points in the global climate – see Lenton et al. (2019[8]) and IPCC (2021[9]; 2022[10]; 2023[11]). The global climate accelerator describes the phenomenon whereby an accumulation of greenhouse gases, by raising global temperatures, in turn, leads to the release of more carbon and even higher temperatures, ultimately making much of the planet uninhabitable. We face a climate crisis, as the world is dangerously close to the tipping points at which irreversible changes would occur. The United Nations' (2023[11]) IPCC AR6 report notes that previous reports understated the risks faced by humanity: "For any given future warming level, many climate-related risks are higher than assessed in AR5, and projected long-term impacts are up to multiple times higher than currently observed (*high confidence*). Risks and projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (*very high confidence*). Climatic and non-climatic risks will increasingly interact, creating compound and cascading risks that are more complex and difficult to manage (*high confidence*)". The global climate accelerator, and the financial accelerator (for instance, that operated in the Global Financial Crisis or GFC), are both characterised by highly non-linear feedback loops (Aron and Muellbauer, 2022[12]). In the GFC, falling real estate prices were amplified in the financial system and by its interaction with the real economy, leading to further price collapses. Thus, the tipping points and cascades in the climate literature have parallels in financial crises like the GFC or the Great Depression, manifested in falling stock markets and bankruptcies of homebuilders, the foreclosures of many homes, and failures of banks and other financial institutions.

The building sector is a large part of the problem in addressing climate change and reaching the global net zero target by 2050. Policy needs to be comprehensive, encompassing green building regulations, subsidies for insulation, subsidies for carbon storage, the promotion of green mortgages and the greening of finance more generally (see the Network for Greening the Financial System (2019[13]) or NGFS), and green taxation such as a carbon tax, emissions trading and green property taxes.

6.2.2. Criteria for property tax design

I consider ten criteria for property tax design: raising revenue; incentivising the green transition; reducing climate risk for the financial system; improving equity; stabilising the economy and the financial system; improving efficiency in resource allocation and promoting growth; simplicity and the cost of administration;

reducing housing supply constraints; balancing localism – subsidiarity and democratic accountability – and national objectives; achieving public acceptability and easing the transition from the previous system.

Raising revenue

After the massive fiscal interventions due to the global pandemic and Russia's war on Ukraine, most governments' fiscal capacity has deteriorated.[1] Broadening the tax base has become a high priority. Given the difficulty of avoiding the tax, the low cost of collection and the potential amount of revenue raised, recurrent property taxes have substantial advantages. Most countries have land registries or cadastres of titles and debt collateralised on property. As OECD (2021[2]) argues: "Many countries are underutilising recurrent property taxes and have substantial scope for increasing these levies".

Incentivising the green transition

Green discounts should be linked to the property's Energy Performance Certificate providing an incentive for all owners including landlords to improve the energy performance of their homes. Note that the EPC does not include only the EPC rating which places a building in a particular energy efficiency class but a good deal of additional information.[2] Green discounts would also generate a systematic incentive for owners to acquire an EPC and to ensure that the home's EPC was up to date and accurate. Even by itself, this encourages households to improve energy efficiency and reduce carbon emissions. It would also encourage mortgage lenders' engagement with owners to improve energy efficiency. OECD (2023[7]) argues that even where there is carbon pricing, additional measures are needed. In particular, landlords have weak incentives to engage in electrification and insulation if the savings accrue to tenants and cannot be recouped in higher rents. As such green investments may even result in higher property taxes, green discounts have a special role to play in strengthening green incentives for landlords.

Green discounts would also sharpen incentives for green mortgage pricing – lower interest rates or more favourable lending criteria for homes with better EPCs. There are good reasons why lenders would have such incentives: two risks worrying lenders are cash-flow problems of households with mortgages and collateral value falling below the mortgage value. The lower tax liability of a green property reduces the running costs of a building over its life-time, supporting household cash-flows. It also reduces the risk of cash-flow stress induced by higher energy prices. Furthermore, a green property, with lower tax obligations, faces a lower risk of a future price collapse – a transition risk – that will also protect the collateral value.

EPCs are influenced by the quality of home insulation, lighting and heating systems, external surface area and draft-excluding design features. As BPIE (2014[14]) notes, there has been significant evolution in the design and implementation of EPCs, with some country differences. EPCs often include information on the carbon footprint of a building in addition to the classification of a building into a particular energy efficiency class. In principle, green discounts could take into account not only the energy efficiency rating but also whether the heating system uses green hydrogen, green electricity or a fossil fuel. In the case of Great Britain, the rating system is already based on CO_2 emissions, rather than purely on energy efficiency. As the availability of green energy increases, green discounts should evolve to include not just energy efficiency but the carbon footprint of the energy used. Linking tax discounts to EPCs would also incentivise builders to prioritise qualities that respond to the resulting shift in demand towards greener building characteristics. As OECD (2021, p. 65[5]) points out, several countries including Brazil,[3] have begun to introduce rebates in their property tax systems that promote the use of green technologies including renewable energy installations and use, and /or energy efficiency.

While reducing life-time carbon emissions from the use of buildings, making building design and retrofitting the key, there could be another green aspect through carbon capture and storage. Only infrequently mentioned is the use of "mass" timber as a superb carbon store (UN Emissions Gap Report (2019[15]) and

Committee on Climate Change (2019[16])). In principle, discounts on property taxes could incentivise the use of timber in construction as well as operate via the energy efficiency rating.

Green incentives reduce financial instability risk from climate change

The real estate sector provides an important channel for the transmission of climate change to financial instability. The two major types of risks linked with climate change are transition risk and physical risk. Amplification of these risks concerning the real estate sector can occur via the financial accelerator (Duca, Muellbauer and Murphy, 2021[17]).[4]

Transition risks have direct effects on the real estate sector and banks. Carbon taxes, regulation and higher insurance premia will affect some real estate values. Early risk reduction via green incentives and early phasing in of valuation effects, rather than late and large disruption reduces risks of financial instability.

The reduction in physical climate risk from green incentives reduces risks of macroeconomic disruption and falling real estate values from rising sea levels, increased flooding and wildfires, storms, heat extremes or drought, making particular places ultimately uninhabitable. As insurance companies would be subject to sharply higher insurance claims, lower physical climate risks lower the threat to their financial stability.

The distributional aspect of green policies

Green policies could, in the short run, weigh most heavily on the poor, worsening housing affordability and fuel poverty. Public acceptance of green policies requires that the distributional issues are at the front and centre of policy design. Thus, higher short-run costs due to green taxes and tougher building regulations need to be compensated by targeted subsidies and progressive green taxes and finance. While OECD (2021[2]) under-emphasises the potential for green property taxation, the tax report OECD (2021[5]) highlights the issue, with recent examples of such policies. A green property tax could potentially resolve the conflict between affordability/equity and meeting climate goals. A similar argument is made in Leodolter, Princen and Rutkowski (2022[18]) for the European Commission. Chancel (2022[19]) has examined inequality in global carbon emissions. For example, in the United States, households in the top 10 per cent of incomes emit around 7 times as much carbon as households in the bottom half of the distribution. In China, the ratio is around 14 times. Chancel (2020[20]) also suggests a progressive wealth tax with a top-up for pollution to help pay for global efforts towards carbon reduction.

The inequality issue is currently particularly relevant since central bank policies and the pandemic have driven land and house prices up to high levels. Although higher house prices in many countries tend to reduce the Gini measure of wealth inequality (OECD, 2021[2]; Dossche, Slacalek and Wolswijk, 2021[21]), the gap has widened between owners and non-owners and between older and younger generations. Inequality has also increased within younger cohorts and between desirable locations and left-behind places.

Property taxes can easily be made more progressive – e.g., imposing a surcharge on the most expensive properties and/or giving a tax allowance on the first *x* euros of each property's value. To make the tax a little less onerous in high-priced regions, the tax allowance could be linked to regional house prices.

Market-value-based property taxes promote financial, macroeconomic and regional stability

Regarding financial and macroeconomic stability, annual property taxes linked to recent market values combined with macroprudential limits on household leverage reduce the incentive for property speculation based on expectations of high rates of return which tend to be based on recent property appreciation, as explained in Duca, Muellbauer and Murphy (2021[17]). Less volatile real estate prices, reduce the risk of over-valuations and price collapses.

Regarding regional stability, taxation linked to recent market values dampens drivers of higher regional inequality. The mechanism is the following: the rise in land prices and related tax obligations in growth hotspots should deter migration to hotspots (and further growth). But without market value-linked taxation, the stabilising role of rising local tax rates will be absent. Then potential migrants to hotspots will tend to keep coming, anticipating further capital gains; and residents sitting on large capital gains will tend to postpone moving to cheaper locations to cash in those gains. (see Cameron and Muellbauer (1998[22]) and Cameron, Muellbauer and Murphy (2006[23])) for evidence on UK regional migration).

Annual property taxes based on recent market values dampen such speculation, which otherwise prolongs the swings in widening regional inequality. There is also a carbon-saving benefit coming from less pressure for extra construction in the hotspots and improving housing stock utilisation in less prosperous locations.

Promoting efficiency and economic growth

Well-designed market-value-based property taxes, avoiding single-person and second-home discounts, improve the efficient use of the existing stock, e.g., encouraging downsizing by retired households. Even without an explicit green design of the tax, this is good for the environment as new construction is carbon intensive. Wealthy foreign owners often leave properties empty for large parts of the year, reducing availability for locals. Similar issues prevail in areas attractive to holiday makers, where locals are increasingly priced out. Higher tax rates on second homes and for international investors, e.g., a surcharge on owners who are not domestic tax payers or pensioners, would discourage foreign speculation and improve the utilisation of the housing stock.

Recurrent property taxes are hard to shift, unlike transaction taxes. Hence, lowering transaction taxes and increasing recurrent property taxes should result in large efficiency gains. Lower transaction taxes increase the flexibility of labour and housing markets and ease adaption to shifts in the economic environment (OECD, 2021[2]). For example, relocating to 20-minute neighbourhoods to reduce commuting times and increase localism is good for the environment (The Planner, 2021[24]). Relocation because of increased flood risk is made easier by lowering transaction taxes.

The evidence has mounted that credit-fuelled real estate booms have crowded out more productive investment, with negative consequences for sustainable growth, as well as increasing crisis risk. Müller and Verner (2021[25]) find crowding out of more productive investment in real estate booms with negative consequences for sustainable growth. They study the sectoral allocation of credit in 116 countries since 1940 and show that credit to non-tradable sectors, including construction and real estate, is associated with a boom-bust pattern in output, similar to household credit booms. Such lending booms also predict elevated financial crisis risk and productivity slowdowns.

More evidence for a negative relationship between rising real estate values and productivity comes from a study of US firms by Doerr (2020[26]). He finds that rising real estate values relax collateral constraints for companies that own real estate and allow them to expand production. Consequently, an increase in real estate prices reallocates capital and labour towards firms that have previously tended to focus on their real estate portfolios at the expense of other factors of production where gains in productivity are likely to be greater. This will tend to have negative consequences for aggregate productivity. Another study by Chakraborty, Goldstein and MacKinlay (2018[27]) shows that for US data, bank lending for housing crowds out commercial lending, lowering investment by firms borrowing from these banks, especially small credit-constrained firms. Basco et al. (2022[28]) find a similar result for Spain and document the negative impact on TFP in the manufacturing sector.

For China, Hau and Ouyang (2018[29]) show that real estate price rises caused by a restrictive land supply reduce bank credit to small firms, increase their borrowing costs, diminish their investment rate and compromise their output and productivity growth. For European countries, Grjebine, Hericourt and Tripier (2022[30]) argue, via a sectoral allocation mechanism that “there is a group of countries where real estate shocks generate TFP losses, including countries where real estate booms started early and were

substantial, such as Ireland, the United Kingdom, France, and Spain….. On the other hand, there is another group of countries for which our mechanism generates TFP gains – including Germany, Austria, and Italy, where real estate prices grew later or at a slower pace."

The bottom line is that current market value-linked property taxes would have moderated all these negative implications and improved sustainable economic growth.

Simplicity and cost of administration

Taxes that are easy to understand and administer help compliance, reduce collection costs and lower tax avoidance. As all properties are (or should be) registered at the land registry, legal avoidance of property taxes is very hard. Information from past sales records makes mass valuation methods quite cheap. Satellite data and access to recent transaction data on internet sites have enhanced transparency.

Incentivise supply

Housing supply restrictions, resulting from planning systems, zoning regulations and costs of providing new infrastructure, are a major problem in many countries, e.g. the United Kingdom (Hilber and Vermeulen, 2014[31]; Muellbauer, 2018[32]). Increases in property values from local infrastructure investment, taxed by a current market-value-based recurrent property tax can help fund such investment and reduce this source of supply blockage.

The balance between localism and national objectives

Much depends on the government structure in particular countries, e.g., the degree of federalism, and how proceeds of taxation are spent and by which agency. Principles of democratic control, subsidiarity, decentralisation and the use of local knowledge suggest that local government should control a substantial part of local spending and hence the revenue base.

One issue is national versus local tax rate setting. Purely locally determined tax rates can exacerbate vicious circles wherein declining locations with rising needs raise tax rates, driving out economic activity and reducing the tax base further. A balance needs to be struck between widening locational inequality and local democratic control. Some redistribution across local jurisdictions is needed. This suggests sharing of property tax revenue or a split system with one tax under local control, plus another at the national government level.

Public acceptability and transition

Tax reforms generate winners and losers. Tax reforms that benefit and are supported by a majority of the public are more likely to succeed. However, opposition often comes from powerful elites, especially from entrenched land-owning interests, 'know-nothing' climate change deniers – long financed by the fossil fuel industry, from a myopic, individualistic ideology that denies externalities and the very concept of 'Society', and from monopolistic media that promulgate disinformation. Most citizens and indeed elected public officials do not understand 'General Equilibrium' – the idea that there are many inter-relations, spill-overs, feedbacks and unintended consequences. Losers tend to shout louder than winners, especially for redistribution with widely spread small gains and concentrated large losses. Any change creates uncertainty which generates resistance. Hence there is a need for phased transitions.

But the biggest single issue for public acceptability of property taxes is the potential discrepancy between cash-flows and property values.[5] We turn to this next.

6.3. Designing property tax deferral

Since recurrent market value-linked property taxes take no account of the cash income of households, deferral is a key element for public acceptance. To protect cash-poor but property-rich households some jurisdictions, such as Canada, Denmark, Ireland and some US states, offer tax deferral (OECD, 2021[5]). OECD (2022, p. 87[6]) says: "There is a strong case for addressing liquidity issues through tax deferrals to reduce the potential for hardship and the need for less efficient and equitable forms of relief (such as broad exemptions or delaying property revaluations)."

In the United States, 24 states operate deferral options for retirees. Munnell, Hou and Walters (2022[33]) describe eligibility criteria typically depending on age (usually 65+), residence, income (typically under USD 20 000), and sometimes property values and with debt ceilings of typically 50% of value. The typical interest rate in 2019 was around 6%. In 9 states, the state finances the deferral programme to guarantee tax revenue for municipalities.

Take-up is remarkably low and this seems to be the case in other countries too. Munnell, Hou and Walters (2022[33]) suggest eligibility restrictions, ignorance, complexity and concern about high interest rates as possible reasons. They propose a simpler state-wide system for which all 65+ households would be eligible. This would eliminate onerous eligibility tests for that age group. The interest rate would be given by the state's borrowing cost plus a buffer to cover administrative costs and defaults. But interest rate risk and downside house price risk for the deferring households are still likely to discourage participation.

In Muellbauer (2018[32]), I proposed a simpler system in which every household, or at least those headed by a person of retirement age, would have the right to defer the tax. The tax authority registers a proportionate interest at the Land Registry equal to the unpaid tax for each year deferred, to be settled when the property is sold or transferred. It is important for revenue flows that the liability to the tax authority is settled at that point and that properties encumbered with a tax liability are not allowed to be sold before that liability is settled. A small discount for cash payments would help stabilise annual revenue flows and roughly offset what otherwise could be seen as a subsidy to the deferrers.

My 'proportion of equity' deferral proposal is easy for tax payers to understand. Ticking a box on the property tax form requesting deferral without having to be means tested, undergo complex form-filling and complex interest rate calculations is a big advantage. As we know from research on the financial sophistication of consumers, many do not understand compound interest. In contrast, the fraction of a home which is owned is a simple concept. For example, with a 1% tax, after ten years of deferral, the property owner would retain 90% of the then-current value of the registered property title. By comparison with deferral taking the form of paying cumulative interest on unpaid tax bills, the household is protected against the risk of higher interest rates over the deferral period, and lower property values at the point where the next transaction takes place and the debt needs to be settled. That could leave the net equity position in a poor state. On the other hand, if interest rates turned out to be lower than expected and house prices higher, the household would be worse off under equity-based deferral.

For the tax authority considering deferral with cumulative interest payments versus equity-based deferral, the relevant question is how the expected profile of real interest rates compares with that of real house price appreciation. In most OECD countries since 2000, annual real house price appreciation has exceeded the real return on 10-year government bonds. In the G7, the exceptions are Japan and Italy. From 1997 to 2022, Germany joins the exceptions as the average real bond yield slightly exceeded the average real house price appreciation. Since 2010, Italy is the only exception in the G7 (Table 6.1). Of course, with a reformed current market-value-based property tax, real house price rises would have been more moderate and history is not necessarily a reliable guide to the future.

Municipalities need stable revenue streams. It is possible that at the beginning of the introduction of an equity-based deferral scheme – if many households choose deferral – revenues will drop temporarily. Revenues will pick up and steady later as transactions or settlements of estates of the deceased occur.

Offering a small discount to those choosing cash payment should help stabilise revenue streams. Moreover, national or state governments that can take the long view and borrow cheaply, especially in recessions, should underwrite deferral schemes to stabilise local revenue streams.

Table 6.1. Comparing annual average real returns on 10-year government bonds and house prices

	USA	Canada	UK	France	Germany	Italy	Japan
Real bond return (annual percentage)							
1997-2022	1.59	1.79	1.64	1.72	1.26	2.07	1.20
2000-2022	1.21	1.47	1.27	1.32	0.87	1.85	1.14
2010-2022	0.31	0.26	-0.11	0.24	-0.72	1.57	0.25
Real housing return (annual percentage)							
1997-2022	2.64	4.51	4.34	3.26	1.16	0.29	-0.66
2000-2022	2.58	5.11	3.79	3.36	1.52	0.44	-0.44
2010-2022	3.35	5.20	2.39	1.32	3.87	-2.19	1.85

Note: Real bond return is defined as the yield minus 100 x 4-quarter change in log consumer expenditure deflator. Real housing return is defined as 100 x 4-quarter change in log real house price index.
Source: OECD Analytical House Price database, OECD Key Short-term Indicators.

This equity-based deferral mechanism has useful stabilisation properties for the economy. In periods when house prices are expected to increase, the incentive to pay cash increases, a counter-cyclical property in terms of private sector spending. In periods when house prices are in retreat, households have a greater incentive to defer, which improves their cash flow and is also usefully counter-cyclical. Indeed, this deferral mechanism shares some of the features of home equity insurance recommended by Shiller and Weiss (1999[34]). Shiller and Weiss bemoan the virtual non-existence of insurance contracts to protect households from major falls in the value of their homes. Knowing that their tax liability would fall if house prices fell removes a major source of stress for deferring households.

6.4. Land value taxes versus property taxes

OECD (2021[2]) argues: “Relying less on housing transaction taxes and more on annual taxes on immovable property while shifting the base of these taxes from the value of structures to current land prices would bring multiple benefits. The move away from transaction levies towards recurring taxes would lower obstacles to mobility, facilitating labour market adjustment and boosting economic growth. Shifting the basis from the value of structures to current land prices would encourage construction in valuable developable areas, helping to address supply-demand mismatches. Many countries are underutilising recurrent property taxes and have substantial scope for increasing these levies.”

Land value taxation has a long history. McLean (2005[35]) and Kumhof et al. (2021[36]) trace the history of LVT back to the French Physiocrats, followed by Tom Paine (1797[37]), Ricardo (1817[38]) and ‘Single Tax’ Henry George (1879[39]). In the United Kingdom, Lloyd George tried to introduce LVT in 1909 and again in 1914 (with the support of Winston Churchill). He failed partly because of the land-owner lobby, and partly because the Land Registry was still not ready by 1914, and post-WW1, the political landscape shifted. While debates over land value taxation never disappeared, in recent years there has been quite a resurgence in interest. This is probably the result of a better understanding of the important role land plays in the economy, practical experience with land value and split-rate[6] taxes and greatly improved spatial data and data processing (Kumhof et al., 2021[36]).

6.4.1. The efficiency of taxing the asset value of land and green discounts

Economists have long regarded LVT as the most efficient type of tax. OECD (2022, p. 117[6]) says: "As the supply of land is highly inelastic, taxes on the unimproved value of land are economically efficient and therefore contrast with taxes on improvements (i.e., buildings), which may affect investment". The 2011 Mirrlees Review (Mirrlees et al., 2011[40]), commissioned by the Institute for Fiscal Studies (IFS) to examine sensible reforms of the UK tax system, argued that business rates should be replaced by a land value tax.[7] However, the Mirrlees Review also argues that homes, and not just the land on which they sit, should be taxed as the services that homes provide are a form of consumption, and taxing consumption is part of an efficient tax system. This contradicts, therefore, the Georgist 'single tax' principle and provides a prima facie case for a split-rate tax. Kumhof et al. (2021[36]) review the literature on the efficiency of LVT, while Bonnet et al. (2021[41]) expound on the efficiency of LVT in several general equilibrium settings, including where second-best issues are important.

Taxes on the asset value of land, capture more precisely than property taxes increases in value stemming from infrastructure investment, improvements in the quality of local schools or human health implications of the environment, and thus help fund such investment.

Land value taxation helps land value capture (LVC) – where gains in land values from shifts in planning or zoning permission and public investment – accrue partly to the general public and not just to the land-owner (OECD (2022[42])). LVC schemes or infrastructure levies are typically leaky. For example, 'hope value' often affects the prices of land currently zoned for low-value uses such as agriculture. This means that gains in value that result from a decision to rezone to more advantageous uses tend to be underestimated. Much of the planning gain then accrues to previous owners or to investors who have taken options on the land (see further discussion below). These are arguments for the case that a split-rate tax should have a higher rate on the land component than on the building.

To shift LVT in a green direction requires taking into account the carbon emissions of buildings on a plot of land – hence a type of split-rate property tax. This implies a two-part tax: one tax on the site value, plus a tax on the building with green discounts. The building tax would be proportionate to the value of the structure and the green discount would depend on the EPC. As noted above, Energy Performance Certificates often include a great deal of qualitative information relevant for evaluating a building's carbon footprint as well as placing it into an energy efficiency class rating.[8] The design of property tax discounts could take both types of information into account. Thus, owners in a well-insulated high-rise apartment block would pay relatively low taxes, particularly if the main energy sources were sustainable. The proportions of a plot devoted to a garden or a building would affect the tax paid.[9] For public acceptability, this is potentially important as labelling this version of LVT as a 'garden tax' would then be avoided.

Such a split-rate tax with green discounts captures the best of both worlds: it shifts behaviour in favour of saving the planet, without taxing increases in the value of retrofitted buildings. Note that a straight property tax would actually penalise such green investment that raised the value of the property. It can be argued that even stronger incentive effects could come from property tax discounts, not on the EPC rating of a building, but on improvements that come from investing, for example, in home insulation and heat pumps. However, using progressive subsidies, as already used in a number of countries, for the cost of such investment is likely to be more effective in incentivising such green investment, especially for cash-constrained low-income households.

Applying the tax to empty land zoned for high-value uses encourages development and discourages land hoarding for speculative purposes. The split-rate system would work well as a business tax with land tax rates similar to residential land but different tax rates, typically lower or zero, on business property located on the land. Replacing conventional business property taxes with this split-rate tax would go a long way to meeting the recommendations of the Mirrlees Review.

A surcharge on owners who are not domestic taxpayers or pensioners would discourage foreign speculation. As noted earlier, regular revaluations are necessary to discourage land speculation and to avoid cliff-edge changes. A three-year average of annual valuations would smooth cash flows. As noted earlier, to make the tax a little less onerous in high-priced regions, a tax allowance could be linked to regional land prices. And such a radical tax reform would need to be phased in over several years.

6.4.2. Distributional issues around the green split-rate tax

For greater progressivity and to avoid capturing low-value land, a tax allowance for the first x euros of the *per sq. m land price* should be given. Note that such allowances on land *parcels* suffer from tax escape through sub-division and therefore should be avoided.

The land element in the split-rate green tax is more progressive than the structures element: land ownership in most developed[10] countries is far more unequally distributed than housing wealth or indeed income. In England, for example, according to Shrubsole (2020[43]) over half of the land by area is owned by around 25 000 owners and owner-occupiers of residential dwellings own only about 5 per cent.[11] The distribution of land by market value in England will be less concentrated than the distribution by area, though still much more unequal than the income distribution. There is some literature that addresses the question of whether a tax on land values is more or less progressive than a tax on total property values. England and Zhao (2005[44]) examine the split-rate property tax in Dover, a small town in New Hampshire, finding that a shift to a pure land value tax would be regressive. Bowman and Bell (2008[45]) replicate the methodology for the larger city of Roanoke, Virginia, finding the opposite result. They confirm the progressive nature of a shift to LVT in two other cities in Virginia. Plummer (2010[46]) finds that in the third most populous county in Texas, a shift to a pure LVT would be progressive.

Barbosa and Skipka (2019[47]) analyse more comprehensive data than previous studies, but confined to owner-occupiers. For Germany, they find that land ownership is more concentrated than property ownership, but land values are slightly less correlated with cash income than overall property values. They find that among owner-occupiers a shift from a property tax to a pure LVT would create somewhat more losers than winners in the lower income quintiles. However, as over half of German households are renters, the opposite conclusion almost certainly holds for households in general. Renters tend to have lower average incomes and are more likely to live in apartments with a lower share of land than the average for owner-occupied homes. Assuming landlords pass on property tax to the tenants, a shift to LVT is likely to benefit most renters.[12] Moreover, Barbosa and Skipka do not consider the age of households and it seems likely that retired homeowners with low cash incomes tend to live in homes with above median land value shares. The deferral scheme explained in the previous section would therefore be likely to modify their conclusion even for owner-occupiers, by breaking the link between the tax burden and current income.

It is important to realise that the above studies of the distributional effects of different types of property taxes are based on a concept of cash income. For welfare measurement, imputed rent from owner-occupation needs to be included in income, as is recognised in the national accounts concept of household disposable income. By breaking the link between the property tax paid and cash income through an easy option deferral mechanism, it becomes realistic to examine the distributional implications of property taxes in terms of household disposable income. And these are transformative: no longer is the cash-poor widow owning a home in an expensive location, ‘poor’ in terms of household disposable income, but she is very well off compared to a tenant with the same cash income but paying rent.

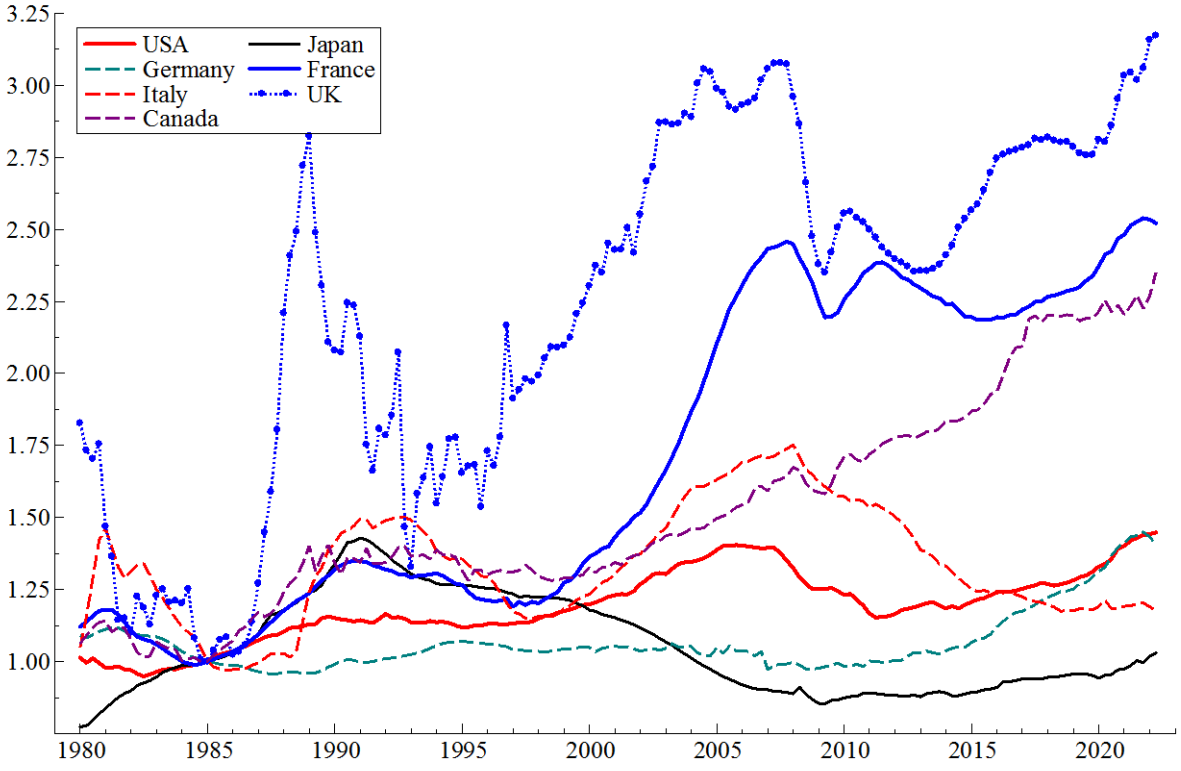
A proportional property tax, and especially one with higher rates on land, is necessarily progressive for household disposable income and can be made even more progressive through tax allowances as noted above. The extra progressive element in the land value component would tend to offset the burden on lower-income households in poor-quality housing from carbon taxes, tighter building regulations or costs of insulation, hence making green policies more acceptable.

Several OECD countries offer tax incentives for energy-efficient retrofitting of homes through the income tax; however, take-up has been disproportionately stronger for higher-income households (2022, p. 114[6]). As land ownership is far more unequally distributed than income or the structure component of property values, the green split-rate tax would automatically offset the green discount that potentially benefits more affluent households, by the highly progressive LVT element. However, home-insulation subsidies for the poorest households will still be necessary.

6.4.3. Stability issues and the share of land in tangible fixed assets

The split-rate tax incorporating LVT is better for financial and macroeconomic stability than conventional property taxes. House prices combine bundles of land and structures. As house prices are far more cyclical and volatile than construction price indices, this must be because land prices are even more volatile. Since 1985Q1, the ratios of national house price indices to construction cost indices have risen in all G7 countries except Japan, where the ratio boomed before 1985 (Figure 6.1). This implies that housing land prices have risen more than construction costs, and by far more in the United Kingdom, France and Canada. This also implies that since 1985, the share of land in the total value of residential property has risen everywhere except in Japan.[13] The OECD has invested considerable effort in improving the quality and international comparability of estimates of the land component in balance sheets, especially for households. OECD/Eurostat (2015[48]) describes four valuation methodologies for the national balance sheets.

Figure 6.1. Price indices for housing relative to construction costs



Note: Historical data for earlier years for the deflators from Oxfordeconomics.com were linked to OECD national accounts data. Base 1985Q1.
Source: OECD for house price indices and deflators for fixed residential investment.

The 'direct method' estimates land values on a price-times-quantity basis, where the total land value is the sum over all plots of the land prices per hectare for each plot multiplied by the area in hectares of the plot. The method begs the question of the origin of the price per hectare data, which may not be easily found especially where buildings occupy plots and vacant plots are rarely traded.

The 'residual method' subtracts the estimate of the construction value – typically the net capital stock – from the current market value of combined land and buildings. This is the most commonly used method, though Kumhof et al. (2021[36]) express reservations as the depreciation rates used for structures can be hard to assess. They can be so small as to sometimes result in negative values for the land on which the structures sit. For example, a physically sound but economically obsolete building can depress the overall property value. Its depreciated valuation based on its original cost indexed to construction cost indices will then exaggerate its share of the overall property value, depressing the estimate of the land share.

The 'land to structure ratio method' assumes knowledge of the ratios of land value to structure at a disaggregated level. It then applies these ratios to the value of combined land and structure bundles. The idea here is that these ratios could be obtained by estimating ratios for a representative sample of types and locations of structures and scaling up these estimates to the whole population of structures.

Finally, the 'hedonic method' can take a variety of forms. For example, suppose there is a sample of observations that includes some vacant plots and (typically many more) observations on bundles of land and buildings. Using detailed building characteristics such as the footprint of the building, the number of rooms, the type of building, its age and location, and the footprint of the plot on which the building stands, a regression of market values is used to separate the value of the building from the value of the underlying land.

Checking land value share estimates with an alternative approach

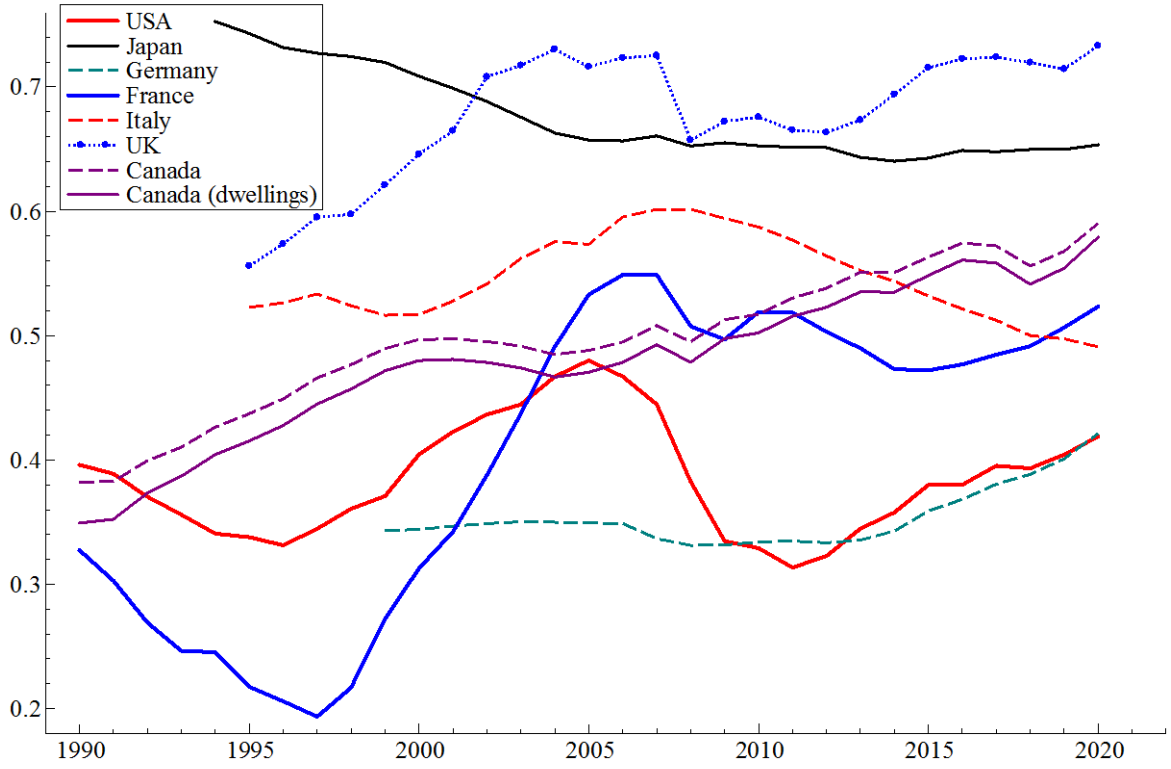
For households, residential property dominates the category of tangible fixed assets. Therefore, the ratio for the household sector of land to tangible fixed assets is a good estimate of the land share in residential property owned by households. Figure 6.2 shows these data[14] for the G7 economies up to 2020. For the United Kingdom, Canada and Germany, land shares are at historic highs, and in France and the United States, not far from previous records.

Because the value of a home is a combination of the value of the structure and of the land it occupies, an alternative approach to tracking the evolution of the share of land is as follows. Let s denote the share of land in a base year. An index of house prices HP can then be defined by s $\times LP + (1-s) \times CP$, where LP is a housing land price index and CP is the construction price index, with these indices referenced to be 1 in the base year. The share of land in the value of a typical home is then

$$S = s \times LP = HP - (1-s) \times CP \quad (1)$$

If there is no substitution between land and structure as a result of relative price movements, equation 1 can be used to trace the evolution of the land share away from the base year. Since substitution takes time and stocks adjust only slowly, equation 1 should be a good approximation to the evolution of the land share. Taking the base year of 2005, let us use the OECD estimate of the land share in that year to construct these alternative estimates of the evolution of land shares. By comparing the two estimates one can learn something about the nature of the land valuation exercises carried out in the different countries. According to OECD/Eurostat (2015[48]), in a 2011 comparison, the United States, United Kingdom, France and Italy were using the residual method for valuing the land share in balance sheets of tangible assets. Canada was using the land-to-structure ratio method. Germany was using a direct method, assembling granular data on land parcels, by type, in combination with purchase values of building land from the national statistical office. Japan was using a similar direct method in combination with publicly assessed land values.

Figure 6.2. The shares of land in tangible fixed assets on household balance sheets



Source: OECD, Balance sheets for non-financial assets owned by households and non-profit institutions serving households.

Figure 6.3 plots these comparisons with the OECD land share estimates. Except for the United States, the United Kingdom and the partial exception of France, the profiles of the OECD national balance sheet estimates of the land share are generally flatter and less volatile than the profiles of the fixed weight index method. The graphs for Italy, Germany, Japan and Canada show lower volatility and a smaller increase over time for the national balance sheet estimates of the land share compared to the fixed-weight method based on OECD house price and construction cost indices. This is confirmed by regressions of the balance sheet estimates on current and lagged fixed-weight estimates (Table 6.2). For all four countries the long-run coefficients on the fixed-weight estimate range between 0.42 and 0.57, and are significantly below 1. Moreover, for Italy and Japan and to a degree Germany, the national balance sheet estimates lag behind the fixed-weight estimates.

What might explain the differences between national balance sheet and fixed-weight estimates?

There are several possible explanations for the differences highlighted in Figure 6.3 and Table 6.2. The first point to note is that we know that year-to-year changes in land prices are far more volatile than those for values of structures. A case study for Finland (OECD/Eurostat, 2015, pp. 85-87[48]) compares the residual-based approach with more direct estimates based on granular data on the land covered by each building and official estimates of local land value per sq. m. It also shows a smoother pattern for the latter than for the residual-based approach. A simple explanation, which has parallels for Germany and Japan, is that available estimates of land prices lag or fail to fully capture true movements in underlying market prices of land. In the case of Italy which, unlike Germany and Japan, uses the residual method, it is possible that the mix of sources of local real estate price information, which includes administrative and tax office

Figure 6.3. Households' shares of land in tangible fixed assets compared with fixed-weight estimates of shares in residential property

Note: Shares for households and non-profit institutions serving households (NPISH), from national balance sheets refer to the share of land in tangible fixed assets. Fixed-weight estimates of land value shares are derived as shown above, based on price indices in equation 1, with the fixed weight calibrated to the land share from national balance sheets at the end of 2005.
Source: OECD, Balance sheets for non-financial assets owned by households and non-profit institutions serving households, author's calculations. See Figure 6.1 for sources of the price indices.

Table 6.2. Regressing household land value shares on fixed-weight estimates of the shares

	USA	Canada	UK	France	Germany	Italy	Japan
Variable							
C	-0.178	0.299	0.0398	0.110	0.185	0.293	0.304
t-statistic	*-2.85*	*13.1*	*0.633*	*5.89*	*21.9*	*30.6*	*8.03*
Fixed-weight share (t)	1.35	0.423	0.952	1.15	0.238		
t-statistic	*9.21*	*10.1*	*10.5*	*8.52*	*3.70*		
Fixed-weight share (t-1)				-0.425	0.222	0.524	0.568
t-statistic				*-3.75*	*2.84*	*27.1*	*9.42*
Std. error of regression	0.0220	0.0139	0.0112	0.0121	0.0044	0.0059	0.0079
Adjusted R-squared	0.807	0.835	0.845	0.962	0.967	0.973	0.814
Durbin-Watson	0.585	0.476	0.397	0.426	0.948	1.27	0.515

Note: Land value shares for households and NPISHs are taken from national balance sheets, see notes to Figure 6.2 and Figure 6.3. For fixed weight estimates of land value shares, see note to Figure 6.3. Insignificant coefficients have been set to zero.
Sources: see Figures 6.1-6.3.

information, understates or lags behind more timely national house price indices. For these countries, one can argue that the national balance sheet estimates are implausibly smooth and not cyclical enough.

The fixed-weight estimates shown in Figure 6.3 may, however, overstate volatility and cyclicality in some cases. The house price indices used are derived from the OECD analytical data base and are generally transactions-weighted indices. Transactions-weighted indices could exaggerate the average rise in prices: more frequently traded houses may have appreciated more or may be disproportionately located in large cities where price rises have outpaced those in the rest of the country. UK evidence for this comes from ONS (2018[49]) and Mason and Pryce (2011[50]). According to ONS (2018[49]), from 2009 to 2015, the transactions-weighted index in the UK increased significantly more than a stock-weighted index. However, this cannot explain the difference between the two UK valuation measures shown in Figure 6.3, suggesting that the ONS balance sheet estimates were based on transactions-weighted house price indices rather than stock-weighted indices. Indeed, the UK house price index used by the ONS tracks quite closely the index from the OECD database.

For the United States, Pennington-Cross (2005[51]) found little evidence for long-run differences between stock-weighted and transactions-weighted indices. However, more recently, Contat and Larson (2022[52]) show that in the United States, differences between the two indices vary greatly over time. Since 2005, transactions-weighted indices appear to have underestimated the decline in house prices compared to stock-weighted indices. This could explain some of the divergences between the fixed-weight estimate of the land share based on OECD (transactions-weighted) house price indices compared to the national balance sheet estimates, assuming that in the United States, the latter relied more on stock-weighted indices.[15]

An important question is whether trends in substitution can explain part of the deviations for other countries between the national balance sheet and fixed weight index estimates. The higher relative price of housing land may have resulted in some substitution towards structures and away from land in the cases of France and Germany. Had fixed weights from years before the rise in house prices been used for those two countries, the fixed-weight index method would, in recent years, be showing substantially higher land value shares than the balance sheet estimates. This is consistent with substitution towards investment in buildings, and conserving land after the relative price of land rose. For the United Kingdom, this mechanism seems to have been absent: from 1996, the fixed-weight method gives a remarkably close match to the ONS estimates, with no tendency for the relative increase in land prices from 1996 to 2006 to show itself in a tendency for the fixed-weight estimates to outpace the ONS estimates. It is important to recognise that

the tendency for substitution in response to relative prices may be absent in highly speculative markets: investment demand and search for yield in low-interest rate environments by wealthy investors may have offset a substitution tendency among those mainly interested in housing as shelter. This could explain the apparent absence of a substitution effect revealed by the close tracking of the fixed-weight estimate for the United Kingdom with the ONS balance sheet estimate. Since speculative fever would surely have died down after the GFC, there could well have been some re-emergence of a substitution effect that could account for some of the small relative increase in the ONS estimate of the land value share relative to the fixed-weight estimate after 2009.

Another possibility may result from a regional bias in the OECD (transaction-weighted) house price indices which, in some countries, may be over-representing large cities, where house prices outpace and rise ahead of prices in the rest of the country, a particularly strong pattern in the last 20 years.[16] This highlights the obvious point that the land share in tangible fixed assets from national balance sheets skates over a great deal of heterogeneity within countries, with far higher land shares in large and dynamic cities than in small ones or non-touristic rural locations.

None of these explanations looks particularly plausible for Canada, where from 1990 to 2002, the national balance sheet estimates strongly contradict the profile from the fixed-weight method. The problem likely lies in the estimates of housing wealth.[17]

The evidence that among these seven economies, the United Kingdom is the most extreme in the relative valuation of land, deserves further comment. Above we surveyed international evidence that credit-fuelled real estate booms, to which the United Kingdom has been particularly prone, crowd out more productive investment, with negative consequences for sustainable growth, as well as increasing crisis risk. In Muellbauer and Soskice (2022[53]), we argue that a mix of policies originating with the Thatcher governments of the 1980s are fundamental to the many problems the United Kingdom faces. The policy mix includes the preservation of exorbitant property rights for land-owners, loose financial regulation, the selling off of the social housing stock without replacement, a highly regressive property tax – both regionally and individually (Muellbauer, 2005[54]; 2018[32]; Fairer Share, 2021[55]), relatively high transaction taxes, restrictive and cumbersome planning regulations, and poor incentives for local governments to permit building. We argue that lacklustre economic performance, the severe damage to the economy from the crises that followed the late 1980s and mid-2000s credit-fuelled house price booms, the United Kingdom's relatively poor infrastructure and low national saving and investment rates, high levels of individual, regional and inter-generational inequality, and the fact that the United Kingdom has the longest commuting times and the worst insulated homes in Western Europe can all be linked to this policy mix.

Many countries lack longer series even for the housing wealth component of household balance sheets let alone estimates of the value of the land component. Given the importance of the need to better understand the role of land markets in the economy and how this differs across countries, this is an area where more work needs to be done by statistical agencies.

6.4.4. Valuation issues for the land value tax

Valuation methods that are fairly satisfactory for aggregate balance sheets are not necessarily adequate for the taxation of individual properties.[18] Difficulties in the measurement of land values are often seen as an explanation for why land value taxes are not more widespread.[19] In principle, LVT should apply to the best-use unimproved land value as distinct from the value of the building on the land. A system of land use regulation based on zoning likely will generate clear land values for land zoned for particular uses. In contrast, a discretionary planning system as used in the United Kingdom, will more often, as Cheshire and Hilber (2021[56]) argue, create ambiguities for the unimproved land values of vacant plots since 'hope value' (of obtaining future planning permission) will affect prices of vacant plots. However, if hope values can be estimated, for example from recent sales or land options[20] this could be more of a benefit of LVT rather than a problem. If the hope value on a piece of vacant land is incorporated in the valuation, LVT

spurs efforts to obtain development rights and improves land value capture for the public interest by reducing speculative hope values.

There are many more transactions of 'house plus land' bundles than of vacant plots. Property values are thus more transparent than underlying land values. One measure of land value is property value minus the replacement cost of a similar structure. If LVT were based on such a residual measure, there could be a misreporting incentive for building insurance-based measures of rebuilding costs in high land-value locations. The replacement cost could also overestimate the value of the structure where deterioration through age has occurred and hence underestimate the land value.[21]

Hedonic mass-valuation measures can be applied to granular multi-year house price data to extract land values (Diewert, de Haan and Hendriks, 2011[57]; 2015[58]). Taking account of the age of the structure and any other indicators of the condition of the building is an important part of such exercises. Construction price indices are largely national and not location-specific. Controlling for their movements improves the identification of local land prices by sorting movements in building values from land values. The hedonic regression then can look like this:

$$(Property\ value)_t = A_t \times (land\ plot\ area) + CP_t \times (1-D)^{age\ of\ structure} \times F(structure\ floor\ space\ and\ other\ characteristics) \quad (2)$$

where CP_t, the construction price index measures movements in the price of constructing a square meter of structure, D is the annual geometric depreciation rate and the age of the structure is in years. The per unit area land price A_t and the depreciation rate D are the parameters to be estimated, along with the parameters of structure floor space and other characteristics. This model therefore allows a decomposition of the property value into land and structure components. The hedonic model for condominium unit sales in high buildings is a little more complicated and was implemented by Diewert and Shimizu (2016[59]).

It can be argued that such estimates of land values should be at least as good as relying on hedonic mass-valuation methods to obtain property values since land value gradients are likely to be relatively smooth and continuous. Consider, for example, a suburban street of houses with heterogeneous characteristics. There could be small differences in per square meter land values between each side, e.g., because sun facing, or at each end, e.g., because of exposure to traffic, but land parcels otherwise should have near-identical per square meter values along the entire street. The continuity of implied land price gradients is an advantage, effectively averaging information to reduce house-specific measurement errors.[22]

The case of agricultural land needs further comment as much of the discussion around valuation issues for LVT has focused on urban settings. Farming tends to be very land-intensive, especially in more marginal hill farms where livestock graze freely with little labour and capital input. In most countries, major exemptions for agriculture apply to recurrent land taxes or property taxes dominated by land values. The value of farming land depends considerably on the efforts of the farmer to ditch, fence, fertilise and generally maintain quality, making the 'unimproved value' an elusive concept. This weakens somewhat the efficiency argument for pure land value taxation of farmland. However, given these exemptions and other tax privileges, e.g., for estate duty, that apply to agricultural and forest land in a number of countries, in the low interest rate environment of the last decades, there have been large portfolio flows, including from international investors searching for yield, into these assets, driving up their prices (Savills, 2020[60]). It can be argued that this has increased barriers to entry into farming and has contributed to the exit of family farms. It has also increased the riskiness of farming for those without large capital behind them. Moreover, as towns and cities have expanded, the rise in prices of nearby agricultural land has contributed to the housing affordability problem. While use-based exemptions for national parks and areas of outstanding natural beauty make sense, it is better for general principles to govern tax criteria. On distributional grounds and for limiting costs of tax collection, it makes sense for agricultural land to be included in broad-based property tax regimes, but for tax allowances to apply. For example, the first EUR 10 000 per hectare of value could be tax-exempt. In France, for example, this would exempt the great

majority of farmland. In countries such as the United Kingdom, Germany, Denmark and Ireland, where average farmland prices are higher, tax allowances would need to be set at higher levels.

Cheshire and Hilber (2021[56]) compare LVT and property taxes on various criteria, raising land valuation difficulties as a particular disadvantage of LVT, though LVT wins on efficiency and stabilisation. However, the conclusion that the distributional implications are similar is not plausible as land is much more unequally distributed (see above). They argue that LVT loses on revenue raising, simplicity, public acceptability and ease of transition. However, a green split-rate property tax with an LVT element does better than a pure LVT on revenue raising, public acceptability and ease of transition. Moreover, errors in valuing land (and the relative contribution of buildings) matter less than in a pure LVT. A split-rate property tax is more complex. But there is some experience with split-rate taxes from Hawaii, Pennsylvania and Finland (OECD, 2021[5]; OECD, 2022[6]) and (Hughes et al., 2018[61]). Some countries, such as Denmark, have a conventional property tax alongside a land value tax. Once land valuations become transparent and built into the system, people will adapt. In Germany, the separate valuation of the land and building component has long been a feature of property valuation. Barbosa and Skipka (2019[47]) provide an explanation of the system, the valuation methods and illustrative findings. The 'Bodenrichtwert' – the standard land value – of the locality continues to play an important role in the current revaluation and tax reform exercise in explaining the composition of the property tax.[23] Enhancing public understanding in this way should improve local accountability and more accurate estimates of land price gradients should help local government decision-making, e.g., in planning and infrastructure decision-making.

6.5. Elements of a transition

The evolution from existing property tax systems to a green split-rate system in which land and buildings are subject to separate tax rates needs to be handled with care and phased in gradually. Step 1 should be to invest in the cadastral registration system, which is not complete in all countries. Vacant and agricultural land are sometimes not covered by the prevailing property tax systems, whether for households or for businesses. Fairly complete registration is needed for the extension of the tax base, an important part of the desirable reform, but subject to tax allowances for land with lower per hectare value, and exemptions for public land such as nature reserves. Step 2 should be to invest, where necessary, in robust systems and trained staff for generating energy performance certificates (EPCs). Some countries would do well to reconsider the harmonisation of local, regional and national tax regimes and the funding structure of local government. Basic rules and valuations should be set at the national level. There should be limits on local tax-setting powers to prevent excessive tax competition between local and regional governments. A balance needs to be struck between encouragement of local and regional autonomy and national criteria for efficient resource allocation, macroeconomic objectives and preventing excessive locational inequality.

Since, in many countries, valuations for the prevailing property tax are out of date (OECD, 2022[6]), updating valuations to current market values needs to be step 3, run concurrently with steps 1 and 2. Given the new valuations, tax rates for residential property and businesses would need to be adjusted in any case in step 4. Bringing in the simple equity-based deferral system for residential property, with small discounts for cash payers (explained above), is highly desirable at this stage as it prevents revaluation shocks to the cash-flow of those with limited ability to pay. Even with incomplete coverage of EPCs across housing, green discounts for homes with favourable EPC ratings should also be introduced at this point. Both simple deferral and the green discount are crucial elements in gaining public acceptability for property tax reform. As public alarm about the climate crisis mounts, especially among younger generations, the rationale for the green discount will be more and more widely appreciated. Initially, a no-strings deferral should be offered to the over-65 age group. Later, given experience with take-up and administration, there can be consideration of rolling out the offer of deferral to all owners of residential property. Throughout, a programme of education and consultation to build public acceptance and achieve a degree of cross-party consensus would be highly advisable.

Even with a deferral for older households and the green discount, it makes sense to phase in the valuations used to implement step 4. For example, in the first year, the effective property value for taxation could be based on one-third of the new value and two-thirds of the old. In the second year, the effective value could be two-thirds of the new and one-third of the old, with the transition completed in the third year. Extensions to longer transitions are obvious.

In step 3, the focus needs to be on an early update of overall property values. As Fernandez Milan, Kapfer and Creutzig (2016[62]) show in some detail, prevailing property valuation methods in most countries need improving, especially as regards land valuation. They suggest that the integration of GIS information and automated mass valuation systems is the way forward,[24] an area where Denmark appears to be the current leader in practical application. Step 5 should implement improvements in valuation systems with a view, for each property, to split the overall value into land and building components. Finally, in step 6, tax rates for the two components can gradually be separated, with tax rates on land values adjusted upwards relative to tax rates on buildings.

One important question is at what stage to incorporate the extension of the tax base to include vacant and agricultural land. This is mainly a question for the business tax regime. Since expanding the tax base is such an important current issue, with widespread concerns about the fiscal capacity of states after the massive increase in government spending both after the GFC and during the Covid pandemic, early extensions are advisable. As ever, phasing in these changes is advisable to prevent excessive sudden shocks to cash-flows and asset prices.

6.6. Conclusions

The paper has explained the urgency to implement green property taxes given the climate emergency. It considered how to implement green discounts in the context of the multiple objectives of good tax design. These include, as well as incentivising the green transition and reducing climate risk for the financial system, raising tax revenue, improving equity, stabilising the economy and the financial system, improving efficiency in resource allocation and promoting growth, simplicity and the cost of administration, reducing housing supply constraints, balancing localism – subsidiarity and democratic accountability – and national objectives, achieving public acceptability and easing the transition from the previous system.

Economists have often argued that there is a trade-off between growth and an equitable distribution, so that policies that favour the latter, damage economic growth and the efficiency of resource allocation. However, well-designed recurrent property taxes do the opposite: they enhance growth and efficiency *and* equity. Lowering transaction taxes and increasing recurrent property taxes improves the utilisation of the existing stock, increases the flexibility of labour and housing markets and eases adaption to shifts in the economic environment. Moreover, the evidence has mounted that credit-fuelled real estate booms have crowded out more productive investment, with negative consequences for sustainable growth, as well as increasing crisis risk. Furthermore, with appropriate green discounts, green property taxes can enhance sustainable growth and address the climate crisis. Green discounts are important because without them, green investments that increase property values raise taxes where these are linked to recent property values, thus discouraging this kind of investment. Green property tax discounts also sharpen incentives for green mortgage pricing in the form of lower interest rates or more favourable lending criteria for homes with better EPCs. These are reasons for maintaining such discounts even if carbon pricing or emissions trading are introduced. The proposed green LVT and deferral mechanisms, while conceptually appealing for achieving equity, efficiency and environmental goals, would entail feasibility challenges in implementation for many countries compared to current property tax regimes. Shifting to this new system would require overcoming hurdles related to public acceptability (see Section 6.2), valuation and data availability (see Section 6.4.4), and the complexity of administering a tax split between land and buildings, requiring careful consideration of the transition from existing tax regimes (see Section 6.5).

A key objection to recurrent property taxes, usually most vociferously made by the wealthiest property owners, is that cash-poor households in expensive properties can face hardship. This is most easily addressed by permitting deferral of payment until the property is sold or transferred. The chapter discussed the issue, why the take-up of deferral is often low and explained a simple equity-based design proposal for deferral that addresses the causes of low take-up.

Several countries have a mix of conventional property taxes and taxes based on land values, including split-rate taxes, though many have only the former. As explained previously, land value taxes have long been seen as the most efficient form of taxation, though the optimal tax literature also argues for consumption taxes. Split-rate property taxes with different tax rates on buildings – a kind of consumption tax- and on land are therefore desirable. Some of the literature on the distributional effects of split-rate property taxes argues that higher tax rates on the land component may not be equitable if the land shares of property values are relatively high for cash-poor households. However, the proposed deferral scheme breaks the link with cash income, making an income concept including imputed rent more relevant. Then the case for arguing that split-rate property taxes lower income inequality becomes overwhelming.

The importance of accurate national balance sheet data was emphasised by uncovering a major error in Canada's data on housing wealth which may well have misled monetary policy by distorting the link between housing wealth and aggregate consumption. National household balance sheet data suggests that in three G7 countries, more than half of the value of housing wealth is accounted for by land – over 70 percent in the case of the UK – and in none is the share less than 40 percent. The share of land has risen strongly in all G7 countries but for Italy and Japan, implying an increase in the relative price of land. As house values are a combination of volatile and cyclical land values and far more stable building values, given by construction costs, this highlights the risks to the stability of the financial system and the wider economy of land prices. Land value taxation therefore is especially useful for promoting economic stability and better targeted than standard property taxation. Advances in data management and statistical methods for mass valuation address concerns over the complexity of separating land and building values for tax and the current roll-out in Germany is evidence for the practicality of valuation methods.

Major tax reforms and property revaluations that generate a large number of winners and losers need to be phased in gradually. The chapter addressed issues of the transition from existing property tax regimes to green split-rate regimes in which buildings and land are taxed at different rates. The proposed deferral scheme greatly reduces the risk of cash-flow distress that could be suffered by losers and is therefore an important part of a reform package.

To summarise the overall conclusions of the chapter, in line with OECD (2021[2]), "Relying less on housing transaction taxes and more on annual taxes on immovable property while shifting the base of these taxes from the value of structures to current land prices would bring multiple benefits". The need for such a shift has never been greater, given widespread fiscal pressure. The Coronavirus pandemic has generated huge structural changes in employment patterns and in housing preferences, many long-lasting. Major structural changes in the economy associated with efforts to reach net zero emissions can be expected. These add to the need to reduce the costs of adjustment by lowering transaction taxes. Especially in English-speaking and Scandinavian countries, there had been large pre-pandemic rises in house prices relative to income, pricing many younger citizens out of home-ownership, especially with tougher down-payment requirements that followed the GFC. Easy monetary policies during the pandemic have fuelled further large wealth gains for property owners relative to the rest and further undermined long-run productivity growth. Stiglitz (2015[63]) has analysed the contribution of the structure of the financial system and of low interest rates to widening wealth and income inequality. He argues that a tax on land values or the returns from land would reduce inequality and increase real labour income.

Moreover, the world is facing a climate crisis and urgent action is needed to reduce carbon emissions of which buildings account for a large fraction. Lower-income households often live in poorly insulated homes and tend to spend a large fraction of their budgets on energy and housing. This means that they can be

more negatively affected in the short run by carbon taxes and tougher building regulations and benefit less from green tax rebates or discounts. The negative distributional effects of dealing with the climate crisis need to be offset by combining green discounts with a more progressive property tax. The green split-rate tax, proposed here, with its property and land value components, as well as a simple deferral mechanism, fits the bill.

The comparison of threats to the climate and financial stability in Aron and Muellbauer (2022[12]) has particular resonance just now: after the post-pandemic rise in inflation and the shocks of Russia's war on Ukraine, the sudden rise in nominal interest rates after over a decade of low rates has brought a near-global house price boom to a sudden halt. Particularly in countries where floating rate or short-term fixed mortgages are prominent, fears of bankruptcies and foreclosures have returned. It is likely that in many countries, policymakers will have regrets that their property taxes were not better designed to stabilise house prices and mortgage debt. In most OECD countries, real house prices have recently been falling and may have further to fall. In the not-too-distant future, an opportune moment will arrive to bring in long delayed revaluations for property tax with smaller changes in relative valuations compared with those at real estate price peaks. With appropriate phasing of tax changes and simple, widely-offered tax deferral, the move to regimes of regular revaluation, ideally with split-rate taxes and green discounts, should then be politically feasible.

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Notes

[1] Bailing out the banking system in the global financial crisis and loss of tax revenue in the recession that followed have also been wide-spread factors in reducing fiscal capacity.

[2] BPIE (2014[14]) explains that 'EPCs may include additional information, such as the actual impact of heating and cooling on the energy needs of the building, on its primary consumption and the carbon dioxide emissions'. Quite apart from placing a building into a particular energy efficiency class, EPCs include 'recommendations for the cost-effective or cost-optimal improvement of the energy performance of a building'. Also see Prestwood (2020[66]) on how EPC data can help reduce carbon emissions. In England and Wales, certificates provide an estimate of annual tonnes of CO_2 emissions and state that "Properties get a rating from A (best) to G (worst) on how much carbon dioxide (CO_2) they produce each year." In a number of other countries, the ratings are based on energy efficiency as measured by annual consumption of kilowatt-hour per square metre.

[3] In the city of Salvador, the fourth largest in Brazil, property tax discounts of up to 10 percent are offered based on the ability of buildings to reduce CO_2 emissions through the use of sustainable technologies, based on a checklist of 70 characteristics.

[4] Harrison (1983[71]) is an early dissection of speculative boom-bust house price and credit cycles, issues to which the author returned in several later books. He sees major benefits for land value taxation in reducing these risks.

[5] Bourassa (2009[68]) suggests that this and lack of public understanding are likely to be the most important explanations for why, when LVT is such a good idea, it has not been more widely implemented. In addition to the points raised in this section, he argues that the additional complexity of separate valuations of land and buildings is a drawback and the additional volatility of land prices can create strong resistance to recent market value based LVT, unless tax rates are moderated after sharp rises in values. He suggests that the rejection in Hawaii of LVT was partly because of fears of over-development in ecologically sensitive parts of the island. However, green discounts and appropriate zoning could easily address this problem. Moreover, LVT discourages urban sprawl (see Fernandez-Milan et al., 2016 and OECD (2022[6]) for references to the large literature on this). Slack and Bird (2014[65]) note the visibility of property taxes in contrast to income tax withheld at source or VAT, and concerns about the accuracy and fairness of valuations, as obstacles.

[6] OECD (2022, p. 117[6]) defines the term as follows: “Split-rate taxes are a hybrid of pure land value taxes and regular recurrent taxes on immovable property, where both the land and improvements on the land are taxed, but land is typically taxed at a higher rate.”

[7] It argued that business property is an intermediate input to production. A basic principle of efficient taxation is that intermediate inputs, as opposed to final consumption, should not be taxed. It is distortionary to skew the economy away from business property- intensive production. Moreover, in practice, business taxes often have other distortionary features such as exemptions for farming or reduced rates for empty buildings or unused land.

[8]In Great Britain, the energy classes are directly based on estimated carbon emissions.

[9] To be precise, note that the parts of a plot not occupied by a building can vary in how ‘green’ they are. A garden, adding to biodiversity with CO_2 absorbing plants, is green, while a tarred forecourt or tennis court or a swimming pool are not. The green discount should be applied to gardens.

[10] Kalkuhl et al. (2018[69]) note that in developing economies where high fractions of low income households are subsistence farmers, a land value tax is likely to be regressive. However, a tax allowance on low value land can easily correct this.

[11] In England around 17% of land is not registered at the Land Registry, mainly estates that have passed down many generations and not been transacted on the open market. Shrubsole’s estimates of ownership concentration takes this into account.

[12] In the theory part of their paper they consider some of the wider general equilibrium effects of a switch to LVT. These include a boost to residential investment, increasing housing supply and lowering rents. Depending on how the efficiency gains from the switch to LVT are shared across the population, there could be further reductions in long-term income inequality.

[13] It is possible that the higher relative price of housing land may have resulted in some substitution towards structures and away from land which would result in somewhat lower fractions attributed to land in 2020 than implied by these numbers. But investment demand and search for yield in low interest rate

environments by wealthy investors may have offset this substitution tendency among those mainly interested in housing as shelter.

[14] Strictly speaking, these data from the OECD balance sheet tables are for households and non-profit institutions serving households (NPISH).

[15] It is also worth noting that the construction cost deflator for the United States tends to be more aligned with the housing cycle than is the case in other countries. This could underestimate the fall in the relative price of land after 2006.

[16] See Muellbauer (2019[67]) for evidence that low interest rates and credit liberalisation tend to have disproportionate effects in major cities such as London and Paris, where supply constraints also tend to be more severe.

[17] Matthew Kelly of Statistics Canada raises the possibility that the housing stock count in the 1991 Census was misinterpreted. This could have led to under-estimating the 1991 benchmark and over-estimating the subsequent rise in the value of the housing stock. Because this would have seriously biased towards zero empirical estimates of the housing collateral or 'wealth' effect on consumption in Canada, this had potentially significant policy implications.

[18] Though improvements in the granular data would feed into improving the aggregate balance sheet data.

[19] See Fernandez Milan, Kapfer and Creutzig (2016[62]), for a remarkably comprehensive, yet concise, review of the literature and of valuation and tax systems in Europe. Hughes et al. (2018[61]) examine international experience of land value taxation and the feasibility of introducing LVT in Scotland.

[20] Key to this is to legislate that for land options to be legally enforceable, they need to be registered on a public database, e.g., at the Land Registry.

[21] As noted above, in the context of national balance sheets, Kumhof et al. (2021[36]) argue that this 'residual' method tends to underestimate land values.

[22] There are counter-examples, such as where the catchment area for a desirable school separates one side of the street from another, or where a wild-life reserve backs onto only one part of a street. However, given houses of similar characteristics in both locations, hedonic methods should be able to track the higher land values in the more desirable locations successfully.

[23] There are differences between states in how valuations of land and buildings are to be assessed and on the tax structure (Stueckmann, 2022[64]). In the Federal valuation model, the building value is determined by multiplying the normal production costs by the construction price index published by the Federal Statistical Office and the gross floor area less a reduction in value due to age. Normal production costs are determined on the basis of the type of building (e.g., office building, factory building of solid or skeleton construction or storage building depending on use) and the year of construction. Baden-Württemberg is proposing to tax only the land value from 2025.

[24] Diewert and Shimizu (2021[70]) integrate GIS information and the hedonic model set out in equation 2 to allow separate estimation of land and structure components of property values.