



# A systematic framework of location value taxes reveals dismal policy design in most European countries



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## ABSTRACT

Location values have long been recognized as an attractive instrument to raise municipal revenues. First, they increase fiscal efficiency and equability compared to traditional property taxes. Second, they can be used to enhance sustainable urban planning. The question of how to design a location value tax has long been discussed in various strands of literature, but there are few efforts to create multidisciplinary approaches. This lack of reconciliation hampers the discussion on optimal designs that includes all economic, social and environmental considerations. Here we combine literature on public finances, urban economics and value capture with that of sustainable urban planning to narrow this gap. We develop a framework to assess the design characteristics of location value taxes from a sustainability perspective, and apply this framework to assess current practices in Europe. The analysis reveals severe shortcoming in policy design in most European countries, although Denmark provides a more promising example. Nonetheless, location value taxes have a high potential for improving sustainable urban planning.

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## 1. The rationale of a location value tax for urban sustainability

Cities constitute both sources and solutions to climate change and other sustainability challenges. While diverse disciplines address some aspects of urbanization, there is a need to integrate this knowledge in order to find optimal – or at least appropriate – pathways that could minimize the negative impacts as well as maximize the positive outcomes of the urbanization process (Rosenzweig et al., 2011; Seto et al., 2014). Solutions are strongly related to policy instruments that enhance synergies among multiple objectives, and well-designed urban plans exhibit great potential (Seto et al., 2014; Zanon and Veronesi, 2013). On the one hand, they efficiently limit urban externalities (Arnott, 2011; Brueckner and Kim, 2003; Kaza and Knaap, 2011). On the other hand, they may alleviate municipal budget constraints (especially in Europe) for low carbon urban infrastructure investment (Dexia and CEMR, 2012; Mathur and Smith, 2013; Rybeck, 2004).

Location value tax (LVT), a tax that recovers the value of properties that has not been created by landowners, could explicitly

support sustainable urban planning objectives (Batt, 2011; Brandt, 2014; Panella et al., 2011; UN-HABITAT, 2011a; UN HABITAT, 1976) (we argue in favor of using the concept LVT instead of the common term land value tax based on a proposal to homogenise nomenclature; see Fig. 1 in Section 3.1 for clarification). First, it increases fiscal efficiency. As the provision of land remains cost-free, taxing away urban location values (LV) does neither harm the economy nor does it distort markets (George, 1879; Kuncze and Shogren, 2008; Mattauch et al., 2013). Revenues have been used to finance sustainable urban infrastructure in different contexts<sup>1</sup> (Ingram and Hong, 2012a,b; Kitchen, 2013; Medda, 2012; UN-HABITAT, 2011a; Zhao et al., 2012). Second, it is legitimate to tax away LV. The share of property's worth which is not produced by landowner's labour, but from public intervention, community actions and environmental quality, is an unfair burden on those whose activities had given it value (Albouy, 2012, 2009; Arnott and Stiglitz, 1979; Brandt, 2014; Brueckner, 2000; Fainstein, 2012; UN HABITAT, 1976). These capitalization dynamics, exacerbated in the last decade, have provoked a strong call for reconsidering the property tax (PT) base and shift it from real estate towards LV for wealth distributional objectives (Antony and Seely, 2013; Brown and Smolka, 1997; Dwyer, 2003; European Environment Agency, 2010; Foldvary, 2006; Gaffney,

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<sup>1</sup> Cord, (1985) found that an annual land rent tax would yield nearly two-thirds of all taxes in place for the U.S.

**Table 1**

Design characteristics of LVT influencing sustainability effects. X indicates the most suggested option literature refers to when looking at the sustainability effects. Abbreviation characters explained in Table 2.

	Criterion	Sub-criterion	X
1. Tax base	Natural resources (N)		
	Private improvements: investment nearby (T)		
	Environmental externalities (Q)		
	I Public/community intervention (C)		
	II Public intervention: urban infrastructure (E)		
	III Public intervention: land-use regulations (O)		
	Private improvements-owner: non-structural (M)		
	Private improvements-owner: structural (G)		
	Site value (S) (T+Q+C+E+O1+M)		
	Location value (LV) (T+Q+C+E+O)		X
Land value (H) (T+Q+C+E+O+M+N)			
2. Tax subject—Ownership	All urban owners (AUO)		X
	Private ownership (PO): private owner-occupied (POo) and Private owner non-occupied (POn)		
	Legal Entities (LE): legal enterprise (LEn), public (P) and institutional (I)		
	Tenants/users (U)		
3. Tax subject—location use	All land uses (ALU) (under restrictive urban land use planning)		X
	All economically usable activities (AEU): residential (RES); commercial (BUSS); industrial (IND); scientific parks (SPK)		
	Non-economically usable (NEU): non-profit (NP); religious (R); education (EDU); health (HEA); public (P); infrastructure provision (IP); natural reserves (NR)		
	Location beneath buildings (L1)		
	Location not beneath buildings (L2)		
Vacant building ground (V)			
4. Valuation method	4.1 Basis of assessment	Market value (MV) (HBPU)	
		Area based assessment (ABA)	
		Cadastral value (CV)	
		Flat base (FB)	
		Location gains (LG)	
		Annual rents (AR)	
		Appraisal: HBPU	X
	4.2 How to appraise	Appraisal: current use (CU)	
		Traditional techniques: abstraction (AB), allocation (ALL), teardowns (TD); contribution (CON)	
		Sales comparison (SC)	
		Self-assessment (SA)	
	4.3 Frequency of assessment	Massive econometric appraisals (MA); computer assisted mass appraisals (CAMA)	
		CAMA + GIS (CAMA-GIS)	X
	<5 years	X	
	≥5 years		

Table 1 (Continued)

	Criterion	Sub-criterion	X
5. Elements of differential taxation	5.1 Liability base	Delays in assessment ratios adjustments under equity considerations	X
	5.2 Tax rate	$\geq 2.5\%$	X
		Differential taxation according to land uses	
	5.1 & 5.2 Tax liability	Rate in relation to local year-to-year market value change/CPI	X
		Enough to raise substantial revenues and change behaviors	X
	5.3 Exemptions and reliefs—owner	No reliefs/exemptions (–)	X
		Assessment limits (AL)	
		General discretionary exemptions (GDE): low incomers (LI); disabled (D); war veterans (WV)	
		Mortgage interest deductibility (MID)	
	5.4 Exemptions and reliefs—land use	Tax deferral (TD)	
Exemptions based on area (ARE)			
Conditional relief (CR): relief if intended use is realized within a given period/budgetary responsibilities			
Pigouvian relief: site specific reasons (PR)			
5.5 Temporality	Exemptions based on types of land use (see Table 1, Section 2.2)		
	Permanent (PER)		
	Temporary (TEMP)		
6. Revenue raising	6.1 Tax liability	Minimum criteria: payment obligations cover administrative costs	X
	6.2 Collection [Normative]	$R_t \geq$ predefined value	X
		$R_t(t)$ constant	X
7. Revenue recycling	[Normative] Locally—benefit view (BV), redistribution—new view (NV)		
8. Governance	8.1 Tax; 8.2 Tax Rate; 8.3 Tax Relief; 8.4 Collection; 8.5 Revenues	Local government (L)	X
		Regional or state (C)	
		State and local (C/L)	
		Local within state set range (C(L))	
		Local within LUZ set range (LUZ(L))	X
9. Fiscal environment	No taxes related to property (No)		X
	Additional taxes related to property (Yes)		
10. Implementation	10.1 Legal separation		X
	10.2 Taxpayer's right to require a revision of the valuation		X
	10.3 Explicit tax bills and revenue recycling		X
	10.4 Strong land use planning		X
	10.5 Coordination among tax offices		X
	10.6 Gradual introduction		X

2009; Institute for Fiscal Studies, 2011; Mills, 2001; Oates and Schwab, 2009; Raslanas, 2013; UN-HABITAT, 2011b). Third, a tax on LV fosters sustainable urban development in the following ways: (a) it reduces urban land conversion trends (Altes, 2009; Banzhaf and Lavery, 2010; Brueckner, 2000), (b) it fosters mixed land use development and by this supports low-carbon transport modes (Altes, 2009; Nuissl and Schroeter-Schlaack, 2009), and (c) it internalizes externalities, especially those related to environmental degradation (Brandt, 2014; European Environment Agency, 2010). The fact that more than 30 states use some form of LVT demonstrates that it is far from being a utopian concept (Anderson, 2009; Bird and Slack, 2003; Bourassa, 2009; Johannesson Lindén and Gayer, 2012; McCluskey and Franzsen, 2005).

While there seems to be a common consensus of the benefits from LVT, literature lacks in conclusive outcomes with regards to optimal designs, particularly for fairness and land consumption concerns (Brueckner and Kim, 2003; Cho et al., 2008; Dye and England, 2009a; Gregory, 2008; Lim, 1992; Luca, 2011; Maxwell and Vigor, 2005; Oates and Schwab, 1997; Skaburskis, 1995; Song and Zenou, 2006; UN-HABITAT, 2011b). Three important shortcomings appear in the literature. First, diverse disciplines investigate different aspects of LVTs, but vague terminology and inconsistencies disable useful comparisons between outcomes (Bird and Slack, 2003; Doerner and Ihlanfeldt, 2011; Dye and England, 2009a; England, 2003; Foldvary, 2006; Institute for Fiscal Studies, 2011; Lutz et al., 2011; Raslanas, 2013). Second, evaluation lacks a systemic holistic perspective that covers all potential benefits at the same time (Alterman, 2011; Cocconcelli and Medda, 2013; Franzsen and William, 2008; Luca, 2011; Maxwell and Vigor, 2005; McCluskey and Franzsen, 2005; UN-HABITAT, 2011a,b). Finally, empirical studies deal with very specific set-ups where evidence comes only from observing the effect of changes in tax regimes, and remains incoherent as evaluation depends also on baseline conditions (initial tax regime), and institutional and macroeconomic contexts (Anderson, 2009; Franzsen, 2009).

We seek to alleviate these shortcomings by critically reviewing and comparing current theoretical and practical approaches to LVT in cities under a sustainable perspective. Sustainability here indicates the set of effects in urban land (developed or developable) induced by shifting PT towards LVT on economic, social and environmental systems, by assembling those independently identified in the literature. On this basis, we answer the following research questions:

- a Which design characteristics of LVT are enhancers of urban sustainability?
- b Are current European practices of LVT properly designed according to what literature says?

Section 2 describes a framework to assess outcomes from different LVT design characteristics. We use this framework for the evaluation of current European practices in Section 3. Finally in Section 4 conclusions are drawn as to whether LVT may be a useful instrument to complement other planning measures. Our research indicates that LVT is a valid option for future fiscal reforms from an urban sustainability perspective, but outcomes strongly depend on the instrument design characteristics as well as on the urban context.

## 2. Design elements of LVT: a framework

This section reviews and synthesizes the literature dealing with LVT to address the first question, combining findings from the fields from urban economics, public finances and property taxation, urban sustainability planning and value capture. We develop a

framework that assists in the evaluation of a shift towards LVT from a holistic perspective, considering the potential effects different tax designs may have on different aspects of urban sustainability, understood as a term that embraces not only pure economic efficiency improvements in the fiscal system and revenue potential (Clark and Jamelske, 2005; Cord, 1985; England, 2007, 2003; Nechyba, 1998), but also social and environmental ones. Social sustainability entails on the one hand the progressivity of the LVT (based on public economic literature) (George, 1879; Musgrave, 1974; Youngman, 2002), and the equitable access to public intervention on the other (taken from sustainability and development literature) (Dempsey et al., 2012, 2011; Fernandez Milan, 2015). Environmental sustainability in cities may include multiple aspects. We focus on excessive urban land consumption (also known as urban sprawl) (see e.g. (Cho et al., 2008; England and Ravichandran, 2010; Lim, 1992), and environmental pollution to a lesser extent (often refer to as environmental externalities) (Alterman, 2011; Batt, 2011). Our evaluation toolkit structures typically discussed issues on which policy-makers take decisions when developing and implementing a LVT into ten main design characteristics (Alterman, 2011; Dye and England, 2009b) (see Table 1 below).

### 2.1. Tax base

#### 2.1.1. What can be taxed?

Terms like “site value”, “location value”, and “value capture” are used interchangeably in the literatures creating inconsistencies (Franzsen and William, 2008; Hubacek and van den Bergh, 2006; Özdilek, 2011; Park, 2014). An established nomenclature would facilitate the discussion (Özdilek, 2011; Hubacek and van den Bergh, 2006; Park, 2014). Two issues are crucial for this exercise: (a) where does the value come from, and (b) who creates the value (Alterman, 2011; Brueckner, 1986; Franzsen and William, 2008; Grosskopf, 1981; Huxley, 2009; Ingram and Hong, 2012a,b; Rao, 2008; Rybeck, 2004; Zhao et al., 2012); both necessary for the applicability of political rationales. Few attempts on classifications and methodological guidelines exist (Alterman, 2011; Ingram and Hong, 2012a,b; Medda, 2012), but none is exhaustive enough to cover all three sustainability criteria we here deal with.

In our attempt to bridge the gap between literatures, we identify the value elements that comprise property values and their value sources. Literatures also use terms that aggregate a number of value elements, but these are never appropriately clarified. We disentangle them and delineate them with their “element mix”, to define them in a systematic way. Fig. 1 and Table 2 below show the different elements and aggregated value terms coming out of this exercise.

#### 2.1.2. What should be taxed?

Defining which value should remain in which hands is a normative issue with philosophical implications. Some authors claim that land productivity should be added to that of private land improvements and remain in private hands because it is already paid for by the owner at the time of acquisition (Ingram and Hong, 2012a,b). Others use the case of larger natural resources to make the case for taxing them (Alterman, 2011).<sup>2</sup> Significant differences between natural resources and the rest of value elements on how the value is created, capitalized and assessed, leads to different outcomes depending on whether they are included or not in the tax base. Taxing natural resources encourages over-exploitation, whereas a tax on extraction outputs – e.g., through a sufficiently high environmental consumption tax – discourages it and leaves

<sup>2</sup> An oil discovery near Gatwick (London, UK) has brought this issue to the front of the discussion (Barrett, 2015).

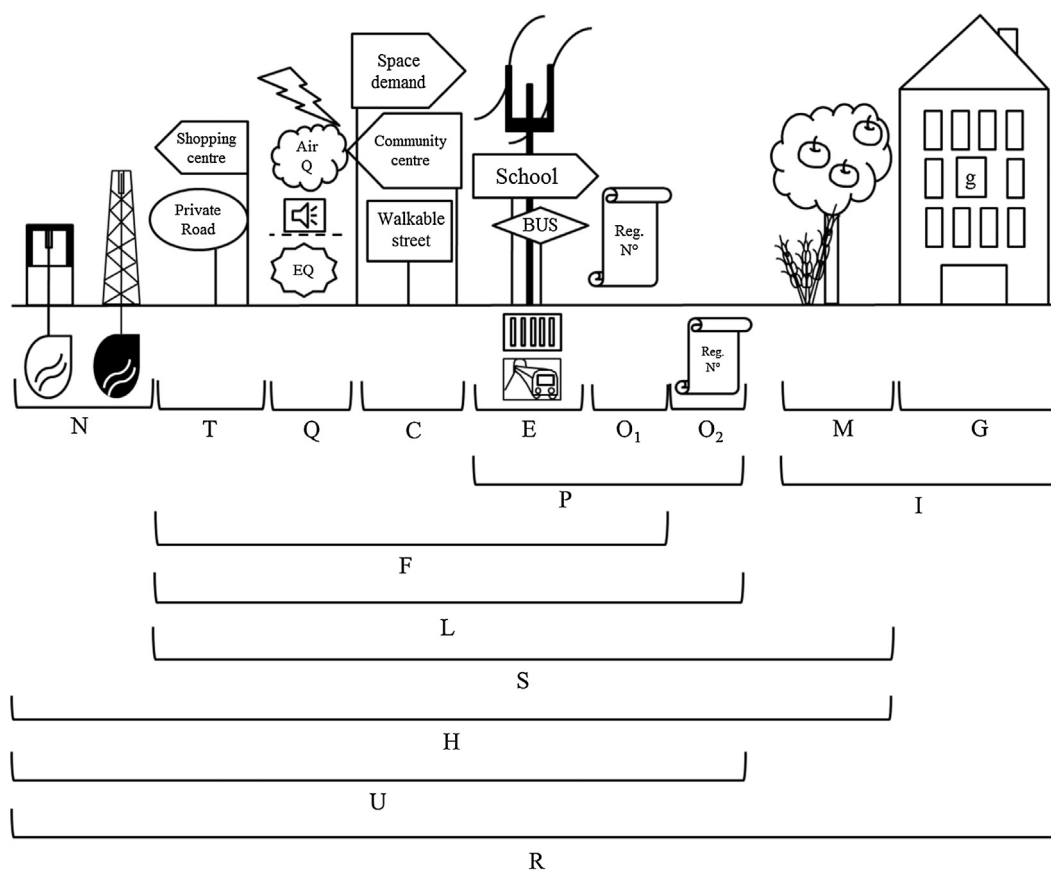


Fig. 1. Nomenclature: conceptual diagram.

the resources underground for future generations. Hence, natural resources should be addressed with an independent instrument which taxes the extraction rent, not the value element (Gaffney, 2009).

A wide agreement exists on capturing value from infrastructure improvements and public services (UN HABITAT, 1976; Walters, 2012a,b). Although it raises political opposition (Dillman and Fisher, 2009), the same occurs with the value from changes in land use regulations. Land use regulations create artificial land scarcity, and building regulation constraints supply through height and density constraints, both inflating location prices<sup>3</sup> (The Economist, 2015; UN HABITAT, 1976; Walters, 2012a,b). Community-related value, forgotten in the value capture literature, it is included in the tax base under wealth redistribution arguments (UN HABITAT, 1976; Walters, 2012a,b). Finally, the value from environmental externalities, only mentioned in new development, should also be part of the LVT for environmental concerns (Pigouvian taxation) (Batt, 2011; European Environment Agency, 2010; Kuncze and Shogren, 2008; Panella et al., 2011). This said, LV is the least economically distortive aggregated value (Foldvary, 2010, 2008, 2006; George, 1879; Mill, 1985; Recktenwald and Smith, 1999); one of the fairest tax base (Foldvary, 2008; Gaffney, 2009; Harrison, 2014), and discourages extensive, space-consuming urbanization by fostering intensive use of urban land (Foldvary, 2008). Weaknesses only appear when it comes to implementation (Ingram and Hong, 2012a,b).

<sup>3</sup> In West End London (UK) land-use regulations inflate LV by about 800%; in Milan and Paris by 300% approx. (The Economist, 2015). The absolute liberalization of the real estate market in the US would yield about \$1.5 trillion, rising GDP by between 6 and 13% (The Economist, 2015).

## 2.2. Ownership

Two types of individual entities constitute private property ownership: residential owners – owner that is registered at the location –, and non-residential owners – not registered at the location –. Tenants, users or renters also hold specific rights and duties. An increase in LV affects only tenants because they suffer a proportional increase in their rents, sometimes high enough to cause displacements. Non-residential owners see their revenues climbing with zero additional investment costs. Residential owners can either sell their property and capitalize the added value, or stay and pay unchanged mortgages. Hence, added values are captured by ownership, and it is thus acceptable to tax only owners, disabling them to pass the charge to renters (Dye and England, 2009a; Foldvary, 2008,b; Ingram and Hong, 2012a,b; Mill, 1985; UN-HABITAT, 2011a). Next, three types of legal entities exist: legal enterprise, public bodies, and institutions. An optimal LVT should apply to all urban ownerships to avoid underuse and suboptimal allocation of untaxed land (Alterman, 2011), especially in countries with a large share of public land (Waicho Tsui, 2008).

## 2.3. Land-uses

The chargeable subject mostly varies depending on the type of human activity allowed. First, a LVT can be applied to all land uses or to all economically usable activities (European Commission, 2015). One could exempt surface not covered by a dwelling and tax only location beneath buildings, but this leads to small dwellings and large surrounding plots, ultimately incites sprawling tendencies. An exemption on the surface covered by building, taxing only unconstructed land also encourages households to fill their location



**Table 2**  
Nomenclature: definitions.

Sign	Nomenclature	Example/definition
Element		
N	Natural resources (including land productivity)	Minerals, oil, water bodies, soil
T	Private improvements: investment nearby	Shopping centre, private road
Q	Environmental externalities	Air Q., noise, radiation
C	I Public/community intervention	Space demand <sup>1</sup> , community attractiveness
E	II Public intervention: urban infrastructure	Transport, sewage, electricity
O	III Public intervention: land-use regulations	O <sub>1</sub> : Zoning; O <sub>2</sub> : use rights
M	Private improvements-owner: non-structural	Garden, irrigation system
G	Private improvements-owner: structural	House, dwellings
g	Private improvements-owner: structural	Apartment or part of building
Aggregated value		
P	Value from public intervention	E+O
I	Value from private improvements-owner	M+G
F	Location surface value	T+Q+C+E+O <sub>1</sub>
L	Location value	T+Q+C+E+O
S	Site value	T+Q+C+E+O+M
H	Land values	T+Q+C+E+O+M+N
U	Unearned value	C+E+O+Q+T+N
R	Real estate/property value	U+I
W	Immobile wealth	Depends on definition of wealth

<sup>1</sup> Space demand is what often is referring to as urban development macro-effects: population increase, economic development (income), security and agglomeration effects among others.

with structures (Dye and England, 2009b; European Commission, 2015; Zabulenas et al., 2010).

Urban economic activities generally entail residential, commercial, industrial, public, special uses (e.g., non-profit, social, religious, events and sports), and undeveloped urban land. Residential use is the most space-consuming use per capita in cities and suburbs with great infrastructure needs<sup>4</sup> (Couch et al., 2007; European Environment Agency, 2013, 2010). Taxing residential use would contribute reducing its excessive urban land consumption (Blum, 2014; Bringezu, 2014; Brown, 2014; European Environment Agency, 2010; Zabulenas et al., 2010), increase residential density and reduce transport emissions (Banzhaf and Lavery, 2010; Creutzig et al., 2015).

Taxing commercial and industrial use is more controversial; two views coexist. On the one hand businesses are not end payers and LVT would hand additional wedges onto consumers (Bird and Slack, 2013, 2003). But excluding them also subsidizes consumers, as the total costs of production – including business location – are not fully internalized. In practice, governments fear taxing businesses especially if the nearby jurisdictions do it too (Wassmer, 2009). But net effects depend on mobility of the business, typically lower in practice than what businesses claim (Wassmer, 2009). Besides, commercial activities represent a great share of the tax base in large urban zones (Gutachterausschuss für Grundstückswerte in Berlin, 2014; Higgsmith, 2013). From a social planner perspective, LVT on commercial use is of particular interest if the net social and environmental benefit of residential space exceeds that of commercial use (Glaeser, 2013). In this regard, innovative alternatives suggest the idea of a “sustainable compensation” or “footprint charge” that fully includes production costs (European Environment Agency, 2010; Zwinger, 2002). With regards to special uses, preferential treatment provides direct community benefits, but also exempts local governments from fiscal responsibilities. It is thus preferable to implement direct subsidies available to all, not just to property owners (Cordes, 2012). In practice, exemptions apply to those called non-economically usable, which include non-profit

and public and institutional uses<sup>5</sup> (European Commission, 2015). One alternative could be that local governments assess the tax base erosion and perform a cost-benefit analysis (Bowman et al., 2009; Cordes, 2012). Finally, vacant land encourages development and deters land speculation (Brueckner and Kim, 2003), but new development is not always desirable, leading to negative outcomes on society and ecosystems – e.g., withdrawal of land from agriculture may provoke unemployment and urban sprawl – (Anderson, 1986; Douglas, 1980; Roakes et al., 1994). An adequate classification of natural and artificial land cover with specific regulation of developable land solves this issue.<sup>6</sup> Even in rapidly growing areas, although a burden on undeveloped land does not ensure contiguous development, it certainly shapes it towards more sustainable urban forms (Brandt, 2014; Fainstein, 2012; Seto et al., 2014). Based on these observations and for the sake of simplicity to further discuss the effects of a shift towards LVT, we assume relative inelasticity of land supply through the existence of restrictive land use planning.

#### 2.4. Valuation method

Valuation methods aim at capturing the spatiotemporal property value change linked to location advantages and disadvantages, and incorporate it into the tax base to provide taxpayers with a sense of fairness (Walters and Rosengard, 2012). Plot-specific appraisals are therefore the most equitable alternative but also administratively unfeasible (Alterman, 2011). We focus on the adequacy of different bases of assessment, the technical approaches, and the importance of the frequency of assessments.

##### 2.4.1. Basis of assessment

The basis of assessment is the indicator used to obtain a monetary value for the tax base (Johannesson Lindén and Gayer, 2012). Market Value (MV) is “the estimated amount for which the property should exchange on the date of valuation between a willing buyer and a willing seller in an arm’s length transaction after proper marketing wherein the parties had each acted knowledgeably, pru-

<sup>4</sup> In Europe, urban residential land consumption accounts for 20% of total land use change in the last decade (Couch et al., 2007; European Environment Agency, 2013, 2010).

<sup>5</sup> Exemptions in Europe include public infrastructure regardless of its owner (water, electricity, and sewage) (European Commission, 2014).

<sup>6</sup> We exclude non-urban artificial land cover like agriculture and other natural land covers.

dently and without being under compulsion” (EU, 2013; TEGoVA, 2015).<sup>7</sup> It reflects the expectation of bidders for the most productive permitted use of the location, often referred to as ‘Highest and Best Permitted Use’ (HBPU). Assessed or cadastral value (CV) is a database with values based on the adjustment of historic MV using diverse factors – age, use, inflation factor, etc. Rent refers to inter-temporal value increase. On a general basis, it accounts for a life-time period – location gains (LG), but it can also be expressed as Annual rental value (AR). This is called recurrent income for non-residential owners and absent owners – the annual income that an owner can expect from renting out the chargeable subject – and imputed income for owner-occupied properties. Flat base appraisals (FB) group properties onto value bands. Lastly, if there is no market, tax agencies base their assessment on stock values and resort to surface areas, the so-called area based assessment (ABA).

FB cancel the need for reassessments, but assume zero relative value variations over time, which makes it regressive and an incentive for space consumption (Mirrlees et al., 2011). ABA is mostly applied in former communist regimes and countries where there is no real estate market (Almy, 2013; Bell and Bowman, 2009; Franzsen and William, 2008). Governments use it to increase PT yields in relatively short periods, its simplicity is appealing and administrable, and brings clarity and transparency for the first stage of a PT regime (Bell and Bowman, 2009). But in the long run ABA undervalues locations and raises equity concerns (Rao, 2008). To include scarce and new market information as the housing market develop one could first weigh the area by indicators of quality and location (Mikesell and Zorn, 2008). AR and LG need continuous adjustment to inflation (Bird and Slack, 2007). AR also requires substantial administrative undertaking to calculate the tax base, especially in the case of owner-occupied housing where no rents are available from the market, and provides highly volatile values compared to LG, where expectation of future value development are included (Bird and Slack, 2003). Also, the link between tax obligations and benefits is more explicitly spelt out under LG compared to AR (Kitchen, 2013). MV and CV – if up to date – are the most preferable assessment bases. They forecast value changes both for market agents and local planners (Raslanas et al., 2010). One could say that they discourage people from moving leading to inefficient household allocation and homeownership among infrequent movers at the expense of frequent (O’sullivan et al., 1995; Wasi and White, 2005). But empirics show that these dynamics benefit low-income homeowners because they move less frequently (O’sullivan et al., 1995; Sjoquist and Pandey, 2001; Wasi and White, 2005). This said, MV performs best regarding the ability-to-pay principle and land use efficiency (Kitchen, 2013; Raslanas, 2013).

#### 2.4.2. How to appraise

Appraisal agencies typically report location and improvement values separately, but their accuracy varies according to the technique used (Bell et al., 2009; Bell and Bowman, 2008, 2006; Mills, 1998; Netzer, 1998). In places with limited assessment capacities, self-assessments and pre-set charges dominate, but resulting inaccurate estimates erode the value capture justification (Alterman, 2011; Bird and Slack, 2007; Brzeski, 2005). The straightest way forward is to assess undeveloped parcels and use the sales comparison approach, where market transactions are adjusted using different characteristics – size, corner influence location, topography, etc. But vacant plots are scarce in urban cores and appraisers use mainly four traditional techniques. First, the abstraction approach subtracts the depreciated costs of improvements to the property value.

It is an attractive alternative when new development abounds, but as structures become older distortions on residual LV increase. Second, the land share allocates a percentage of the total parcel value to land derived from the market evidence. This comes from the abstraction method, historical sales data of a time where there were enough undeveloped plots, or by comparing data from a nearby jurisdiction. While the first source requires proper calibration of construction costs and depreciation percentages georeferenced, the second and third ones lack in accounting for timing and spatial related changes (Bell et al., 2009). Third, the contribution value method calculates the sum of values of each property element and its characteristics – typically differing from total property value (Eckert, 1990). Finally, sales data for teardowns discount the demolition costs to the property value (Dye and McMillen, 2007a). All these methods use statistical models to calculate the urban property universe (Bell et al., 2009; Eckert, 1990). However, they show significant weaknesses (Bell et al., 2009; Mills, 1998), with the contribution approach providing most accurate results (Bell et al., 2009; Bell and Bowman, 2006). Either way, it is always better to combine these methods with vacant and improved sales data (Gludemans et al., 2002).

Today, appraisers use econometric regressions to develop modern mass appraisals. They estimate both vacant and improved LV with reasonable accuracy, even if few vacant plots data are available (Barker, 2007; Case, 2007; Davis and Heathcote, 2007; Gludemans, 2000). Based on this methodology, Computer Assisted Mass Appraisals (CAMA) estimate hedonic price indexes from a representative sample of sales and apply it to the entire universe of unsold properties. Indexes relate sale prices to physical and location characteristics, where weights are estimated from marginal changes in the physical and location figures and then used to assess unsold properties. Finally, the most accurate methodology is the integration of CAMA into Geographic Information Systems (GIS) technology to develop spatially explicit datasets (Aleksiene and Bagdonavicius, 2009; Bell et al., 2009; Ward et al., 2002). Even with low level of satellite imagery, combining GIS with little on-ground data and international expert support is highly recommended in countries with no sale records or markets in transition (Aleksiene and Bagdonavicius, 2009; Eckert, 2008). Industrial and commercial inactive markets also benefit from CAMA-GIS because it replicates appraisal procedures more efficiently than traditional per-unit-breakdowns. Benchmarks or proxy sales are adjusted by property characteristics – e.g., size, zoning, retail, apartment, warehouse, motel, heavy manufacturing – and then interpolate between known points to finally obtain the value of unsold properties, including dummy variables to account for additional land use specifics – e.g., primary, unused or right-of-way-(Bell et al., 2009).

To sum up, good appraisal practices require a combination of modelling specifications to enhance coefficients from regression models, data enhancement techniques – e.g., working with real estate companies –, GIS technologies, and regularly evaluated standards regardless of whether they are public or private contracted appraisal firms (Bell et al., 2009). Also, legislation should specify how the technical approach can avoid variation among municipalities, although the assessment practice must take place at the lower spatial level (Bell et al., 2009; Bell and Bowman, 2006; Mattsson, 2003).

#### 2.4.3. Frequency

An updated base is crucial to keep the liability, accountability, transparency and rationale of the tax, but here is where most countries perform worse (Almy, 2013; European Commission, 2014; Mirrlees and Institute for Fiscal Studies, 2011; Smith, 2013; UN-HABITAT, 2011a,b). Governments believe that updating CV makes the PT more visible and creates social and political reluctance, which ultimately costs votes. But out-of-date tax bases lead to

<sup>7</sup> Market price is not the same as market value. In a competitive market, the buyer’s willingness to pay (market value) might be higher than the market price due to personal preferences; the difference is the “consumer surplus”.

unfair fixes, unequal taxation and political disruption. It is thus better to have an annually updated inflation-adjusted ABA than a CV above three to five years of age, – depending on the market conditions – (Almy, 2013; Cocconcelli and Medda, 2013).

## 2.5. Elements of differential taxation

### 2.5.1. Liability base

Liability base, also known as assessment ratio value, is the part of the assessment base to which charge rates are applied (Dye and England, 2009a). A split rate tax burdens a higher assessment ratio and/or tax rate to LV as compared to structures. The extreme case – a pure LVT – is when buildings are assessed with zero ratios (Brandt, 2014). Assessment ratios adjustments may be delayed a period of time under equity considerations (Ayuntamiento de Madrid, 2014; European Commission, 2015, 2014).

### 2.5.2. Tax rate

There is no consensus on how high or low a tax rate should be; it is intrinsically dependent on the tax purposes – e.g., abatement of previous PT, raise additional revenue –. What does seem clear is that rates have to be sufficiently high to (a) result in higher tax bill on the affected location, and (b) raise enough revenue to cover the administrative costs of the tax (Alterman, 2011; Cho et al., 2008; Mirrlees and Institute for Fiscal Studies, 2011; Raslanas et al., 2010; Walters and Rosengard, 2012). Next, for LVT to be a planning instrument, under the condition of inelastic supply of land, as mentioned above, the rate should be high enough to raise enough revenues and change behaviours – the “super neutral” nature of LVT – (Alterman, 2011; Calavita et al., 2010; Calavita and Mallach, 2009; Dwyer, 2014). Looking at the revenue raising from LVT in Europe and other countries, tax rates below 2.5 percentages contribute in a lesser way to local revenues than what the LVT rationale suggests (major contributor of local revenues) (Cord, 1985; European Commission, 2015, 2014; Foldvary, 2006). Finally, rates should be flexible to absorb shifts in the tax burdens, e.g., through housing consumer price index (CPI) adjustments (Bourassa, 2009).

Generally, municipalities define the tax rates freely or within a given rate, which creates heterogeneity between different locations. Additionally, it is often the case that different tax rates apply to different land uses (e.g., commercial, industrial, residential, etc.) (Bird and Slack, 2007; Smolka and Biderman, 2011; Waicho Tsui, 2008). But discretionary tax rates create additional burdens, leading to unfair circumstances, lobbying, and suboptimal land use allocation, which ultimately hinders appropriate land use mix from an urban sustainability perspective (Alterman, 2011; Augustine and Bell, 2009) (although discretionary tax rates is less distortive than zoning (Augustine and Bell, 2009)).

Together, the liability base and the tax rate should produce a tax liability (what remains when applying the tax rate to the tax base) high enough to foster the land regulation potential of LVT, and to raise enough revenues to cover administrative cost of the tax (Brandt, 2014; Dye and England, 2009b).

### 2.5.3. Exemptions and reliefs

Exemptions and reliefs are used for two things. First, they neutralize the regressive aspects of PT, especially with regards to low-incomers and elderly owners (Augustine and Bell, 2009). Second, they subsidize owner-occupied residential housing, a practice massively applied throughout the 20th century for economic development reasons (Kortelainen and Saarimaa, 2015; Sexton et al., 2012).

For the first objective, governments typically use assessment limits to stabilize tax liabilities when property values raise rapidly (Hamilton, 2007; Sexton, 2009). But these create unequal redistribution of burdens which undermines the fairness of the LVT

(Dornfest, 2005; Dye, 2007; Dye and McMillen, 2007b; Minnesota Department of Revenue, 2006). Those, whose property values are increasing more rapidly, profit because effective tax rates decline more rapidly the faster the property appreciates at rates above the limit. Next, if assessment limits apply interchangeably to all uses, the burden will shift toward residential owners: their aggregate assessed value increases more rapidly due to turnover because they typically change ownership more frequently (Dornfest, 2005; Dye, 2007; Dye and McMillen, 2007b; Minnesota Department of Revenue, 2006). Finally, they erode the tax base and impact government revenues heavily (Anderson, 2006; Minnesota Department of Revenue, 2006; Moak, 2004; O’sullivan et al., 1995; Sexton, 2009; Sjoquist and Pandey, 2001). General discretionary exemptions apply according to property or owner characteristics – e.g., low income, disabled; war veterans, etc. They have direct social benefits, but these can be more efficiently provided through alternatives that do not discourage owners to seek for higher income or optimum use location (Sexton, 2009).

To subsidise homeownership tax payments can be credited – tax deferrals – or exempted if the income is below a certain threshold. These practices however discourage owners seek for higher or more stable income. Tax deferrals also reduce the expectation value of inheritors, who often find alternative ways to avoid their tax bills. Similarly, mortgage interest deductibility enables taxpayers deduct their tax liability according to their level of indebtedness. This practice creates critical distortions by incentivising private households indebtedness and sprawl (Archer, 2010; Couch et al., 2007; Diaz-Serrano and Raya, 2014; Hanson et al., 2013; Johannesson Lindén and Gayer, 2012; Sexton et al., 2012). It produces very low tax payments, while it does little to increase homeownership (Augustine and Bell, 2009; Kortelainen and Saarimaa, 2015). An increasing agreement exists on the idea that deductibility practices should be replaced by subsidies targeted at low-income first-home buying households instead of a general measure that in practice enables tax avoidance of high income residential owners (Augustine and Bell, 2009; Bartlett, 2013; Bell et al., 2009; Bowman, 2009; Stiglitz, 2014).

Literature discussing the externalities of new development or already developed areas with a specific project or public intervention plan refers to a tax relief based on the consumption of new or old urban land to achieve lesser eat up land development (Panella et al., 2011). Value capture literature also identifies reliefs based on budgetary and/or development responsibilities, the so-called conditional reliefs (Ingram and Hong, 2012a,b; Peterson, 2009). Finally, there is zoning specific reliefs based on noise, air pollution etc; a kind of inverse Pigouvian tax (Batt, 2011; Brandt, 2014; Kreiser et al., 2011; Panella et al., 2011).

All this said, reliefs or exemptions undermine the beneficial aspect of LVT, and limit local spending capacity (Augustine and Bell, 2009; Bird and Slack, 2003). They function in the same way as regulation or an additional tax, but with more complex distortions (Barnett and Yandle, 2004). Hence, lower and uniform rates are less likely to create distortions than higher and non-uniform rates (Augustine and Bell, 2009; Buchanan, 1987). Socially based exemptions may be considered in very specific cases by no means are permanent; they need to be constantly revised (Alterman, 2011). But even then, direct expenditures are more efficient than tax reliefs (Augustine et al., 2009; Green and Weiss, 2009; Edel and Sclar, 1974).

## 2.6. Tax liability and collection

### 2.6.1. Liability

Liability refers to the final payment obligation, often expressed as the effective rate – the ratio of the liability change to the market value change –. Effective rates vary due to different factors. Gov-



ernments may intentionally set the tax liability significantly below market values for political reasons (Waicho Tsui, 2008), but it is often the case that they are not aware of the factors behind (Barnett and Yandle, 2004; Virtanen, 2000). Bahl and Linn (1992) developed a methodology to decompose the tax revenues and identify factors affecting the level of LVT collection. First, the relative growth of property stocks may not follow the overall growth (macroeconomic factors). Policy choices influence the non-exemption ratio, the valuation or assessment ratio, and the tax rate. Lastly, the collection rate falls, to a major extent, under the tax administration authority (Gravelle and Wallace, 2009). There is no harmonized suggestion on how high effective rates should be – besides that of uncover administrative costs –, but underrating location values weakens the redistributive effects and hinders significant net yields (Alterman, 2011).

### 2.6.2. Collection

The value capture literature uses two criteria for evaluating the instrument that can be applied to a LVT: the percentage of LV captured ( $R_r$ ), and the percentage of public infrastructures investment financed by the LVT ( $R_i$ ) (Hong, 2003, 1996; Walters, 2012a,b). Deciding  $R_i$  and  $R_r$  has normative assumptions. Nonetheless the following criteria are strongly recommended: (a)  $R_i$  should take into account investment, operation, and maintenance; (b)  $R_r$  should be constant over time for equity reasons (Hong, 2003, 1996; Walters, 2012a,b).

### 2.7. Revenue recycling

How to invest the revenues is a highly normative decision where two views compete. The “new view” says that revenue should be redistributed where most needed, regardless the revenue raising location. The “benefit view” suggests that LVT is a benefit tax, thus its benefits should be directly reinserted in the place where they were raised (Alterman, 2011; Oates, 1969; Oates and Schwab, 2009; Tiebout, 1956).

### 2.8. Governance level

The main argument towards a decentralized LVT relies on the fundamental link between tax and expenditure decisions, assuming competing autonomous municipalities. If finance comes from elsewhere, this link is broken and the choice of programs are not based on true costs (McKinnon and Nechyba, 1972; Oates, 2001, 1999, 1993; Weingast, 1995). To motivate municipalities they should keep full LVT revenues; otherwise collection is not robust enough (Alterman, 2011; Bird and Slack, 2013). In metropolitan areas, the local discretion on rates may cause tax competition and socio-economic segregation (Cutler and Glaeser, 1997; Glaeser, 2013). There is no clear cut solution to this problem but the subsidiarity principle or to a central planning approach may help, where total metropolitan revenues should be inter-municipality redistributed (Alterman, 2011).

### 2.9. Fiscal environment

The interaction of LVT with other forms of property charges varies the outcomes of the instrument. Typically, countries tax LV through non-recurrent instruments. Zoning, land-use charges, development taxes, or transaction taxes are some examples. We do not address these interactions because they are beyond the scope of this paper. Nevertheless, consensus exists on the idea that additional instruments may hinder the potential benefits of LVT (Batt, 2011; Dye and England, 2009b; Panella et al., 2011; Powers, 2009; Raslanas, 2013; Zabulenias et al., 2010).

### 2.10. Implementation

LVT often faces political opposition; unpopularity of wealth taxation grows when this is based on unrealized capital gains rather than current cash flow (Bourassa, 2009). This makes it a highly contested debate that intersects with political ideologies (Alterman, 2011), and may even be perceived as a violation of the state's constitutional principles of uniformity, equality and proportionality (Coe, 2009). The philosophical and legal perspective on property rights and land ownership is a key element in the discussion of the viability of LVT. For example, the concept of property used by the European Court on Human Rights could be understood as that appropriation of some part of land value is permitted if it benefits public interest, but appropriation is not permitted to seize the LV produced by someone else but the owner (Carss-Frisk, 2001; Council of Europe, 1950). This view contrasts with “the unearned value” the UN-HABITAT refers to in the Vancouver Action Plan (UN HABITAT, 1976). These dichotomies appear not only at the institutional level, but also between parties from the same country (Alterman, 2011). The concept of property changes over time and scale, and so does the legitimacy of taxing away LV. However, although fundamental, the normative discussions go far beyond the scope of this paper.

Assuming a legal framework that allows the taxation of LV and considering the above, the rationale behind a LVT is of extreme importance, where two main views coexist: the redistribution and justice argument – “capturing the unearned value” –, and the pragmatic view, which seeks to enforce developers pay their share and control development patterns (Alterman, 2011; Balchin et al., 1995; Booth and Albrechts, 2012; UN HABITAT, 1976; Walters, 2012a,b). The first one faces administrative and regulatory-based feasibility challenges; the second one faces transparency issues because policies are jointly design by developers and government (Alterman, 2011; Fainstein, 2012; Meltsner, 1971; Smolka and Biderman, 2011). Clear rationales (what should be taxed, and why) and national legal frameworks alleviate these challenges. But designs should be flexible enough to accommodate to changing needs for public perceptions on what merit public financing (Alterman, 2011; Bourassa, 2009; Coe, 2009). Predefined assessment standards must apply nationally (Bell et al., 2009) and it has to be legally separated. Its revenue and revenue recycling should be reported separately from other taxes to increase awareness and acceptability (Alterman, 2011; Bourassa, 2009; Coe, 2009; Oates, 2001; Powers, 2009). The other way around, unless taxpayers are ensured adequate level of public services, it will face opposition (Bourassa, 2009; Rao, 2008).

Next, every tax reform creates winners and losers, and so does LVT. Governments should acknowledge this and ensure that the tax bill is affordable by majority of tax payer (Powers, 2009). Taxpayers should have the right to require a revision of the valuation (Aleksiene and Bagdonavicius, 2009). To avoid drastic changes, the implementation of an LVT should be best done in combination with a tax shift. This could be gradually introduced through a split tax rate, where there is a simultaneous decrease on improvement rate with increases in rates on location values (Wallace Oates and Robert Schwab, 2009). Next, never increase the LVT at the same time as assessments take place (Bourassa, 2009). It is also important to minimise administrative costs in the long term – e.g., coordination on data collection and valuation – (Bourassa, 2009; Powers, 2009; Tiits, 2009). Local governments should be aware of macroeconomic forces that may interfere and lead to an apparent failure (Bourassa, 2009). Finally, the introduction of a LVT has to go hand in hand with appropriate land use planning that regulates and delimitates developable zones; otherwise overconsumption of land may take place (Bourassa, 2009; Franzsen, 2009).

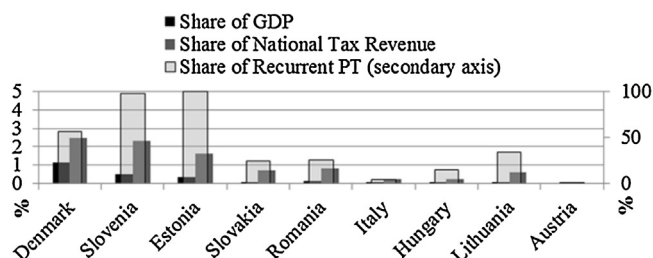


Fig. 2. LVT revenues expressed in GDP, national and recurrent property taxes revenues (secondary axis).

### 3. Assessing current practices in Europe

This section deals with the second question on whether current European practices of LVT are designed according to the criteria from the previous section. We select those European countries that have a kind of LVT. Two inclusion criteria apply: (a) the tax base excludes structural private improvements (and thus focuses on some aspect of LV), and (b) the tax ownership includes private owners. The evaluation material is based on databases and reports from the European Commission on property taxes (European Commission, 2015, 2014; European Environment Agency, 2010). We look at the “Grundskyld” in Denmark, the “maamaks” in Estonia, the “compensation for the use of building ground” in Slovenia; the “tax on land” in Slovakia, the “tax on land” in Romania, the tax on “aree edificabili” in Italy (IT), the “telekado” in Hungary, and the “land tax” in Lithuania. Data is from 2014, the latest fiscal year available for all countries. We compare the design characteristics available in the database with the findings of the previous section for each country. Each criterion (a total of 20) is weighted according to whether it fits or not with literature suggestions (no: 0, yes: 1) (see Table 3 below). Although it is challenging to evaluate normative criteria, we attempt to do it in the following way: To give an intuition on criterion revenue rising (6), although there are no LV databases available, we express the revenues from LVT as share of Gross Domestic Product (GDP), national and recurrent property tax revenues (see Fig. 2). For the revenue recycling criterion (7), as there is also no data available on how revenues are allocated, we evaluate it negatively for all countries based on the transparency and accountability criteria (see Section 3.10), same as we do when no data is available for any other criterion (“n.a.” entries in Table 3). Grey shadowed entries in Table 3 indicate that the design criteria are appropriate according to the revised literature.

This evaluation demonstrates that Denmark is the best practice in Europe, followed by Slovenia and Slovakia. Denmark also had a pure LVT until 2013, which has not been recorded in the evaluation, as we use data from 2014. Lithuania is currently developing a LVT with improved design; considerable effort is made in updating cadastral values (last update 2013). For Slovenia, although it also has a well-designed tax, it is worthwhile mentioning that the constitutional court recently abolished the tax. In Estonia, for every property there is an area up to 0.15 ha exempted since 2013, which erodes the tax base enormously. Looking at the revenue raised expressed as share of GDP and share of national tax revenue, Denmark is followed by Slovenia and Estonia (Fig. 2 most and second most dark grey in the graph). Interestingly, the latter two base their share of recurrent property taxes solely on the LVT (Fig. 2 light grey, secondary axis).

### 4. Discussion and conclusion

A vast amount of research from public economics to sustainability science indicates that a shift from traditional PT towards LVT improves specific sustainability metrics: it increases fiscal effi-

ciencies and raises revenue to pay back low carbon infrastructure investment, it fosters denser development and decreases urban land consumption, and it redistributes wealth accumulated in real estate cycles given by LV and not by private investment”. To understand how design characteristics enhance urban sustainability, we homogenise nomenclature and revise the normative statements behind LVT. We also present a framework that organizes alternative design decision, together with a discussion on the sustainability effects from each of them. Fields of urban economics and public finance address issues of equity, and efficiency (socio-economic outcomes). Value capture and sustainable transport literatures provide mixed insights on the sufficiency and equity arguments. Urban planning and sustainability sciences address the issue of land consumption and environmental effects. All together, they stress the following crucial elements in the design of a LVT for its outcomes: the importance of how the tax base is designed the valuation method that is used – especially the frequency of assessments –, the disturbances of exemptions and tax reliefs together with other property taxes in place. In addition, strong land use regulations is very much encouraged for dealing with environmental concerns, especially with regard to reducing land use consumption.

Overall, we find that location value tax is of relevance in the urban sustainability debate and, with adaptive policy instruments, should be considered in planning integrated strategies for sustainable cities. We also suggest that a quantitative assessment would be desirable, enabling the quantification of not only financial but also ecological and societal effects of the proposed tax reform. A shift towards LVT would enhance the overall sustainability outcome of the real estate taxation system.

In Europe, although there are good practices with regards to some criteria (e.g., assessment ratios, governance level, and tax subject definition), most countries fail our evaluation. In other words, there is considerable room for improvement in most countries, especially by improving the tax base, the frequency of assessment practices, and abolishing additional property taxes that distort the outcome of LVT. But countries like Slovenia illustrate the enormous legal difficulties a LVT has to overcome, not always successfully. As it prioritises urban planning objectives that interfere with incentives for economic development – e.g., profitability for developers –, supporters must be able to package a rationale that transcends party ideologies. In societies where private control of land is firmly embedded, resistance to limiting speculative profit is greater and will be opposed politically. Thus, many states prefer indirect instruments designed to collect contributions from developers to meet the infrastructure needs – e.g., betterment ad public ownership, agreements, to obligations and community infrastructure levies – (Alterman, 2011). At the European level, the few research projects are quite disperse and either look at its potential for spatial planning and environmental policy (Altes, 2009; European Environment Agency, 2010) or on abstract economic rationales (Mattauch et al., 2013a,b). Interestingly, there are a number of places where LVT is gaining attention (Alterman, 2011; Brandt, 2014; Dwyer, 2003; Dye and England, 2010; European Commission, 2012; Land Value Tax Working Party, 2005; Panella et al., 2011; Tom and Kris, 1999). In Europe, the UK (Mirrlees and Institute for Fiscal Studies, 2011; Seely, 2013; Wightman, 2013), Scotland (Wightman, 2010), Ireland (Gurdgiev, 2010, 2009; Inter-Departmental Group, 2012) and the Netherlands (Altes, 2009) openly debate the issue. In particular, Greece would greatly benefit from implementing a land registry and a location value tax, obtaining stable tax revenue with less regressive effects compared to high levels of value added taxes. The European Statistical Office (EUROSTAT) and the Organisation for Economic Co-operation and Development (OECD) have a joint project to develop methodological guidelines for LV estimation that will be applied in future tax systems reviews at the EU level (European Commission, 2012; Garnier et al., 2013). This initiative

**Table 3**

Evaluation of current European practices.

	Denmark	Slovenia <sup>1</sup>	Estonia	Slovakia	Romania	Italy	Hungary	Lithuania	Austria
1. Tax base	S <sup>2</sup>	S	H	LV	S	S	S	S	S
2. Owner	AUO <sup>3</sup>	AUO + US	AUO – P <sup>4</sup>	AUO + US	AUO + US	AUO	AUO	PO <sup>5</sup>	AUO
3. Land use	ALU	V + L1	ALU <sup>6</sup>	AEU	AEU – L1	V	L2 + V	ALU	V
4.1 Basis of assessment	MV	ABA	CV	CV	ABA	AR <sup>7</sup>	ABA/MV <sup>8</sup>	CV	CV
4.2 Frequency (stipulated/last year)	2	1	6 (2001)	(2004)	n.a.	(1988)	n.a.	5 (2013)	n.a.
4.3 How to appraise	SC	CON <sup>9</sup>	CON/SC <sup>10</sup>	CON	CON <sup>11</sup>	CON <sup>12</sup>	SA	CAMA	n.a.
5.1 Assessment ratio (%)	81	n.a. <sup>13</sup>	66	72	n.a.	100	50 <sup>14</sup>	100	n.a.
5.2 Tax rate (%)	2.60 <sup>15</sup>		1.30 <sup>16</sup>	17	18	0.4 <sup>19</sup>	1.5 <sup>20</sup>	1.5 <sup>21</sup>	1
5.3 Exemptions and reliefs: ownership	NP; IP <sup>22</sup>	p <sup>23</sup> ; L1 <sup>24</sup>	D <sup>25</sup> ; PO(RES) <sup>26</sup>	R; NP; EDU; HEA	R; NP; EDU; HEA; WV; D	R; NP; EDU; HEA	PO (RES) <sup>27</sup>	LI, D	–
5.4 Exemptions and reliefs: land use	I	I; L1 <sup>28</sup>	N <sup>29</sup>	30	I; IND; SPK; N <sup>31</sup>	n.a.	n.a.	I; NR;	ZN <sup>32</sup>
5.5 Temporality	PER	PER	TEM	PER	PER	PER	PER	PER	TEMP
6. Revenue raising	See Fig. 2								
7. Revenue recycling	n.a.								
8.1 Tax base	C	L	C/L	L	C	C	L	C	C
8.2 Tax rate	C(L)	L	C(L)	LUZ(L)	C	C/L	L	L	C
8.3 Reliefs	C/L	L	C/L	L	C/L	C/L	L	C/L	C
8.4 Collection	L	C	C	L	L	C	L	C	C
8.5 Revenues	L	L	L	L	L	C/L	L	L	C
9. Fiscal environment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Buildings and apartments	X	X		X	X	LUX	X	BUSS, LUX	X
Capital gains	0.24	0.1	0.21	0.19	0	0	0.16	0.15	0.25
Land use change	X	X	–	–	–	X	–	–	–
Gift and inheritance	X	X	–	X	–	X	X	X	–
Transactions	X	X	–	X	X	X	X	–	X
Mortgage registration	–	–	–	–	–	X	–	–	–
Imputed rent of residential owners	–	n.a.	–	–	n.a.	n.a.	n.a.	–	n.a.
Luxury value criterion	X	n.a.	–	–	n.a.	X	–	X	n.a.
10. Implementation	n.a.								
Score (max. 20)	11	3	5	7	3	4	5	8	5

<sup>1</sup> Abolished in 2014.<sup>2</sup> Until 2013, private non-structural improvements were excluded.<sup>3</sup> A separated LVT applies to Public ownership.<sup>4</sup> Excluded: municipal land and land in public use. Included: state land not in public use.<sup>5</sup> A separated LVT applies to Public ownership.<sup>6</sup> Included: exploitation minerals.<sup>7</sup> From cadastre.<sup>8</sup> Municipalities choose either 50% of MV; or L2 + V.<sup>9</sup> Factors: plot size; municipality; location zone; land use coefficient; infrastructure availability.<sup>10</sup> Valuation authorities allowed to consider all available evidence: e.g. sales comparison, estimation of value for HBPU.<sup>11</sup> Factors: plot size; municipality; location; land use coefficient; [10] For MV basis.<sup>12</sup> Factors: plot size; municipality; location zone; land use coefficient; infrastructure availability.<sup>13</sup> Each parcel assessed in absolute amount.<sup>14</sup> For MV basis.<sup>15</sup> 1.6–3.4%, average 2.6%.<sup>16</sup> 0.1–2.5%, average 1.3%.<sup>17</sup> Up to 5 times the lowest rate set by another municipality.<sup>18</sup> Lump sum per square meter.<sup>19</sup> 0.2–0.4%, average 0.4%.<sup>20</sup> 0.0–3%, average 1.5%.<sup>21</sup> 0.1–4%, average 1.5%.<sup>22</sup> Optional.<sup>23</sup> Exemption.<sup>24</sup> Reduction.<sup>25</sup> Optional.<sup>26</sup> Formerly repressed persons if not receiving rent for leasing out land.<sup>27</sup> 25 m<sup>2</sup> per resident; 50% lower; land where building is not permitted.<sup>28</sup> During 5 years after construction.<sup>29</sup> RES: Area up to 0.15 ha exempted; NR: 50% reduced rate.<sup>30</sup> Exempt if NEU due to natural state or zoning.<sup>31</sup> Exemption: land for subsoil exploitation, water bodies.<sup>32</sup> Private ownership recovers tax payment if dwelling built within 5 years.

may indeed further stimulate the discussion on LVT. Neither urban sustainability nor location taxes are easy to impose. There are logistical and institutional hurdles, where politics is the hardest one. But the underlying rationale of a levy on locations for financing public expenses is compelling.

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