



**Public houses and house prices in Great Britain: A longitudinal study**

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## Public houses and house prices in Great Britain: A panel analysis

### ABSTRACT

This paper examines the relationship between public houses or 'pubs' and house prices in Great Britain. Using a unique dataset, comprising statistical indicators for 373 local authorities registered between 2005 and 2015, the authors investigate this relationship from a panel data perspective. The analysis identifies a strong positive association between an increase in the number of pubs and house prices, showing different patterns with regard to pubs located in urban, suburban and rural areas. Results offer an original contribution to the literature related to the economic value of pubs as important third places in Great Britain, providing the basis for potential policy choices aimed at supporting community investment.

**Keywords: Public Houses, Third Places, House Prices, Great Britain**

**JEL: R00, R30**

**Word count: 8,430**

# Public houses and house prices in Great Britain: A longitudinal study

## 1. Introduction

In the United Kingdom (UK hereafter), public houses or *pubs* provide important places for social aggregation, offering physical settings for many types of communal activities (Maye et al., 2005; Mount & Cabras, 2015). Several recent studies confirm the positive impact of pubs as third places on local communities (Bowler & Everitt, 1986; Maye et al., 2005; Mayo and Ross, 2009; Cabras & Mount, 2015; Mount & Cabras, 2016), and this impact on community cohesion appears to be greater than other third place including community halls, village shops, post offices, and libraries (Cabras & Lau, 2019). Any decline in the number of pubs therefore represents a potential threat to the cohesion and attractiveness of a community. According to British Beer and Pub Association (2015) the total number of UK pubs declined from about 67,000 to less than 49,300 in the period 1982-2015.

Notwithstanding the importance of the issue and the significance of the long run decline, there is an absence of large sample research evidence into the consequences of pub closures. One reason is that significant attention, understandably, has concentrated on the causes of these closures, notably regulation, restructuring, and competition from supermarkets (Higgins et al., 2016; Preece, 2016). A further possible reason is the lack of a consistent long run data source suitable for longitudinal analysis of the effects of closures on community cohesion and economic wellbeing.

Moreover, because pubs offer generalised social benefits, placing an economic value on their presence or absence in a community is problematic. These benefits may differ according to access and location effects, for example according to the degree of urbanisation. A possible solution, explored in this paper, is to use house prices as a standard of economic value across these locations in order to proxy the effects of pubs and pub closures in any given locality. Access and proximity to amenities are important factors in households' choice to purchase a house in the countryside (Costello, 2007) and in

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2  
3 urban and suburban areas (Ding et al., 2010; Reynolds et al., 2014), with a substantial number of  
4 homebuyers specifying proximity to a pub as important in their decision (Tepilo, 2015). The presence of  
5 a pub, therefore, according to its location, may be expected to have a positive impact on house prices.  
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7 In similar vein, specifying this relationship through time and across a range of urban and rural contexts,  
8 allows us to analyse the local economic consequences of pub openings and closures.  
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14 We thus investigate the relationship between changes in the number of pubs and house prices  
15 between 2005 and 2015, using an original panel dataset, comprising information on facilities and  
16 services available for 373 local authorities (LAs hereafter) in Great Britain<sup>1</sup>, grouped according to their  
17 degree of urbanisation. The paper comprises of six sections, including the introduction. Section two  
18 discusses and illustrates the theoretical background of the study, focusing on third places and  
19 analysing their importance with regard to concepts such as community cohesion and social capital.  
20 Section three provides an overview of the progressive decline in pubs that has occurred in England,  
21 Scotland and Wales, focusing on pubs operating in spatially remote areas and rural parishes and  
22 explaining the significance of these places for rural communities. Section four describes data used and  
23 methodology applied and explores research hypothesis. Section five presents and explains the  
24 econometric models elaborated in the analysis, examining results. Section six evaluates findings from  
25 previous section in light of the main research questions addressed by this study, discussing the linkage  
26 between pubs and house prices and drawing recommendations and conclusions.  
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## 47 **2. Third places and the decline of pubs in the UK**

48 The purpose of the study presented in this paper is to explore, examine and evaluate the possible  
49 relationships between pubs and house prices within LAs. In particular, our investigation aims to  
50 understand whether changes in the number of pubs could have a different impact on house prices in  
51 urban, suburban and rural areas.  
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<sup>1</sup> For purposes of comparability, the study uses data from England, Scotland and Wales, and excludes Northern Ireland.

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3 The reasoning behind this question is intrinsically related to the role of pubs as *third places*, thus  
4 physical places for people to congregate and join together, shaping and delineating frameworks and  
5 boundaries for individuals and groups (Oldenburg, 1989; Watson and Watson, 2012). Third places are  
6 assumed to facilitate the accumulation of social capital within the communities they serve, with social  
7 capital being the whole of relationships and ties among individuals which provide a degree of social  
8 interaction, cohesiveness and networking in a given community (Putman, 2000). Empirical evidence  
9 seems to suggest that third places play an important functional role in providing platforms for these  
10 concepts to develop and expand (Botterman et al., 2012). Relationships between individual and society  
11 are often regulated “by other social ‘bodies’ such as community groups, friendship networks, voluntary  
12 groups but, above all, by families and organisation” (Watson and Watson, 2012 p.687); and these  
13 relationships define the network dimension of social capital (Copus & Skuras, 2006).

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28 **Despite these findings, however, the last decade has been characterised by an increasing**  
29 **number of pub closures, and a variety of factors that have affected British pubs can be**  
30 **distinguished and used to explain pubs’ decline. Among these factors, the changes in the**  
31 **sector since the 1960s, which saw the separation of pubs from breweries that traditionally**  
32 **owned them (Preece, 2016); the Beer Orders issued by Parliament in 1989, which forced large**  
33 **brewers operating in an oligo- monopolistic market to dispose of a large stock of their pubs**  
34 **(Pratten, 2007); the rise and enlargement of corporate pub-chains or *pubcos* in the early 1990s**  
35 **and the consequent decline of independently owned pubs or *free-houses* (Preece, 2016); and,**  
36 **more recently, tough market re-structuring and related pub closures due to the 2008 financial**  
37 **crisis (Andrews and Turner, 2012). Moreover, factors like the progressive decrease of alcohol**  
38 **prices sold in supermarkets and off-license retailers (Smith and Foxcroft, 2009); the raise of**  
39 **European style-cafes (Lincoln, 2006); and the growth of home entertainment (e.g. game-**  
40 **consoles, high-definition TVs and home-theatre sound systems) all contributed to making pub**  
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3 nights less attractive (Pratten, 2007), pushing many pub-goers to reduce their visits and move  
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5 them mainly during weekends (Mount & Cabras, 2015).  
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8 Pubs may also face different challenges depending on which areas they are located. In  
9  
10 urban areas, pubs represent an important component of the so called 'night-time economy'  
11  
12 (NTE), based on clubs, bars and other licensed premises that attract residents as well as  
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14 tourists to urban centres, generating significant employment and revenues (Tierney, 2006;  
15  
16 Hough & Hunter, 2008). Successive UK Governments encouraged the NTE with licensing and  
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18 planning policies in the 1990s and early 2000s, in conjunction with a national strategy that  
19  
20 sought the re-vitalization of city-centre locations (Hough and Hunter, 2008). Such support was  
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22 not enjoyed by pubs located in rural areas, and many needed to reconfigure themselves into  
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24 different types of businesses (e.g. gastro-pubs, bed and breakfasts) in order to survive.  
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### 30 31 **3. Determinants of house prices and the relationship with pubs**

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33 Because the house is the most valuable asset for the vast majority of households, housing  
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35 market issues generated a significant amount of literature. Among theoretical frameworks  
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37 explaining the functioning of housing markets, the model proposed by Rosen (1974) is  
38  
39 frequently used to describe housing as a composite bundle of goods determined by house's  
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41 attributes such as size, location, neighbourhood, access to transport links etc. A market  
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43 equilibrium in the model is reached when the marginal benefit of improving one or more parts of  
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45 the bundle (e.g. buying a larger estate, or moving to a safer neighbourhood), based on  
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47 individual consumers' preferences and income, is offset by the utility costs of the additional  
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49 expenditure involved. In Rosen's model, house prices capture and reflect the benefits of a range  
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51 of composite attributes, and can be used to interpret consumers' willingness to pay for one or  
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53 more of those attributes, and to define the relationship between housing prices and houses'  
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55 implicit attributes also known as the 'hedonic' price function.  
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3 DiPasquale and Wheaton (1992) use a four-quadrant model to explain the housing market, in  
4 which quadrants indicates i) the asset market valuation, ii) the property market rent  
5 determination, iii) the asset market construction and iv) the property market stock adjustment.  
6 Mutual interactions across these quadrants result in a continuous adjustment between housing  
7 demand and supply; basically, starting with a given stock of space, the property market  
8 determines rents which reflect property prices by the asset market. These, in turn, 'generate  
9 new construction that, back in the property market, eventually yields a new level of stock. The  
10 combined property and asset markets are in equilibrium when the starting and ending levels of  
11 the stock are the same' (DiPasquale and Wheaton, 1992 p.189). This signifies that, in a well-  
12 functioning space market, real effective housing prices and rents decrease when the housing  
13 demand increases, and vice versa.  
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28 More recent literature on the subject tends to focus the so-called spatial equilibrium  
29 condition proposed by Glaeser (2008), which sees individual households maximize their utility  
30 by moving locations, buying houses in what they perceive to be better locations compared to  
31 the ones they depart from, with the housing market reaching an equilibrium when individuals  
32 see no difference across locations in terms of the utility offered by each location. By doing so,  
33 households maximize their indirect utility function (Glaeser, 2008).  
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42 As the presence (or absence) of facilities and amenities affects the attractiveness of a given  
43 area or location and its related housing prices, many research works address and investigate  
44 this issue in different countries worldwide. See, for instance, studies identifying the positive  
45 impact of good quality schools (Figlio and Lucas, 2004), presence of sport facilities (Feng and  
46 Humphreys, 2016), and better access to railways stations and metro connections (Baum-Snow  
47 and Kahn, 2000, Armstrong and Rodriguez, 2006) on residential property values in the United  
48 States; the housing price premium that a favourable job location combined with a variety of  
49 amenities confer to housing prices in the Netherlands (Garresset and Marlet, 2015); and the  
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3 increase in housing prices resulting from having a playground within spatial proximity in  
4 Australian neighbourhoods (Breunig et al., 2019). Moreover, other studies demonstrate how the  
5 overall attractiveness and housing prices of residential areas fall in presence of factors such as  
6 higher crime rates (Gibbons, 2004), higher levels of pollution (Chen & Chen, 2016) and  
7 environmental dis-amenities (e.g. risk of flooding, Zhang, 2016).  
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15 With regard to the UK housing market, Holly & Jones (1997) indicate household incomes to  
16 be the most important determinant of house prices, while Brooks & Tsolacos (2010) refer to  
17 lagged values as another significant predictor. According to Hincks et al. (2014), prior to the  
18 recession in 2007, housing markets across the UK had experienced more than a decade of  
19 uninterrupted growth. While this growth was widely assumed to continue by policy-makers after  
20 2008, the onset of the recession and subsequent recovery accrued differences across localities,  
21 imposing new challenges for policymakers at national and sub-national levels (Holmes &  
22 Grimes, 2008). This resulted in a significant variability of housing stock across the UK, with  
23 some areas experiencing a dramatic oversupply and others a lack of supply due to the  
24 reluctance of the private sector to commit to new build activities, creating affordability issues in  
25 some areas (e.g. London and the South East) as well as negative equity concerns in others  
26 (Hincks et al., 2014).  
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42 In such context, notwithstanding the assumption that the loss of third places and pubs in particular  
43 can have a detrimental impact on the attractiveness of residential places, there has been some  
44 speculation in the UK that the presence of pubs in given communities could have a positive effect on  
45 house prices. Particularly in the countryside, community initiatives undertaken by residents to save their  
46 locals, officially aimed at preserving spaces for residents to congregate and join together, could actually  
47 be intended to conserve the value of residents' housing investments, keeping house prices higher and  
48 therefore maintaining their residential areas more attractive for future investors. This aspect may have  
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3 become even more significant with many rural areas becoming bedroom communities for metropolitan  
4 areas (Scott, 2002).  
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8 An example supporting this argument is provided by the case of the Lyvennet Community Trust  
9 (LCT hereafter), in the village of Crosby Ravensworth in the Lyvennet Valley, Northern England. The  
10 LCT is a Community Land Trust, thus a non-for-profit organization that supports and promotes any  
11 charitable purpose for the benefit of the community in the area. Its steering group comprises County,  
12 District and Parish Councillors, along with interested representatives from the community. The LCT is  
13 particularly focused on the provision of affordable housing for people who want to relocate to Crosby  
14 Ravensworth. When the Butcher's Arms, the only pub in the village, was put on the market in  
15 September 2009, the LCT worried that its closure could compromise the attractiveness of Crosby. More  
16 worryingly for the LCT, however, was the fact that this closure could have compromised the  
17 construction of 20 new houses in 2010, since the presence of a pub in a village makes the village itself  
18 more attractive for potential residents and has an impact on the local housing market.  
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33 The LCT then actively campaigned to rescue the pub from closure, and it was successful in in  
34 promoting the creation of a cooperative of local residents with the objective to purchase the Butchers'  
35 Arms. In an interview given to one of the authors in April 2010, Doug Henderson, a LCT member,  
36 explained at that time:  
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44 *'Crosby it is quite an isolated community, you don't get an awful lot of passing trade. So with a pub, the*  
45 *likelihood of someone that can stop and look at the place could just rise (...) getting the pub is just part of the*  
46 *story: it is actually what we can do to add value to this local area'.*  
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50 He also added:  
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53 *'The LCT is an umbrella organisation for the community living in Crosby Ravensworth. It is actually focused*  
54 *on supporting any initiative, any business that can develop here. The idea of us [the LCT] building houses and*  
55 *selling them to local people is still our priority. But if this is your vision, then you need to have other things in*  
56 *place to make the place sufficiently attractive for them [the local people] to come and live here. The pub is*  
57 *collateral to our vision'*  
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5 In February 2010, the LCT organised a public meeting in the village hall with the aim to propose to  
6 collect £300,000, approximately the price set by the landlords, by selling shares to cooperative  
7 members. The idea had a positive response from the local community, with 103 shares purchased in  
8 May 2010. The collection continued and enough financial capital was raised from the cooperative to  
9 complete acquisition the following year (Foster, 2013). At the time this study is developed, the Butchers'  
10 Arms is still owned by the local cooperative promoted by the LCT, which counts 298 shareholders each  
11 of whom put up £250 to £20,000 to purchase their shares. The pub is rented by a tenant who operates  
12 it on behalf of the cooperatives; shareholders' annual dividends are most entirely re-invested in the pub.  
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23 The example of Crosby Ravensworth seems to suit more pubs in rural areas rather than those  
24 located in urban areas, although empirical evidence available in the UK is not unequivocal. Examining  
25 the impact of amenities and facilities in London, Gibbons (2004) found that property prices tend to be  
26 higher in areas with a selection of pubs and wine bars, with having as many as ten pubs or wine bars  
27 per square kilometre boosting property prices by 2.8%. However, Gibson also found that living too  
28 close to a pub could negatively affect housing prices due to high levels of antisocial behaviours and  
29 criminal damages likely to occur in proximity of these places. Research conducted in Wales by Kapman  
30 and Aru (2017) found significant differences in housing prices across neighbouring rural wards,  
31 although the impact of pubs on price variation was unclear. For instance, the median price paid for a  
32 property in the village of Llangynidr (LA: Powys), was £295,938 at the end of 2016 - four times higher  
33 than in neighbouring in the village of Twyn Carno (LA: Caerphilly), where the median price was  
34 £75,944. At the time the study was conducted, Llangynidr had two pubs, a shop, and a primary school  
35 in the area. Similarly, Twyn Carno had a pub, a shop and takeaway in the area, along with a primary  
36 school.  
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54 Based on these considerations, we propose and address the following research questions: *What is*  
55 *the relationship between the number of pubs and housing prices in Great Britain? And how does this*  
56 *relationship differ between urban and rural LAs?*  
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## Methodology

### 4.1 The dataset

To answer our two research questions, we extracted and combined a range of information from various datasets provided by the Office for National Statistics (ONS, 2016a), including those provided by the Annual Business Enquiry (ONS, 2016b). The resulting dataset encompasses data for 373 LAs on an annual basis, covering a time-period of nine years between 2005 and 2015 (years 2008 and 2009 excluded due to incomplete data). The dataset comprises the median house prices (reported in £), treated as the dependent variable, as well as the number of pubs, treated as the independent variable of main interest. In addition, we use median weekly salary (reported in £), unemployment rate, and size of resident population as control variables. Table 1 reports descriptive statistics for these variables. The dataset contains a small percentage of cases for which information was missing or incomplete; we excluded these cases from our analysis, with the dataset classed as unbalanced and resulting in a final sample size of 3,134 observations.

LAs comprised in our dataset were classified according to their levels of urbanisation based on the urban-rural classification provided by Bibby and Shepherd (2004) which mainly considers Output Areas (OAs) and their sub-hierarchies, and ranks geographical areas in six main categories: 'Major Urban' (districts with a population of at least 100,000 people or with half of their population concentrated in urban areas with a population of more than 750,000); 'Large Urban' (districts with a population of at least 50,000 people or with half of their population concentrated in urban areas with a population between 250,000 and 750,000); 'Other Urban' (districts with a population lower than 37,000 or with less than 26% of their population concentrated in larger market towns and rural settlements); 'Significant Rural' (districts with a more than 37,000 people or more than 26% of their population concentrated in larger market

towns and rural settlements), 'Rural – 50' (districts with at least 50% but less than 80% of their population in rural settlements and larger market towns); and 'Rural – 80' (districts with at least 80% of their population in rural settlements and larger market towns). The six-fold grouping can be further aggregated within three main groups 'Predominantly Urban' (Major, Large and Other Urban), 'Significant Rural' and 'Predominantly Rural' (Rural-50 and Rural-80).

Using Bibby and Shepard's urban-rural classification has the advantage of addressing areas at the same administrative level across the three countries considered, and for which an appropriate amount of data are available in the time-span analysed<sup>2</sup>. Equally, we chose to focus on LAs instead of other administrative or geographical units (for instance OAs, which are more homogenous with regard to attributes such as size and population), as LAs provided a much clearer distinction in terms of scalar levels of urbanity/rurality (e.g. OAs usually consist of either entirely of urban postcodes or entirely of rural postcodes). Hence, we apply the urban-rural classification to model interaction effects and to analyze how the relationship between pubs and house prices varies across LAs with different levels of urbanisation/rurality.

However, applying the urban-rural classification used for England to Welsh and Scottish LAs required some adjustment and transformation. Therefore, we followed indications provided by Pateman (2011) in relation to urban-rural areas to identify, select and reclassify LAs in Wales and Scotland. The exercise was straightforward for the vast majority of LAs considered, with just a few cases requiring further investigation with regard to grouping. Figure 1 shows the LAs considered in our study, while Table 2 reveals that cases excluded from our unbalanced dataset did not change the regional distribution of data significantly. Therefore, the information presented can be assumed as representative of the UK.

**[TABLE 1 HERE]**

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<sup>2</sup> Data available at lower administrative levels, such as ward and parishes, were considered with regard to creating the dataset, although significant gaps were detected. Similarly, we focused on LAs instead of Output Areas (OA) as these provided a much clearer discerning in terms of urban/rural; urban/rural mixes were avoided where possible in our analysis

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3 **Table 1: Variables used in the study**  
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6 [TABLE 2 HERE]  
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8 **Table 2: Urbanisation/Rurality Classification**  
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11 [FIGURE 1 HERE]  
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13 **Figure 1: Map of LAs analysed in this study**  
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18 **4.2 Descriptive data analysis**  
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20 Figure 2 comprises of four graphs. The first graph (a) shows the development of the overall house  
21 prices in £ against the overall development of the numbers of pubs per 1.000 inhabitants from 2005 to  
22 2015. The remaining three graphs illustrate the evolution of house prices against the evolution of the  
23 numbers of pubs separately for 'Predominantly Urban' (d), 'Significant Rural' (c) and 'Predominantly  
24 Rural' (b) LAs.  
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33 [FIGURE 2 HERE]  
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35 **Figure 2: Evolution of number of pubs, and house prices.**  
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40 Average house prices show a positive trend in all the four graphs. After an initial steep increase  
41 between 2005 and 2007, house prices declined in the direct aftermath of the financial crisis. A quick  
42 recovery followed in 2010, with the trend showing a period of slow growth and stagnation between 2010  
43 and 2013, particularly in rural areas. In contrast, data for 2014 and 2015 highlight a period of steep  
44 growth in all regions. In 2005, 'Significant Rural' LAs showed the highest average house price at  
45 approximately £194,000; ten years after, in 2015, the highest average house price was found in  
46 'Predominantly Urban' LAs at approximately £283,800. In contrast, 'Predominantly Urban' LAs showed  
47 the lowest average house price with approximately £184.500 in 2005, but ten years after the lowest  
48 average house price was found in 'Predominantly Rural' LAs with approximately £249.600. As a result,  
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3 'Predominantly Urban' LAs show the highest growth rate (54%) within the period considered followed  
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5 by 'Significant Rural' LAs (42%) and 'Predominantly Rural' LAs (35%).  
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8 Trends related to pub counts tell a different story, as all show a negative trend. After a relatively  
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10 stable period between 2005 and 2007, a steady decline in the number of pubs is evident since 2010,  
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12 particularly in 'Predominantly Urban' LAs. 'Predominantly Urban' LAs showed the lowest pubs per  
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14 capita ratio both in 2005 and 2015, with 0.87 pubs and 0.44 pubs per thousand residents respectively.  
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16 In contrast, 'Predominantly Rural' LAs the lowest pubs per capita ratio, both in 2005 and 2015, with  
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18 1.62 pubs and 1.15 pubs per thousand residents respectively. However, 'Predominately Urban' LAs  
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20 also show a sharp decline in the numbers of pubs (-49%), followed by 'Significant Urban' LAs (-35%)  
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22 and 'Predominantly Rural' LAs (-29%).  
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26 Although these figures seem suggesting an inverse relationship between the number of pubs and  
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28 average house prices in the period considered, they are not sufficient to confirm such relationship  
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30 maintained for all types of LAs on an annual basis. We further test the correlation between the annual  
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32 growth rate in house prices and the annual growth rate in the number of pubs (percentages  
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34 respectively) for each LA using Spearman's rank correlation coefficient, or Spearman's  $\rho$ . Spearman's  
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36  $\rho$  is a non-parametric measure based on the rankings which assesses how the correlation between two  
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38 variables can be described as a monotonic function; as such, it can be used for both continuous and  
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40 ordinal variables. **As illustrated in Figure 3, some LAs shows a negative correlation between the  
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42 annual growth rate related to house prices and the annual growth measured for number of  
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44 pubs, although the majority exhibits a positive correlation. An important aspect to consider  
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46 would be then how these LAs differ in their levels of urbanization/rurality in view of addressing  
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48 our research questions.**  
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56 **[FIGURE 3 HERE]**

57 **Figure 3: Spearman's rho correlations per LA**  
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## 5. Modelling for house prices

The findings generated from the descriptive analysis provides valuable information about the relationship between the number of pubs and housing prices in Great Britain, confirming our general assumptions and identifying some relevant associations among selected variables. Firstly, descriptive results corroborate evidence provided by other sources (CAMRA, 2012; BBPA, 2015) that the stock of pubs in Great Britain has significantly decreased between 2005 and 2015, with housing prices increasing in the same period. Secondly, they show that the decline of pubs appears to disadvantage urban communities more strongly than rural ones, while the increase of average house prices is stronger in urban communities than rural ones. Thirdly, results confirm that the impact of pubs on the housing markets deserve more detailed and critical scrutiny, for instance by examining potential interaction effects used to understand how the relationship between changes in number of pubs and changes in average housing prices across the LAs varies based on LA's levels of urbanisation/rurality.

To investigate this relationship, we develop a range of models by applying a panel data approach using LAs as subject observations for which measures are repeated annually (see Raudenbush & Bryk, 2002). In doing so, we treat housing prices as the dependent variable, and number of pubs, weekly median salary, population, and unemployment rate as independent variables, adding an interaction effect between the urbanisation/rurality and numbers of pubs in an LA in our model. In total, we fitted five models generated by following a step-wise procedure, introducing variables in succession and by considering gains over the unconditional model (Raudenbush and Bryk, 2002).

In the first step, we calculate the unconditional model ( $m_0$ ), which contains no explanatory variables, estimating the residuals within LAs ( $n_t$ ) and the general residuals ( $\varepsilon_{it}$ ) separately, as shown by Equation [1]:

$$[1] \quad \text{HousePrice}_{it} = \beta_0 + n_i + \varepsilon_{it}$$

Next, we calculate the intra-cluster correlations  $\rho$ , which represents the unobserved heterogeneity across LAs and indicates the estimated proportion of the total variance attributed to the between variance, as shown by Equation [2]:

$$[2] \quad \rho = \frac{(\sigma_u)^2}{(\sigma_u)^2 + (\sigma_e)^2}$$

where  $\sigma_u$  describes the standard deviation of residuals within LAs ( $n_i$ ), while  $\sigma_e$  describes the overall error term ( $\varepsilon_{it}$ ).

The unconditional models report an intra-class correlation ( $\rho$ ) of 0.89, indicating house prices as strongly correlated within LAs over time and therefore influenced by unobserved heterogeneity across LAs. This finding underpins our decision to apply a panel data approach, as performing standard OLS regressions would entail the risk of the standard assumption of independent observations being violated, leading to inefficient and biased standard errors (Mizon, 1995). In such situation, random-effect and fixed-effect panel regressions would be more suitable to estimate. After applying a Hausman Specification Test to compare random-effect and fixed-effect estimates in the final model ( $m_5$ ), which yield a significant results (Prob>chi2 = 0.0000), we decide to estimate a fixed-effect panel regression to capture the average within-subject effects of the time-varying covariates on the dependent variable (Rabe-Hesketh & Skrondal, 2008).

Next, we perform a Fisher-type unit-root test for panel data to test whether our dependent variable is stationary; a Fisher-type unit-root test does not require strongly balanced data and the individual series can have gaps – two characteristics of our dataset (Whitehead, 2002). As the Fisher-type unit-root test yielded an insignificant result, we can assume that the dependent variable is non-stationary, allowing to insert the lagged house prices with a time lag of one year



as an independent variable, assuming that house prices are influenced by values registered in the previous year ( $m_2$ ).

We then add the median weekly salary, unemployment rate, and size of resident population as control variables to model ( $m_3$ ). Sequentially, we include number of pubs as independent variable ( $m_4$ ), and then insert an interaction effect capturing the association between and numbers of pubs and levels of urbanisation/rurality within LAs, focusing on 'Rural – 80' LAs in order to analyse whether the impact of pubs on house prices is significantly different in these LAs compared to more urbanised LAs ( $m_5$ ). The resulting linear fixed-effects model is shown by equation [3]:

$$[3] \quad y_{it} = \beta_0 + \beta_1 \text{HousePrice}_{it-1} + \beta_2 \text{Pubs}_{it} + \beta_3 \text{Unemployment}_{it} + \beta_4 \text{Population}_{it} + \beta_5 \text{Wage}_{it} + \beta_6 \text{Pubs}_{it} * \text{Rural} - 80_{it} + \eta_t + \varepsilon_{it}$$

In Equation 3,  $y_{it}$  represents the average house price in LA  $i$  at year  $t$ . In terms of coefficients,  $\beta_0$  represents the constant term of the regression;  $\beta_1$  represents the within-unit component of average house prices in LA  $i$  in year  $t-1$  (lagged variable);  $\beta_2$  represents the within-unit component of number of pubs;  $\beta_3$  represents the within-unit component of the unemployment rate,  $\beta_4$  represents the within-unit component of the **resident population**;  $\beta_5$  represents the within-unit component of the **weekly salary in LA  $i$  in year  $t$** ; and  $\beta_6$  represents the within-unit component of the interaction effect of the number of pubs and the rurality of LA  $i$  in year  $t$ . The random error is represented by  $\varepsilon_{it}$ , while the remaining unobserved heterogeneity is represented by  $\eta_t$ .

All the coefficient signs in Table 3 are consistent with our expectations. The results confirm that lagged house prices have a positive impact on average house prices, and that an increase in the unemployment rate leads to a decline in average housing prices within LAs. The model also confirms a positive effect of population growth on house price development, and suggests

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3 that any change in weakly salary levels have no significant impact on housing prices. Most  
4 importantly, the results confirm that an increase in the number of pubs, indeed, has a positive  
5 impact on house price development. Based on the positive interaction effect, it can also be  
6 concluded that the positive impact of pubs on house prices is significantly stronger in rural  
7 areas compared to more urban ones. For the most part, these findings were confirmed by a  
8 GMM estimation, which was performed as a robustness test (see appendix).  
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17 Finally, in the last step we develop our models by focusing on additional combinations of  
18 interaction effects ( $m_6, m_7, m_8, m_9, m_{10}, m_{11}$ ). Results indicates that the positive  
19 relationship between an increase in the number of pubs and house prices is significantly  
20 weaker in 'Other Urban' LAs, but significantly stronger in 'Major Urban' and 'Rural-80' LAs. This  
21 finding suggests a u-shape relationship between levels of urbanisation and the strength of the  
22 effect of pubs on house prices, identifying this effect as significantly stronger in very rural and  
23 very urban LAs, with a much stronger effect in 'Rural-80' areas compared to 'Major Urban' ( $m_{11}$   
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[TABLE 3 HERE]

Table 3: Linear fixed-effect panel regression results

## 6. Discussion and Conclusions

The aim of the paper was to analyze the relationship between the number of pubs and housing prices in the UK, examining whether this relationship differs among urban and rural areas by developing linear fixed-effect panel regressions for a dataset of 373 LAs over a period of nine years comprised between 2005 and 2015.

The analysis yields three important results. Firstly, the descriptive data analysis indicates that rural LAs experience a smaller decline in the number of pubs than urban LAs. This finding is in contrast to previous studies, highlighting that the decline in pubs affects rural areas more significantly than urban

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3 areas (Andrew & Turner, 2012; CAMRA, 2012; Cabras & Mount, 2015; Mount & Cabras, 2015). While  
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5 these studies reason that rural areas might not provide sufficient customer demand to justify the  
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7 presence of pubs from a financial perspective, our findings seem to point into the opposite direction.  
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9 Our results suggest that urban pubs face more challenges than rural pubs, likely due to stronger  
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11 competition between pubs and alternative localities.  
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15 **Secondly, our econometric models identify a positive relationship between an increase in**  
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17 **the number of pubs and an increase in housing prices. This result adds to previous studies that**  
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19 **highlighted the importance of pubs for local communities, focussing on community cohesion**  
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21 **and social engagement (Cabras & Reggiani, 2010; Mount & Cabras, 2015), as well as on local**  
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23 **economic development (Mayo & Ross, 2009; Cabras & Bosworth, 2014). Thirdly, our analysis**  
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25 **indicates that the effect of pubs on house prices is significantly stronger in rural areas within**  
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27 **the period considered, confirming the positive impact that initiatives such as the one in Crosby**  
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29 **Ravensworth might produce for housing prices in rural areas.**  
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33 **The decline of pubs in terms of business closures is often associated with the vanishing of**  
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35 **several other initiatives and activities taking place at a local level, with negative effects on local**  
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37 **communities that go far beyond the mere closure of commercial businesses and services**  
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39 **(Cabras & Mount, 2017). Findings from our panel data analysis demonstrate that their decline**  
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41 **also affect overall attractiveness in terms of economic value of residential areas, particularly in**  
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43 **the countryside. In rural areas, preserving pubs from closure can help keeping house prices**  
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45 **stable and may even increase the value of localised house markets.**  
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49 **Our findings suggest that actions and initiatives aimed at preserving pubs from closures,**  
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51 **particularly in rural areas, should be reinforced. Government and LAs can play an important**  
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53 **role: in the past, public sector financial support helped many resident communities to create the**  
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55 **co-operatives aimed at purchasing their pubs, particularly in the countryside (see Cabras, 2011).**  
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57 **In recent years, campaigns and initiatives carried out by a number of organisations such as Pub**  
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3 **is The Hub, the Plunkett Foundation, and the Campaign for Real Ale (CAMRA) have increased**  
4 **public awareness about the dangers incurred by local communities were incurring in terms of**  
5 **lost opportunities and cultural degradation. These campaigns and initiatives generated a**  
6 **number of outcomes specifically aimed at preserving the role and impact of third places, and**  
7 **pubs in particular, within local communities.**  
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15 For instance, with the inclusion of 'public eating places' among those places to preserve in the  
16 Sustainable Local Community Act (2007), Parliament provided an initial instrument to protect pubs from  
17 unnecessary closures, and in 2009 the Department for Communities and Local Government (DCLG)  
18 allocated £70 million to an initiative called 'Communitybuilder', aimed at funding projects at local levels,  
19 'including those offering communities a place to meet and those to provide and host community  
20 services' (Carpenter 2009). Moreover, the Localism Act and the Neighbourhood Planning Act passed  
21 by Parliament in 2011 and 2017 respectively supplied and increased control of LAs in matters related to  
22 community assets and services. Community groups can now identify services and assets 'of community  
23 value' and require LAs to insert them on a protected list: when listed assets come up 'for sale or change  
24 of ownership, community groups are given enough time to raise funds to bid and buy the asset when it  
25 comes on the open market' (Mount & Cabras, 2015 p.1213), forbidding for pubs to be redeveloped or  
26 demolished without reference to the local community or planners (Parliament, 2017). UK legislation  
27 then provide powerful instruments to LAs to protect pubs' premises from any change of destination or  
28 use, indirectly contributing to maintaining housing prices stable in those communities or residential  
29 areas served by pubs.  
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49 However, while pubs appear to be the most important amenities in rural areas (Cabras and Lau,  
50 2019), this may not be the case elsewhere. Some sources suggest a link between the presence of pubs  
51 and anti-social behaviour (Hough & Hunter, 2008; Crawford & Flynt, 2009), mainly related to the  
52 expansion of the NTE (Tierney, 2006), although a clear relationship has not been proved as yet.  
53 Alcohol consumption can provide a pretext for anti-social behaviour, and places serving alcohol could  
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3 increase fear among the public in relation to this issue. **In this regard, our results suggest a U-**  
4 **shaped relationship between the levels of urbanisation and the positive effect of pubs on house**  
5 **prices, indicating a much stronger effect of pubs in most rural LAs and, to a lesser extent, in**  
6 **'Major Urban' LAs, with the same effect being significantly weaker in 'Other Urban' LAs.**  
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12 Although the findings of our analysis provide an original contribution to the field, they also present  
13 some limitations. For instance, the urban-rural classification used to develop our analysis, while  
14 providing an important tool to discern between more urbanised and less urbanised areas at sub-  
15 regional level, and to identify more rural LAs, still does not account the potential variation within LAs.  
16 For example, LAs located in Cumbria or Cornwall, while presenting lower levels of urbanisation  
17 compared to other areas (e.g. Greater London or the West Midlands), may still have heavily urbanised  
18 pockets due to high population density and concentration of services and infrastructures in restricted  
19 areas. Given the range of observations and information provided in the dataset analysed in this study,  
20 controlling for LA size, population or even urban/rural classification should help to investigate trends  
21 and relationships within these groups.  
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35 In conclusion, findings gathered from this study provide significant information and new knowledge  
36 about the decline of pubs in Great Britain and its effects on the housing market at a local level. The  
37 evidence presented and discussed in this paper, while providing an incentive for further studies, can  
38 also give practitioners and policymakers more accurate instruments to design and implement policies in  
39 support of pubs.  
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## 51 References

- 52  
53  
54 Armstrong, R.J. & Rodriguez, D.A. (2006). An Evaluation of the Accessibility Benefits of Commuter Rail  
55 in Eastern Massachusetts Using Spatial Hedonic Price Functions, *Transportation*, 33, 21–43.  
56  
57  
58 Andrews, D. & Turner, S. (2012). Is the pub still the hub? *International Journal of Contemporary*  
59 *Hospitality Management*, 24(4): 542 - 552.  
60

- 1  
2  
3  
4  
5 Baum-Snow, N. & Kahn, M.E. (2000), The Effects of New Public Projects to Expand Urban Rail Transit,  
6 *Journal of Public Economics*, 77, 241–63.  
7  
8  
9 Bibby, P. & Shepherd, J. (2004). Developing a new classification of urban and rural areas for policy  
10 purposes – the methodology. Report for the Department for Environment, Food and Rural Affairs,  
11 Countryside Agency. Available on line at [http://www.econsultation.net/ru/method\\_paper\\_final.pdf](http://www.econsultation.net/ru/method_paper_final.pdf)  
12 [Accessed 22 February 2019]  
13  
14  
15 Botterman, S.; Hooghe, M. & Reeskens, T. (2012). ‘One Size Fits All’? An Empirical Study into the  
16 Multidimensionality of Social Cohesion Indicators in Belgian Local Communities. *Urban Studies*,  
17 49(1): 185-202  
18  
19  
20 Bowler, I. & Everitt, J. (1999). Production and Consumption in Rural Service Provision: The Case of the  
21 English Village Pub. In Walford N, Everitt J and Napton D (eds) *Reshaping the Countryside:*  
22 *Perceptions and Processes of Rural Change*. Oxford: CABI Publishing, pp. 147–56  
23  
24  
25 British Beer and Pubs Association (2015). *Statistical Handbook – A compilation of drinks industry*  
26 *statistics*. London: Brewing Publication Limited.  
27  
28  
29 Breunig R, Hasan, S and Whiteoak, K (2019) Value of playgrounds relative to green spaces: Matching  
30 evidence from property prices in Australia, *Landscape and Urban Planning* 190, October 2019, doi:  
31 <https://doi.org/10.1016/j.landurbplan.2019.103608>  
32  
33  
34 Brooks, C. & Tsolacos, S. (2010). *Real estate modelling and forecasting*. Cambridge: Cambridge  
35 University Press.  
36  
37  
38 Cabras, I. (2011). Industrial and Provident Societies and Village Pubs: Exploring Community Cohesion  
39 in Rural Britain. *Environment and Planning A*, 43(4): 2435–2451.  
40  
41  
42 Cabras, I. & Reggiani, C. (2010). Village Pubs as a Social Propellant in Rural Areas: An Econometric  
43 Study. *Journal of Environmental Planning and Management*, 53(7), 947–62.  
44  
45  
46 Cabras I. & Bosworth G. (2014). Embedded models of rural entrepreneurship: The case of pubs in  
47 Cumbria, North West of England. *Local Economy*, 29(6-7), 598-616  
48  
49  
50 Cabras, I. & Mount, M. (2017). Assessing the impact of pubs on community cohesion and wellbeing in  
51 the English countryside: a longitudinal study. *International Journal of Contemporary Hospitality*  
52 *Management*, 29(1), 55-79  
53  
54  
55 Cabras, I. & Lau, C.K. (2019). The availability of local services and its impact on community cohesion  
56 in rural areas: Evidence from the English countryside. *Local Economy*, 34(3), 248-270  
57  
58  
59 Campaign for Real Ale (2012). CAMRA releases new national pub closure research. Available at:  
60 <http://www.camra.org.uk/page.php?id=33&filternews2=May%202012> (accessed 12 May 2017)

- 1  
2  
3  
4  
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47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
- Carpenter, J. (2009). Local asset measures could save vital pubs. *Regeneration and Renewal*, 7, 27
- Chen D. and Chen S, (2016). Particulate air pollution and real estate valuation: Evidence from 286 Chinese prefecture-level cities over 2004–2013 *Energy Policy* 109: 884-897
- Cook, S. (2003). The Convergence of Regional House Prices in the UK. *Urban Studies*, 40(11), 2285–2294.
- Copus A & Skuras D (2006). Business Networks and Innovation in Selected Lagging Areas of the European Union: A Spatial Perspective. *European Planning Studies*, 14(1), 79-93.
- Costello, L. (2007) Going Bush: The Implications of Urban-Rural Migration. *Geographical Research*, 45(1), 85-94.
- Crawford, A. & Flint, J. (2009) Urban safety, anti-social behaviour and the night-time economy. *Criminology & Criminal Justice*, 9(4), 403-413.
- Department for Communities and Local Government. 2007. Sustainable Communities Act, London: Eland House. Ref: 07LGSR050080.
- Ding, W.; Xheng, S. & Guo X. (2010). Value of Access to Jobs and Amenities: Evidence from New Residential Properties in Beijing. *Tsingua Science and Technology* 15(5): 595-603.
- DiPasquale D. & Wheaton W.C. (1992). The Markets for Real Estate Assets and Space: A Conceptual Framework. *Real Estate Economics*, 20(2): 181-198
- Figlio, D.N. & Lucas, M.E. (2004). 'What's in a Grade? School Report Cards and the Housing Market', *American Economic Review*, 94, 591–604
- Foster, N. (2013) *How to Bolster the Real Estate Market*. New York Times, January 3. Available at: <http://www.nytimes.com/2013/01/04/greathomesanddestinations/how-to-bolster-the-real-estate-market.html> [accessed 19 August 2019]
- Garretsen, H. & Marlet, G. (2015) Amenities and the attraction of Dutch cities; *Regional Studies* 51(5): 724-736
- Glaeser E.L. (2008) *Cities, Agglomeration, and Spatial Equilibrium*. Oxford: Oxford University Press
- Gibbons, S. (2004) The Costs of Urban Property Crime. *The Economic Journal* 114(499), 441-463
- Hincks S.; Webb B. & Wong C. (2014) Fragility and Recovery: Housing, Localities and Uneven Spatial Development in the UK. *Regional Studies* 48(11), 1842-1862

- 1  
2  
3 Higgins, D; Toms, S. & Uddin, M. (2016) Vertical monopoly power, profit and risk: The British beer  
4 industry, c. 1970–c. 2004. *Business History* 58(5), 667-693.  
5  
6  
7 Holmes, M. & Grimes, A. (2008) Is There Long-run Convergence among Regional House Prices in the  
8 UK?, *Urban Studies*, 45(8), 1531–1544.  
9  
10  
11 Hough, M. & Hunter, G. (2008) The 2003 Licensing Act's impact on crime and disorder: An evaluation.  
12 *Criminology and Criminal Justice* 8(3), 239–60.  
13  
14  
15 Huang, H. & Humpreys, B. (2014) New Sports Facilities and Residential Housing Markets. *Journal of*  
16 *Regional Science* 54(4), 629-663  
17  
18  
19 Kapman, J. & Aru, D. (2017) *The huge difference in house prices in neighbourhoods right next to each*  
20 *other.* Wales Online, Press Release 20 July. Available at:  
21 [https://www.walesonline.co.uk/lifestyle/welsh-homes/huge-difference-house-prices-](https://www.walesonline.co.uk/lifestyle/welsh-homes/huge-difference-house-prices-neighbourhoods-13348717)  
22 [neighbourhoods-13348717](https://www.walesonline.co.uk/lifestyle/welsh-homes/huge-difference-house-prices-neighbourhoods-13348717) (accessed 30 November 2017).  
23  
24  
25 Maye D., Ilbery, B. & Kneafsey, M. (2005) Changing Places: Investigating the Cultural Terrain of  
26 Village Pubs in South Northamptonshire. *Social and Cultural Geography*, 6(6), 831–847.  
27  
28  
29 Mizon, G. E. (1995). A simple message for autocorrelation correctors: Don't. *Journal of Econometrics*,  
30 69(1), 267–288.  
31  
32  
33 Montgomery, D.; Peck, E.A. & Viner, G. (2012) *Introduction to Linear Regression Analysis*, New York:  
34 John Wiley & Sons.  
35  
36  
37 Mount, M. & Cabras, I. (2015) Community Cohesion and Village Pubs in Northern England: An Econometric  
38 Study. *Regional Studies*, 50(7): 1203-1216.  
39  
40  
41 Oldenburg, R. (1989) *The Great Good Place*. New York: Marlowe and Company.  
42  
43  
44 Office for National Statistics (2016a) *Census Statistics*. London: Office for National Statistics.  
45  
46  
47 Office for National Statistics (2016b) *Annual Business Inquiry*. London: Office for National Statistics.  
48  
49  
50 Parliament (2017) *Neighbourhood Planning Act; Chapter 2*. London: HM Stationery Office.  
51  
52  
53 Pateman, T. (2011). Rural and urban areas: comparing lives using rural/urban classifications. *Regional*  
54 *Trends*, 43(1): 11-86.  
55  
56  
57 Pratten, JD (2007). The development of the modern UK public house – Part 1: The traditional British  
58 public house of the twentieth century. *International Journal of Contemporary Hospitality*  
59 *Management* 19(4): 335–42.  
60



- 1  
2  
3 Preece, D. (2016). Turbulence in UK Public House Retailing: Ramifications and Responses. In Cabras  
4 I., Higgins D. and Preece D. (eds): *Brewing, Beer and Pubs: A Global Perspective*. London:  
5 Palgrave Macmillan, 247-265.  
6  
7  
8 Putman, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York:  
9 Simon & Schuster Paperbacks.  
10  
11  
12 Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using Stata* (2nd ed.).  
13 College Station (Texas): Stata Press Publication.  
14  
15  
16 Raudenbush, S. W. & Bryk, A. (2002) *Hierarchical linear models* (2<sup>nd</sup> Ed). Thousand Oaks, California:  
17 Sage.  
18  
19  
20 Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition.  
21 *Journal of Political Economy*, 82 (1): 34–55.  
22  
23  
24 Scott, M. (2002). Delivering Integrated Rural Development: Insights from Northern Ireland. *European*  
25 *Planning Studies*, 10(8): 1013-1025  
26  
27  
28 Smith, L & Foxcroft, D. (2009). *Drinking in the UK. An exploration of trends*. Report, Joseph Rowntree  
29 Foundation, UK, June. Available at: <http://www.jrf.org.uk/sites/files/jrf/UK-alcohol-trends-FULL.pdf>  
30 [\(accessed 17 June 2018\)](#).  
31  
32  
33 Tepilo (2015). *Our 2015 Buyer Barometer*. Available at: [https://www.tepilo.com/advice/2015/9/our-](https://www.tepilo.com/advice/2015/9/our-2015-buyer-barometer)  
34 [2015-buyer-barometer](#) (Accessed 15 December 2017).  
35  
36  
37 Twisk, J. (2006). *Applied multilevel analysis: A practical guide*. Cambridge: Cambridge University  
38 Press.  
39  
40  
41 Watson, T. & Watson, D. (2012). Narratives in society, organizations and individual identities: an  
42 ethnographic study of pubs, identity work and the pursuit of 'the real'. *Human Relations*, 65(6): 683-704.  
43  
44  
45 Whitehead, A. 2002. *Meta-Analysis of Controlled Clinical Trials*. Chichester, UK: Wiley.  
46  
47  
48 Zhang, L. (2016) Flood hazards impact on neighbourhood house prices: A spatial quantile regression  
49 analysis. *Regional Science and Urban Economics*, 60: 12-19  
50  
51  
52  
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3 **Tables and Figures.**  
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6 **Table 1: Variables used in the study**

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Variable		Mean	Std. dev.	Min.	Max.	Observations	
house price (in £)	overall	219,777	109,937	66,600	1,461,965	N=	3134
	between		107,073	83,944	986,037	n=	373
	within		357,87	-220,948	695,705	T-bar=	8.4021
number of pubs	overall	95	68	5	539	N=	3134
	between		65	8	503	n=	373
	within		27	-18	426	T-bar=	8.4021
weekly salary (in £)	overall	381	67	205	824	N=	3134
	between		60	265	759	n=	373
	Within		29	237	488	T-bar=	8.4021
unemployment (as %)	overall	6.0	2.4	1.7	16.6	N=	3134
	between		2.0	2.4	12.2	n=	373
	within		1.4	1.3	11.3	T-bar=	8.4021
resident population	overall	160,354	108,952	22,210	1,111,307	N=	3134
	between		109,724	22,862	1,065,587	n=	373
	within		6,310	109,417	206,074	T-bar=	8.4021

24 Source: Authors' own calculations based on ONS (2016a) and ONS (2016b).  
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28 **Table 2: Urbanisation/Rurality Classification**  
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urban/rural classification	original sample (frequency)	original sample (percentage)	final sample (frequency)	final sample (percentages)
<b><i>Predominantly Rural</i></b>	1254	30.1	894	28.5
Rural – 80	693	16.6	499	15.9
Rural – 50	561	13.5	395	12.6
<b><i>Significant Rural</i></b>	682	16.4	512	16.3
<b><i>Predominantly Urban</i></b>	2,233	53.6	1,728	55.1
Other Urban	1,166	28.0	910	29.0
Large Urban	165	4.0	121	3.9
Major Urban	902	21.6	697	22.2
<b><i>Total</i></b>	4,169	100	3,134	100

45 Source: Authors' own calculations based on ONS (2016a).  
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Table 3: Linear fixed-effect panel regression results

	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11
lagged house price (in £)		0.996*** (0.0237)	0.955*** (0.0214)	0.955*** (0.0226)	0.956*** (0.0228)	0.954*** (0.0227)	0.955*** (0.0228)	0.955*** (0.0231)	0.955*** (0.0228)	0.954*** (0.0236)	0.955*** (0.0239)
unemployment (as %)			-4079.804*** (214.2877)	-3950.563*** (215.2716)	-3935.461*** (214.6752)	-3956.431*** (216.1007)	-3952.050*** (216.2360)	-3943.779*** (214.8527)	-3951.830*** (215.7897)	-3961.969*** (215.8676)	-3946.906*** (215.5015)
weekly salary (in £)			-0.581 (13.8187)	3.427 (14.5988)	5.556 (14.6262)	2.731 (14.5622)	3.2567 (14.4937)	2.671 (14.5506)	3.435 (14.6150)	0.489 (14.3071)	2.357 (14.3861)
resident population			0.412*** (0.0617)	0.458*** (0.0763)	0.448*** (0.0761)	0.463*** (0.0770)	0.459*** (0.0772)	0.468*** (0.0782)	0.459*** (0.0762)	0.481*** (0.0831)	0.474*** (0.0829)
number of pubs				20.976* (12.5073)	17.9412 (12.5123)	23.308* (12.7213)	21.397* (12.9474)	30.782** (15.5578)	22.715* (12.6774)	9.614 (11.4179)	3.974 (11.8292)
numbers of pubs x rural – 80					87.994*** (27.4632)						100.487*** (26.9434)
numbers of pubs x rural – 50						-41.550 (25.5304)					
numbers of pubs x significant rural							-5.521 (19.5172)				
numbers of pubs x other urban								-26.726* (13.6583)			
numbers of pubs x large urban									-21.531 (25.0040)		
numbers of pubs x major urban										29.470* (17.0056)	35.112** (16.9166)
constant	219777.40*** (1.83e-08)	11013.30** (5094.130)	-21664.87*** (7951.306)	-33276.89*** (12489.630)	-33754.38*** (12293.510)	-33400.54*** (12560.020)	-33299.64*** (12521.440)	-34974.34*** (12982.670)	-33308.80*** (12489.600)	-35241.50*** (13313.750)	-36162.93*** (13203.810)
rho	0.8875	0.4862	0.9368	0.9496	0.9476	0.9503	0.9498	0.9521	0.9493	0.9545	0.9534
sigma_u	107072.810	12511.462	44383.115	50033.167	49010.041	50403.039	50172.880	51395.190	49911.177	52753.593	52065.773
sigma_e	38121.453	12862.321	11532.190	11527.796	11520.831	11527.530	11530.541	11525.203	11529.405	11523.662	11513.964
prob > F	.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R <sup>2</sup> (overall)	.	0.9871	0.8525	0.8182	0.8255	0.8156	0.8173	0.8101	0.8192	0.8012	0.8067
R <sup>2</sup> (between)	0.0031	0.9975	0.8498	0.8131	0.8200	0.8106	0.8121	0.8043	0.8140	0.7953	0.8002
R <sup>2</sup> (within)	.	0.8783	0.9023	0.9025	0.9026	0.9025	0.9025	0.9025	0.9025	0.9026	0.9028
observations	3,134	2,420	2,420	2,420	2,420	2,430	2,430	2,430	2,430	2,430	2,430
groups	373	372	372	372	372	372	372	372	372	372	372

Source: Authors' own calculations based on ONS (2016a) and ONS (2016b). \*\*\*Significant at 1% level ( $p < 0.01$ ). \*\*Significant at 5% level ( $p < 0.05$ ), \*Significant at 10% level ( $p < 0.1$ ).

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Figure 1: Map of LAs analysed in this study

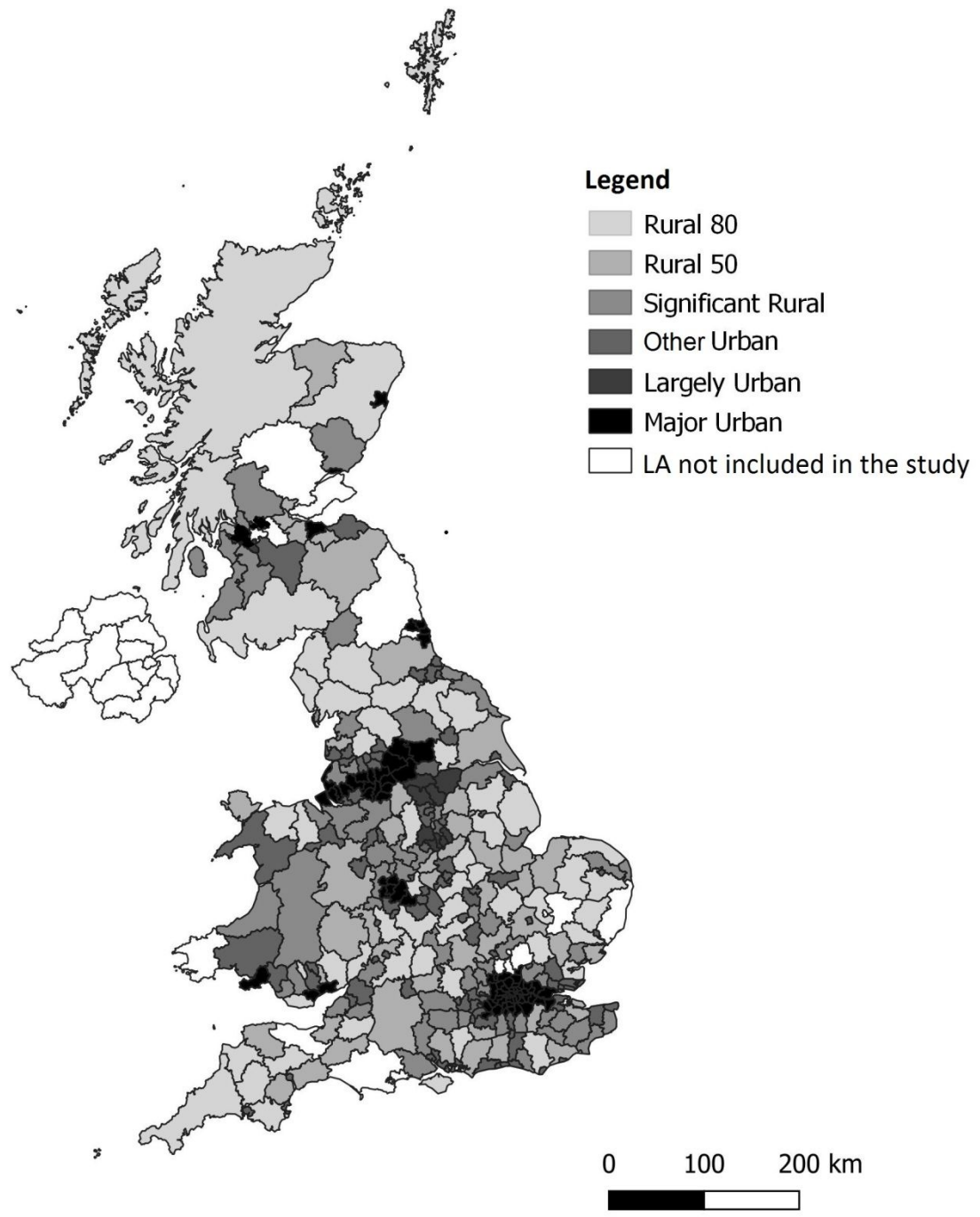
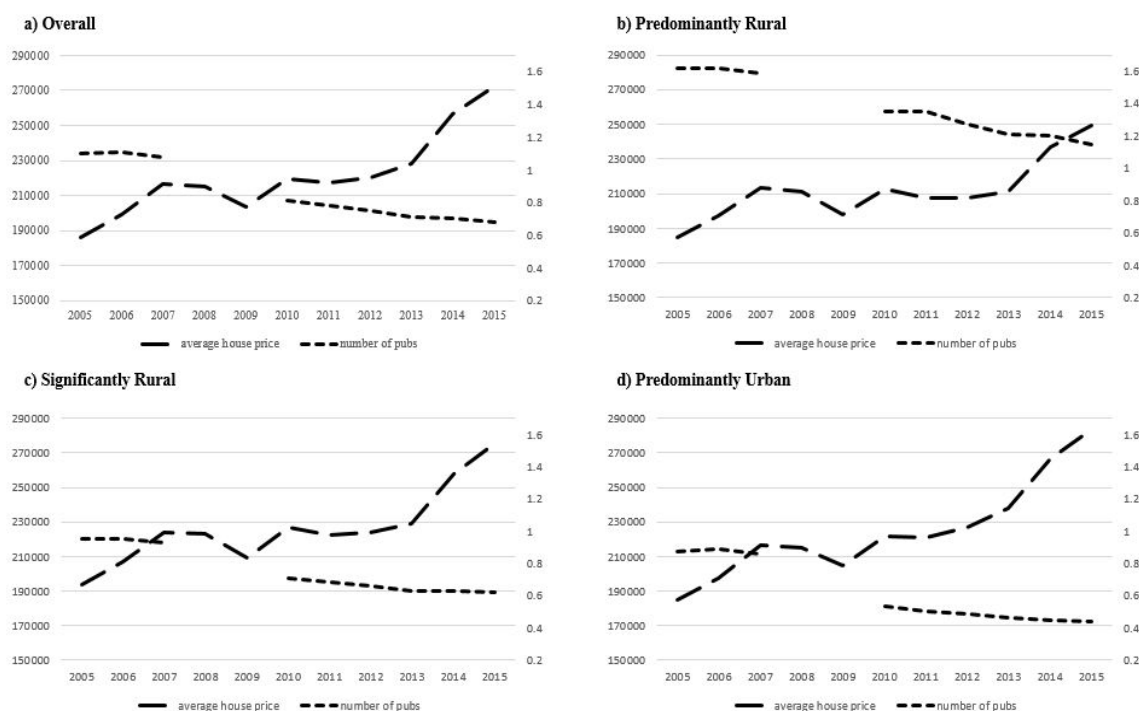
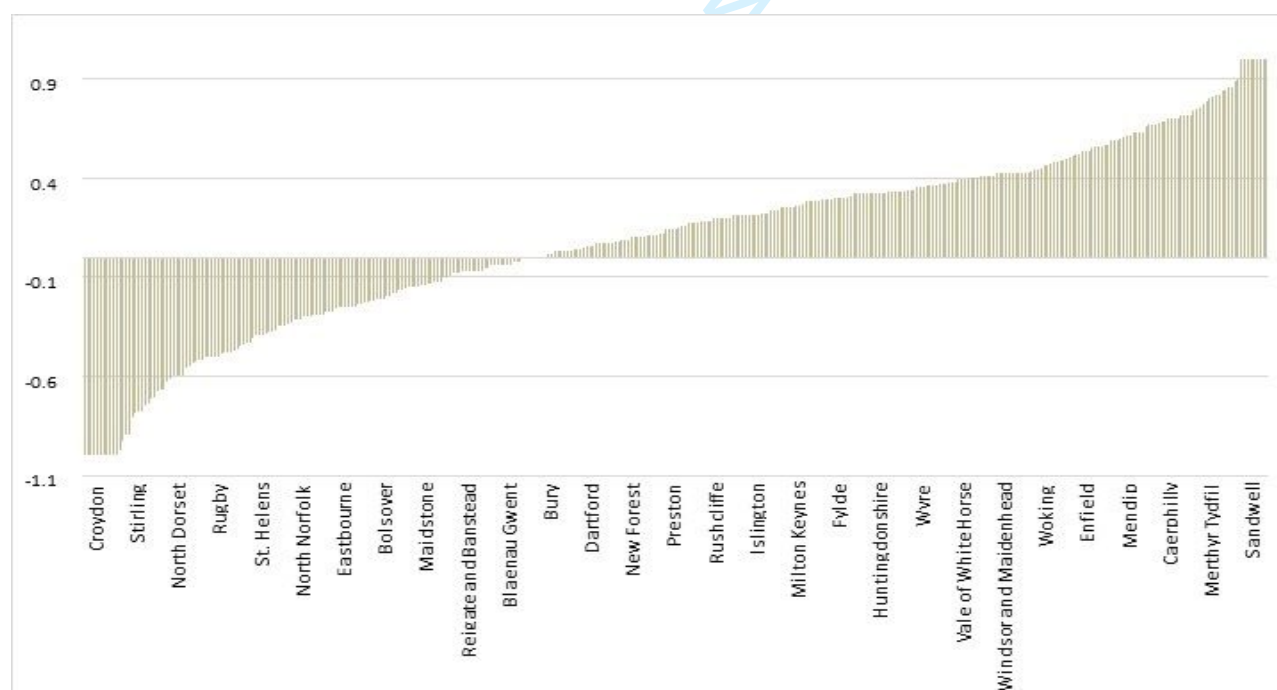


Figure 2: Evolution of number of pubs, and house prices.



Source: Own calculations based on ONS (2016a) and ONS (2016b).

Figure 3: Spearman's rho correlations per LA



Source: Authors' own calculations based on ONS (2016a) and ONS (2016b).

## Appendix 1: GMM regression results

	m3	m4	m5
unemployment (as %)	-9307.155*** (715.492)	-6416.479*** (1662.318)	-11580.210*** (2558.593)
weekly salary (in £)	-6.600 (73.344)	407.510** (173.898)	434.041* (235.042)
resident population	6.884*** (0.245)	11.782*** (0.809)	11.1786*** (1.104)
number of pubs		3834.165*** (459.866)	1221.719 (877.769)
numbers of pubs x rural – 80			20566.530*** (4881.087)
constant	-825280.1*** (39768.2)	-2153078.0*** (183105.2)	-2087313.0*** (247889.7)
Wald chi2	4927.75	1023.95	578.66
prob > chi2	0.0000	0.0000	0.0000
observations	3,134	3,134	3,134
groups	373	373	373

Source: Own calculation based on ONS (2016a) and ONS (2016b). \*\*\*Significant at 1% level ( $p < 0.01$ ). \*\*Significant at 5% level ( $p < 0.05$ ), \*Significant at 10% level ( $p < 0.1$ ). Instruments for differenced equation (27 instruments) - GMM-type: L(2/), HousingC.

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3 CEPS-2019-0083: **"Public houses and house prices in Great Britain: A panel analysis"**  
45 Dear Professor Jakobsen  
67 We are extremely grateful to the two referees for their valuable feedback which significantly helped us in re-developing and  
8 improving our paper. While REF#1 appeared to be very positive with our previous submission, REF#2 identified a number of  
9 relevant issues that we have fully taken into careful consideration while elaborating this new version of the paper. We provide  
10 a detailed response to all comments below:  
1112  
13 *REF#1: The paper is very interesting and original. This empirical paper, in fact, examines the relationship between the*  
14 *presence of public houses and the house prices in Great Britain. A longitudinal dataset for the period 1991- 2015 in 375 local*  
15 *authorities has been used for the econometric analysis. A strong positive association between the presence of pubs and house*  
16 *prices in Great Britain has been identified, confirming the economic value of pubs as important third place (...) there are a*  
17 *number of omitted variables which certainly affect house prices but have been omitted from the analysis. Even if it is not be*  
18 *possible to account for all the factors that affect house prices, however few other variables should be taken into consideration.*  
19 *The estimation method such as system and difference GMM should be considered to estimate the regression model and*  
20 *correct for endogeneity (this could be added as an extra robustness test).*  
2122 **Answer:** We thank REF#1 for his/her comments and positive feedback. We are delighted you enjoyed the paper and we  
23 addressed your concern about the econometric model by revising it profoundly, adding additional control variables such as  
24 median weekly salary and resident population (see Section 4 and Section 5). We also applied a Fisher-type unit-root test for  
25 panel data to verify whether our dependent variable is stationary. As its result was not significant, we can assume that the  
26 dependent variable is non-stationary, and we added lagged house prices with a time lag of one year as an independent  
27 variable with the assumption that house prices are influenced by the previous house price level (Section 5). In addition, rather  
28 than estimating different model for rural and urban LAs, we added the interaction effect capturing urbanization/rurality and  
29 numbers of pubs to investigate whether the effect of pubs on house price was significantly different in rural LAs compared to  
30 more urban ones. By comparing the random-effect and fixed-effect estimates for the final model [via means of Hausman  
31 Specification Test], we estimated a fixed-effect panel regression to analyse the average within-subject relationships between  
32 the time-varying covariates and the dependent variable. Finally, and as you suggested, we estimated a GMM as an extra  
33 robustness test, which confirmed our results (see appendix).  
3435 *REF#2: What the paper does is check the housing market literature which is not fully used as the paper defines a model to*  
36 *relate both variables adding other variables, as unemployment and weekly wage, together with the housing prices to try to*  
37 *identify the reasons why pubs fall during a long period. In principle, the intuition is OK: as pubs serve to population and they*  
38 *live in a house, so as there should be some relationship between the existence of pubs and housing prices which could cause*  
39 *each other. I have to say that the author/s seems to be very convinced that the change on the regulation is the principal cause*  
40 *to explain the decline in the number of pubs (after reading the comments in the paper), but it seems to be a reluctance to test*  
41 *such hypothesis in this paper and what it finally does is to test how the number of pubs affects housing prices. From my view,*  
42 *section 2 develops a convincing explanation of the pubs market performance, its relevance and potential reasons for the*  
43 *collapse in the numbers which can derive in a testable hypothesis. The paper is well written and it can be read easily.*  
4445 **Answer:** We thank REF#2 for this very valuable comment. Indeed, the objective of our paper is not to explain pub closures  
46 but to investigate and estimate the effect of changes in the number of pubs on house price development, comparing LAs  
47 based on different level of urbanity/rurality. We appreciate that our argument was not articulated in a straightforward manner  
48 in our previous submission. Therefore, we have significantly revised the paper in this new version, focussing on our main  
49 research objective. Our results show that the decline of pubs appears to disadvantage urban communities more strongly than  
50 rural ones (Section 5). In addition, our results confirm our intuition that an increase in the number of pubs has indeed a positive  
51 impact on house prices in the period considered. Based on the positive interaction effect, it can also be concluded that the  
52 positive impact of pubs on house prices is significantly stronger in rural areas compared to more urban ones.  
5354 *REF#2: The topic is interesting and, from my view, this issue falls in a well-known testable area in housing economics which*  
55 *is to identify the role of amenities close to the house on housing prices (...) but I think that the author/s is/are confused about*  
56 *how to focus the intuition. Firstly, the paper develops literature on housing which is far from the topic it pursues. Section 3*  
57 *includes paper which jumps from housing market fundamentals to macroeconomic drivers with no good structure which does*  
58 *not add any clarity to understand the theoretical framework the paper uses to develop the empirical exercise.*  
59  
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3 **Answer:** Thank you again for this very valuable and relevant comment. We addressed this issue and redeveloped the literature  
4 review on the subject (Section 3) significantly by focusing on the large literature checking the impact of facilities and amenities  
5 on housing prices, including relevant theoretical frameworks such as Rosen (1974), DiPasquale and Wheaton (1994), and  
6 Glaeser (2008), in order to better justify why the presence of pubs would represent a valid economic reason in view of  
7 increasing house price values in given areas.  
8  
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10 *REF#2: Most of the hypothesis comes from a visual description of the figures. It is not bad itself but the interpretation should*  
11 *be made in light of the economic theory. Saying that: the interpretation of figure 2 is not clear (...) and the empirical exercise*  
12 *is quite confusing. There are several issues related to data and the empirical model: In the title, the paper promises to use*  
13 *longitudinal data. In statistics, this data is understood as a set of individual observations in which the statistics follow every*  
14 *individual during a period gathering the information of interest. This is not the data here. This paper uses aggregated and*  
15 *weighted data for Local Authority area in which the number of pubs is counted.*

16 **Answer:** We have completely rewritten the descriptive analysis provided in section 4, focusing more strongly on the dependent  
17 variable (house price) and the individual variable of main interest (pubs), as well as on the correlation between the two during  
18 the period considered. We also changed previous Figure 1 [now Figure 2] and 2 [now Figure 3] to address your comment. We  
19 agree that our title was misleading, as we perform a panel data analysis by focusing on LAs as individual observations over a  
20 period of 11 years (see Sections 4.1 and 4.2). We are aware that it is possible to run panel data regressions for regional  
21 entities based on aggregated data; we changed the title to reflect this aspect more consistently.  
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24 *REF#2: The data used never is shown in terms of their basic statistic other than their representation in Figure 1(pp 32) or the*  
25 *type of data in Table 1 (pp30). The figures are in bad quality but it seems to have non-continuous data. If so, it compromises*  
26 *the methodology to be used and conventional stochastic time-series methods do not fit with non-continuous variables (...)*  
27 *The paper relates 5 variables nested in six classes of urban areas. After a long description about the LA's classification, the paper*  
28 *decided to use 6 classes but such decision is not supported by clear reasons explaining why the paper needs to break the*  
29 *geographical area down in six, and which the six are (the maps in the appendix contain all areas!).*

30  
31 **Answer:** We have added descriptive statistics for dependent and independent variables. As our dependent variable (house  
32 prices) is continuous, applying a linear panel regression is appropriate. We also expanded the description of geographical  
33 areas in terms of urban/rural classification, highlighting the reasons for choosing this specific classification and providing a  
34 clearer and more consistent map of all the LAs included in our analysis.  
35  
36

37 *REF#2: The period used is inconsistent. In Table 1 and along with the article, the paper talks about the analysis done between*  
38 *1991 and 2015. In page 14 it is set that, due to data constraints, the paper reduces the time to 2005-15. There is no description*  
39 *of the values of every variable by year and by LA's; how many observations are used in the model or the statistics*  
40 *characteristics of data (...) Table 2 is not informative in these terms (the relevance of showing the data is simply to give*  
41 *trustability to the exercise: an empirical model based on wrong treated data would give spurious results). Besides, it says that*  
42 *'the data still contain a small percentage of some missing cases affecting some variables...'(pp14) but not explain what is*  
43 *missing and which variables are affected and how the empirical exercise deals with them. This is very unclear to believe in*  
44 *the exercise.*

45 **Answer:** Thanks for highlighting this shortcoming. After looking into the data, we decided to focus on the years 2005-2015,  
46 as it reduces the effect of missing values (see Section 5). We have changed the descriptions accordingly. In addition, we  
47 deleted Table 2 as it is of no importance for the new econometric model we developed in this re-submission. To clarify: while  
48 missing cases have been excluded from our analysis, the dataset remains defined as unbalanced, resulting in a final sample  
49 size of 3,134 observations (Table 2 in Section 4.1).  
50  
51

52 *REF#2: The methodology used is very rare for me. It seems to me that the paper tries to use hierarchical models but not as*  
53 *clear as the explanations are quite unusual and difficult to understand. The methods used are also confusing (...) The model*  
54 *is referred as a 'mixed model which uses LA's as subject observations for which measures with regards to the set of reference*  
55 *variables are repeated for a number of years (pp14) What does it mean? The model includes fixed effects estimated for the*  
56 *number of pubs' and all other variables (pp14). (...) How the fixed effects are applied or defined and what they capture? The*  
57 *paper sets that six models are fixed (with no description, no definition, no relationship about dependent and independent*  
58 *variables), but it seems to me that they are the same because it follows a stepwise procedure. In summary, if the paper wants*  
59 *to demonstrate its hypothesis, it should fully explain the calculation process, the model defined and the data used before to*  
60



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3 *debate the findings. (...) With only 11 data to find cointegration is uncommon but the type of root found can be highlight the*  
4 *way to instrument the model.*  
5

6 **Answer:** These comments are extremely valuable and relevant, and we are much grateful to REF#2 for providing such a  
7 detailed justification. We agree that results in our previous submission could have been reported and explained in a more  
8 coherent and clear manner. Therefore, we revised section 4 and 5 profoundly in this re-submission by adding a description of  
9 the panel dataset (two dimensions: areas and time), clarifying about the inclusion of information related to 373 LAs which  
10 covers a period of nine years between 2005 and 2015. We also expanded our explanation of the stepwise process we follow  
11 in developing our econometric analysis, providing Table 3 which illustrates and summarises all estimates more effectively.  
12 Our econometric model has changed significantly by including new control variables (median weekly salary and resident  
13 population]. We also verified stationarity/non-stationarity of our dependent variable by using Fisher-type unit-root test, adding  
14 lagged house prices and interaction effects in the model (as explained earlier). Finally, we compared random-effects and  
15 fixed-effects in our final model by applying a Hausman Specification Test, opting to develop a fixed-effect panel regression to  
16 estimate the average within-subject relationships between time-varying covariates and our dependent variable. The GMM  
17 estimates added in the appendix provide a further robustness test which confirms our results.  
18

19 *REF#2: The article talks about descriptive statistics which cannot be found in any table. See pp 15-second paragraph. All the*  
20 *paragraph comments several results which are not shown. Salaries are not a significant predictor for housing prices, so as*  
21 *they are excluded! (...) The model fitted in stages: which stages? If the period is 2005-2015 which stages are taking into*  
22 *account that the data is shared in multiple LAS's? How many observations are in every stage and LA's together?*  
23

24 **Answer:** We added descriptive statistics in Sections 4.1 and 4.2, reporting significant and non-significant coefficients in our  
25 new econometric model in Table 3. Results indicate that, while population size has a significant positive effect on house prices,  
26 the changes in the wage level remain insignificant. We acknowledge once again the lack of precision in the wording used to  
27 describe our methodology in previous submission; we addressed this shortcoming by improving and strengthening  
28 explanations in this re-submission. In particular, 'stages' refer to the stepwise procedure used to develop the final model (see  
29 Section 5) with the number of observations remaining the same in each model and for each stage.  
30

31 *REF#2: The paper should show a previous analysis of the variables to support both assumptions. Find that the trend explains*  
32 *a large portion of the variability of housing prices (pp16) so as, it is part of prices! First-order structure (series time pattern)*  
33 *can be used when the variable is stationary. Otherwise, it is not valid. No test of stationarity is done. Covariance analysis is*  
34 *not definitive, not causal. Finally, the model is simple. Try to explain the impacts on housing prices taken into account the*  
35 *median of the prices is quite had and difficult to believe.*  
36

37 **Answer:** All these comments have been addressed and extensively argued in previous points. The data we analyse is indeed  
38 in a panel format comprising of two dimensions (LAs and years) and non-stationary. We re-developed and adapted the  
39 econometric model accordingly; fixed effects for the variable time are not included in our new analysis as we estimate a linear  
40 fixed-effect panel regression, adding the lagged house prices with a time lag of one year as an additional independent variable.  
41

42  
43 In the light of these considerations, we would be grateful if you could consider our reviewed manuscript with regard to  
44 publication in European Planning Studies. We will look forward to hearing from you.  
45

46 Yours faithfully  
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