

Location value tax for urban sustainability

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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 equitability compared to traditional property taxes. Second, they can be used as an enhancer of sustainable urban planning. There are diverse and useful disciplinary contributions and experiences to design a location value tax, but few efforts to create multidisciplinary approaches, which ultimately hampers the discussion on optimal designs that includes all economic, social and environmental considerations. 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 tax from a sustainability perspective. We use this framework to assess current practices in Europe. Although current practice limits the overall performance of location value tax, they are one realistic planning instrument to consider for sustainable urban planning.

Keywords: location value tax, urban sustainability, tax reform.

1. Land value tax for urban sustainability

Cities constitute both sources and potential 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 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). First, planning instruments efficiently limit urban externalities that are difficult to exclude with the assignment of private property rights (R. Arnott 2011; Brueckner and Kim 2003; Kaza and Knaap 2011). Second, they assist municipal budget constraints (especially in Europe) with instruments that can be implemented at the regional and local scale (Dexia and CEMR 2012; Dexia and CEMR 2012).

Location Value Tax (LVT), a tax that recovers the value of properties not created by landowners, could foster urban planning objectives (Batt 2011; Brandt 2014; Panella, Zatti, and Carraro 2011a; UN HABITAT 1976; L. C. Walters 2011). First, LVT is welfare enhancing as it increases fiscal efficiency¹. Taxing away urban location value does neither harm the economy nor does it distort markets and revenue could contribute financing sustainable urban infrastructure (Ingram and Hong 2012b; Kitchen 2013; Medda 2012; L. W. Walters 2012). Second, it is legitimate to tax away location values. The share of property's worth not produced by landowner's labour, but coming from public intervention, community actions and environmental quality, and hence an unfair burden on those whose activities had given it value (Albouy 2012; Albouy 2009; R. J. Arnott and Stiglitz 1979; Brandt 2014; Brueckner 2000; Fainstein 2012; Mattauch et al. 2013; UN HABITAT 1976). These capitalization dynamics, exacerbated in the last decade, have provoked a strong call for reconsidering the property tax base and shift it from real estate towards location values for wealth distributional objectives (UN-HABITAT 2011b; UN Habitat 2010; Gaffney 2009; Wightman 2013a; European

¹ Henry George, a political economist from the 19th century, used the principles of economic efficiency and sufficiency and his conception of justice to argue in favor of a single tax on location rents (George 1879). Cord (1985) found that an annual land rent tax would yield nearly two-thirds of all taxes in place for the U.S. in 1981.

Environment Agency (EEA) 2010; Adam 2012; Antony and Seely 2013; D. E. Mills 2001; W. Oates and Schwab 2009; Raslanas 2013; Dwyer 2003; F. E. Foldvary 2006; H. J. Brown and Smolka 1997). Thirdly, a tax on location values 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; Nuisl and Schroeter-Schlaack 2009), and (c) it internalizes externalities, especially those related to environmental degradation (Brandt 2014; European Environment Agency (EEA) 2010). The fact that more than 30 states use some form of LVT demonstrates that it is far from being a utopian concept (J. E. Anderson 2009; Richard M. Bird and Slack 2002; Bourassa 2009a; McCluskey and Franzsen 2005).

While there seems to be a common consensus of the benefits from a LVT, literature lacks in conclusive outcomes with regards to optimal designs, particularly for fairness and land consumption concerns (Brooks et al. 2005; Brueckner and Kim 2003; Cho et al. 2008; Dye and England 2009b; Gregory 2008; Lim 1992; Luca 2011; W. E. Oates and Schwab 1997; Seto et al. 2014; Skaburskis 1995; Song and Zenou 2006a; Song and Zenou 2006b; UN-HABITAT 2011b). A lack of understanding and inconsistency limit a coherent discussion (LVT Working Party 2005; Wightman 2010; Wightman 2013a; Wightman 2013b; Adam 2012; Constantin 2010; Cord 1985; F. E. Foldvary 2006; Gurdgiev 2009a; Gurdgiev 2010; England 2003; Altshuler 2000; Doerner and Ihanfeldt 2011; Grosskopf 1981; Lutz, Molloy, and Shan 2011; Raslanas 2013). Two important shortcomings appear in the literature. First, vague terminology and inconsistencies disable useful comparisons between outcomes (Richard Miller Bird and Slack 2010; Dye and England 2009b; Dye, England, and Lincoln Institute of Land Policy 2010). Second, evaluation lacks a systemic holistic perspective that covers all potential benefits at the same time (Alterman, 2011; Brooks et al., 2005; Cocconcelli and Medda, 2013; Luca, 2011; Walters, 2011; Franzsen, 2009; Franzsen and William, 2008; McCluskey and Franzsen, 2005; UN-HABITAT, 2011b).

We seek to alleviate these shortcomings by exploring LVT from a multidisciplinary sustainability perspective. Sustainability here indicates the set of effects induced by shifting PT towards LVT on economic, social and environmental systems, by assembling the effects that were independently identified in the literature. After describing or methods in Section 2, Section 3 presents a framework to assess outcomes from different design characteristics that apply to LVT. In Section 4, we use of the framework for the evaluation of current European practices. Our results indicate that location value restitution is a valid alternative for future fiscal reforms from an urban sustainability perspective. But outcomes strongly depend on the instrument design characteristics as well as on the specifics of the urban context.

2. Methods

We critically review and compare current theoretical and practical approaches to LVT in cities under a sustainable perspective. On this basis, we attempt to answer the following research questions:

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

In section 3, we review the literature on LVT to address the first and second question. We include a proposal to homogenise nomenclature, and argue in favour of using the concept location value taxation (LVT) (Section 3.1). We develop a framework to assess LVT effects on economy, society, and environment. In section 4, we evaluate the cases of LVT in Europe using the framework previously presented and discuss existing designs. We look at 9 European countries that have at least partially implemented LVT, based on databases and reports on EU PT (European Commission 2014b; European Environment Agency (EEA) 2010; European Commission 2014a). We look at the “Grundskyld” in Denmark (DK); the “maamaks” in Estonia (SI); the “compensation for the use of building ground” in Slovenia (EE)²; the “tax on land” in Slovakia (SK); the “tax on land” in Romania (RO); the tax on “aree edificabili” in Italy (IT); the “telekado” in Hungary (HU); and the “land tax” in

² The Slovenian Constitutional Court has recently abolished the LVT.

Lithuania (LT). Data is from 2014, the latest fiscal year available for all countries. Section 4 discusses the main findings and finally conclusions are drawn as to whether LVT may be a useful instrument to complement other planning measures.

3. Evaluation framework

We structure the insights from different knowledge areas into ten main design characteristics on which policy-makers take decisions when creating and implementing a LVT and further discuss their sustainability effects (see Table 1 below).

Table 1 Design characteristics of LTV influencing sustainability effects. X indicates the most suggested alternative literature refers to when looking at the sustainability effects.

	Criterion	Sub-criterion	X
	Location Value (LV) (T+Q+C+E+O) Land Value (H) (T+Q+C+E+O+M+N)		X
2. Tax subject - Ownership	All urban owners (AUO) 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)		X
3. Tax subject - Location Use	All land uses (ALU) All Economically Usable Activities (AEU): (RES); (BUSS); (IND); (SPK) Non-Economically Usable (NEU): (NP); (R); (EDU); (HEA); (P); (IP); (NR) Location beneath buildings (L1) Location not beneath buildings (L2) Vacant building ground (V)		X
4. Valuation method	3.1 Basis of assessment	Market value (MV) [HBPU] Area based assessment (ABA) Cadastral value (CV) Flat base (FB) Location gains (LG) Annual rents (AR)	X
		Appraisal: HBPU Appraisal: Current Use (CU)	X
	3.2 How to appraise	Traditional techniques: Abstraction (AB), allocation (ALL), teardowns (TD); Contribution (CON). Sales Comparison (SC) Self-Assessment (SA) Massive Econometric Appraisals (MA); Computer Assisted Mass Appraisals (CAMA) CAMA + GIS (CAMA-GIS)	X
		3.3 Frequency of assessment	< 5 years ≥ 5 years
5. Elements of differential taxation	5.1 Assessment ratio/ Liability base	< 50% total value ≥ 50% total value	X

	5.2 Tax rate [Normative]	Enough to raise revenues that cover admin. costs Enough to change behaviours Nondiscretionary rates Rate in relation to local year-to-year market value change/ CPI	X X X X
	5.3 Exemptions and reliefs - Owner	No reliefs/exemptions (-) Assessment limits (AL) General discretionary exemptions (GDE): Low Incomers (LI); Disabled (D); War Veterans (WV) Mortgage interest deductibility (MID) Tax deferral (TD)	X
	5.4 Exemptions and reliefs - Land use	Exemptions based on area (ARE) Conditional relief (CR) Pigouvian relief (PR) Types of land use (see 2.2)	
	5.5 Temporality	Permanent (PER) Temporary (TEMP)	
6. Revenue raising	6.1 Tax liability	Minimum criteria: payment obligations cover administrative costs ($\geq 30\%$)	X
	6.2 Collection [Normative]	$R_c \geq$ predefined value $R_i \geq$ predefined value $R_i(t)$ constant	X X X
7. Revenue recycling	Locally - Benefit view (BV) Redistribution - New view (NV)		
8. Governance	8.1 Tax Base; 8.2 Tax Rate; 8.3 Reliefs; 8.4 Collection; 8.5 Revenues	Local Government (L) Regional or State (C) State and Local (C/L) Local within state set range (C(L))	X
		Local within LUZ set range (LUZ(L))	X
9. Fiscal Environment	No taxes related to property (No) Additional taxes related to property (Yes)		X
10. Implementation	10.1 Legal separation		X
	10.2 Revision of the valuation		X
	10.3 Transparency		X
	10.4 Strong land use planning		X
	10.5 Coordination among tax offices		X
	10.6 Gradual introduction		X

3.1. Tax base

3.1.1 What can be taxed?

The terms “site value”; “location value”, “unimproved location value”, and “value resulting from public intervention” are used interchangeably in the literatures creating inconsistencies (Franzsen and William 2008; Hubacek and van den Bergh 2006; Özdilek 2011; Park 2014). A consistent nomenclature would facilitate discussion (Özdilek 2011; Hubacek and van den Bergh 2006; Park

2014). Two factors are crucial for defining terms: a) where does the value come from, and b) who creates that value (Huxley 2009; Rybeck 2004; Ingram and Hong 2012b; Zhao et al. 2012; Rao 2008; Grosskopf 1981; Brueckner 1984; Riël C.D. Franzsen and William 2008; Alterman 2011). Recognition is necessary for the applicability of political rationales. A few attempts on classifications and methodological guidelines exist (Alterman, 2011; Gregory K. Ingram and Hong, 2012), but none is exhaustive enough to cover all three sustainability criteria we here deal with.

We identify the value elements that comprise property values and their value sources. Divergent knowledge areas 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 and consistent way. Fig. 1 and Table 2 below show the different elements and aggregated value terms that we suggest.

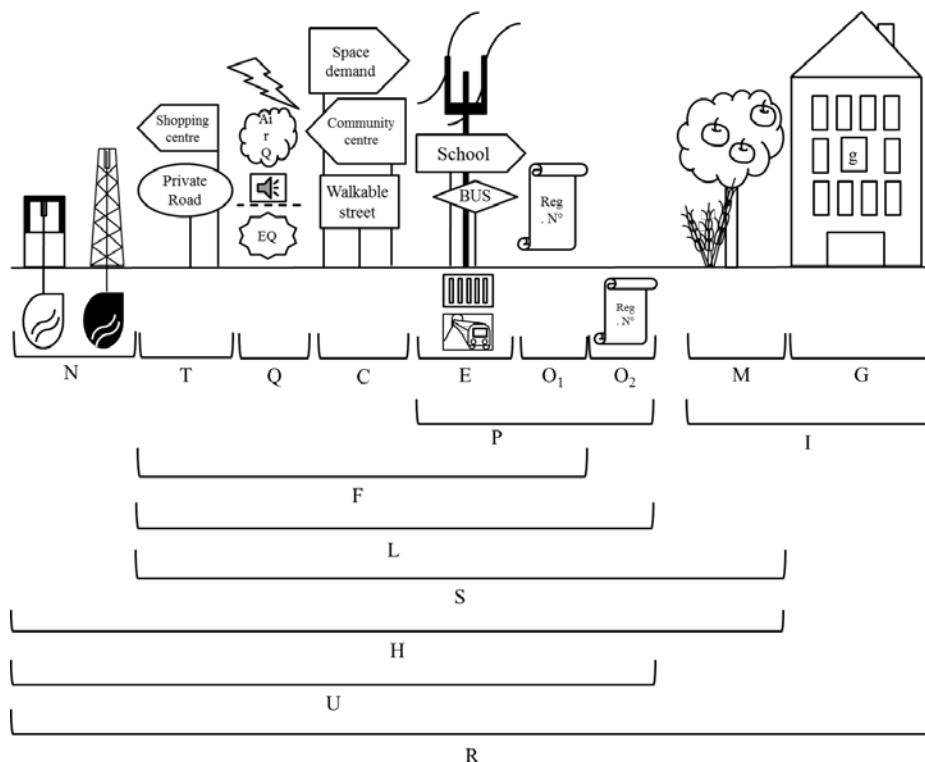


Figure 1 Nomenclature – Conceptual Diagram

Table 2 Nomenclature – Definitions

Sign	Nomenclature	Example/ Definition
Element		
N	Natural resources	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 ³ , community attractiveness
E	II Public intervention: Urban infrastructure	Transport, sewage, electricity
O	III Public intervention: Land-use regulations	O ₁ : Zoning; O ₂ : use rights
M	Private improvements-owner: non-structural	Garden, irrigation system
G	Private improvements-owner: structural	House, dwellings
g		Apartment or part of building

³ Space demand is what often is refer to as urban development macro-effects: population increase, economic development (income) Security, income, agglomeration

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 ₁
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

3.1.2 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 (N) should be added to that of private land improvements (M) and remain in private hands because it is already paid for by the owner at the time of acquisition (Ingram and Hong 2012a). Others use the case of larger natural resources to make the case for taxing them⁴. Significant differences between N and the rest of value elements on how the value is created, capitalized and assessed, leads to different outcomes depending on whether N is included or not in the tax base. A simple tax on N encourages over-exploitation, whereas taxing extraction outputs through, i.e. a sufficiently high environmental consumption tax, discourages it and leaves the resources underground for future generation (Gaffney 2009). Thus, N should be addressed with an independent instrument from LTV.

A wide agreement exist on capturing value from infrastructure improvements and public services (E) (UN HABITAT 1976; L. W. Walters 2012), whereas the value from changes in land use regulations (O) raises political opposition and conflict. Landowners believe that they possess the entire bundle of property rights in perpetuity (Dillman and Fisher 2009). But strong rationale exists on regulation-value recapture, from all public finances, equity and sustainability perspectives. Land use regulations create artificial land scarcity, and building regulation constraints supply through height and density constraints, both inflating location prices⁵ (*The Economist* 2015a; UN HABITAT 1976; L. W. Walters 2012). The so-called urbanization dynamics or community-related value (C) should also be included in the tax base under wealth redistribution arguments (UN HABITAT 1976; L. W. Walters 2012). Finally, the value coming from environmental and social externalities (Q) should also be included under an environmental perspective (Pigouvian taxation) (Batt 2011; European Environment Agency (EEA) 2010; Panella, Zatti, and Carraro 2011a). Location value (L) is the least economically distortive aggregated value (Recktenwald and Smith 1999; Mill 1985; George 1879; F. E. Foldvary 2006; F. E. Foldvary 2008; F. Foldvary 2010) and its tax is one of the fairest tax in societal perspective (Harrison 2014; F. E. Foldvary 2008; Gaffney 2009). It further discourages extensive, space-consuming urbanization, and fosters more intensive use of land (F. E. Foldvary 2008).

3.2. Chargeable subject: Ownership

Two types of individual entities constitute private property ownership (PO): residential owners - owner that is registered at the location (POo)-, and non-residential owners or absent owners (POn) - not registered at the location, not renting and renting the place respectively -. Three types of legal entities exist (LE): Legal Enterprise (LEn), Public bodies (P) and Institutions (I). In addition, the figure of tenants/ users/ renters (US) also holds specific rights and duties. An increase in L 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 – and that with zero additional

⁴ An oil discovery near Gatwick (London, UK) has brought this issue to the front of the discussion (Barrett 2015).

⁵ In West End London (UK) land-use regulations inflate location values by about 800 percent; in Milan and Paris by 300 percent approx. (*The Economist* 2015a). The absolute liberalization of the real estate market in the US would yield about \$1.5 trillion, rising GDP by between 6 and 13 percent (*The Economist* 2015a).

investment costs. Residential owners can either sell their property and capitalize the added value, or stay and pay unchanged mortgages (Coalition for Economic Justice 2013). Hence, added values are captured by ownership and it is thus acceptable to tax only owners to avoid distortions, disabling them to pass the charge to renters (L. C. Walters 2011; F. E. Foldvary 2008; Mattauch et al. 2013; Ingram and Hong 2012b; Dye and England 2009b; Mill 1985). With regards to legal entities (LE), an optimal LVT should apply to all urban ownerships (AUO) to avoid underuse and suboptimal allocation of untaxed land (Alterman 2011), especially in countries with a large share of public land (Waicho Tsui 2008).

3.3. Chargeable subject: Land-uses

The tax base can be applied to All Land Uses (ALU) or to All Economically Usable Activities (AEU) (i.e. Slovakia and Romania). Based on constructability criteria, one could exempt surface not covered by a dwelling –i.e. Slovenia- (L1) and tax only location beneath buildings, but this leads to small dwellings and large surrounding plots, which enhances sprawling tendencies and increase the urban infrastructure demand per household. The exemption of the surface covered by building and tax only unconstructed land (L2) also encourages households to fulfil their location with structures.

Typical land uses include residential, commercial, industrial, public, special uses (i.e. non-profit (NP), Religious (R), Education (EDU) and Sports (SPO)) and vacant land. Residential use (RES) is the most space-consuming use per capita in cities with great infrastructure needs⁶ (European Environment Agency (EEA) 2013; European Environment Agency (EEA) 2010; Couch, Leontidou, and Petschel-Held 2007), hence it should be included in the tax base to contribute reducing its excessive urban land consumption (L. E. Brown 2014; Bringezu 2014; Blum 2014; European Environment Agency (EEA) 2010). A LVT could also increase residential density and consequently reduce transport emissions (Banzhaf and Lavery 2010; Creutzig et al. 2015).

Taxing commercial (BUSS) and industrial (IND) use is more controversial. 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 of production for businesses (Zwinger 2002; European Environment Agency (EEA) 2010). With regards to special uses, preferential treatment provides direct community benefits, but also exempts local governments from fiscal responsibilities. From a public finance perspective, it is more desirable to implement direct subsidies available to all, not just property owners (Cordes 2012). In practice, exemptions apply to those called Non-economically usable (NEU), which include non-profit and public and institutional uses (i.e. Public Infrastructure (water, electricity, and sewage), Natural Reserves (NR), Education (EDU), Health (HEA) and Infrastructure Providers (IP). Local governments should at least assess the tax base erosion and perform a cost-benefit analysis (W. Bowman, Cordes, and Metcalf 2009; Cordes 2012). Finally, vacant land has shown many controversies. On the one hand, including vacant land into the tax base encourages development and deters land speculation. But new development is not always desirable; it can lead to negative outcomes on society and natural ecosystems – i.e. withdrawal of land from agriculture may lead to unemployment and urban sprawl. An adequate classification of natural and artificial land cover with specific regulation of developable land solves this issue⁷. In rapidly growing areas a higher burden on undeveloped land does not ensure contiguous development but it certainly shapes it towards more sustainable urban forms (Brandt 2014; Fainstein 2012; Seto et al. 2014).

⁶ In Europe, urban residential land consumption accounts for 20 percent of total land use change in the last decade (European Environment Agency (EEA) 2013; European Environment Agency (EEA) 2010; Couch, Leontidou, and Petschel-Held 2007).

⁷ We focus on urban areas, considering only urban artificial land cover, which consists on developed and developable zones. We exclude non-urban artificial land cover like agriculture and other natural land covers (croplands, woodland, shrub land, grassland, bare land, water areas and wetlands).

3.4 Valuation method

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

3.4.1 Basis of assessment

The basis of assessment is the indicator/s used to obtain a monetary value for the tax base (Johannesson Lindén and Gayer 2012). Market Value (MV) is the price that would be achieved in a fair auction of the ownership rights to the location. 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 properties⁸. Flat base appraisals (FB) group properties into one of a number of value bands⁹. 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). Area-based assessment is mostly applied in former communist regimes and countries where there is no real estate market¹⁰ (UN-HABITAT 2013). Governments use it to increase PT yields in relatively short periods; its simplicity is appealing and administrable by local bodies, 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; it should only be taken as a transitional measure towards MV (Rao 2008). Adequate methods exist to include scarce and new market information as the housing market develops – i.e. weigh the area by indicators of quality and location to move toward a market-value based system (Mikesell and Zorn 2008)-. In developing countries ABA is especially useful and location values are not strongly driven by public and community intervention (Riël C.D. Franzsen and William 2008; Bell and Bowman 2009). AR and LG need continuous adjustment to inflation¹¹ (Richard Miller Bird and Slack 2010). AG 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 (2002).

Finally, Market value (MV) and cadastral value (CV) – if up to date - are the most preferable. They allow forecasting future changes in the market and in the tax base both for market agents and local planners (Raslanas et al., 2010). MV performs best regarding the ‘ability-to-pay’ principle, encourages market activity and efficient land use (Kitchen 2013; Raslanas 2013). One could say that it discourages people from moving (O’Sullivan, Sexton, and Sheffrin 1995; Wasi and White 2005), but these dynamics also benefit low-income homeowners at the expense of other households because they

⁸ Annual Rental Value base historically applied in France, Belgium, Italy, Ireland and the United Kingdom. Italy and Ireland have changed recently to MV (Ingram and Hong 2012b).

⁹ In the UK the FB regime has eight bands (Adam 2012). This approach is also one of the options to Hungarian municipalities.

¹⁰ Switzerland also has an area-based approach.

¹¹ In Taiwan, the LG transaction tax uses the Consumer Price Index (CIP) to adjust for inflation to the cost of land purchase (Waicho Tsui 2008).

tend to move less frequently (O'Sullivan, Sexton, and Sheffrin 1995; Sjoquist and Pandey 2001; Wasi and White 2005).

Property appraisers can either assess HBPU or current use (CU) of a property except in the case of MV. CU reduces tax obligations and favours investment projects with a short gestation period (Bentick 1979). But HBPU is by definition, the optimal basis of assessment with least distortionary effects on economic decisions or timing of development (assuming unchangeable land supply) (Fainstein 2012; W. E. Oates and Schwab 2009)¹². In practice, the exploitation of the gap existing between CU and HBPU - i.e. through land use changes - encourages development that often excludes minorities causing gentrification processes (Bell, Bowman, and German 2009a; Charles 2011; Fainstein 2012; Fainstein 2011; N. Smith 1987; N. Smith 1979). But capturing the value gap holds also from the equity perspective, and revenues could be distributed in way that avoids displacement (Fainstein 2012).

3.4.2 How to appraise

Appraisal agencies typically report location and improvement values separately, but their accuracy may vary according to their technical approach (Bell, Bowman, and German 2009a; Bell and Bowman 2008; Bell and Bowman 2006; E. S. Mills 1998; Netzer 1998). In places with limited assessment capacities, self-assessments and pre-set charges dominate (SA), but these practices lead to inaccurate estimates and losses of the value capture justification (Alterman 2011; Richard Miller Bird and Slack 2010; Brzeski 2005). The straightest forward way is to assess undeveloped parcels and use the sales comparison approach (SC), adjusting for different characteristics – size, corner influence location, topography, etc.-. But vacant plots are scarce in urban cores and appraisers use the following traditional techniques: abstraction, land shares, contribution and teardowns data¹³. All these methods show, however, significant weaknesses (Bell, Bowman, and German 2009a; E. S. Mills 1998), where the contribution approach provides the most accurate results (Bell, Bowman, and German 2009a; Bell and Bowman 2006). Either way, it is always better to combine these methods with vacant and improved sales data (Gloude-mans, Handel, and Warwa 2002).

The most widespread practice is the use of econometric regressions to develop modern mass appraisals (MA). They estimate both vacant and improved location values with reasonable accuracy, even if few vacant plots data are available (Barker 2007; Case 2007; Davis and Heathcote 2007; Gloude-mans 2000). Computer Assisted Mass Appraisals (CAMA) uses regression analyses to 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 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, Bowman, and German 2009a; Ward et al. 2002). Combining GIS with little on-ground exterior collection data and international expert support is very useful in countries with no sale records or markets in transition (Aleksiene and Bagdonavicius 2009; Eckert 2008). For example, industrial and commercial inactive markets with numerous characteristics benefit greatly from CAMA-GIS. This technique replicates appraisal procedures more efficiently than traditional per-unit-breakdowns. Benchmarks or proxy sales are adjusted by property characteristics –i.e. size, zoning, retail, apartment, warehouse, motel, heavy

¹² If the tax rate on improvements also decreases, land prices and the capital investment per surface rise, thus decreasing sprawl. The land price effect is given by the valuation process happening when decreasing tax on improvements, which is larger than the devaluation process given by higher rates on land (W. E. Oates and Schwab 2009).

¹³ First, the abstraction approach subtracts the depreciated costs of improvements to the property MV. One could also calculate the land share by allocating a percentage of the total parcel value to land derived from the market evidence (Bell, Bowman, and German 2009a). Thirdly, the contribution value method calculates the sum of values of each property element and /or characteristics, which often is not the same as the total MV (Eckert 1990)(Bell, Bowman, and German 2009a; Eckert 1990). Finally, one could also use sales data for teardowns and discount the demolition costs to the property value (Dye and McMillen 2007b).

manufacturing, etc. – and then interpolate between known points to finally obtain the value of unsold properties, including dummy variables to account for additional land use categories – i.e. primary, unused or right-of-way- (Bell, Bowman, and German 2009a).

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

3.4.3 Frequency

An updated base is crucial to keep the liability, accountability, transparency and rationale of the tax. Surprisingly, here is where most countries perform worse (UN-HABITAT 2013; (IFS) and Mirrlees 2011; A. Smith 2013; UN-HABITAT 2011a; UN Habitat 2010). Governments believe updating cadastral values makes the PT more visible and creates social and political reluctance, which ultimately costs votes. But out-of-date tax bases lead to unfair fixes, unequal taxation and political disruption. For instance, it is better to have an annually updated inflation adjusted ABA than a MV o CV that above three to five years of age, depending on the market conditions (UN-HABITAT 2013; Cocconcelli and Medda 2013).

3.5 *Elements of differential taxation*

3.5.1 Assessment ratio/ 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 2009b). A split rate tax, one way of LVT, burdens a higher assessment ratio and / or tax rate to location values as compared to structures. The extreme case - a pure LVT - is when buildings are assessed with zero ratios (Brandt 2014). An assessment ratio below fifty cancels the land regulation potential of LVT, and may not raise enough revenues to cover administrative cost of the tax (Brandt 2014; Dye and England 2009a). In practice, assessment ratios adjustments may be delayed a period of time under equity considerations (Ayuntamiento de Madrid 2014; European Commission 2014b; European Commission 2014a).

3.5.2 Tax rate

There is no consensus on how high or low a tax rate on location should be; it is intrinsically dependent on the tax purposes – i.e. abatement of previous PT, raise additional revenue, etc. – . 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; (IFS) and Mirrlees 2011; L. W. Walters 2012). Next, for LVT to be a planning instrument, the tax should be high enough to change behaviours – the Pigouvian nature of LVT - (Calavita et al. 2010; Calavita and Mallach 2009; Alterman 2011). From a social perspective, rates should be flexible enough to absorb shifts in the tax burdens, i.e. through housing CIP adjustments (Bourassa 2009a).

Generally, governments apply different rates according to land uses, property and ownership types to seek for equitability enhancement of the policy instrument, or to encourage a certain type of development (Richard Miller Bird and Slack 2010; Smolka and Biderman 2011; Waicho Tsui 2008). But discretionary tax rates create additional burden, leading to unfair circumstances, lobbying creation and suboptimal land use allocation, which ultimately hinders appropriate land use mix from an urban sustainability perspective¹⁴ (Alterman 2011; Augustine and Bell 2009).

¹⁴ However, differential tax rates is said to create less distortion than zoning (Augustine and Bell 2009).

3.5.3 Exemptions and reliefs

Exemptions and reliefs are used for two things. First, they neutralize the regressively aspects of PT, especially with regards to low-incomers, elderly, farmers and commerce location 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; S. E. Sexton, Wu, and Zilberman 2012).

For the first objective governments use assessment limits (AL) to stabilize tax liabilities when property values raise rapidly (T. A. Sexton 2009; Hamilton 2007). This creates unequal redistribution of burdens, undermining the fairness of the LVT (Minnesota Department of Revenue 2006; Dye and McMillen 2007a; Dye 2007; Dornfest 2005). 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 AL applies 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 (Minnesota Department of Revenue 2006; Dye and McMillen 2007a; Dye 2007; Dornfest 2005). Finally, they erode the tax base and impact government revenues heavily (N. B. Anderson 2006; Minnesota Department of Revenue 2006; Moak 2004; O'Sullivan, Sexton, and Sheffrin 1995; T. A. Sexton 2009; Sjoquist and Pandey 2001). Another practice is to apply general discretionary exemptions (GDE) according to property or owner characteristics – i.e. Low Incomers (LI); Disabled (D); War Veterans (WV), among others-. Although they have direct social benefits, these can be more efficiently provided through alternatives that do not discourage owners to seek for higher income or use location towards optimum (T. A. Sexton 2009).

With regards to homeownership subsidies, this can be done in different ways. First, tax payments can be credited – tax deferral (TD) - or exempted to the taxpayer if the income is below a certain threshold. These practices however discourage owners to seek for higher income, while the purpose is to encourage more stable income generation. TD also reduces the expectation value of inheritors, who often find alternative ways to avoid their tax bills. Similarly, mortgage interest deductibility (MID) enables taxpayers deduct their tax liability according to their level of indebtedness. This practice creates critical distortions through the incentive of private households indebtedness and sprawl (Archer 2010; Couch, Leontidou, and Petschel-Held 2007; Diaz-Serrano and Raya 2014; Hanson, Brannon, and Hawley 2013; Comisión de las Comunidades Europeas, Dirección General de Asuntos Económicos y Financieros, and Oficina de Publicaciones Oficiales de las Comunidades Europeas 2012; S. E. Sexton, Wu, and Zilberman 2012). Moreover, it produces very low tax payments, while it does little to increase homeownership (Augustine and Bell 2009; Kortelainen and Saarimaa 2015). There is an increasing agreement on the idea that MID 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, Bowman, and German 2009b; J. H. Bowman 2009; Stiglitz 2014).

According to the land consumed, the literature discussing the externalities of new development refers to a tax relief based on the consumption of new/old urban land to achieve lesser eat up land development (Panella, Zatti, and Carraro 2011a). The value capture literature also identifies reliefs based on budgetary and/ or development responsibilities, the so-called conditional reliefs (CR) (Ingram and Hong 2012a; Peterson 2009). Finally, there is zoning specific reliefs due to site-specific reasons –i.e. noise, air pollution etc.- which is a kind of inverse Pigouvian tax or subsidy. But these instruments only apply to new development or already developed areas with a specific large project or public intervention plan (Batt 2011; Brandt 2014; Kreiser et al. 2011; Panella, Zatti, and Carraro 2011a).

All this said, reliefs or exemptions undermine the beneficial aspect of LVT, and limit local spending capacity, which may lead to undesirable effects such as the increase flight to private schools (Augustine and Bell 2009; Richard M. Bird and Slack 2002). They function in the same way as regulation or an additional tax, but with more complex distortions (Barnett and Yandle, 2004).

Reasonable socially based exemptions may be considered in very specific cases (Alterman 2011), but in even then public finance theory argues that direct expenditures are more efficient than tax reliefs (Augustine et al. 2009; Edel and Sclar 1974). By no means have exemptions and reliefs to be permanent; they need to be constantly revised. Lowering rates on a broad tax base are superior to higher rates on a narrow base, since lower and uniform rates are less likely to create distortions than higher and non-uniform rates (Augustine and Bell 2009; Buchanan 1999).

3.6 Tax liability and collection

3.6.1 Liability

Liability refers to the final payment obligation, often expressed as the effective rate or the ratio of the liability change to the market value change. Effective rates vary due to different factors. Governments 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 main factors intervening and misunderstand the impact of their tax designs (Barnett and Yandle 2004; Virtanen 2000). Bahl and Linn (1992) developed a methodology to decompose the tax revenues and identify those factors affecting the level of LVT collection. First, the relative growth in stock of property may not follow the overall growth in the economy (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 straight forward suggestion on how high effective rates should be, but underrating location values weakens the redistributive effects and hinders significant net yields. In order to uncover administrative cost of the tax suggests an effective rate never below 30 percent (Alterman 2011).

3.6.2 Collection

The value capture literature uses two indicators for evaluating the performance of value capture instruments that can also be applied to a LVT: the percentage location value captured (R_r), and the percentage public infrastructures investment financed by the LVT (R_i) (Hong 2003; Hong 1996; L. C. Walters, n.d.). The definition of R_i and R_r contains normative elements. Nonetheless the following criteria are strongly recommended: first a) R_i should include investment, operation and maintenance; b) R_r should be constant over time, so that LVT captures location value variations over time (Hong 2003; Hong 1996; L. C. Walters, n.d.).

3.7 Revenue Recycling

How to invest the revenues is a highly normative aspect of the design of LVT where two views compete. The new view says that revenue should be redistributed where most needed, regardless the revenue raising location. The benefit view is based on Tiebout suggestion that people vote with their feet, and suggests that LVT is a benefit tax, thus its benefits should be directly reinserted in the place where they were raised (Alterman 2011; W. E. Oates 1969; W. E. Oates and Schwab 2009).

3.8 Governance level

The main argument towards a decentralized LVT relies on the fundamental link between tax and expenditure decisions. If local government is to make the right fiscal decision, it must weigh the benefits of proposed public measures against the costs. If finances comes from elsewhere, this link is broken and the choice of programs are not based on true costs (McKinnon and Nechyba 1972; W. E. Oates 2001; W. E. Oates 1999; W. E. Oates 1993; Weingast 1995). In order to make municipalities interested in the efficient governance of LVT, they should keep full revenues; otherwise collection is not robust enough (Alterman 2011). Bird and Slack (2013) recommend that the discretion of local governments as beneficiaries and administrators of a tax should be differentiated along their actual functions according to the classes of local governments: metropolitan, urban and rural. 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 literature refers

either to the subsidiarity principle or to a central planning approach. The idea behind is that total metropolitan revenues should be inter-municipality redistributed, but there has to be a direct link between government authorities charged with collection and the one that benefits from revenues (Alterman 2011).

3.9 Fiscal Environment

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

3.10 Implementation

LVT often faces political opposition. First, the general unpopularity of wealth taxation grows when this is based on unrealized capital gains rather than current cash flow (Bourassa 2009a). This makes it a highly contested debate that intersects with political ideologies (Alterman 2011). Differential taxation of location gains and improvements may be challenged as a violation of the state's constitutional principles of uniformity, equality and proportionality (Coe 2009). The rationale behind a LVT is of extreme importance, where two main views coexist: the redistribution and justice argument taking about "capturing the unearned value", and the pragmatic view, which seeks to enforce developers pay their share and further control development patterns (Alterman 2011; Balchin, Bull, and Kieve 1995; Booth and Albrechts 2012; UN HABITAT 1976; L. C. Walters, n.d.). Whereas the first one faces administrative and regulatory-based feasibility challenges, the second one often lacks democracy and transparency because policies are jointly design by developers and government (Alterman 2011; Fainstein 2012; Meltsner 1971; Smolka and Biderman 2011). Clear rationales with strong legal frameworks would overcome the challenges, giving room for flexibility to accommodate to changing needs for public services or public perceptions on what merit public financing (Alterman 2011; Bourassa 2009a; Coe 2009). This implies that LVT has to be legally separated and its revenue should be reported separately from other taxes (Alterman 2011; Bourassa 2009a; Coe 2009) and predefined assessment standards (Bell, Bowman, and German 2009a). Local residents may also receive information on the revenue recycling to increase awareness and transparency of the costs of public intervention (Bourassa 2009a; W. E. Oates 2001; Powers 2009). Taxpayers are more likely to accept a tax and pay it if they understand the reason, perceive the rate system as fair, i.e. they must be able to see a connection between overall paid taxes and service level provided by the local government (Powers 2009; L. C. Walters 2011). The other way around, LVT has gained the attribute of a benefit tax; unless taxpayers are ensured adequate and good public services no reform measures can convince them (Bourassa 2009a; Rao 2008).

Every tax reform creates winners and losers, and so does implementing LVT (Bourassa 2009a). Governments should acknowledge this and ensure that the tax bill is affordable by majority of tax payer (Powers 2009). First, taxpayers should have the right to require a revision of the valuation (Aleksiene and Bagdonavicious 2009). Second, to avoid drastic changes LVT 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, increasing the LVT at the same time as assessments take place creates public opposition. It is also important to minimise administrative costs in the long term, (Tiits 2009) - i.e. through coordination on data collection, valuation, appeal processing, and collection of taxes among public offices and between trained professionals (Powers 2009)-. Local governments should also be aware of macroeconomic forces that may interfere and lead to an apparent failure (Bourassa 2009b). 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 2009b; Riel C. D. Franzsen 2009).

4. Assessing current practices in Europe

Table 3 presents the results from the evaluation of the European cases, following the criteria defined in the previous section. Bold entries mean that the design criterion follows what literature defines to be best practices. There are few criteria omitted due to lack of data (i.e. revenue recycling, value capture). Grey shadowed entries means that the design criteria are appropriate according to the revised literature. Each criterion (a total of 20) is weighted according to whether it fits or not with literature suggestions (0,1). We also include in the evaluation the criteria with no data available (n.a.), and count them as 0 based on the transparency and accountability criteria (see 3.10 Implementation). There are no data available on investment nor is change in location values, and we also evaluate Criterion 6 negatively for all countries. However, to give an intuition, we express the revenues from LVT in share of GDP, National taxes revenues and Recurrent Property Taxes (see Figure 2).

Table 3. Evaluation of current practices

	Denmark	Slovenia*	Estonia	Slovakia	Romania	Italy	Hungary	Lithuania	Austria
1. Tax base	SV [1]	SV	H	LV	SV	SV	SV	SV	SV
2. Owner	ALO [2]	ALO + US	ALO - P [3]	ALO + US	ALO + US	ALO	ALO	PO [2]	ALO
3. Land use	ALU	V + L1	ALU [4]	AEU	AEU - L1	V	L2 + V	ALU	V
4.1 Basis of assessment	MV	ABA	CV	CV	ABA	AR [5]	ABA/MV [6]	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 [7]	CON / SC [8]	CON	CON [9]	CON [7]	SA	CAMA	n.a.
5.1 Assess. ratio (%)	81	n.a.	66	72	n.a.	100	50 [10]	100	n.a.
5.2 Tax rate (%)	2.60 [11]	[12]	1.30 [13]	0.25 [14]	[15]	0.4 [16]	1.5 [17]	1.5 [18]	1
5.3 Exemp. and reliefs: ownership	NP; IP [19]	P [20]; LI [21]	D [19]; RES[22] [19]	R; NP; EDU; HEA	R; NP; EDU; HEA; WV; D	R; NP; EDU; HEA	n.a.	LI, D	-
5.4 Exemp. and reliefs: land use	I; [23]	I; L1[24]	RES(ARE); N [25]	[26]	I; IND; SPK; N [27]	[28]	RES (ARE); ZE [29]	I; NR; [30]	ZN [31]
5.5 Temp.	PER	PER	TEM	PER	PER	PER	PER	PER	TEMP
6. Revenue raising	See Fig. 2								
7. Revenue recycling	n.a.								
8.1 Gov. Tax Base	C	L	C/L	L	C	C	L	C	C
8.2 Gov. Tax Rate	C(L)	L	C(L)	LUZ(L) [32]	C	C/L	L	L	C
8.3 Gov. Reliefs	C/L	L	C/L	L	C/L	C/L	L	C/L	C
8.4 Gov. Collection	L	C	C	L	L	C	L	C	C
8.5 Gov. Revenues	L	L	L	L	L	C/L	L	L	C
9. Additional	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes

PT									
10. Implem.				n.a.					
Score (max. 20)	11	4	6	7	3	4	5	8	5

[1] Until 2013, private and Natural improvements were explicitly excluded making it a pure LVT; [2] Separate LT for P; [3] Excluded: Municipal land and land in public use; Included: state land not in public use; [4] Exploitation mineral rights included; [5] from Cadastre; [6] Municipalities can choose either 50 percent of market value; or L2 + V; [7] Plot size; municipality rank; location zone rank; land use coefficient; infrastructure availability; [8] Valuation authorities are allowed to consider all available evidence before arriving at their valuation. Sales comparison is one approach applied; the other is the estimation of value for highest and best permitted use (HBPU), with information received from both the corresponding local government and the Estonian Land Board; [9] Plot size; municipality rank; location zone rank; land use coefficient; [10] for MV basis; [11] 1.6-3.4%, avg. 2.6%; [12] Each parcel is assessed in absolute amount; [13] 0.1-2.5%, avg. 1.3%; [14] Former average 0.25%. Up to 5 times the lowest rate set by another municipality; [15] lump sum per square meter; [16] 0.2 to 0.4% ; [17] 0 to 3%; [18] 0.1 to 4%, avg. 1.5%; [19] Optional; [20] Exemption; [21] Reduction; [22] Formerly repressed persons if not receiving rent for leasing out land; [23] Agricultural land: lower rate; [24] 5 years after construction; [25] RES: Area up to 0.15 ha (since 2013); Agricultural land: 2% reduced rate; NR: 50% reduced rate; [26] Exempt if economically not usable due to natural state or zoning; [27] Exemption: land for subsoil exploitation; Water bodies; [28] Exemption: rural mountain areas; [29] 25m² per resident; 50% lower: land where building is not permitted; [30] Agricultural land: lower rate; [31] Individual owners get tax paid back if dwelling built within 5 years; [32] Up to 5 times the lowest rate set by another municipality; [33] Negligible; [34] Depends on decision of municipality.

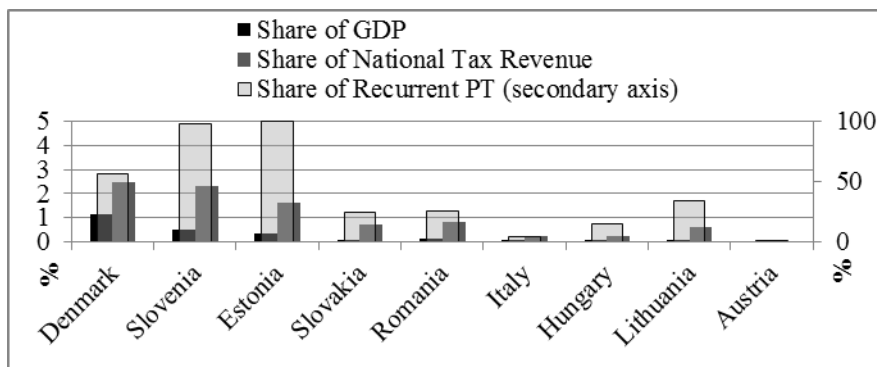


Figure 2. Revenues from LVT expressed in GDP, National taxes revenues, Recurrent Property Taxes (secondary axis) and, for DK, EE and LT, share of LVT from urban areas (down part of the graph).

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 hectares 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 last two base their share of recurrent property taxes solely on the LVT (Fig.2 light grey, secondary axis).

5. Discussion

A vast amount of research from public economics to sustainability science indicates that a shift from traditional property taxation towards LVT improves specific sustainability metrics. To address our first research question on the design characteristics that enhance urban sustainability, we first 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. We find that the design of the tax base, the valuation method (especially the frequency of assessments), the exemptions and tax reliefs, and the fiscal environment are crucial in the performance of LVT. Our results also emphasize the role of strong land use regulations for environmental concerns, especially reducing land use consumption.

In Europe, although there are good practices with regards to some criteria (i.e. assessment ratios, governance level, and tax subject definition), there is 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 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 – i.e. 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 decide towards indirect instruments designed to collect contributions from developers to meet the infrastructure needs– i.e. 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 (EEA) 2010)¹⁵ or on abstract economic rationales (Klenert, Schwerhoffy, and Edenhofer 2015; Mattauch, Siegmeier, and Edenhofer 2013; Mattauch et al. 2013). Interestingly, there are a number of places where LVT is gaining attention (Alterman 2011; Brandt 2014; Dwyer 2003; Dye, England, and Lincoln Institute of Land Policy 2010; European Commission 2012; Land Value Tax Working Party 2005; Panella, Zatti, and Carraro 2011b; Tom et al. 1999). In Europe UK ((IFS) and Mirrlees 2011; Seely 2013; Wightman 2013a), Scotland (Wightman 2010), Ireland (Gurdgiev 2010; Gurdgiev 2009b; Inter-Departmental Group 2012) and the Netherlands (Altes 2009)) openly debate the issue. The European Statistical Office (EUROSTAT) and the Organisation for Economic Co-operation and Development (OECD) have a joint project to develop methodological guidelines for location value estimation that will be applied in future tax systems reviews at the EU level (European Commission 2012; Garnier et al. 2013). This initiative 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 politically tricky problems are ten-a-penny. Few offer the people who solve them a trillion-dollar reward” (*The Economist* 2015b).

6. Conclusion

The paper explores if a LVT is a realistic option when designing future fiscal reforms. We find that it does have relevance in the urban sustainability debate and, with adaptive policy instruments, should be considered in planning integrated strategies for sustainable cities. We further argue 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 real estate taxation system. For this to happen, there is a need to harmonise nomenclature, properly define the tax instrument, change normative statements on property taxes, and evaluate the effects beyond fiscal welfare enhancing. Here we offer new insights on these three issues.

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¹⁵ Research projects from Netherlands, Germany and France.

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