ABSTRACT

The economic impact of each new residential development on the public budget can be very different than expected when, due to the real estate speculation, a poor demand forecast or to unexpected reasons, the dwellings are not built and occupied by their final users within the planned term. To quantify to what extent public costs and revenues are affected in unfinished developments, the economic balance of the public services operation when vacant lots, empty dwellings and dwellings with temporary occupancy are persistent in the long term has been simulated in three theoretical developments under the tax burden and operating cost of a sample of Spanish municipalities. Regardless of the local particularities, the results obtained show a clear stress to public finances when dwellings are not built, and less robust statistical results when said dwellings are built but remain empty or are occupied only temporarily. This leads to a reflection on whether the current tax system, based more on the amount of real estate properties than on their effective use, is the most appropriate for the promotion of sustainable urban patterns.

KEYWORDS

economic metabolism; economic sustainability; empty houses; public services operating cost; second homes; vacant lots

1. INTRODUCTION

Usually, the economic impact of each new urban development on the budget of the Public Administrations in charge of managing the services generated is assessed under the hypothesis that the real estate properties produced will be occupied by their final users within a specific period. However, due to a poor demand forecast, to unexpected reasons or speculative capital movements, reality shows frequent gaps between the development, building and commercialization cycles, which bring about the persistence in time of vacant lots, empty houses or dwellings with temporary occupation, thus bankrupting the economic forecasts of the Public Administrations involved. Although the economic impact of these imbalances has been widely analyzed at supramunicipal level, there are few studies that tried to quantify it at the level of specific urban developments, which limits the possibilities of the Public Administrations to forecast the consequences of an excessively expansive urban policy. Given this lack of research at a "micro" level, the purpose of this study has been to quantify the degree of sensitivity of municipal revenues and expenditures in a series of standard urban developments when, in the horizon year, different percentages of vacant lots, empty houses and second homes persist. To assess the economic impact provoked both by the extension of infrastructure networks and the level of occupancy of the new dwellings, the research has been focused on Spanish municipalities, since they are legally in charge of managing not only physical infrastructures (water supply, sewage, public lighting, etc.) but also personal services (public libraries, social facilities, etc.).

The present study comprises two phases, a qualitative and a quantitative one. In the first phase, the economic concepts that, because they are stable in time, define the economic metabolism of a residential area from the municipal point of view were selected. After that, their sensibility against different percentages of vacant lots, empty houses and second homes was analyzed from a theoretical point of view. Since the specific economic impact depends on

the tax burden as well as on the operating cost of public services, and these are different in each municipality, that impact was quantified in the second phase for three standard developments under the specific conditions of a sample of Spanish cities with populations between 100.000 and 300.000 inhabitants, which has made it possible to obtain representative results at least for this range of population and geographical area.

The study is organised as follows. In the next section, a bibliographic review is included, showing both how urban studies usually forecast the long-term economic impact of new residential developments and those studies highlighting the causes and economic consequences of the gaps between real estate supply and demand. Afterwards, the mentioned qualitative and quantitative analyses about the effects of vacant lots, empty houses and second homes on the municipal economic balance in new residential developments were carried out consecutively. Finally, the discussion and conclusions of the study will be shown.

2. BACKGROUND

It is fully accepted these days that new urban developments should be designed with economic, social and environmental sustainability criteria (Krueger and Buckingham, 2012). From the economic point of view, the level of sustainability of either a new development or an existing urban area is measured by the capacity of the urban pattern to generate the resources their own metabolism consumes in the long term (Ewers and Nijkamp, 1990). Despite the apparent simplicity of the definition, the concept of economic sustainability is intrinsically complex for two main reasons. On the one hand, a large amount of economic flows are involved in the economic metabolism of an urban area and, on the other hand, the level of economic sustainability can be evaluated from the perspective of any of the different stakeholders playing a part in the development process, such as the inhabitants of the neighbourhood, those of the city where it is located or the Public Administrations in charge of

providing the public services (Klug and Hayashi, 2007). Thus, the same urban pattern might be economically sustainable for one of the parts and completely unsustainable for another, depending on factors such as local taxes, public transport fees, subsidies, etc. Therefore, the assessment of an urban area's degree of economic sustainability requires both the determination of the subject from whose point of view the analysis is developed and the identification of the long-term economic flows involved in each case (Garrido-Jiménez et al., 2013).

Once these two starting conditions are determined, to carry out the economic sustainability studies (or simply cost/revenue studies) either on new or existing developments, it is always necessary to forecast the future characteristics of the built environment, since many of the economic flows involved are closely related to them (property tax is a clear example). It is at this point when the vast majority of studies tend to simplify the future, identifying as representative of the long term an ideal situation in which all real estate properties have been built and occupied by their final users (Frank, 1989). Thus, the long-term economic forecast is usually limited to a static analysis of the economic balance under that hypothesis in the horizon year (Wheaton and Schussheim, 1955; Stone, 1973), with some exceptions where the transitory phase of building and commercialization, although perfectly bounded in time, is also analyzed (Isard and Coughlin, 1955; Real Estate Research Corporation [RERC], 1974). However, reality shows that this hypothesis is often broken by temporary gaps between the supply and demand for real estate, producing an excess of developed land or housing against the effective population (Nausser and Raskin, 2014). Even though these gaps can be produced by a poor demand forecast or by unexpected causes such as prolonged industrial declines (Moss, 2008; Radzimski, 2016) or climatic reasons (Tacoli, 2009), the most frequent cause is the speculative movement of capitals to the real estate market (Molloy, 2016). The latter is more evident from the 1980´s, when the real estate activity was extensively "financializated",

turning a local and full-of-nuances market into a standardized global financial product, better prepared to absorb the surpluses of the productive economy than to supply for the real estate demand (Aalbers, 2009; Christophers, 2011). Under these circumstances, since the urban processes are usually very long in time, and certainly much slower than capital movements, the result is a succession in time of cycles of over-accumulation and under-accumulation (Aalbers, 2008). As if this were not enough, the exploitation of high-risk markets in search of greater benefits is added, with its trail of abandoned dwellings resulting from foreclosures (Gotham, 2009). When these gaps persist in time, the situation where the urban infrastructure is overdimensioned becomes representative for the long term, bankrupting the economic forecasts of the stakeholders involved, among them the Public Administrations in charge of managing public services (Mädding, 2004; Aalbers, 2009). Municipalities are usually the most affected Public Administration, - although it is very difficult to generalize because of their different roles across the countries (Goldsmith, 1992) and the changing presence of private partners in the provision of public services (Wollmann, 2011) -, since they are usually in charge of the operation and maintenance of the basic infrastructures (water supply, public lighting, parks and gardens, roads) even in the case of unfinished developments (Mahon and Cinnéide, 2009; Kitchin et al., 2014).

From the municipal point of view, the lack of culmination of an urban development always brings about a reduction on the expected long-term incomes, although of different intensity in each tribute according to its nature. For example, if lots remain vacant, there is a reduction in property tax collection (Lutz et al., 2011), since the base of this tax is the floor area and its value (Chernick et al., 2011). In this case, the level of occupation of the dwellings is not relevant. The fee for refuse collection shows a similar behaviour, since most municipalities rate this service by residential unit and not by the amount of waste produced (Bilitewski, 2008; Puig-Ventosa, 2008). Instead, the income from other services, such as water supply,

sewage or sanitation are influenced by both the existence of the dwellings and their occupation level, since the collection is linked to consumption (Faust et al., 2016). Finally, next to the direct influence on fees and taxes, the presence of vacant lots or empty houses would have a negative indirect effect on public revenues, due to the deterioration of public and private services (Glock and Haussermann, 2004), the decrease of real estate prices (Whitaker and Fitzpatrick IV, 2013) and the impact on the general consumption (Martinez-Fernandez et al., 2012).

On the expenditure side, the breaking of the forecasts also has different consequences depending on the nature of the service, which are much more difficult to analyze. Among the urban infrastructures, the presence of vacant lots or underutilized housing would not affect the gross operation and maintenance cost in services such as the street lighting or the parks and gardens maintenance, since it mainly depends on the size of the infrastructure (Stone, 1973) or it would even be reduced in the water supply, sewage or sanitation due to the reduction in the amount of water to manage (Asociación Española de Abastecimientos de Agua y Saneamientos [AEAS], 2011). However, in all services even in the latter, the existence of fixed costs against a smaller number of users would raise the per capita operation cost (Koziol, 2004). In personal services, which are characterised for being very labour intensive, attention to sparsely populated or declining areas usually lead to an increase in the per capita cost since the gross cost of the service is maintained or even increased in the case of social services (Schilling and Logan, 2008). Although much more difficult to assess, the presence of second residences would also mean an increase in the current expenditure of the municipalities, which according to Deller et al. (1997) would be 1.2% for every 10% increase in second homes, a percentage that would rise up to 1,9% in Spain (Costa, 2011). Finally, the lack of completion of urban developments would end up generating to Public Administrations

a series of extraordinary expenses in issues such as fire fighting, demolitions or judicial costs (United States Government Accountability Office, 2011; Henderson, 2015).

Moreover, in addition to the economic aspects, other tensions which should not be overlooked arise from this situation when the urban infrastructure is oversized compared to the effective population (Bernt, 2009). For example, abandoned urban zones have other undesired effects such as, among others, the increase in public insecurity (Wilcox et al., 2004), social segregation (Haase et al., 2012) or the loss of scenic and environmental attractiveness (Sousa and Soares, 2018). Thus, although this growing problem is encouraging resilient proposals such as the conversion of vacant lots into green areas, sports or cultural spaces (Blanco et al., 2009; Johnson et al., 2014), the most common response from Public Administrations in the short term is a combination of tax rates increase (Lutz et al., 2011) with the total or partial reduction of the level of public services (Popper and Popper, 2002), which in the long term ends up affecting the global competitiveness of the city (Chernick et al., 2011) and its social equity, since social services end up being more affected than others like public safety (Skidmore and Scorsone, 2011).

3. STUDY APPROACH

3.1. Objectives and general issues

As a complement to the large amount of existing research at the "macro" level, the purpose of this study is to quantify the reduction of municipality incomes and expenses in a specific urban development when, in the long term, its dwellings are not fully built and occupied. This way, it is analyzed to what extent the economic balance of the public services operation is threatened when due to unexpected reasons, capital speculation or an excessively optimistic real estate demand forecast, an urban development remains unfinished in the long term.

To achieve this objective, the incomes and expenses of a sample of Spanish municipalities in a series of standard developments were estimated, considering different percentages of vacant lots, empty dwellings or homes available to owners for occasional occupation. Spanish municipalities were selected as a basis for this study since they are in charge of providing not only basic infrastructures (water supply, sewage, public lighting, etc.) but also person-oriented services (Ermini and Fiorillo, 2008) and this is necessary to assess the economic impact of both the extension of public infrastructures and the provision of services in partially inhabited urban areas. The sample of cities on what the study was carried out is composed of 8 of the 56 Spanish cities with a population between 100,000 and 300,000 inhabitants, since in larger and smaller cities it is more likely to find anomalies in municipal incomes and expenses (Solé-Ollé and Bosch, 2005). Even though the size of the sample is necessarily limited because of the difficulties to collect the operating cost of public services in each municipality (tax burden is usually available), it was attempted to cover all the income levels in order to detect possible biases due to this parameter on the municipal tax burden or the operating cost of public services (La Caixa, 2005).

The incomes and expenses to be considered in the economic sustainability analysis are those economic flows that, involving the municipality, are stable in time and have their origin and destination within the analyzed area. In this case, the incomes are the taxes and fees on services, while the expenses are operating and maintenance costs of public services and infrastructures. In this study, only direct economic flows are considered, ruling out the indirect effects of the economy induced by the new growth (Paulsen, 2009).

Although it is necessary to carry out a preliminary purification to discard conjectural concepts (Downing and Gustely, 1977), the municipal budget is the most reliable source to identify the incomes and expenses involved in the economic sustainability study, which is regulated in Spain by Order EHA/3565/2008. Once those economic items have been identified, for this

study´s purpose it is especially useful to divide them into the categories of services to "the property" and services to "the people", where the former would be those deployed throughout the territory due to the existence of buildings (water supply, sewage, public lighting, etc.), while the latter would be those necessary because of the existence of people living or working in those buildings such as police stations, libraries, social services, etc. (Mace, 1961). In order to assess the incomes and expenses in services to "the people", it was estimated that the inhabitants of the new developments would have the same socio-economic characteristics as those of the rest of the city. Thus, the economic per capita ratios in this range of services are maintained (Guelton and Navarre, 2010), which can be obtained from the municipal budget. In the case of services to "the property", it is necessary to carry out an ad hoc study, since their economic flows depend on the urban characteristics of the area analyzed. Therefore, the incomes for services to "the property" for each urban area are estimated from the level of municipal taxation according to the data published by the Spanish Ministry of Finance and Public Administration, while the operating unit cost for this range of services is obtained from personal interviews with the person in charge of each service, given the absence of cost accounting for most of the public services at both municipal and sub-municipal levels (Castel 2006). Even though this methodology is the most laborious, it is the most reliable too (Guengant et al., 1995).

To carry out the assessment of the income and expenses in partially occupied dwellings, it is assumed that these are second homes used by their owners during holiday periods (Velvin et al., 2013), using Costa´s results. Although the economic behaviour of other temporary occupation situations such as occasional rental (Rosen and Smith, 1983) or intensive tourism regime (Martínez et al., 2003) may be similar from the conceptual point of view (Hoogendoorn and Visser, 2010), its quantification is much more complex.

3.2. Incomes Sensitivity

Considering the above, the income concepts which, due to being stable in time, determine the economic sustainability of a new development in a Spanish municipality are shown (see Figure 1). The basis for each tax and fee is indicated together with their sensitivity against increasing percentages of vacant lots, empty dwellings and second homes.

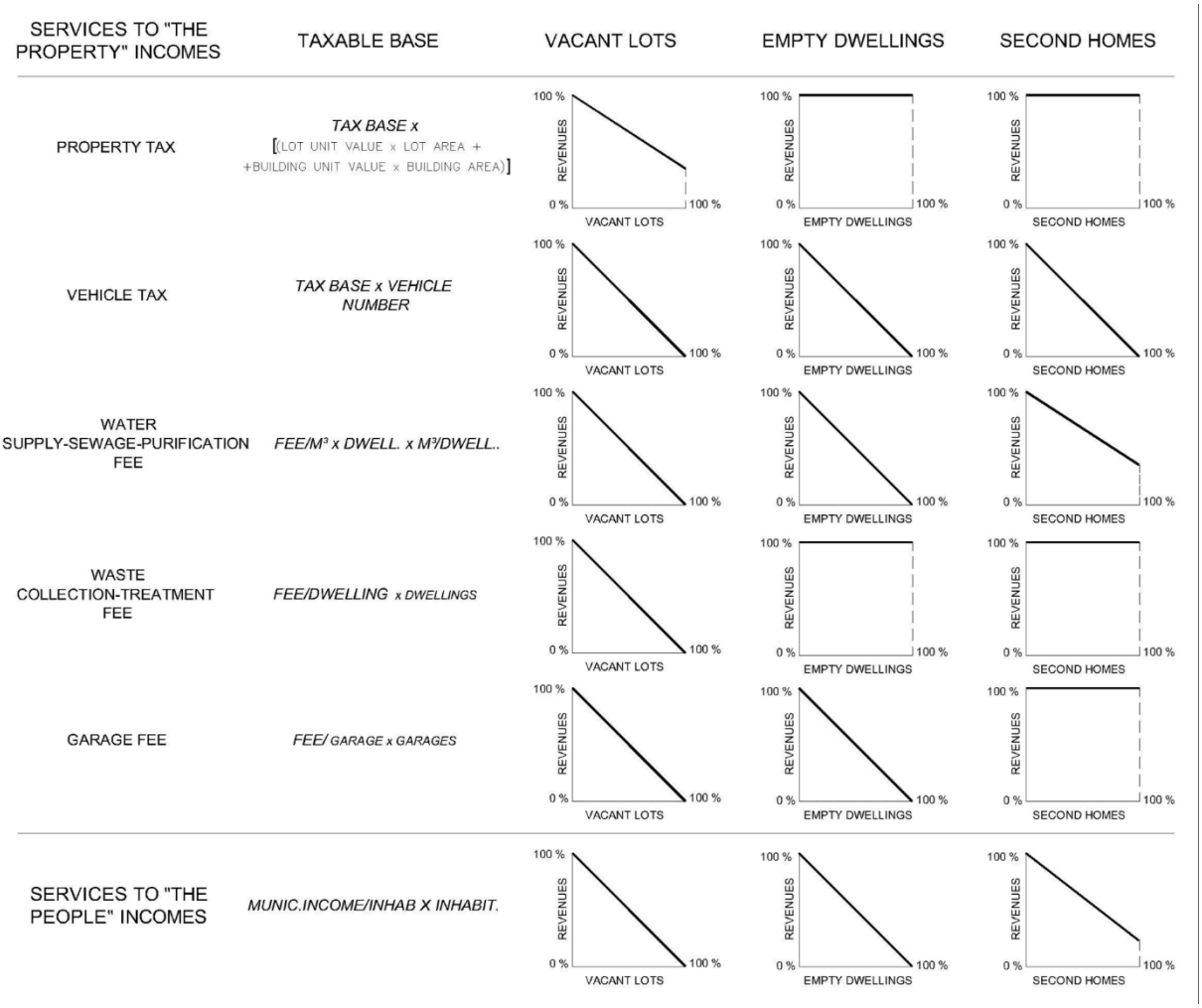

Figure 1. Incidence of vacant lots, empty dwellings and second homes on municipal income concepts

Within the services to "the property", the vehicle tax and the fees for water supply, sewage, sanitation, waste collection and garage access are totally elastic against the existence of vacant lots, since they are tributes linked to the existence of properties. Instead, the property tax would be only partially elastic because of the existence of the lots residual value. When the dwellings have been built but remain empty, the impact on municipal revenues is lower,

since in this situation the incomes from property tax and waste collection are not affected. Finally, when the dwellings are occupied temporarily, municipalities receive part of the incomes from water supply, sewage and sanitation (in function of occupancy time) as well as the full incomes from the access to garage fee, since the owners are expected to make the most of this facility.

The increasing percentages of vacant lots and empty dwellings have the same effect on the incomes in services to "the people", since in both cases there is a lack of population, while some incomes are possible in the case of second homes, which are a function of the degree of occupation.

3.3. Expenses Sensitivity

With a similar reasoning, the concepts to be considered from the expenses side, maintaining the differentiation between services to "people" and "property" are the following (see Figure 2):

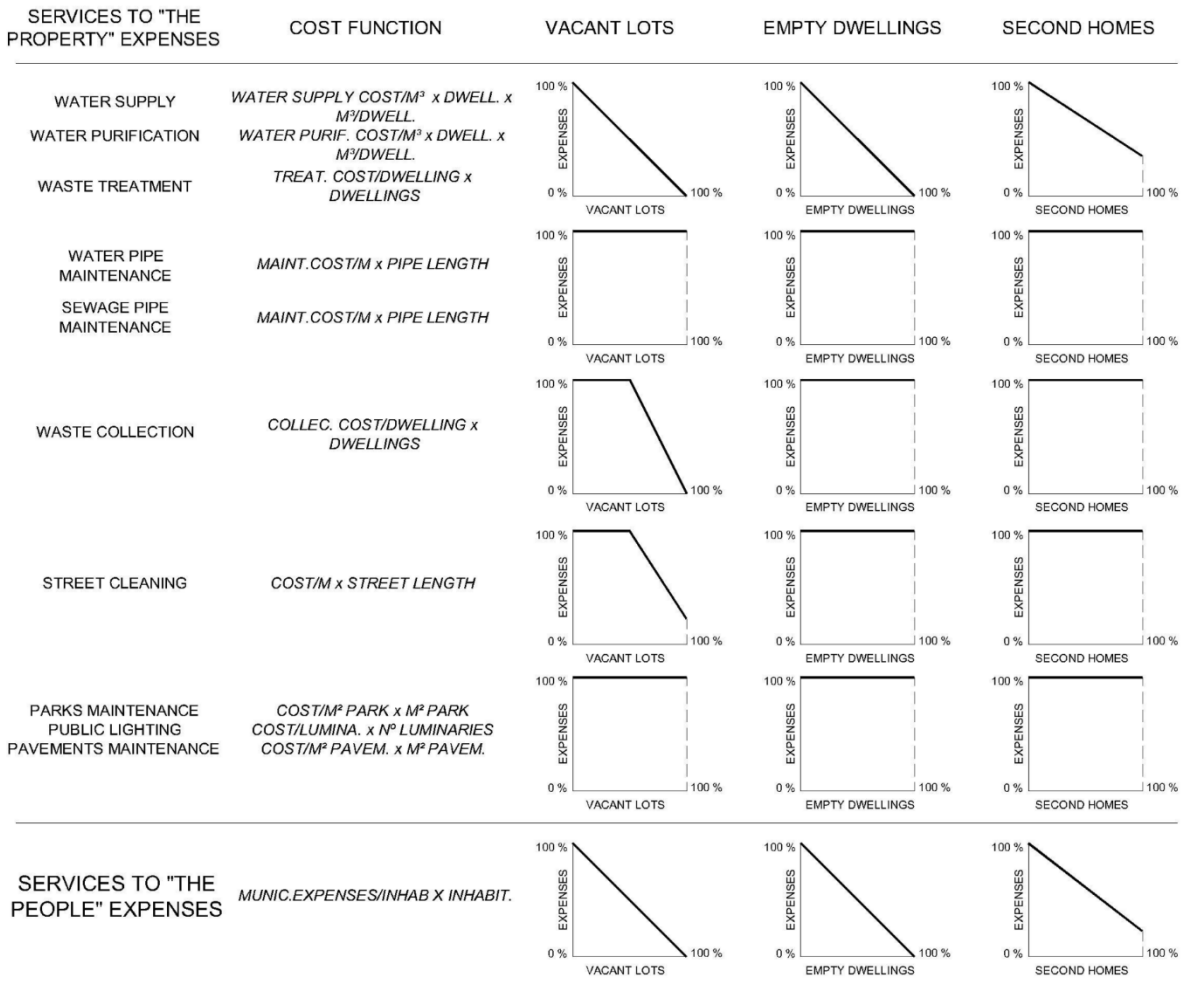

Figure 2. Incidence of vacant lots, empty dwellings and second homes on municipal expense concepts

Expenditures on services to "the property" behave differently in each situation. For example, water supply, purification or waste treatment costs are entirely elastic against the increase in vacant lots, while waste collection or street cleaning are only partially so. The reason is that in this study it has been assumed that, from a building degree of 50%, waste collection routes and street cleaning cannot be optimized and thus, the full service must be supplied. Furthermore, since the municipality does not have to know whether dwellings are empty in every moment, a complete waste collection service and street cleaning must be provided whenever dwellings exist. Actually, under Spanish tax rules, empty dwellings and occupied ones are equally taxed. The same conclusion is reached as regards second homes, with the only difference that there is some water consumption and waste production. In these three

situations, the costs of public infrastructure conservation need to be assumed in full, since possible nuances due to the lower/greater deterioration of services when there is little occupation or the different damages resulting from vandalism have not been considered owing to their difficult assessment.

The behaviour of the expenses on services to "the people" is identical to that of the incomes, with entire elasticity where there are no inhabitants (vacant lots and empty dwellings) and only partial where there are temporary occupants.

3.4. Model

The estimation of municipal revenues and expenditures in a defined physical area, fully built or with incomplete development, requires the knowledge of four types of data (see Figure 1 and Figure 2): the taxation of the municipality, the operating and maintenance unit cost of the public services, the consumptions per dwelling and the urban planning characteristics of the analyzed area (Garrido-Jiménez et al., 2018). Given that the first three factors are different for each municipality, a representative sample of Spanish municipalities was chosen to obtain consistent results from the statistical point of view, which, as indicated above, is relatively limited due to the difficulty in collecting data from operating and maintenance unit costs of the public services. The fourth factor involved, the characteristics of the urban pattern, is used so that the intermunicipal results are comparable, since the long-term economic assessments are performed for a series of standard urban developments which are identical in all cases. The data on taxation, the operating unit cost of the public services and per dwelling ratios are the following (see Table 1):

Table 1.- Taxation, operating unit cost of public services and per dwelling ratios in sample municipalities (2011)

CITY	AG	GR	AL	SA	MA	LO	LL	SS
				REVENUES				
Services to "the people"								
Services to "the people" revenues (€/inhabitant/year)	581	855	541	632	721	546	575	1134

Services to "the property"								
Property tax rate (%)	1,100	0,650	0,539	0,700	0,3300	0,5300	0,6900	0,1832
Vehicle tax (€/vehicle/year)	63,05	64,24	62,41	62,99	68,16	57,81	64,75	81,56
Water supply/sewage/purification fee (€/dwelling/year)	425,76	523,08	389,64	135,24	253,20	105,12	125,52	160,08
Refuse collection/disposal/treatment fee (€/dwelling/year)	89,21	89,52	62,50	119,42	105,41	45,88	57,30	116,34
Garage fee (€/garage/year)	64,14	202,50	110,95	105,66	18,99	115,23	119,70	65,17
EXPENSES								
Services to "the people"								
Services to "the people" expenses (€/inhabitant/year)	731	912	566	725	789	622	812	1166
Services to "the property"								
Water supply (€/dwelling/year)	100,58	69,28	103,26	75,02	42,52	30,37	80,66	40,79
Water pipeline maintenance (€/m/year)	1,99	2,62	2,16	1,83	1,53	6,02	1,68	4,38
Sewage pipeline maintenance (€/m/year)	3,71	1,62	3,75	2,42	5,38	6,02	3,15	9,50
Water purification (€/dwelling/year)	42,75	50,63	31,22	32,44	No Munic	62,06	37,38	28,94
Refuse collection (€/dwelling/year)	88,77	84,88	58,40	43,80	37,12	40,15	51,10	62,04
Refuse disposal/treatment (€/dwellling/year)	124,54	100,71	55,85	37,13	62,11	32,15	22,08	155,08
Street cleaning (€/m/year)	34,45	47,05	18,98	8,39	6,62	14,96	18,61	24,40
Public Lighting (€/luminary/year)	132,80	86,53	85,89	106,95	84,70	78,78	75,55	97,48
Parks/gardens maintenance (€/m^2/year)	15,12	4,01	3,23	3,17	2,26	2,40	3,38	11,05
Pavements maintenance (€/m^2/year)	21,19	21,19	21,19	21,19	21,19	21,19	21,19	21,19
DWELLING RATIOS								
Vehicles/dwelling	1,52	1,44	1,41	1,17	1,10	1,08	1,14	1,10
Inhabitants/dwellling	3,16	2,92	3,06	2,75	2,79	2,72	2,75	2,69
Water consumption (l/inhabitant/day)	218	250	215	202	167	133	196	134

CITIES CODE: AG: Algeciras; GR: Granada; AL: Amería; SA: Salamanca; MA: Mataró; LO: Logroño; LL: Lleida; SS: San Sebastián

The design of the standard developments was carried out according to the recommendations of Caminos and Goethert (1978), which led to the use of square developments of 400 m of side with regular grid in order not to produce a bias due to urban pattern. Given that it is an exploratory study, it was chosen to cover the maximum variability among the building types, by testing three developments composed of isolated, semi-detached and multi-family dwellings (see Figure 3).

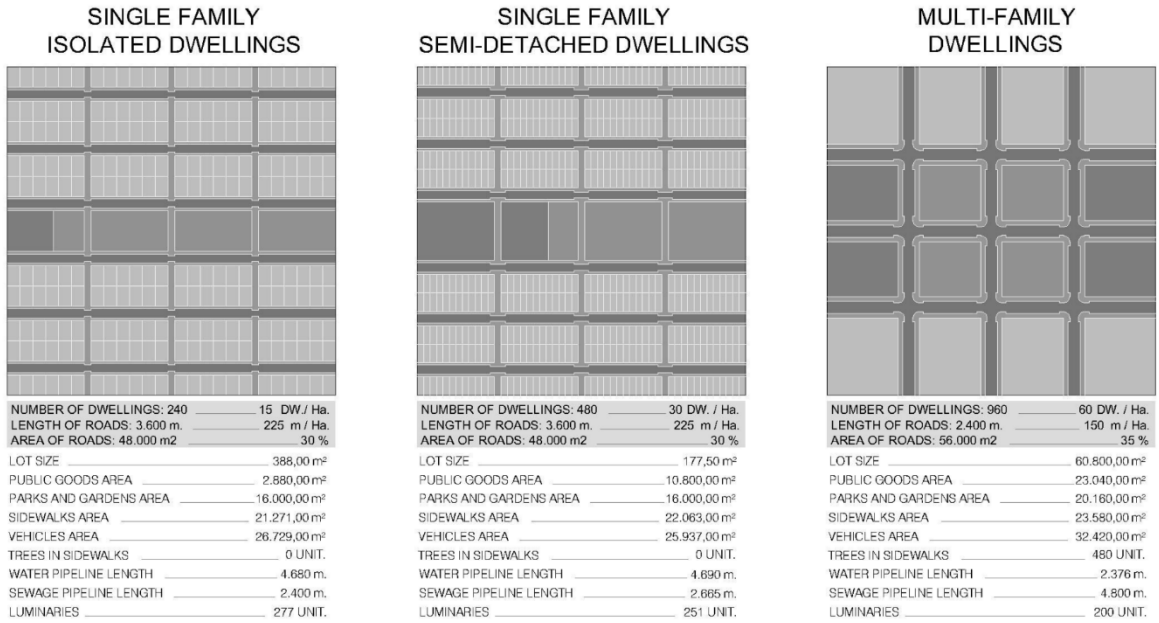

Figure 3. Standard developments analyzed

The maximum revenues and costs that could be achieved in the municipalities of the sample in each of the type developments shown, once the building phase is completed and all the dwellings are occupied in the horizon year, would be the following (see Table 2):

Table 2.- Potential maximum revenues and expenses in the standard developments analysed

SINGLE FAMILY ISOLATED DWELLINGS

REVENUES

CITY	PROP.	VEHI.	WAT.	REFU.	GARA.	PEOPLE	TOTAL
ALGECIRAS	338602	28503	102182	21410	15394	440919	**947010**
GRANADA	200083	27662	125539	21485	48600	599597	**1022966**
ALMERIA	165915	26242	93514	15000	26628	397523	**724822**
SALAMANCA	215474	21926	32458	28661	25358	417463	**741340**
MATARÓ	101581	22459	60768	25298	4558	482802	**697466**
LOGROÑO	163145	18493	25229	11011	27655	356670	**602203**
LLEIDA	212396	21943	30125	13752	28728	379698	**686642**
S. SEBASTIAN	56393	25100	38419	27922	15641	732407	**895882**

EXPENSES

CITY	WAT.	W.PIPE	S.PIPE	PURIF.	W.COL	W.TRE.	S.CLE.	LIGHT.	PARK.	PAV.	PEOPLE	AMOR.	TOTAL
ALGECIRAS	24138	9313	8904	10259	21305	29889	248040	32736	241920	2254	554163	95196	**1278117**
GRANADA	16626	12262	3888	12150	20371	24171	338760	19919	64160	2254	639354	95196	**1249111**
ALMERIA	24780	10109	9000	7492	14016	13403	136656	19742	51680	2254	415700	95196	**800028**
SALAMANCA	18005	8564	5808	7786	10512	8910	60408	25575	50720	2254	478302	95196	**772040**
MATARÓ	10203	7160	12912	0	8909	14905	47664	19412	36160	2254	528167	95196	**782942**
LOGROÑO	7288	28174	14448	14893	9636	7716	107712	17772	38400	2254	405852	95196	**749341**
LLEIDA	19359	7862	7560	8971	12264	5300	133992	19742	54080	2254	535907	95196	**902487**
S. SEBASTIAN	9789	20498	22800	6947	14890	37219	175680	24653	176800	2254	752576	95196	**1339302**

SINGLE FAMILY SEMI-DETACHED DWELLINGS

REVENUES

CITY	PROP.	VEHI.	WAT.	REFU.	GARA.	PEOPLE	TOTAL
ALGECIRAS	734250	57007	204365	42821	30787	881837	1951067
GRANADA	433875	55323	251078	42970	97200	1199195	2079641
ALMERIA	359783	52484	187027	30000	53256	795047	1477597
SALAMANCA	467250	43851	64915	57322	50717	834926	1518981
MATARÓ	220275	44918	121536	50597	9115	965603	1412044
LOGROÑO	353775	36986	50458	22022	55310	713341	1231892
LLEIDA	460575	43887	60250	27504	57456	759396	1409068
SAN SEBASTIAN	122286	50199	76838	55843	31282	1464815	1801263

EXPENSES

CITY	WAT.	W.PIPE	S.PIPE	PURIF.	W.COL	W.TRE.	S.CLE.	LIGHT.	PARK.	PAV.	PEOPLE	AMOR.	TOTAL
ALGECIRAS	48277	9333	9887	20518	42610	59777	248040	29663	241920	5086	1108326	96714	**1920150**
GRANADA	33253	12288	4317	24300	40742	48341	338760	18049	64160	5086	1278708	96714	**1964719**
ALMERIA	49560	10130	9994	14983	28032	26806	136656	17889	51680	5086	831400	96714	**1278930**
SALAMANCA	36010	8583	6449	15572	21024	17820	60408	23175	50720	5086	956604	96714	**1298164**
MATARÓ	20406	7176	14338	0	17818	29811	47664	17590	36160	5086	1056334	96714	**1349096**
LOGROÑO	14576	28234	16043	29786	19272	15432	107712	16104	38400	5086	811705	96714	**1199063**
LLEIDA	38717	7879	8395	17942	24528	10600	133992	17889	54080	5086	1071814	96714	**1487635**
SAN SEBASTIAN	19577	20542	25318	13894	29779	74438	175680	22339	176800	5086	1505152	96714	**2165318**

MULTI-FAMILY DWELLINGS

REVENUES

CITY	PROP.	VEHI.	WAT.	REFU.	GARA.	PEOPLE	TOTAL
ALGECIRAS	987360	114014	420573	93953	30787	1763674	3410361
GRANADA	583440	110646	517597	118008	13349	2398390	3741429
ALMERIA	483806	104969	384538	114893	25608	1590094	2703907
SALAMANCA	628320	87702	133013	68669	8874	1669853	2596431
MATARÓ	296208	89836	256216	110633	912	1931207	2685012
LOGROÑO	475728	73972	103832	84091	14380	1426681	2178684
LLEIDA	619344	87774	123311	77844	7670	1518792	2434735
SAN SEBASTIAN	164440	100399	163423	122110	21404	2929630	3501405

EXPENSES

CITY	WAT.	W.PIPE	S.PIPE	PURIF.	W.COL	W.TRE.	S.CLE.	LIGHT.	PARK.	PAV.	PEOPLE	AMOR.	TOTAL
ALGECIRAS	96553	4728	17808	41035	85219	119554	165360	28293	304819	5933	2216652	100402	**3186357**
GRANADA	66506	6225	7776	48600	81485	96682	225840	19039	80842	5933	2557415	100402	**3296746**
ALMERIA	99121	5132	18000	29967	56064	53611	91104	18911	77914	5933	1662799	100402	**2218958**
SALAMANCA	72019	4348	11616	31144	42048	35640	40272	23123	84917	5933	1913208	100402	**2364670**
MATARÓ	40812	3635	25824	0	35635	59621	31776	18673	56606	5933	2112668	100402	**2491587**
LOGROÑO	29152	14304	28896	59571	38544	30864	71808	17489	56669	5933	1623409	100402	**2077042**
LLEIDA	77435	3992	15120	35884	49056	21199	89328	16843	79075	5933	2143627	100402	**2637895**
SAN SEBASTIAN	39155	10407	45600	27787	59558	148875	117120	22457	237168	5933	3010304	100402	**3824766**

4. RESULTS

4.1. Vacant Lots

The sensitivity of the maximum revenues and expenditures shown against increasing percentages of vacant lots in the horizon year is as follows (see Figure 4):

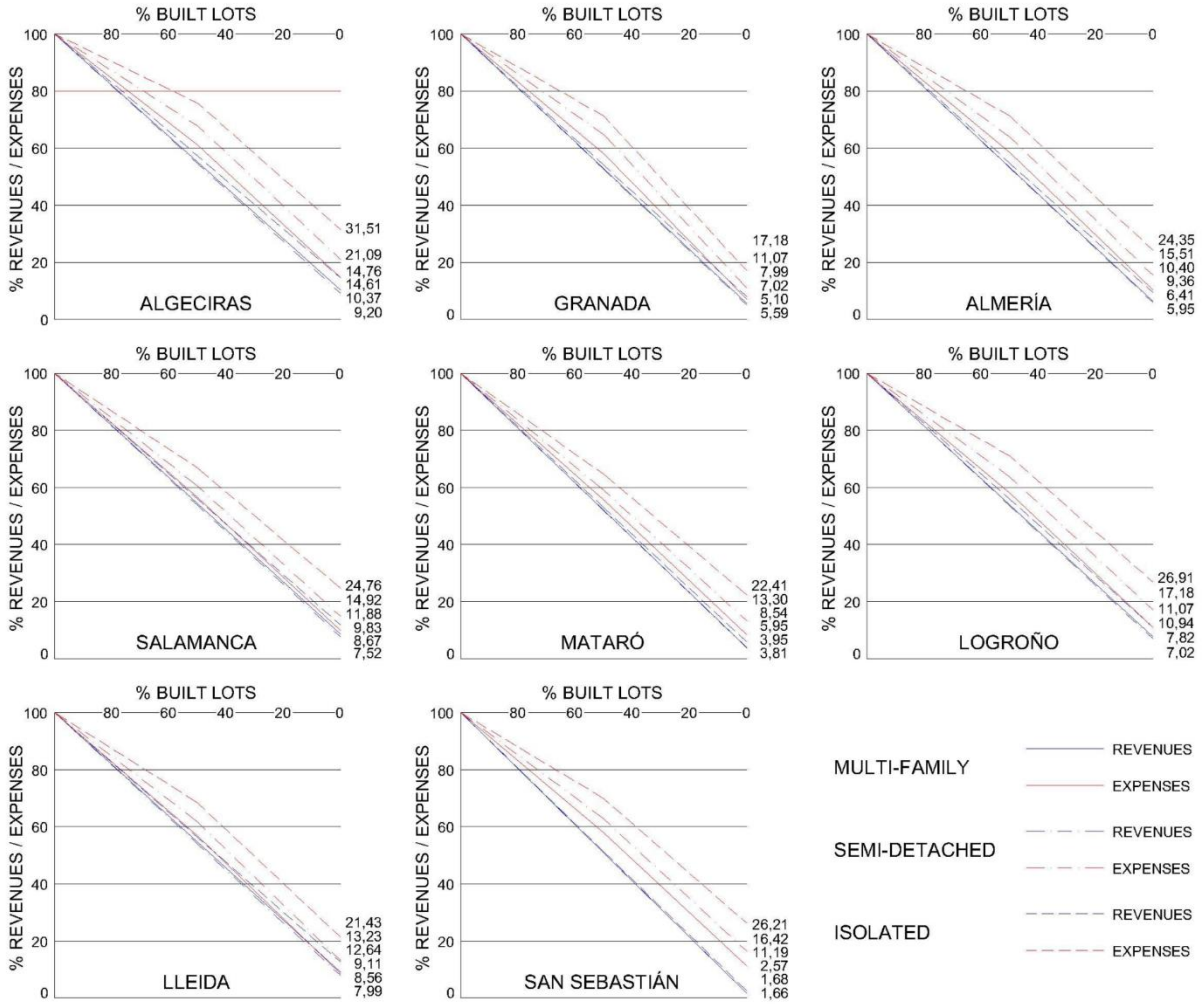

Figure 4. Percentage of municipal revenues and expenses compared to the maxima in each sample city and standard development. Vacant lots.

In all the municipalities and building types analyzed (except for a residual value in Lleida), revenues decrease more rapidly than expenditures, which shows that, regardless of the tax burden, the operating costs and the urban pattern, any percentage of vacant lots brings about a damage to public finances with respect to the ideal situation of a complete development. For the analyzed sample, on average, each 10% increase in vacant lots reduces municipal revenues between 9.05% and 9.40% depending on the building type, a reduction that ranges from 7.57% to 8.98% in the case of expenses. The greatest average difference between revenues and expenses is observed in the isolated dwellings development, where 1.48% is

reached for every 10% of vacant lots, while the smallest difference is 0.35% in multi-family developments.

4.2. Empty Dwellings

The sensitivity of municipal revenues and expenditures to increasing percentages of empty dwellings is the following (see Figure 5):

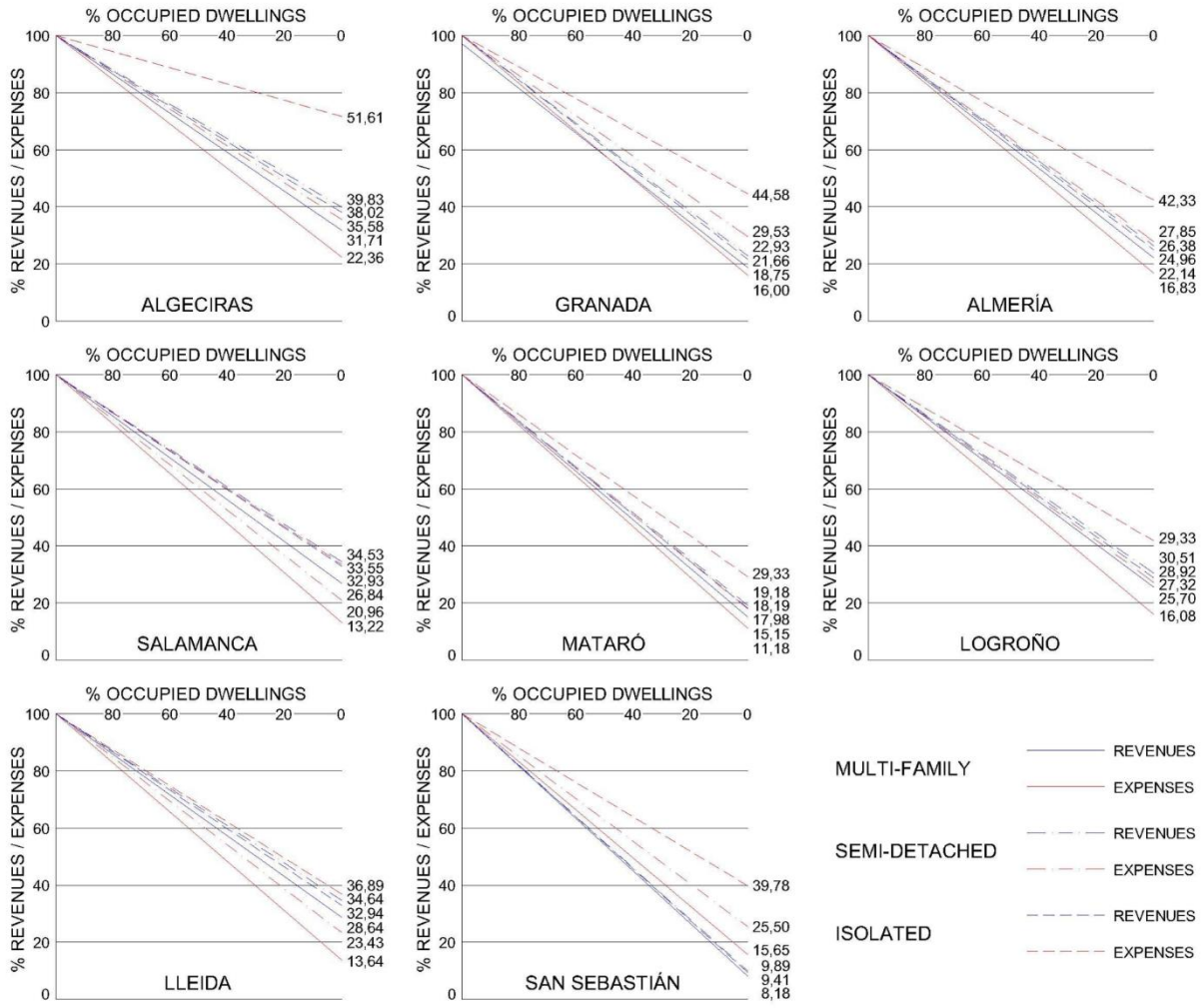

Figure 5. Percentage of municipal revenues and expenses compared to the maxima in each sample city and standard development. Empty dwellings

The decrease in municipal revenues is very similar among the different building types, ranging from 7.28% to 7.79% for every 10% increase in empty dwellings, while the decrease in expenses ranges higher, from 6.00% to 8.44%, in the same situation. This brings about very

different results for the urban patterns analyzed. Thus, while in the development based on single-family isolated dwellings any percentage of empty dwellings worsens the public finances, in the other building types the results are not quite clear. For example, in the development based on semi-detached dwellings, municipal incomes fall more slowly than expenses in all the municipalities with the exception of Granada, Almeria and San Sebastian, whilst in the case of the multi-family dwellings model, the fastest relative fall of the expenses affects all the cities except San Sebastian. The result obtained shows that, for the Spanish municipalities, the increase in housing density (and in its close variable floor-built area) is accompanied by a high number of stable resources, which are independent from whether the dwellings are occupied or not. In this context, San Sebastian, the municipality with the lowest property tax rate, would be the hardest hit if the dwellings remained empty. Since property tax and waste collection and disposal are the municipal resources immune to the degree of occupancy of the dwellings, the result confirms the paramount role of the property tax as the main funding source of Spanish municipalities, because it represents 27% of their total incomes (Spanish Ministry of Treasury, 2017). In the light of the results obtained, the nature of this tax brings about a paradoxical situation, where a residential development fully unoccupied could be economically more convenient for the municipality than a fully inhabited one if property tax rate is high enough.

4.3. Second Homes

The results obtained for each municipality if increasing percentages of second homes persist in the horizon year in the analyzed standard developments are the following (see Figure 6):

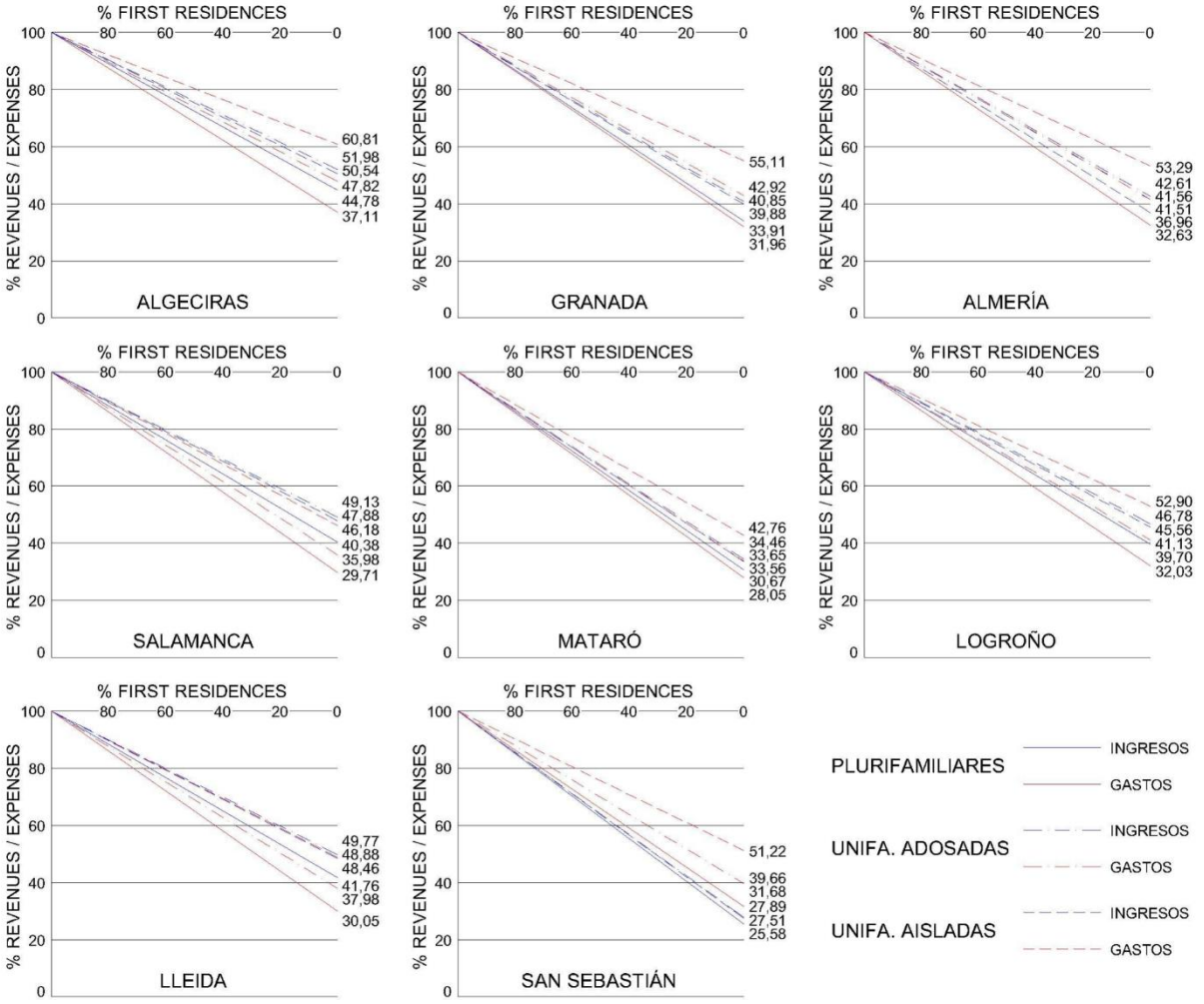

Figure 6. Percentage of municipal revenues and expenses compared to the maxima in each sample city and standard development. Second Homes

In this situation, a lower variation in the decrease in revenues (5.81%-6.33%) than in expenses (4.86%-6.83%) for each 10% of second homes can be also observed on average. The results show a similar behaviour than that obtained for the case of empty dwellings, with the averages falling slightly lower, since in Spain there is no difference in taxation between both the situations and the only difference between them is the presence of additional incomes and expenses for the municipality when the dwellings are partially occupied (water supply and treatment, personal services). The results again show that the isolated single-family building type is the most sensitive for the municipality, since in all the cities with the exception of Salamanca, any unexpected percentage of second homes would worsen their

economic situation as compared to the hypothesis where all the dwellings are first residences and are fully occupied. Similarly to the case of the empty dwellings, the developments based on semi-detached and multi-family buildings are accompanied by an increase in the global built area and the number of dwellings, which, because of the effect of property tax as well as waste collection and disposal fee, sustain municipal incomes at relatively high levels. In this context and for the reasons indicated, none of the cities with the exception of San Sebastian (and Granada in the case of multi-family dwellings) would be economically pushed to promote the full-time use of the dwellings within their administrative boundaries.

5. DISCUSSION

As was to be expected, in all cases the lack of culmination of urban developments brings about a decrease in municipal revenues and expenses with respect to the potential maxima, which are reached when all the real estate properties have been finished and occupied by their final users. However, once these reductions are quantified, very different results are obtained for each of the three building types analyzed, mainly due to the relationship between the nature of the taxes and fees involved and the urban planning variables, their relative weight in the whole taxation as well as the specific operating cost of the public services provided.

The results herein clearly show the negative role that, for municipal finances, the developments not fully built in the horizon year play. In this situation, the decrease in property tax collection, which represents between 19% and 25% of the total revenues in the three models analyzed, is not balanced by the savings in services such as water supply and purification, waste collection and treatment and street cleaning, since these services only make up for 11% and 21% of the total expenses. The greatest imbalances are observed in the development based on single family isolated dwellings, due to the fact that, in this building type, the fixed expenses on infrastructure maintenance (water and sewage pipelines, public

lighting, parks and pavements maintenance and infrastructure amortization) reaches 22% of the total spending, compared to 14% for single family semi-detached dwellings and to 10% for multi-family dwellings. Thus, regardless of the building type, the lack of culmination of the building phase in an urban development always produces a detriment to public finances in the long term.

When the development is fully built but the real estate properties are not occupied, the nature of the income involved turns out to be more decisive. The relative weight of the incomes that increase compared to the situation in which there are vacant lots, that is, the property tax and the waste collection/treatment, is greater than that of the increase in expenses, such as waste collection and street cleaning. Thus, on average, the relative difference between both those revenue and expense groups, always in favour of incomes, is 10% in single-family isolated dwellings, 17% in semi-detached dwellings and 16% in multi-family developments. This relative improvement of the incomes against the expenses reaches such a magnitude that, except for the development based on isolated single-family dwellings, many cities would get a better relative economic position with respect to the situation when dwellings are fully occupied, which would be illogical from the urban planning point of view. In fact, that would mean that a development which is not economically sustainable with all its dwellings occupied could reach that consideration with all of them empty. In this case, the nature and relative weight of the property tax, totally linked to the amount of built floor area and fully unlinked to the degree of the occupation of the dwellings have arisen as the decisive factors, followed by the waste collection and disposal fee. Under these circumstances, the higher the housing density, the less encouraged the municipalities are to promote a sustainable use of the real estate properties.

In comparison to the substantial economic change that the lots being built represent, the results vary very little if the real estate properties change their situation from empty to

partially occupied, since the taxation is almost the same. Thus, the municipality would increase its revenues in services with low relative weight (water supply/purification and garage fee only represent 11% of total income) and its expenses in other services also with limited economic impact such as the water supply/purification and the waste treatment (5% of average expenses). Since the imbalance is again in favour of higher incomes, the paradox indicated above is still accentuated. Thus, depending on the municipality taxation and the structure of the expenses among the different services, an urban development might be more attractive for the municipality if it is based on second homes rather than on first residences.

The results obtained, although very explicit, must be analyzed with caution, since, as indicated, for the estimation of the economic flows linked to the services to "the people", which represent between 60% and 65% of the total incomes and between 56% and 78% of the total expenses, it was assumed that the inhabitants of the new development would have similar socio-economic characteristics to those of the rest of the settlement where it is located. This hypothesis does not allow for the detection of possible per capita spending growths due to threshold jumps in any public service (Malisz, 1970; Grant and Barton, 2013), the loss of scale economies in intensive-labour services (Carruthers and Ulfarsson, 2003; Hortas-Rico and Solé-Ollé, 2010; Bastida et al., 2013) and possible savings by the best use of existing infrastructures capacity (Burchell and Mukherji, 2003). Since these phenomena could modify the numeric results of the study, any analysis of this nature carried out should be suitably reviewed according to the urban context which is being analyzed. It should be noted that a decisive incidence of per capita incomes of the inhabitants of the cities has not been detected.

However, beyond the numerical results obtained, what this study aims to highlight is how the nature of public taxation may induce municipal administrations, which usually have the last word in urban planning, to bet for sustainable urban patterns or not. In this way, an adequate review of the tax system, especially of the property tax, could be a powerful tool to promote

more desirable development models, where greater emphasis is given to the occupation of the real estate stock, discouraging its quantitative extension.

6. CONCLUSIONS

The study shows how, both for unexpected reasons and for a poor estimation of the real estate demand, an urban development whose building phase is not completed in the long term could potentially have very negative effects on the finances of the administrations responsible for the provision of public services and the maintenance of infrastructures. In this situation, even developments planned with economic sustainability criteria could lose this attribute, which should encourage public authorities to make more reasonable forecasts about their territory's growth potential.

On the other hand, the limited strength of the results in the situations where empty dwellings and second homes persist in the horizon year, leads to a greater scope reflection. The fact that these situations, so harmful from the urban environment point of view, are not especially penalized economically essentially due to the weight and the nature of the property tax, may not encourage rationality during the decision-making in the urban planning process.

The response to this problem probably might not be found in the property tax reform itself, since its reduction would serve only to lower municipal resources, rewarding real estate speculation by property owners. Thus, even though it is a very complex issue which requires further study, the most viable solution to discourage simultaneously both the municipality from promoting in excess and speculative investments could come from a high-administrative level, on the one hand, by taxing empty properties specifically and, on the other hand, by cutting down on the resources coming from regional and national governments to those municipalities which, with their inappropriate urban policy, do not contribute to the sustainability of the system as a whole. Even though the latter would be complex, since it

should be based on objective indicators very difficult to fix due to the differences between municipalities (expansive or regressive population dynamics, touristic areas, gross population, etc.), its implementation could be interesting not only to promote more sustainable urban patterns, but also because it could encourage public debate about the complex role of the real estate market both as a first necessity commodity provider and the focus of an intensive capital speculation.

REFERENCES

Aalbers, M. (2008). The financialization of home and the mortgage market crisis. *Competition & Change, 12*(2), 148-166.

Aalbers, M. (2009). Geographies of the financial crisis. *Area, 41*(1), 34-42.

Asociación Española de Abastecimientos de Agua y Saneamientos [Spanish Society of Water Supply and Sewage Companies] (AEAS). (2011). *Guía de Tarifas de los Servicios de Abastecimiento y Saneamiento de Agua*. Madrid, Spain: AEAS.

Bastida, F., Guillamón, M.D, & Benito, B. (2013). Municipal spending in Spain: Spatial approach. *Journal of Urban Planning and Development, 139*(2), 79–93.

Bernt, M. (2009). Partnerships for demolition: The governance of urban renewal in East Germany´s shrinking cities. *International Journal of Urban and Regional Research, 33*(3), 754-769.

Bilitewski, B. (2008). From traditional to modern fee systems. *Waste Management, 28*(12), 2760-2766.

Blanco, H., Alberti, M., Olshansky, R., Chang, S., Wheeler, S.M., Randolph, J., London, J.B., Hollander, J.B., Pallagst, K.M., Schwartz, T. et al. (2009). Shaken, shrinking, hot,

impoverished and informal: Emerging research agendas in planning. *Progress in Planning, 72*(4), 195-250.

Burchell, R. W., & Mukherji. S. (2003). Conventional development versus managed growth: The costs of sprawl. *American Journal of Public Health, 93*(9), 1534-1540.

Caminos, H., & Goethert, R. (1978). *Urbanization Primer*. Cambridge, USA: MIT Press.

Carruthers, J.I., & Ulfarsson, G. (2003). Urban sprawl and the cost of public services. *Environment and Planning B: Planning and Design, 30*(4), 503–522.

Castel, J.C. (2006). Les coûts de la ville dense ou étalée. *Etudes Foncières, 119,* 18–21.

Chernick, H., Langley, A., & Reschowsky, A. (2011). The impact of the Great Recession and the housing crisis on the financing of America´s largest cities. *Regional Science and Urban Economics, 41*(4), 372-381.

Christophers, B. (2011). Revisiting the urbanization capital. *Annals of the Association of American Geographers, 101*(6), 1347-1364.

Costa, A. (2011). *Necesidades de gasto de los municipios turísticos.* Palma de Mallorca, Spain: Universidad de las Islas Baleares.

Deller, S., Marcouiller, D., & Green, G. (1997). Recreational housing and local government finance. *Annals of Tourism Research, 24*(3), 687-705.

Downing, P.B., & Gustely, R.D. (1977). The public service cost of alternative development patterns: A review of the evidence. In P.B.Downing (Ed), *Local service pricing policies and their effect on urban spatial structure*. Vancouver, Canada: University of British Columbia Press.

Ermini, B., & Fiorillo, F. (2008). *Local government reform across developed countries: A guideline for comparison*. Armidale, Australia: University of New England.

Ewers, H., & Nijkamp, P. (1990). Urban sustainability. In P.Nijkamp (Ed), *Urban Sustainability*. Avebury, UK: Gower Publishing Company.

Faust, K., Abraham, D., & McElmurry, S. (2016). Water and Wastewater Infrastructure Management in Shrinking Cities. *Public Works Management & Policy, 21*(2), 128-156.

Frank, J.E. (1989). *The Costs of Alternative Development Patterns. A Review of the Literature.* Washington DC, USA: Urban Land Institute.

Garrido-Jiménez, F.J., Magrinyà, F., & del Moral-Ávila, M.C. (2018). Municipal operating costs and revenues in future developments as a function of urban planning variables. *Journal of Urban Planning and Development, 144*(1), 04017020.

Glock, B., & Häussermann, H. (2004). New trends in urban development and public policy in Eastern Germany: Dealing with the vacant housing problem at the local level. *International Journal of Urban and Regional Research, 28*(4), 919-929.

Goldsmith, M. (1992). Local Government. *Urban Studies, 29*(3-4), 393-410.

Gotham, K. (2009). Creating liquidity out of spatial fixity: The secondary circuit of capital and the subprime mortgage crisis. *International Journal of Urban and Regional Research, 33*(2), 355-371.

Grant, M., & Barton, H. (2013). No weighting for healthy sustainable local planning: evaluation of a participatory appraisal tool for rationality and inclusivity. *Journal of environmental planning and management, 56*(9), 1267-1289.

Guelton, S., & Navarre, F. (2010). Les coûts de l´etalement urbain: urbanisation et comptes publics locaux. *Flux, 79/80,* 34-53.

Guengant, A., Josselin, J.M., & Rocaboy, Y. (1995). Densités et finances locales. Difficulties de la modélisation. *Annales de la recherche urbaine, 67,* 65-71.

Koziol, M. (2004). The consequences of demographic change for municipal infrastructure. *German Journal of Urban Studies*, *44*(1), 1-13.

Haase, A., Rink, D., Grossmann, K., Bernt, M., & Mykhenko, V. (2014). Conceptualizing urban shrinkage. *Environment and Planning A, 46*(7), 1519-1534.

Henderson, S. R. (2015). State intervention in vacant residential properties: an evaluation of empty dwelling management orders in England. *Environment and Planning C: Government and Policy*, *33*(1), 61-82.

Hoogendoorn, G., & Visser, G. (2010). The economic impact of Second Home Development in Small-Town South Africa. *Tourism Recreation Research, 35*(1), 55-66.

Hortas-Rico, M., and Solé-Ollé, A. (2010). Does urban sprawl increase the costs of providing local public services? Evidence from Spanish municipalities. *Urban Studies, 47*(7), 1513–1540.

Isard, W., & Coughlin, R.E. (1957). *Municipal Costs and Revenues Resulting from Community Growth*. Wellesley, USA: Chandler-Davis.

Johnson, M. P., Hollander, J., & Hallulli. A. (2014). Maintain, demolish, re-purpose: Policy design for vacant land management using decisions models. *Cities,* 40, 151-162.

Kitchin, R., O´Callaghan, C. & Gleeson, J. (2014). The new ruins of Ireland? Unfinished Estates in the Post-Celtic Tiger Era. *International Journal of Urban and Regional Research, 38*(3), 1069-1080.

Klug, S., & Hayashi, Y. (2007). Social and Public Costs of Residential Urban Sprawl. In *Proceedings of the Eastern Asia Society for Transportation Studies The 7th International Conference of Eastern Asia Society for Transportation Studies*, 58. Eastern Asia Society for Transportation Studies.

Krueger, R., & Buckingham, S. (2012). Towards a 'consensual' urban politics? Creative planning, urban sustainability and regional development. *International Journal of Urban and Regional Research, 36*(3), 486–503.

La Caixa. (2005). *Anuario económico de España,* Barcelona, Spain: La Caixa.

Ladd, H.F. (1992). Population growth, density and the costs of providing public services. *Urban Studies, 29*(2), 273-295.

Lutz, B., Molloy, R., & Shan, H. 2011. The housing crisis and state and local government tax revenue: Five channels. *Regional Science and Urban Economics, 41*(4), 306-319.

Mace, R.L. (1961). *Municipal Cost-Revenue Research in the United States*. Chapel Hill, USA: University of North Carolina.

Mädding, H. (2004). Demographic change and local government finance: Trends and expectations. *German Journal of Urban Studies, 43*(1).

Mahon, M & Cinnéide, M. (2009). Governance deficits in residential housing estates in Ireland. *Urban Studies, 46*(1), 93-116.

Malisz, B. (1970). Implications of threshold theory for urban and regional planning. In *Regional Economics*, (pp. 220-230). London, UK: Palgrave Macmillan.

Martínez, F., Pauls, A., & Solsona, J. (2003). Las viviendas familiares y su uso turístico en la Comunidad Valenciana. *Estudios Turísticos, 155-156*, 159-178.

Martinez-Fernandez, C., Audirac, I., Fol, S., & Cunningham-Sabot, E. (2012). Shrinking cities: urban challenges of globalization. *International Journal of Urban and Regional Research, 36*(2): 213-225.

Molloy, R. (2016). Long-term vacant housing in the United States. *Regional Science and Urban Economics, 59,* 118-129.

Moss, T. (2008). "Cold spots of urban infrastructure: "Srinking" processes in Eastern Germany and Modern Infrastructural Ideal." *International Journal of Urban and Regional Research, 32*(2), 436-451.

Nassauer, J.I., & Raskin, J. (2014). Urban vacancy and land use legacies: A frontier for urban ecological research, design and planning. *Landscape and Urban Planning, 125*, 245-253.

Paulsen, K. (2009). *The effects of land development on municipal finance a conceptual overview*. Cambridge, USA: Lincoln Institute of Land Policy.

Puig-Ventosa, I. (2008). Charging systems and PAYT experiences for waste management in Spain. *Waste Management, 28*(12), 2767-2771.

Popper, D.E., & Popper, F.J. (2002). Small can be beautiful: Coming to terms with decline. *Planning, 68*(7), 20-23.

Radzimski, A. (2016). Changing policy responses to shrinkage: The case of dealing with housing vacancies in Eastern Germany. *Cities, 50*, 197-205.

Real Estate Research Corporation (RERC). 1974. *The Costs of Sprawl, Environment and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*. Washington DC, USA: US Government Printing Office.

Rosen, K., & Smith, L.B. (1983). The price-adjustment process for rental housing and the natural vacancy rate. *The American Economic Review*, *73*(4), 779-786.

Schilling, J., & Logan, J. (2008). Greening the Rust Belt. *Journal of the American Planning Association, 74*(4), 451-466.

Skidmore, M., & Scorsone, E. (2011). Causes and consequences of fiscal stress in Michigan cities. *Regional Science and Urban Economics, 41*(4), 360-371.

Solé-Ollé, A., & Bosch, N. (2005). On the relationship between authority size and the costs of providing local services: Lessons for the design of intergovernmental transfers in Spain. *Public Finance Review, 33*(3), 343-384.

Sousa, C. & Soares, C. (2018). Portuguese West Coast tourism resorts: an unfinished landscape of territorial liabilities. *European Planning Studies, 26*(1), 94-114.

Spanish Ministry of Treasury (2017). *Haciendas Locales en Cifras año* 2015.

Stone, P.A. (1973). *The Structure, Size and Costs of Urban Settlements.* Cambridge, UK: Cambridge University Press.

Tacoli, C. (2009). "Crisis or adaptation? Migration and climate change in a context of high mobility. *Environment and Urbanization, 21*(2), 513-525.

United States Government Accountability Office. (2011). *Vacant Properties: Growing Number Increases Communities´ Costs and Challenges,* GAO-12-34.

Velvin, J., Kvikstad, T., Drag, E., & Krogh, E. (2013). The impact of second home tourism on local economic development in rural areas in Norway. *Tourism Economics, 19*(3), 689-705.

Wheaton, W., & Schussheim, M. (1955). *The Cost of Municipal Services in Residential Areas*. Washington DC, USA: US Government Printing Office.

Wilcox, P., Quisenberry, N., Cabrera, D.T., & Jones, S. (2004). Busy places and broken Windows? Toward defining the role of physical structure and process in community crime models. *Sociological Quarterly, 45*(2), 185-207.

Withaker, S., & Fitzpatrick IV, T.J. (2013). Deconstructing distressed-property spillovers: The effects of vacant, tax-delinquent, and foreclosed properties in housing submarkets. *Journal of Housing Economics*, *22*(2), 79-91.

Wollmann, H. (2011). Provision of public services in European countries: From public/municipal to private and reverse?. *Croatian and Comparative Public Administration, 11*(4), 889-910.