Can Recurrent Land Taxation Reduce Land Consumption and Improve Municipal Finances?

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Urban form and municipal finances mutually influence each other. Denser settlements provide public services more efficiently, but also in larger amounts per surface unit. By contrast, sprawled development often correlates with higher rates of consumption of resources per capita: land, raw materials, infrastructure, and transport fuel among others. The financial crisis in Spain, exacerbated by the real estate bubble, has revealed the growing budget imbalance at the municipality level. Here we link the waste of land through rapid urban land consumption with that of municipal funds. The contribution of this paper is the following: First we identify the specific characteristics from urban sprawl in Europe, paying particular attention to the case of Spain. Second, we provide with an overview of the delicate time for local governments, and further analyse the contribution of property taxes. We further argue in favour of a shift towards land-based taxation using two main arguments: the efficiency and equity to finance local provision of public goods, and the subsequent anti-sprawling effect it would have in future development. We present a simple model to illustrate the revenue potential of a land-based tax in the context of Spain. The results encourage further research to better evaluate the outcomes of such reform.

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I. Introduction

The financial crisis in Spain has been accentuated by the real estate bubble. The combination of these factors has had uncountable outcomes on the national’s economy and the overall population welfare. In addition, the 20 years preceding the financial crisis have seen an explosion of land use for housing and transport, particularly during the housing bubble, with often detrimental outcome for the environment and climate change. The report Urban Sprawl in Europe published by the European Environment Agency (2006) was one of the first attempts to raise the awareness on recent sprawled developments in most European States, where cities average expansion has been more than 75% compared to roughly 35% of the population increase since mid-1950s. Although there are different definitions and approaches to measure sprawl, it is generally referred as urban land development characterized by low levels of density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity (Brueckner, 2000; Galster et al., 2001).

a. Rapid Urban Land Consumption: Evidences, Causes and Consequences

Evidence

Europe has the largest share of urban land cover, with currently around 5% of its total surface covered by urban areas (Angel et al., 2013, 2011; EUROSTAT, 2013). In understanding the consequences of urban land cover, it is necessary to look a flow accounts on land use changes (European Environment Agency (EEA), 2006). Urbanization, expressed as the proportion of people living in urban places shows a recent but explosive growth reaching values around 80% in most European countries (Antrop, 2004). A great increase can be seen on the annual land take, with housing, services and recreation as the main drivers (European Environment Agency (EEA), 2013, 2006). At the present, almost 1000 kkm2 per year are converted to urban cover in Europe, and Spain is by far the largest contributor, with more than 250 km2 per year, 22% of total Europe urban land uptake. In comparison with the EU average, artificial
land cover has change dramatically in Spain within the last decade (EUROSTAT, 2013). In 2000, about 1.7% of the surface of Spain was covered by urban land use, whereas nowadays this number has almost reached 4.5%. The EU27 average has only increase from 4% to 4.8% (European Environment Agency (EEA), 2006; EUROSTAT, 2013).

A comparative analysis of 15 European urban areas on the development between 1950 and 2005 shows that Southern European urban areas, although still are very compact if compared to other European cities, in particular to those in Northern Europe, they have started to experience rapid urban expansion since mid- 1990s (Kasanko and Barredo, 2006). A more recent study analyses urban form with respect to landscape metrics and population-related indicators for 231 European cities, and further clusters European cities according to their urban form. Italy, Spain and Germany account for most of the cities with the lowest population density (Schwarz, 2010).

Ortuño-Padilla and Fernández-Aracil (2013) report typically sprawled characteristics of urbanization in those provinces located in the Mediterranean coast and the central region of Spain since 2000. Marull and Pino (2010) observe a loss of land-use efficiency from the mid-19th century to present in the Barcelona Metropolitan Region. Similarly, Garcia-López (2010) finds that the polycentric model of Barcelona has been modified through large suburbanization trends both at the central business district and the subcenters. The new urban character of the region presents lower urban densities, high losses of non-urban land covers, depopulation of the metropolitan inner core, an increasing importance of single housing or the expansion of transportation infrastructures (Bibiana Catalán, 2008). The Madrid region is considered to be one of the EU hotspots in suburban development in the EU (European Environment Agency, 2006). Urbanized land in Madrid grew by 50 % in the 1990s, compared with a national rate of 25 %, and an EU Figure of 5.4 % (Fernández-Galiano, 2006; EEA, 2005). Although the difference with national numbers decreased in the 2000s, it is one of the most sprawling urban centers at the EU level (see figure 1).

A number of studies published after the financial crisis argue towards a shift in urban development patterns. They state that automobile dependence is declining and densification observable in some parts of the developed world, including Europe. The increase of fuel prices and further projections drive this change (Anas and Hiramatsu, 2012; Molloy and Shan, 2012). We provide two arguments to show that these findings do not contravene the relevance of our work.

First, the scope of these studies is based on Central European cities with lower public financial problems, and in no case Spanish cities are included (Eriksson et al., 2010; Kuhnimhof et al., 2012; Millard-Ball and Schipper, 2010; Newman and Kenworthy, 2011). To provide some evidence, we show the average urban growth patterns for all EU27 States, and those specific to Spanish cities. From a sample of 542 cities with EU27 representativeness, Figure 1 (above) shows the most observable\(^1\) value for each State.

\(^1\) We took median values to account for extreme examples
in terms of change in Large Urban Zone (LUZ) population and change in city core share of the overall LUZ population distribution. The interpretation of the figure is as follows: the horizontal axes show the percent change in LUZ, the vertical one shows the percent change in population living at the urban core. Most cities show positive LUZ population growth (right side of the graph) and an increase in population living in the suburbs (lower part of the graph), which based on (Couch et al., 2007) methodology, we consider as an indicator or urban growth with sprawl. Malta is by far the country that has experienced sprawling urban growth, followed by Slovenia, Estonia and Czech Republic. Spain had more than average urban growth, with certain sprawl. A deeper look at the Spanish dataset shows that from 24 cities included, only 30% experienced larger population increase in the inner part of the city (Figure 1, below).
That said, although future urban growth may achieve more compact development, it will only be observable in the long term. Our research combines present urban structure with the short term viability of local public finances. Besides, evidence from US and Australia shows the location of low socioeconomic households on outer suburban areas,
with high levels of car dependence and hence more vulnerable to fuel prices (Dodson and Sipe, 2008, 2007; Sexton et al., 2012). An immediate increase in fuel prices will further limit the today’s scarce budget from medium and low income households according to their location, commuting patterns and transport mode substitutability. Political agendas at the local level need an awareness of these potential links between fuel prices and household spatial distribution.

**Drivers**

Urban studies generally use the variables from the urban space explicit monocentric model, known as the AMM model (Alonso (1964); Mills (1967); Muth (1968)) as a starting point to explain urbanization dynamics. Spatial household location preferences are defined through income, housing costs, transport costs, and other goods consumption preferences. An increase in population and income and a decrease in transport costs attempt to explain a quantitative share of urban development patterns (Bertaud and Renaud, 1995; Nordhaus, 2008), including urban sprawl (Baum-Snow, 2007; Brueckner and Fansler, 1983; Brueckner, 2000; Burchfield et al., 2006; Kim, 2012; McDonald, 2009; Mieszkowski and Mills, 1993). Empirical research available has a special focus on land-rich\(^2\) countries, and the link between income, land rent and transport characteristics with urban land consumption (Brown and Logan, 2008; Burchfield et al., 2006; Jean-Paul, 2013; Kim and Brownstone, 2013; McGibany, 2004; Rodriguez, 2013; Song and Knaap, 2004; Tanguay and Gingras, 2011; Wassmer, 2008), with population growth influencing the most (McGrath, 2005).

A theoretical study by Brueckner (1997) provided valuable insights on the effect a fiscal distortion such as underpricing urban infrastructure may have on the excessive spatial growth of cities. Besides, studies dated after the financial crisis in the US also stress the role mortgage and monetary policy, together with fiscal and housing policies promoting home ownership have on urban development in the broader sense, and urban sprawl in particular (Hanson et al., 2013; Sexton et al., 2012; Smart Growth America, 2013).

That said, the characteristics shaping urban dynamics among EU countries may contribute to a better understanding of the picture in Spain. The work developed by Couch et al. (2007) has valuable insights. They identify a set of sprawling patterns among European regions, with different drivers, problem scales, spatial structures and temporal developments (see Table 1).

<table>
<thead>
<tr>
<th>Region</th>
<th>Main Drivers of Urban Sprawl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern and Western Europe</td>
<td>Lifestyle-driven</td>
</tr>
<tr>
<td>Southern Europe</td>
<td>Infrastructure-related</td>
</tr>
<tr>
<td>Post socialist and Central-East Europe</td>
<td>Regulation-related</td>
</tr>
<tr>
<td>City specific (i.e.: Leipzig and Liverpool)</td>
<td>Declining urban areas</td>
</tr>
<tr>
<td>Southern Europe, Sweden, Austria</td>
<td>Development of second homes</td>
</tr>
</tbody>
</table>

Table 1 Types of urban sprawl in Europe (adapted from Couch et al. (2007)).

\(^2\) Land-rich countries: Australia, Canada, New Zealand and United States
Sprawl in rich-State in Europe has been mainly demand side driven, through well-developed patterns of urban welfare and livability, and the affluence of “weekend” homes. Regulation related refers to the impact of transition from socialist to free-market economies. Interestingly, Couch et al. (2007) found that sprawl does not always refer to population growing cities, illustrating this fact with the cases of Leipzig and Liverpool. Southern Europe in general is identified with infrastructure related sprawl and Spain and Greece, in particular, to second homes development, following a sort of seasonal family life pattern, fragmenting time between work and leisure. This explains peak traffic jams and air pollution, just by looking at the transport behaviors arising from such division (Couch et al., 2007; European Environment Agency, 2006; Garcia-López et al., 2013).

Ortuño-Padilla and Fernández-Aracil (2013) find a positive relation between GDP per capita and urban development in general, and sprawled in particular. Besides, an increase of 1% in the price of fuels will lead to a reduction of 0.73% in the percentage of suburban development and to an increase of 1.84% at the city center. In addition, housing prices positively correlate with increase in high-dense development, whereas public transport costs and the economic recession have the opposite effect. These variables have no significant influence on the development of suburbanized areas. Although valid, these results cannot explain the difference between Spain and other EU countries on per capita urban land consumption (see figure 2). A first hypothesis is to think that economic development (pre- financial crisis) showed larger figures in Spain, or that transport costs have been drastically lower.

![Figure 2 Urban Annual Land take per Inhabitant (square meters) National averages 2000-2012](image)

Significant to our research is the capacity of their set of variables in explaining urban dynamics. While changes in the GDP per capita, public transport costs, house prices,
recession and the price of fuel and housing determine 81% of the variation in the construction of high-dense centralized development, its only 48% for suburban sprawled development (Ortuño-Padilla and Fernández-Aracil, 2013). This fact goes in line with the one that commonly used urban drivers show a similar development since 2000 between those two (see Table 2). The economic welfare has increased in parallel with that of the EU27 average. Transport costs have increased in line with averages at the EU27. Furthermore, recent evidence suggest that an increase in transport costs may have had larger effects in Spain compared to EU27 (Álvarez et al., 2012). Indirect taxes in Spain account for roughly 50% of the final price of transport fuels, whereas in the EU-15, the share is around 60%, 10 pp higher. Hence, for a given change in fuel prices, final prices in Spain change largely than in the EU-15. In addition, household expenditure share on refined oil products has increased over time from less than 2% in 1970s to around 6.2 % at the present, considerably higher than in Europe (4.6%), only partially offset by heating oil consumption, mostly explained due to lower average temperatures (Álvarez et al., 2012). Hence, additional factors such as fiscal policies, land use management and local development plans may have played a key in Spanish urban sprawled development.

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Measure</th>
<th>% Change 2000-2012 Spain</th>
<th>% Change 2000-2012 EU27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Land Consumption</td>
<td>Average m2/year per inhabitant 2000-2012</td>
<td>70</td>
<td>34</td>
</tr>
<tr>
<td>Income³</td>
<td>GDP per capita</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Expenditure per capita</td>
<td>31</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Actual rentals for housing⁴</td>
<td>110</td>
<td>9</td>
</tr>
<tr>
<td>Transport costs</td>
<td>Operation of personal transport equipment</td>
<td>26</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Gasoline price (Euro-super 95) without taxes</td>
<td>49%</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>Gasoline Prices (Euro-super 95) with taxes</td>
<td>21%</td>
<td>0%</td>
</tr>
<tr>
<td>Credit Availability</td>
<td>Mortgage Interest Rate</td>
<td>-40</td>
<td>-80%⁵</td>
</tr>
<tr>
<td></td>
<td>EURIBOR (1 Year)</td>
<td>-82⁶</td>
<td>-71⁷</td>
</tr>
<tr>
<td>Population</td>
<td></td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

*Table 2 Main Urban Drivers Development 2000-2012 Spain and EU27*

Other studies provide with more evidence on the influence of infrastructure development. Suburbanization has been highly influenced by the massive construction of transport infrastructure, mostly freeways and highways, with population concentration along them. Suburban municipalities that were given improved access to

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³ Source: European Commission (2014)
⁴ Imputed rentals for housing: Spain = 17, EU27 = 22. Source European Commission (2014)
⁵ Data from 2002 and 2012
⁶ EURIBOR: Spain (2000): 4.7; (2012): 0.82.
the highway system between 1991 and 2006 grew 4.6% faster (García-López et al., 2013). In the Metropolitan Region of Madrid, only a number of drivers other than population could explain the extraordinary urban development. A number of interlinked socio-economic factors have produced enormous pressures. The demand for second homes has increased the number of houses twice as the increase in population (European Environment Agency, 2006). Additionally, there has been a huge extension and improvement of the road and motorway network and local railway, including three motorway rings around the city (Díaz Orueta, 2007).

Finally, the desirability of growth in Spain among the private and public sector, no matter what, has favored development coalitions, over conversion of land to urban purposes and household loans enhancement policies. There has been a limited extent of public housing units and a massive popular preference for privately owned dwellings (Díaz Orueta, 2007; García-Palomares, 2010).

**Effects**

The undesirability of sprawled urban growth has been widely justified in the literature through multiple arguments. It induces higher operational energy consumption of households, mostly due to the large shares of motorized transport modes (Cervero, 2001; National Research Council, 2009; National Research Council et al., 2002; Newman and Kenworthy, 1989; Perkins et al., 2009; Rickwood et al., 2008; Su, 2011; Troy et al., 2003). Whereas transit share of city-wide city-wide carbon dioxide (CO2) emissions is only 3%, gasoline consumption by on-road vehicles accounts for more than 20%, with the subsequent contribution to global warming (UN-HABITAT, 2011). Transit-oriented, denser cities show lower per capita usage of energy for transportation (Rickwood et al., 2008). At the EU level, Bart (2010) finds that the correlation between transport CO2 emissions and the increase of artificial land area is much stronger than the one between CO2 emissions and GDP or population. In Spain, 50% of the total consumption in road transport comes from private transport and up to 27% of the total CO2 is generated by road transportation. Equivalent CO2 have seen an increase from 280,000 thousand tons in 1990 up to 370,000 in 2009. Despite the economic crisis, this trend continues and no major change is observed in the usage of private vehicles (Navalpotro et al., 2012). National Spanish CO2 emissions triple the ones from the Kyoto Protocol (Navalpotro et al., 2012). Thus, reducing sprawl and automobile dependence in cities is a basic requirement to mitigate global warming.

High rates of land consumption also increases the demand for numerous natural resources, including fixed stocks of land and soil permanently or at very high costs of reversibility (Cervero, 2001; European Environment Agency, 2006). The Spanish consumption of concrete has increase by 120% since 1996 (European Environment Agency, 2006). Urban land consumption also increases soil sealing, which diminishes extremely important soil functionalities such as its water storage capacity (European Environment Agency, 2006). The European Environmental Agency has expressed its concerns at the share of artificial land in coastal areas in Spain which goes up to 50%,
considering the vulnerability of coastal ecosystems and the value this region has on biodiversity matters.

In the Barcelona Metropolitan Region a simultaneous loss of energy efficiency and land-use efficiency from the mid-19th century to present is tracked by changes in the functional landscape structure (Marull and Pino, 2010). In Madrid, consequently to the recent development, there has been a tremendous increase in the housing market that pushes people out of the city. Hence, data shows an increase in commuting volumes, distances, and car use mode share (García-Palomares, 2010). In addition, decentralization processes in all economic activities can be observed, with employment hubs and shopping and entertainment malls emerging all over the region (European Environment Agency, 2006).

Besides, economic inefficiencies arise from the over usage of land for urban purposes. It increases per capita infrastructure needs and related public expenditures (Arnott and Stiglitz, 1979; Barr, 1972; Brueckner, 1997; Ecorys Transport (NL), 2005; Fisch, 1977; National Research Council, 2009; National Research Council et al., 2002; OECD, 2013a). Finally, indications on social welfare loss through decrease in accessibility to public goods, the deterioration of urban centers and public health (Berrigan et al., 2014; Griffin et al., 2013; James et al., 2013), the diminishment of community identity and additional social negative impacts have been observed (Batty et al., 2011; Bhatta and Drennan, 2003; Bongardt et al., 2010; Brunner, 2013; Creutzig and He, 2009; Creutzig et al., 2012; Dulal and Akbar, 2013; Dulal et al., 2011; Echenique et al., 2012; Ferdous et al., 2010; Glaeser et al., 2008; National Research Council et al., 2002; OECD, 2013b). In Spain, the resulting spatial segregation and household historic heights of debt are a reality in many cities that showed sprawling development, especially in the capital (European Environment Agency, 2006).

b. The delicate time for Public Finances, particularly in the case of the Spanish Local Governments

A major negative impact on the national economy is seen in the present public debt crisis on all government levels, leading to strict budgetary constraints that have dramatic consequences on the provision of public social services and investment in infrastructure. The economic solvency problem from public finances in Spain is not solely related to austerity regimes applied over recent years. Indeed, the annual difference between revenues and expenditure has increased since 1995 more than 75% at the national level. If added up annual differences, this number multiples by a factor of 10 (E. European Commission, 2014). These numbers are much larger at the regional and local level of government (see Fig 1).
Another illustrative data of the differences on local finances between Spain and other EU countries is given by the average indebtedness per capita at the local level. The EU27 average went from almost 0 Euros in 2000 to 10 Euros in 2012, and never showing values above 95 Euros. In contrast, Spain has passed from no indebtedness and even per capita revenues around 2000 to more than 180 Euros per capita of indebtedness in 2012 (European Commission, 2014).

Supranational and central state funds have had a major contribution to the annual budgets of local and regional public administrations in the last almost two decades. This gap between funding and revenues may lead to an inefficient provision of public goods, generally through an overprovision of local infrastructures and services. One way in which such a phenomenon can be observed is by looking at the per capita increase in locally public finances amenities. A recent study carried out by the Council of Europe on Local administrations places Spanish local public debt as the largest among EU states, with a total debt of more than 220 as per cent of their revenues in 2010 (Irina Turgel, 2011). Although this number may not be relevant in percentage of GDP (3.3 % in 2010), the trend is alarming when it comes to budget stability. Taking 2000 as a reference year, the total debt as a factor of revenue in 2012 has been multiplied by a factor larger than 20.8 (Irina Turgel, 2011). A well-known example is the per capita average consumption of street light in Spain. Whereas the energy efficiency goals for 2012 were estimated in 75kWh/year per inhabitant, a recent study (Sánchez de Miguel, 2011) the data from the same year shows an average consumption of 113 kWh/year, more than 50% of the efficiency goal, and the largest by difference from all EU nations9. In expenditure terms, the national costs of street light doubled in 5 years, from EUR 450 mill in 2007 to EUR 830 mill in 2012.

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8 2000 = 100, 2012 =2274
9 France: 90-77 kwh/year; Germany: 48-43 kwh/year
In addition, drops in real terms in the local budget revenues with difference of almost 15% between the revenues from 2007 and 2012 (E. European Commission, 2014). Intergovernmental transfers and short-term funding schemes were the first reaction to the financial crisis in 2008, most of them aiming to keep the construction industry in business. However, since 2011, the serious uncertainty on whether the crisis will be over in the short have led to loans and transfer reductions either by discouraging municipal borrowing or temporarily lowering the limits on local debt. One commonly used solution to overcome public budgetary constraints in Spain has been the promotion of PPPs, with Spain being the second state with more PPPs, behind only the UK. However, the value of PPP transactions has been also been affected after the crisis. Furthermore, they are typically in the transport, healthcare and education sector, mostly under the competence of the central government (Irina Turgel, 2011). This goes in line with the OECD’s recent identification of local budgets as the most severely affected by the financial consequences of recession (Irina Turgel, 2011).

In order to cope with this fact, the central government proposes to local municipalities to reduce costs and implement saving measures based on efficiency. Unsurprisingly, changes in the street lighting regulation were proposed together with improvements in the high-energy consumption of water supply and water purification facilities. Nevertheless, these changes need front financing, which nowadays should be taken care by local administrations.

The role of Property Taxes in Public Finances
We focus on property tax revenues. The argumentation is two-fold: Most municipalities base their incomes in sales, income and value added taxes. These instruments, although they share some advantages, when economies show lower o negative growth rates, they react immediately with notable revenue reductions. During the recession, the property tax was much more robust, at least when compared with Personal Income Tax (PIT) (Irina Turgel, 2011). Hence, greater revenue stability requires greater contributions by property taxes. Second, our working hypothesis suggests that property taxes may have had a major say in the extraordinary urban development in Spain and the current difficulties local finances face, by the overprovision of public infrastructure for new development.

In the exercise of analyzing property taxes in scale and time, an initial difficulty arises in trying to find comparable disaggregated data. There is a lack in systematic reporting with regards to tax regime specifics (tax base, assessment ratios and valuation methods, applicability and exemptions). Revenues are embedded in larger tax categories (i.e.: OECD, Eurostat). We used "Taxes in Europe" database (TEDB) (European Commission, 2014b), property tax revenues in 2012 accounted only for 2% of national GDPs on average for all EU27, same as in 2000. The share of total taxation has also remained stable around the 5%, with no major changes before, during and following the financial crisis. There are certain country-based differences, with the United Kingdom at the forefront in raising tax funds from properties (see Fig x).
Two major sources of revenues from property taxes systems are reported in this dataset, named “recurrent” and “other taxes”. Recurrent taxes refer to those ones that are collected periodically, mostly on an annual basis. Within the second group, although a wide variety of taxes is included, most are transfer taxes, which apply only when a property changes its ownership. There is a general opinion on the non-neutrality of transaction taxes because it reduces the number of transactions, hampers the price discovery process and affects labour mobility. Following the recent economic development, one new argument has been added to the previous ones, on the issue of short and long term variability of revenues, depending on the behaviour of the real estate market, used by the European Union to suggest a shift away from transfer taxes in favour of recurrent ones (European Commission, 2012a, 2012b; Lampis and Fraser, 2013).

Contrary to the efficiency argument, recurrent taxes account only for 60% of total property tax revenues in the EU27. Somehow in line with these arguments, the variability of return in percent contribution to total tax revenue since 2000 tell us that recurrent taxes behave almost four times more stable compared to the second group (Coefficient of variance (CV): 0.11 and CV: 0.03 respectively). A quick look at the spatial distribution of those European tax systems based on transfer taxation (Figure 5, no- and red colour) shows some regional patterns, with Southern European countries generally favouring these type of tax revenue. Besides, there is a general trend to distribute the revenues from recurrent taxes locally (70%).
Property taxes in Spain account for 6% of total tax revenues, with equal distribution coming from recurrent and other taxes. The variability of return however, shows telling differences as compared to EU27 (see Figure 6). In both cases non recurrent show more variance in the period 2000-2012, most probably due to the change over time on the real estate market values and the number of operations that have taken place during the years before and after the crisis. This tell us that a much more resilient and trusty tax system is the one based on recurrent taxation, as already suggested by European experts (European Commission, 2012a). For Spain, the revenue instability is notably larger to the EU27 average.

One could also argue that the variance coming from non-recurrent means that they account more efficiently to market fluctuations and this makes them more beneficial. However, literature and evidence tell us that even there is surplus in revenue when real estate values grow, both on stable and shrinking markets this does not hold. Thus, they potentially mislead politicians in terms of budget capabilities, as has been seen infinitely for the case of Spain. The overall decrease in non-recurrent taxes since 2007 has dropped largely than the increase they had between 2000 and 2006 with the housing bubble, indicating a regressive behaviour in terms of value capture (see Figure 7). A comparison between 2000 and 2012 revenues shows a decrease of 15%, whereas recurrent taxes have increased by more than 40%. At the present, recurrent taxes represent half of revenues and “other taxes” have dropped from more than 55% in 2000 to less than 40% now.
Our analysis goes one step further and looks at those taxes related to urbanization processes which aim to recover the additional costs of private development on public provision of services and infrastructure, known as development taxes. At this point, massive urban development in Spain during the last decades, especially since 2000 is an irrefutable truth. Impressively, the share of revenues from development taxes has remained stable around the 7%, showing 16% increase between 2000 and 2012 values. This indicates that development taxes have not adequately contributed to the overall urban development investment from public authorities.

Additionally, a deep look at the tax scheme and how it operates provides with illustrative figures: no more than 0.25% of the total cadastral value is captured by all property taxes in place, a number that has been remained stable also during the years of the housing bubble. The system is full of exemptions, reductions and re-evaluations if cadastral values are too high due to a recent assessment. Besides, although tax rates can go from 0.4 to 1.1% in urban areas, municipalities tend to be around 0.5 (i.e.

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10 Tax base is reduced for the following nine years if an update of cadastral values has taken place (}
Madrid, the capital of Spain, has an average residential tax rate of 0.6 (Ayuntamiento de Madrid, 2014).

II. Motivation

Urban form and local finances mutually influence each other. The relationship is two-fold. First, the effectiveness of public expenditures to provide public services highly depends on the characteristics of the urban settlement (population density, accessibility, connectivity, etc.) and people will locate according to the grade of accessibility for each location to public services. Additionally, the revenue potential from property taxes is highly dependent on the settlement characteristics, besides the tax regime itself. The relation between the viability of local budgets and urban sprawl patterns of development has not yet been explicitly addressed.

On the one hand, the proposals from supra levels of governance and research on how to overcome the difficulties to local finances in Southern Europe is mostly based on cutting costs. Additionally, although a policy portfolio to address sprawling development has emerged, this does not hold for Southern Europe at the present time. A special focus is given to transit-oriented development. Case studies all over the world show this alternative as the “number one” strategy to mitigate climate change in cities (i.e. most mega cities sin Asia, recent development of BRT projects in Colombia, Brasil, and Chile, and the interest in enhancing transit accessibility in a number of US cities). Another alternative is to implement higher-density, mixed-use, growth management policies and urban infill. However, a new strand of opinion critics the usage of policies aiming to reverse, or at least slow down, urban sprawl. Commonly used arguments are crowdedness, reduction of urban green areas and increases housing prices (Burton, 2000; Cox, 2008; Ewing et al., 2014; Wendell, 2011). Compact development curbs land development and poses significant challenges to promoting affordability (Addison et al., 2013). Some evidence indicates that a tax on large lots or a subsidy for small lots may be welfare improving under certain conditions (Turner, 2007). In Southern Europe, multiple fragmented public agents together with large economic enterprises and public-private partnerships lead to wastage of local finances on inefficient local infrastructure provision (Couch et al., 2007; Díaz Orueta, 2007; European Environment Agency, 2006; García-Palomares, 2010; Hawkins, 2013). Conflicting planning guidelines for local authorities, lack in regional urban planning, and competing consumer preference pose a barrier in the effective implementation of these policies (Coble, 2013). Hence, a lack of agreement exists about anti-sprawl policies among urban planners and politicians and also between the constituents about the amount of taxes and fees that should be provided by the governments and the proportionality that should be paid through local taxes. Politicians often find strong public opposition in their attempts to raise taxes and fees to cover the costs of services and infrastructures. The current downturn has worsened this matter. Supranational bodies have curtailed financial assistance to municipalities at the same time their highly variable revenues have drastically declined and costs on entitlement programs have increased (Ingram and Hong, 2012).
We try to fill this gap of understanding between public finances and sprawling patterns in Spain, aiming to shed light on possible solutions to overcome both problematic. We focus on the optimal municipal revenue decision from property taxes, which considers economic viability and the contribution to reduce accumulative debt with anti-sprawling secondary objectives as opposed to the previous growth model favoured by Spanish municipalities. First, we adduce arguments in support of a shift away from traditional property schemes based on the whole value of the property in favour of land-based assessment of the property, leaving aside structure value. Through a literature review process, we identify recurrent land-based properties and development taxes to be the mechanisms that better perform in tackling urban sprawl and raising local revenues. We then use a simple model, based on (Cord, 1985) calculations for the US case, to bring some insights on the potential revenue that could be taken when replacing all current property taxes with a single tax on land values. We also demonstrate that the adoption of a yearly land assessment has a great impact on local finances stability, contributing to both the revenue and the expenditure sides. Based on these results, this paper tentatively answers the following question: Has the current state of property taxation in Spain played a role in the rapid expansion of urban land cover? Finally, in the last section, we shortly discuss how a reform towards land taxation would be possible and in which terms.

a. Rationale for a shift towards land-based taxation

The Efficiency and Equity argument
A brunch of the scientific and citizen community advocates for the idea of a property tax reform towards land-based taxation. The idea of replacing the current property tax system, based on the assessment of both infrastructure and site values is not new. Already in 1973, the UN-HABITAT stressed the benefits for implementing such an instrument,

“Taxation should not be seen only as a source of revenue for the community but also as a powerful tool to encourage development of desirable locations, to exercise a controlling effect on the land market and to redistribute to the public at large the benefits of the unearned increase in land values.”

UN-HABITAT, 1976

The “unearned value” to the increase in land value resulting from a change in the use of land, from public investment, or due to the general growth of the community (UN’s Vancouver Action Plan, 1976). Hence, local authorities’ intervention enhances the attractiveness of a location through different actions (see Figure 8). Demand for housing increases in the surroundings and so does market prices. Thus, public investment is capitalized in higher housing values, which then go to the private sector in most cases. An adequate property tax regime should curtail this effect, and capture the added value equitable and efficiently which in other case would go to undeserved hands.
Figure 8 Relationship between Public Intervention and Property Values

Henry George, a famous political economist from the 19th century (George, 1879) argued that the overall expenditure on public goods equals the differential land rent before and after the public intervention and thus, this differential must be taxed out though land-based taxation to finance the initial investment. Land-based taxation is recognized to be an efficient and equitable mechanism for public revenues. Efficient because taxing away rents does not harm the economy or distorts markets. This holds true in particular for such assets with a low elasticity of supply, such as land and other natural resources. In addition, beneficiaries of infrastructure are required to pay part of the investments costs, this preventing the public from undervaluing public goods (efficient provision public goods). Equitable because those who did not contribute to the increased value do not retain the financial benefits, which can then be used to fund programs to serve the community at large. If high prices of the assets decrease the equal distribution of accessibility to that asset, higher economic rents might cause a greater degree of redistribution. Hence, the accumulation of market power might be contained by a taxation of rents. Loehr (2013) found evidence that access to land and the foundation of the profits on rents appear to be an essential base for sustainable performance of companies.

Having said this, many scholars, including Henry George have advocated for a single tax on land and the abolishment of all other taxes (Foldvary, 2006; Löhr and Harrison, 2013). Shifting taxation onto economic rents might decrease the excess burden which is connected with the usual taxation of income (generalized (George, 1879; Stiglitz, 2010). One of the many critics this lasted in time proposition has face is the skepticism on its revenue potential. Cord (1985) gave an estimation of the revenue that a full land value tax would have yield in the US using data from 1981, with an astonishing result of 28 per cent of the total national income. This is nearly two thirds of all taxes levied by all levels of government in the same year 1981, and, with user charges and similar fees
continued, it is probably equal or nearly equal to burdensome taxes. In addition to the efficiency and equitable argument, recent economic events have stressed also the use as a stabilizer to the negative effects of an economic downtown in public revenues (Cocconcelli and Medda, 2013; Constantin, 2010; Löhr and Harrison, 2013; Wightman, 2013, 2010). Cocconcelli and Medda (2013) use the case of the speculative bubble in Tallinn (Estonia) to show that a more rigorous implementation of the Estonian land tax would have reduced the effects of the boom and bust dynamics in the real estate market. They explicitly refer to the periodicity of assessment to be a determinant factor.

**Effects on urban development**

There is a large amount of literature on land-based taxation and other value capture mechanisms, including specific discussion on the neutrality of these instruments on urban development and the effects on burden sharing. Most results are case-specific, and therefore it is difficult to make an argument in one or another direction. We here try to bring in those ones that are strongly supported, to tentatively answer the question on land-based taxation and urban sprawl. In order to achieve consistency in our findings, we focus only on two mechanisms which are largely discussed in the literature and seem to have more significant outcomes regardless of the specific circumstances: recurrent land-based taxation and development land-based taxes.

**Development land-based tax**

A development tax in all its forms has been widely used as an anti-sprawl mechanism. It is based on the idea that the developer of urban land has the duty to pay for all its development costs, including those related to the provision of public services and infrastructure in the new urban area. Although there are many tax designs in place, a generally a common feature is the definition of the tax base somehow related to the differential value of land before and after development takes place. Taking the AMM model as a basis of analysis, Brueckner (1997) estimated that using development taxes city boundaries grow more efficient in comparison with traditional sharing schemes (traditional property tax regimes), independently of the payment time (at the time of development or issuing government bonds). Additionally, a shift from shared schemes to development tax affects the value of land only if there is an over or under provision of public goods at the beginning of the exercise. Bento et al. (2006) compared the anti-sprawl efficiency and welfare distributional impacts of development taxes, urban growth boundaries, property taxes and gasoline taxes. His results showed that development taxes perform better, especially with regards to welfare impacts. Besides, they have less distortionary effect on urban decline at the city core and under provision of open space amenities at the urban fringe in comparison with the property taxes (Bento et al., 2011).

**Recurrent land-based tax**

One way to capture the land value windfall is though a land tax, of which the most common is the split-rate tax (Medda, 2012). In this case, a higher assessment ratio and/or tax rate is applied to land values. The extreme case is when buildings are assessed with zero ratios, which leads to a full land-tax.
Shifting towards land-based taxation has multiple outcomes when it comes to urban land consumption, depending on the design of the tax reform. A point of disagreement is whether it changes the time of development or not. Douglas (1980) argued that it provides development incentives, and thus, increases urban land consumption. Lim (1992) argues in the same way only for the first of a two-period model, saying that in the second period, the city is smaller as if it would have been without a land tax. Other authors use different methods to theoretically and empirically demonstrate that a sliding land value tax scale may be effective in targeting sprawl areas because it increases infill development (Brueckner, 1984; Cho et al., 2008; Gihring, 2009, 2001). Banzhaf and Lavery (2010) use the case of Pennsylvania to illustrate that a shift from property taxes to a split-tax rate induces a denser pattern of development in those locations where it is applied. Choi (2006) used an urban computable general equilibrium approach for the case of an urban area with large lot zoning. His results suggest that a Land tax reform can contract the urban area, improve the welfare of households, especially those of lower income, and it’s economically feasible. Many studies for the sake of simplicity focus on the effects of traditional property tax regimes. Here is clear that they discourage the efficient use of sites and encourage owners to pass on the tax to tenants. It causes a decoupling of the benefits and costs of land-use (Brueckner and Kim, 2003; Brueckner, 1984; Löhr, 2012). Song and Zenou (2006) found that an increase of 1% in tax property reduces the size of the city only by 0.4% (Song and Zenou, 2006), thus, having a minor effect on urban sprawl. Hence, the “anti-sprawl” effectiveness of implementing land-based taxation in detriment of property taxes remains unclear on a general basis, specifically when there is land available to be developed. However, there is sufficient evidence to suggest that it induces denser urban form in already developed land compared to property taxes.

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Anti-sprawl effectiveness</th>
<th>Revenue Potential</th>
<th>Suggested for</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development Tax</strong></td>
<td>Effective</td>
<td>Neutral: Covers development costs</td>
<td>New development with clear identification of value capturers</td>
</tr>
<tr>
<td><strong>Recurrent Land-based taxation</strong></td>
<td>Depends on the tax design and the prior tax scheme</td>
<td>Depends on the tax design: Lower Neutral or Larger Revenue</td>
<td>Highly developed residential land, difficult to identify value capturers</td>
</tr>
</tbody>
</table>

*Table 3 Effects of Development tax and Recurrent Land-based taxation*
III. Land-based Taxation

In Spain there is no land-based taxation. In order to have some insights on the revenue stability of this type of tax compared to real estate or building taxes, we calculated the coefficient of variability from tax revenues in those countries with some type of land-based taxation, a total of 13 States in 2012 (European Commission, 2014b). Land-based taxes showed less variability in their revenues compared to Building or Real Estate ones (CV: 0.25 to CV: 0.31 and CV: 0.49 respectively). However, as opposed to what theory suggests, recurrent land-based taxation plays a minor role in overall national public revenues, contributing no more than 2.5 % to the total of tax revenues (Denmark). Estonia, with 100% of property taxes based on land may be an interesting case to look at.

b. The relation between Municipal Debt, Sprawling Patterns and Land Values in Spain

We compared the numbers of accumulative debt per capita and land value with % change in LUZ population for those cities reported in the first section of this paper. Although no significant results can be assumed from such a small sample, we can observe a general trend. Those cities with larger suburbanization (i.e. Madrid, Málaga, Valencia), also showed higher municipal debt per capita. In a similar way, cities with higher land values also have higher per capita indebtedness. Further analysis on these three variables considering a larger sample will provide insights into these factors.

![Figure 9 Municipal Debt and Urban Sprawl](image-url)
c. A simple model: Revenue potential of a shift toward Urban Land-based taxation in Spain

We use methodology from Cord (1985) to estimate how much revenue a full land value tax might collect. Our calculations, unlike Cord’s ones, are based only on urban land use surface, given by the hypothesis, that a link between municipal investments and the increase in urban land values has happened in Spain. More elaborated assumptions on land productivity would be needed in order to include rural surface as well. The first thing is to determine the country’s urban land values. We took the total cadastral value reported by the General Cadastral Directorate [Dirección General del Cadastro] for urban land, using the data from the year 2012 (see table below, column 2). However, looking at market values between the years 2000 and 2013 we saw that on average they were 3.17 times higher (Ministrio de Fomento, Gobierno de Espana, 2013) and 1.71 times higher for the study year 2012. Hence, here we make a conservative assumption, saying that cadastral values reflect half of the market prices (see table below, column 3). We calculated the share of land value that is assumed to be constant in our study. Interesting to say is that, on average, land share has increased 0.5% every year since 2006 (first data available on cadastral values of construction and land independently).
Table 4 Spain - Cadastral and Market Values

Urban land in Spain is categorized in different uses for tax purposes, with 64% used for residential purposes. We calculated the revenue potential of implementing a land-based tax with 1% tax rate, the current maximum rate that is applicable to urban land in Spain. We did it for four scenarios: defining the tax bases as the total value of urban land (which implies no exemptions for different uses), for both cadastral value and market value, and estimating the tax base as the value of residential land, also reporting the revenues from cadastral and market values.

In addition, to further give a perception of the revenue potential from such scenarios, we subtracted those numbers to the overall municipal debt in Spain for the year 2012. The results show that a shift towards land-based taxation could reduce the municipal public debt by 21% in the case of cadastral values of residential land to 66% for market values of all urban land.

![Figure 11 Revenue Potential of a 1% Land tax for the first fiscal year](image)

These results hold when no exemption on the tax base applies. However, in Spain, an average of 16% of the tax base is lost through exemptions, and more than 4% of the tax liability goes away with reductions. These issues should therefore be considered when considering a tax reform for the case of Spain due to the system in place. There would
be numerous losers and winners, and the tax burden would suffer a great shift. Nevertheless, our purpose here was to provide with some pre-evaluation of the potentials. Our results suggest that further research is desirable to better understand the consequences.

IV. Conclusion

This paper connects the issue of rapid urban land consumption with municipal public finances for the case of Spain. The focus of this paper is on the intrinsic links that may exist between these two variables, currently of great importance for a great number of European States. We discuss the potential of land-based taxation to enhance the relations between those two, following the recurrent literature advocating in favour of this fiscal instrument. There are sufficient arguments based on economic efficiency, social equity and the ability to shape urban form to, at least consider, a tax reform in this direction. We develop broad calculations to shed light on the potential of land-based taxation in Spain. Our work suggests that a shift towards land taxation, especially recurrent taxation, could improve the local revenue base and enable a stabilization of municipal finances. This argument goes in line with an increasing number of voices at the EU level in favor of this idea. Löhr and Harrison (2013) have go further and even proposed a common European tax based on land values, which revenues should be redistributed to the EU states according to the size of their population. In addition, the insignificant role of development taxes during the housing bubble indicates that a more robust implementation of land-based property taxes could have contributed to limit speculation-driven urban development. Hence, our work brings some insights on the benefits that should be further evaluated with regards to a tax reform in Spain.


Brueckner, J.K., 1984. A modern analysis of the effects of site value taxation. [Urbana, Ill.] : College of Commerce and Business Administration, University of Illinois at Urbana-Champaign.


