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Visitor expenditure estimation for grocery store location planning: A case study of Cornwall

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Abstract

Visitor expenditure is an important driver of demand in many local economies, supporting a range of services and facilities which may not be viable based solely on residential demand. In areas where self-catering accommodation is prevalent visitor demand makes up a considerable proportion of sales and revenue within grocery stores, yet this form of visitor consumption is commonly overlooked in supply and demand side estimates of visitor spend. As such, store location planning in tourist resorts, decisions about local service provision and the local economic impacts of tourism are based on very limited demand-side estimates of visitor spend.

Using Cornwall, South West England as a study area, we outline a methodology and data sources to estimate small-area visitor grocery spend. We use self-catering accommodation provision, utilisation and visitor expenditure rates as key factors driving visitor spend. We identify that the use of visitor accommodation accounts for the spatial and temporal complexities of visitor demand that may be overlooked when using alternative approaches, such as the up-scaling of residential demand. Using a spatial interaction model, we demonstrate that our expenditure estimates can be used to generate store level revenue estimation within tourist resorts and we make a number of recommendations for service provision and store location planning in these areas.

Keywords

Visitor expenditure; Grocery retail; Cornwall; Economic impact of tourism; Spatial interaction modelling

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Introduction

Tourism is an important driver of UK economic growth, generating spending of £75.1bn (in 2009) and directly supporting 1.1m jobs (Deloitte, 2010). Tourism is inherently dependent upon specific locations and destinations, which attract large numbers of visitors and associated expenditure. This expenditure plays an important role in local and regional economies, supporting employment, the development of infrastructure and the provision of local services, many of which would not be viable based solely on residential demand. Tourism is not characterised by specific supply-side industries as businesses meeting the needs of tourists (accommodation, transportation, entertainment, retail, catering etc.) also meet residential demand. As such, the tourism 'product' is not distinct from other forms of demand and identifying the impact of visitor expenditure on local economies and specific industries is problematic.

Headline visitor surveys such as the International Passenger Survey (IPS) (spending by inbound visitors from overseas), the United Kingdom Tourism Survey (UKTS) (spending by domestic visitors on overnight breaks in the UK) and the English Leisure Visits Survey (ELVS) (spending by domestic residents on day trips within the UK) provide robust estimates of visitor numbers at a national or regional level and some indication of the volume of visitor expenditure on key components of the tourism 'product' such as accommodation, transport and shopping. However, little information can be directly extracted about local level visitor spend or the impact upon specific industries, such as individual retail sectors. In particular, it is difficult to identify the impact of visitor spend on food and drink purchased from grocery stores, which is commonly overlooked in both supply and demand side estimates of visitor

spend.

Nonetheless, Newing et al. (2012; 2014) demonstrated that visitor expenditure makes up a considerable proportion of sales within some grocery stores, yet grocery retailers have very limited knowledge of the drivers behind this form of expenditure. Location planning teams working within major grocery retailers have a long-established and important role in estimating revenue for proposed new stores and in managing the existing store portfolio by monitoring store performance against predicted revenue (Bennison et al., 1995; see also Wood and Reynolds (2011) for a detailed discussion of the role, scope and influence of location planning within a range of UK retailers). These teams may make strategic (network) or store-level location-based decisions with limited insight into the potential impact of local level visitor spend on store performance. This paper seeks to address this issue and aims to estimate visitor demand for groceries at the small-area level.

By building seasonal expenditure estimates at the Output Area (OA) level, we aim to produce a series of seasonal visitor-demand layers that could be used, via a spatial interaction model (SIM), to aid location planners in generating store-level revenue forecasts based on visitor demand. We also envisage that demand layers of this nature would form an important contribution to decision making related to the small-area economic impact of tourism and for identifying visitor demand for a range of retail and non-retail service provision in tourist resorts. Specifically, and using Cornwall, South West England as a study area, this paper seeks to:

- Estimate small-area residential demand for groceries and briefly identify the spatial distribution of residential grocery demand.

- Identify and critique the range of datasets available to estimate small area visitor numbers and spend associated with self-catering tourism in coastal resorts.
- Estimate small-area visitor expenditure on groceries at various times of year, based on the provision of self-catering accommodation, coupled with occupancy and inferred spending rates.
- Identify the spatial and temporal distribution of visitor demand and explore implications for store location planning in the context of local service provision.
- Demonstrate the potential to improve SIM revenue predictions based on the use of small-area visitor demand estimates, taking the peak summer season as an illustrative example.
- Identify some of the barriers to retailers producing and making use of similar demand estimates.

Cornwall is used as a study area as Newing et al. (2012) demonstrated that at grocery stores in certain Cornish tourist resorts, visitor expenditure was found to represent over 50% of weekly store revenue during the peak tourist season, and it is inferred that this expenditure is driven by self-catering accommodation. Self-catering accommodation is known to generate visitor expenditure on food and drink as, by definition, meals are not provided as part of the accommodation. Instead, visitors display a high propensity to eat out or make use of the self-catering facilities within their accommodation, purchasing supplies from a range of local stores, including supermarkets and other grocery stores (Dudding and Ryan, 2000; Huse et al., 1998; Timothy, 2005; Wilton, 2004). We thus explore one of the key drivers behind tourist spend on food and drink in an area where it is recognised that this form of expenditure has a considerable impact on service provision at the local level. We begin by outlining the

importance of visitor demand to sub-regional and local economies in Cornwall.

Importance of Tourism to local and sub-regional economies – Cornwall.

The Office for National Statistics (ONS) Tourism Information Unit (TIU) have made recent advances in determining the economic impact of tourism to the regions and sub-regions of the UK, and within specific industries (Buccellato et al., 2010; TIU, 2011). Nonetheless, relatively little is known about how much value is actually generated by tourism at the local level, or within certain sectors of the economy. Analysis of the economic contribution of tourism to local economies and services is largely dependent on information about visitor spending, derived from local surveys, which are often infrequent, outdated or rely on a small sample (TIU, 2011). As such, firms and development authorities are making decisions about service provision with very little knowledge of the extent to which visitor spending supports local and regional economies (Bryan et al., 2006; Jones et al., 2003; Jones et al., 2009). In this section we demonstrate the importance of visitor expenditure to economic well-being and service provision within Cornwall.

The domestic tourism market is considered to be particularly important, both for its overall contribution to tourist spend in the UK (with Mintel (2011a) analysis forecasting a 5.7% increase in spend on domestic trips up to 2016) and as a driver of grocery spend by tourists (most notably for self-catered trips (Timothy, 2005)). For domestic tourism, the South West represents one of the most popular destinations in the UK. Consequently, "A large part of the commercial landscape in the South West is concerned with, and devoted to, satisfying the needs of the visitors as consumers" (South West Tourism, 2010c, p10), highlighting that many businesses in this region rely on tourism and tailor their enterprise to meet the needs of visitors. According to analysis by the TIU, the South West displays one of the highest shares of tourism activity, with total tourist expenditure of £7.6bn, including £3.3bn from domestic

overnight visitors, and another £3.1bn from day visitors (in 2008) (Buccellato et al., 2010). Since food and drink expenditure represents an important component of expenditure by overnight visitors, grocery stores will derive significant additional revenue from this domestic overnight visitor spend. Visitor expenditure is also driven by expenditure associated with day visitors, yet since these visitors are not associated with an overnight stay their grocery expenditures are likely to represent only a very small proportion of their total expenditure.

Cornwall, a coastal peninsula in south west England, forms our study area as the considerable seasonal impact of visitor spend on grocery stores in this area has been demonstrated (Newing et al., 2012; 2014). Cornwall is thought to attract around 25% of all tourist expenditure in the South West (South West Tourism, 2010b), and was awarded 'top UK holiday destination' in the 2010 British Travel Awards, also winning awards for 'Best UK Seaside Town' (St Ives), along with 'Best UK Day out Experience' for the Eden Project (Visit Cornwall, 2010). Although geographically remote, it is Cornwall's location, landscape and distinctive regional identity (Everett and Aitchison, 2008) that attract tourists, with established coastal resorts such as Newquay representing a major draw for a wide variety of visitors. Traditional family beach holidays make up 28% of the market, whilst holidays focused on history and heritage are also important (South West Tourism, 2005a). St Austell is home to the Eden project, one of the top 20 UK major paid attractions (South West Tourism, 2010c), which alone attracted 1.1million visitors in 2008 (South West Tourism, 2010a), and is said to have generated £462m revenue within the local economy in its first five years of operation (HIL, 2005).

Cornwall and the Isles of Scilly was ranked second from bottom in the UK in 2009 in terms of its Gross Value Added (GVA), an indicator of the value of the counties contribution to the UK economy (Community Intelligence, 2010, p1). The former Penwith and Kerrier districts

are some of the most deprived in the UK (South West Observatory, 2009) characterised by poor health, high unemployment, low income, and a long-term difficulty in attracting investment, compounded by poor accessibility "at the western end of a long narrow County" (Penwith District Council, 2004, Sec 2.3). The coast is an important resource and economic asset, supporting economic activities such as fishing and commercial port activities, alongside the leisure and tourism industry. Other traditional industries such as mineral extraction have suffered from decline and a lack of investment, particularly to the west of the county, and the dependence on low skilled, low paid and seasonal occupations in the tourist industry have resulted in widespread deprivation. In the former Penwith District, over 20% of the population are employed in the tourism industry in some form (Deloitte, 2010), yet since jobs in this sector tend to be entry level, low paid and highly seasonal, gross disposable income per head is just £13,010 for Cornwall as a whole, compared to a GB average of £14,920 (Community Intelligence, 2010).

Tourism is recognised as one of Cornwall's most valuable industries and has supported improvements in infrastructure and service provision over the last few decades (Cornwall Single Issue Panel, 2004). The (now dated) Cornwall Structure Plan outlines the long-term development priorities for the county and recognises the importance of tourism as a much needed driver of development and regeneration, stating that "improvement in [tourist] facilities is also vital to the regeneration of the main coastal resorts" (Cornwall County Council, 2004, p38). As a result of tourist demand, coastal resorts such as Newquay, St Ives, Bude and Padstow enjoy facilities that exceed the usual expectations for centres of their size. This is driven by the inflow of visitors and associated expenditure during the peak season. This form of expenditure enables the provision of services that simply would not be viable without additional demand originating from visitors. In many cases, particularly in terms of provision of infrastructure, leisure, retail or medical facilities, residents also benefit from

increased provision. This may be especially true in terms of the provision of grocery stores, with resorts such as Newquay and Bude exhibiting grocery retail floor space and provision beyond that which would be reasonably expected for a residential population of their size (GVA Grimley, 2010). The facilities associated with visitor demand thus represent a significant development opportunity for Cornwall, benefitting residents and local communities alongside visitors (Cornwall Council, 2010). In the following section we focus specifically on grocery retail provision and attempt to estimate residential demand, before considering the spatial patterns of demand uplift due to visitor expenditure.

Residential grocery demand

In this section we seek to estimate small area grocery demand originating from residential households in order to demonstrate the spatial patterns of residential demand across Cornwall. We then go on to estimate small area visitor demand originating from self-catering accommodation and demonstrate the lack of spatial fit between residential and visitor demand, before discussing some of the implications for local service provision.

There is no established methodology for estimating small area demand for groceries and many retailers use their own in-house techniques based on their own consumer data, geodemographics, headline surveys and datasets produced commercially by consultancies such as CallCredit and CACI. These estimates are commonly derived using household expenditure rates obtained from the Living Costs and Food Survey (LCF)[1], coupled with small area household counts and geodemographic data. The LCF is an annual survey undertaken by ONS as part of the Integrated Household Survey (IHS) and the most recent

[1] Formerly the Expenditure and Food Survey, which itself succeeded the Family Expenditure Survey and the National Food Survey. Reported via an annual report titled 'Family Spending' and often referred to by this name.

(2010) edition involved a sample of just over 5,000 households which, as part of the (IHS), represents part of the biggest pool of social data after the Census (ONS, 2011). Surveyed households are required to complete a diary of expenditure for a two week period, with results weighted to account for the characteristics of all households. The LCF reports average household weekly expenditure in 12 expenditure groups, one of which is 'food and non-alcoholic drink', used here to estimate small-area grocery demand originating from residential households.

The LCF also breaks down household expenditure by an area based geodemographic classification, recognising that household purchasing power and spending characteristics will be influenced by their socio-economic and geodemographic characteristics. The LCF uses the ONS Output Area Classification (OAC), an area based household classification drawn from census data at the Output Area (OA) level. An OA is the lowest level of aggregation for census and administrative data dissemination, containing an average of 124 households (Vickers and Rees, 2006). Newing et al. (2014), used loyalty card data to investigate the socio-economic and geodemographic characteristics of local residents purchasing groceries in Cornish stores operated by a major UK food retailer. They identified that residential demand in certain parts of Cornwall was characterised by a number of relatively less-affluent consumers, particularly those from OAC supergroup 6 'Typical Traits'. It is thus important to take into account the geodemographic characteristics of households when seeking to estimate residential demand in Cornwall and the LCF household food and drink expenditure estimates, disaggregated by all 21 OAC groups are used here. In these groups, average weekly spend on food and non-alcoholic drink varies from £32.40 among 'senior communities' to £65.30 among 'prospering younger families'.

Residential grocery demand was therefore estimated at the OA level using expenditure rates

(by OAC group) from the LCF[2], household counts from the 2001 Census[3], and small area geodemographic classification from the OAC[4]. The 2001 census remains the most comprehensive source of small area household/population estimates (since mid-year population estimates are not available at an OA level) and the use of expenditure estimates disaggregated by OAC group should ensure that the overall magnitude and degree of spatial variation in small-area residential demand is represented.

[2] Table A52 ONS. 2011. Family Spending: A report on the 2010 Living Costs and Food Survey, Office for National Statistics, Newport. (Published 2011 – figures relate to 2010).

[3] Census Area Statistics – Table UV053 'Housing Stock'

[4] Available via http://areaclassification.org.uk/data/

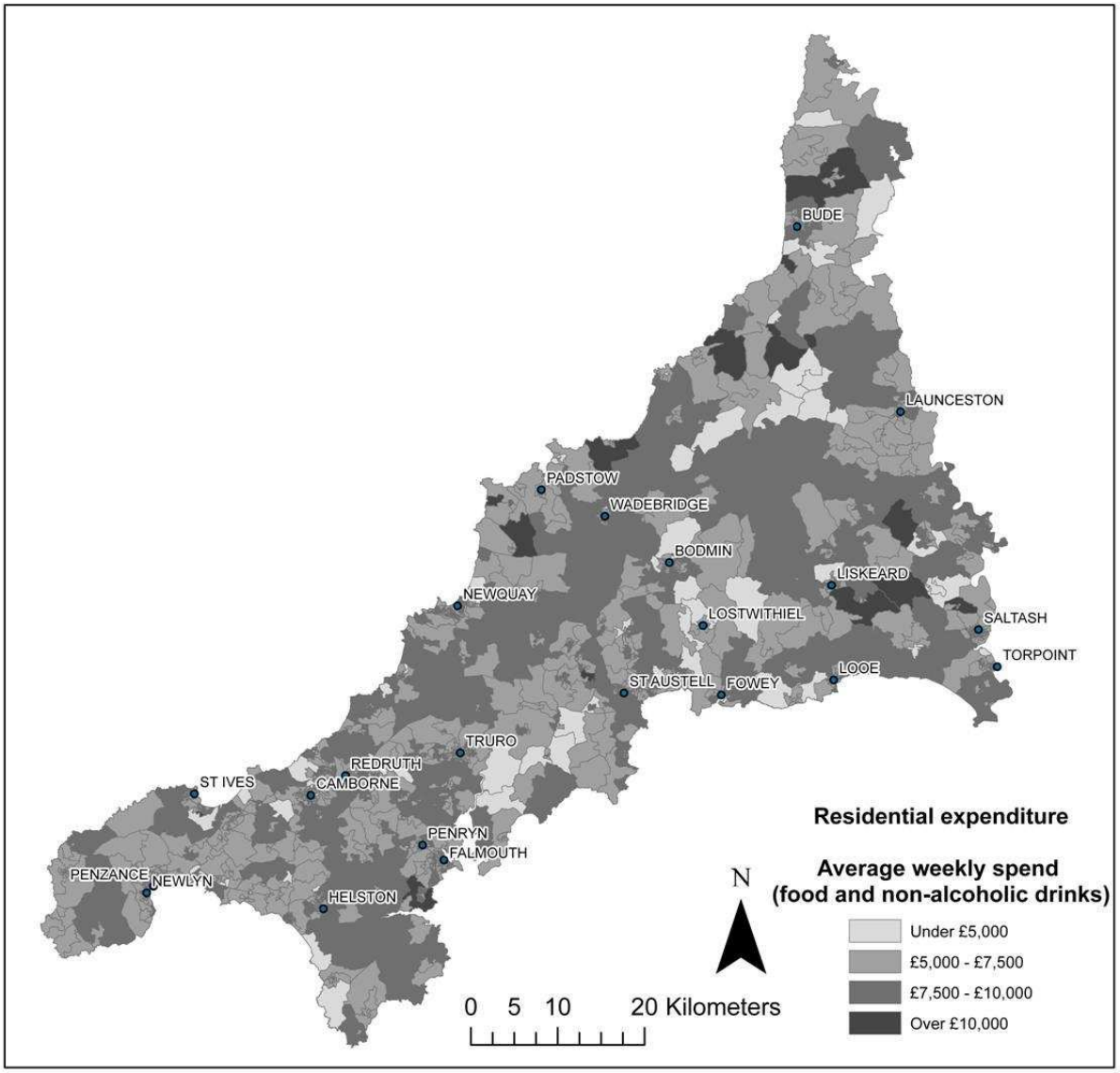

Figure 1 - Estimated visitor grocery spend (food and non-alcoholic drinks) - residential expenditure up-scaled by 30% (Census OA)

The spatial distribution of estimated residential grocery demand is shown at the OA level on Figure 1. Since OAs have been constructed in order to maintain a consistent number of households per OA, there is a fairly uniform county-wide distribution of residential grocery expenditure at an OA level. Variations in available expenditure at an OA level are thus largely driven by local geodemographics, household size and composition or slight variations in the number of households per OA. We later use figure 1 to draw comparisons with the distribution and degree of spatial clustering of visitor expenditure at a county-wide level.

Approaches for estimating visitor demand

Newing et al. (2012) demonstrated that a common practice when estimating visitor demand for use in grocery store planning applications involves the up-scaling of residential demand. A pre-determined factor is often used, and it is thought to account for some of the additional expenditure originating from visitors at certain times of year. Recent applications for new stores or store extensions in Cornwall have employed tourist demand uplift values of 30%, 25% and 15% (API, 2010; API, 2011; API, 2012). Taking this very crude approach, and using the 30% uplift as an illustrative example, we have applied a visitor demand uplift to our residential demand estimates adding an additional spend attributable to visitors of between £784 and £3,824 per OA. This represents a total visitor spend on groceries in any given week of £3.57m, distributed across the county. Newing et al. (2012; 2014) strongly argued that this approach was misleading and suggested that it failed to account for a number of characteristics of visitor demand – most notably the spatial distribution of visitor accommodation, differences in the volume and value of visitor expenditure compared to residential expenditure, and seasonal variations in visitor demand, none of which are accurately handled in the estimations based on the simple up-scaling of residential demand. As such, retail location planners commonly combine generic up-scale approaches with some form of additional insight. Our discussions with retailers reveals that this often involves analogues with similar stores (where available) within their network, to understand more about the exact volume and seasonal pattern of sales uplift. Nonetheless, since each tourist resort is likely to have a unique set of local factors that attract a specific mix of visitors and particular local seasonal variation, it may be difficult to identify suitable analogue stores.

Anecdotal evidence also suggests that some location planners may identify key accommodation sites (such as large holiday parks) within proposed store catchment areas, and incorporate additional demand within their location based modelling in an attempt to

account for this additional available expenditure. This approach allows location planners to take account of the spatial distribution of visitor demand, which, as explored below, may be very different to residential demand. In their recent comprehensive review of the techniques and resources available to location planning teams, Wood and Reynolds (2011) note that many location planning teams are under-resourced or have limited influence on decision making at a strategic level. Consequently, we believe that sophisticated approaches to handle visitor demand are unlikely to be widespread and where used may not be full incorporated in decision making. We therefore seek to demonstrate the potential value and utility of developing approaches to incorporate visitor demand in location based decision making.

In the following sections we attempt to produce a series of separate visitor demand layers for use in location planning. To do so we estimate OA level visitor grocery spend based on self-catering accommodation provision, visitor expenditure rates and seasonal variations in visitor numbers. We demonstrate that this approach takes account of the spatial and temporal distribution of visitor demand, and identify some of the data required to generate these forms of robust small-area estimates of visitor grocery spend, and some of the challenges preventing location planners using this approach in a more widespread manner. We begin with an outline of the visitor accommodation stock.

Accommodation provision within Cornwall

Cornwall has a diverse stock of visitor accommodation, as explored throughout this section, which makes use of a comprehensive database of accommodation provided by South West Tourism (SWT). The database contains individual records for all accommodation sites, units and providers that were known to SWT as of February 2011[5] and has been collated and

[5]South West Tourism was funded by the South West Regional Development Agency and was responsible for delivering the tourism strategy for the South West. Following the withdrawal of

updated by SWT over a number of years, following regular surveys of accommodation establishments, in common with good practice (see White, 2010).

Table 1 shows the overall breakdown of the countywide accommodation stock by type. The categories are based on those used by White (2010) in his guidance to tourism officials operating at the sub-regional level (in the UK). Table 1 clearly highlights the dominant role that self-catering accommodation (tourist campsites, holiday centres and rented cottage/apartment) plays in the overall provision of accommodation, collectively representing over 80% of the available bedspaces. The high provision of holiday centres and tourist campsites are likely to meet the demand for family holidays, many of which are seasonal in nature, focussed predominantly around the school summer holidays. A 2010 draft of the Local Planning Framework (Cornwall Council, 2010) expresses concerns that the accommodation stock is becoming narrowly focussed on meeting the needs of self-catering breaks. Table 1 suggests that this is true, and in common with the (now dated) Regional Planning Guidelines for the South West (RPG10) (DTLR, 2001) identifies that hotels, guesthouses and B&Bs make up only 15% of the accommodation provision.

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funding to RDAs, South West Tourism ceased operations in March 2011, although some of the functions have been transferred to 'The South West Tourism Alliance', an industry-led consortium.

Table 1 - Accommodation stock by type, Cornwall

Type of accommodation	Number of units/ bedrooms	% of units/ bedrooms	Number of bedspaces	% of bedspaces
Hotel	7,698	15	17,714	10
Guest Accommodation[6]	4,295	8	9,210	5
Youth hostels	n/a	n/a	1,810	1
Tourist Campsites	18,431	35	57,793	32
Holiday centres and villages, site with static caravans	11,496	22	47,020	26
Rented cottage/apartment	10,773	20	46,190	26
Total	**52,693**	**100**	**179,737**	**100**

It is also important to note that the 47,020 bedspaces located within holiday centres are spread across a total of just 98 sites, with an average of over 550 bedspaces per site. This generates large spatial clusters of accommodation provision in certain areas. **Figure 2** outlines the county-wide small area accommodation provision based on the overall number of

[6] Bed and breakfast, farmhouse, guest house and inn.

available visitor bedspaces at an OA level. As expected, **Figure 2** clearly shows a high degree of spatial clustering in visitor accommodation provision, most notably around resorts on the north coast, including St Ives, Padstow, Bude and Newquay. Newing et al. (2012) outlined that during the peak season, visitor populations may outnumber local residents in some of these resorts. Most notably, resorts such as Newquay were found to benefit from a level of visitor accommodation that far exceeded the resident population and it is thus essential to understand more about the seasonal nature and local economic impact of this additional expenditure.

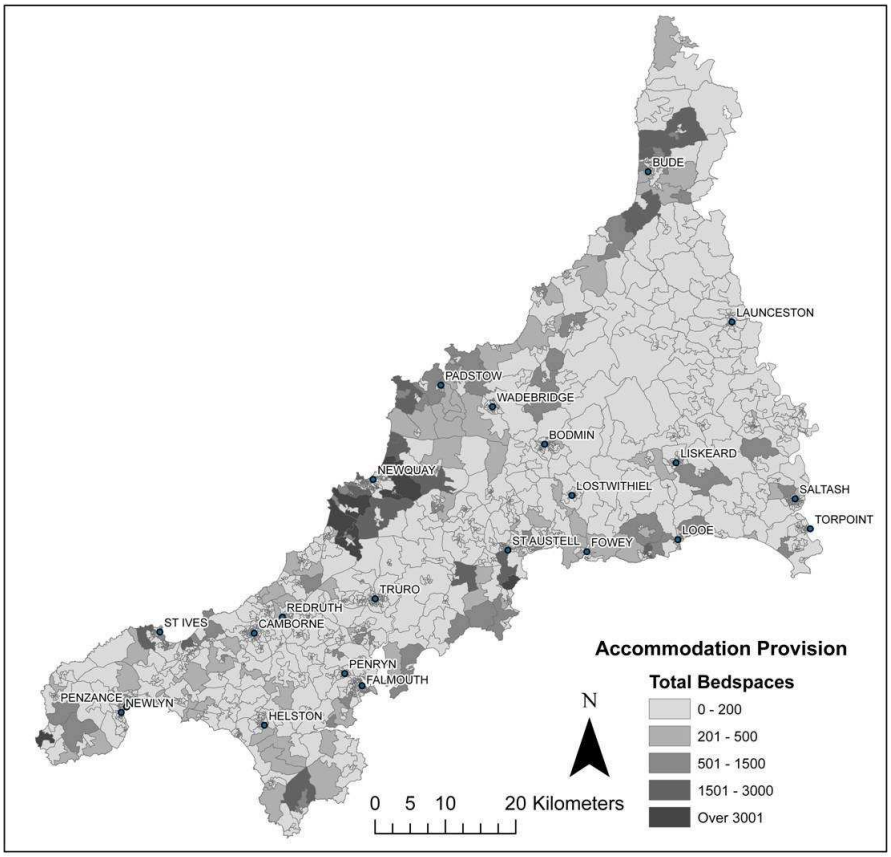

Figure 2 - Spatial distribution of accommodation stock – bedspaces (Census OA)

The accommodation provision is geared heavily towards self-catering forms of accommodation, which can be expected to generate a higher grocery spend (see Newing et al. 2012 and 2014). Figure 3(i) shows the number of self-catering bedspaces at an OA level. The

high number of bedspaces around resorts such as Newquay is largely driven by holiday centres and tourist campsites, with some sites, such as Haven's Perran Sands (9km south west of Newquay), catering for over 2,400 guests and generating large spatial clusters of visitors and associated expenditure. Brookman (2009) and Mintel (2011b) identify that holiday camps have enjoyed a recent period of growth, especially among the family market, with significant investment and improved facilities at sites, which are largely owned and operated by major companies such as Bourne Leisure (Butlins and Haven), Park Resorts Ltd and Centre Parks. These forms of accommodation also tend to be more seasonal in nature than serviced accommodation, with a number of sites, including the largest in Cornwall (by bedspaces), Haven's Perran Sands, being closed from November to March.

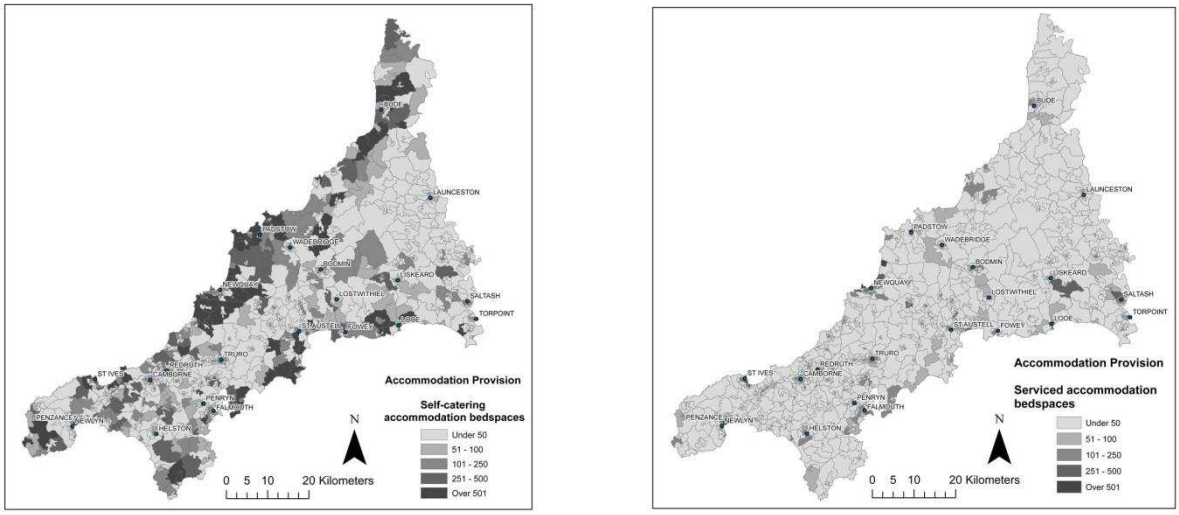

Figure 3 - Spatial distribution of accommodation stock – (i) self-catering accommodation bedspaces and (ii) serviced accommodation bedspaces (Census OA)

Figure 3 (ii) shows the number of serviced accommodation bedspaces. Overall numbers of serviced accommodation provision is lower. Less than 10,000 guesthouse and B&B, bedspaces are distributed across over 1,000, predominantly small, establishments, with 68% of the bedspaces being in establishments with less than 10 bedspaces. However, even though the provision is highly fragmented, these forms of accommodation still tend to be clustered towards principal coastal resorts such as Newquay and Bude. Comparison between Figure 3(i) and (ii) and Figure 1 suggests that, in common with Newing et al. (2012), visitor demand

demonstrates a very different spatial pattern to residential demand. Highly seasonal forms of demand appear to be clustered around principal coastal resorts, with clear implications for local expenditure and demand uplift within these areas.

Nonetheless, visitor demand does not purely originate from the forms of accommodation highlighted on Figure 3. Visitor demand is also driven by visitors staying with friends and relatives (VFR) that reside within the local area, or that stay in a second (or holiday) home that they own. The latter represents a form of self-catering accommodation and is likely to generate additional visitor grocery expenditure within local communities. These forms of visitor demand are drawn from the existing housing stock and so are less likely to cluster to the same extent as other forms of accommodation provision. At a local level, estimating actual numbers or seasonal patterns of visits using these forms of accommodation is difficult and not routinely part of local level data collection (see Hall and Müller, 2004; National Housing and Planning Advice Unit et al., 2008; South Lakeland District Council et al., Undated). Although it is possible to identify the potential stock of residential host households for VRF visits, we do not consider VFR within this paper, since obtaining information at the sub-regional level for the number or spatial distribution of VFR visits is extremely difficult. We need to be able to account for occupancy and expenditure rates for this form of accommodation before we can draw firm conclusions about its impact on the spatial patterns of visitor grocery demand, and this forms the basis of subsequent work reported elsewhere.

Overall numbers of properties classed as a ‘second home’ can be obtained from council tax data (Wyatt, 2008) and for Cornwall, these are shown at a middle layer super output area (MSOA) level (within Cornwall these contain an average of 2,936 households) on Figure 4. Second home units are also spatially clustered, particularly on the north coast between Padstow and Bude, and also around Fowey and Looe on the south coast. The high

concentration of second home units in the MSOA containing Padstow can be clearly seen on Figure 4, containing over 1,000 second home units and representing 36% of the housing stock. It is inevitable that the high number of second home units in this MSOA will have an impact on local services, with demand likely to fluctuate at different times of year, boosted by the influx of second home owners at certain times. For inclusion within out expenditure estimates, we have re-sampled the MSOA second home data to an OA level, taking account of the underlying distribution of the housing stock.

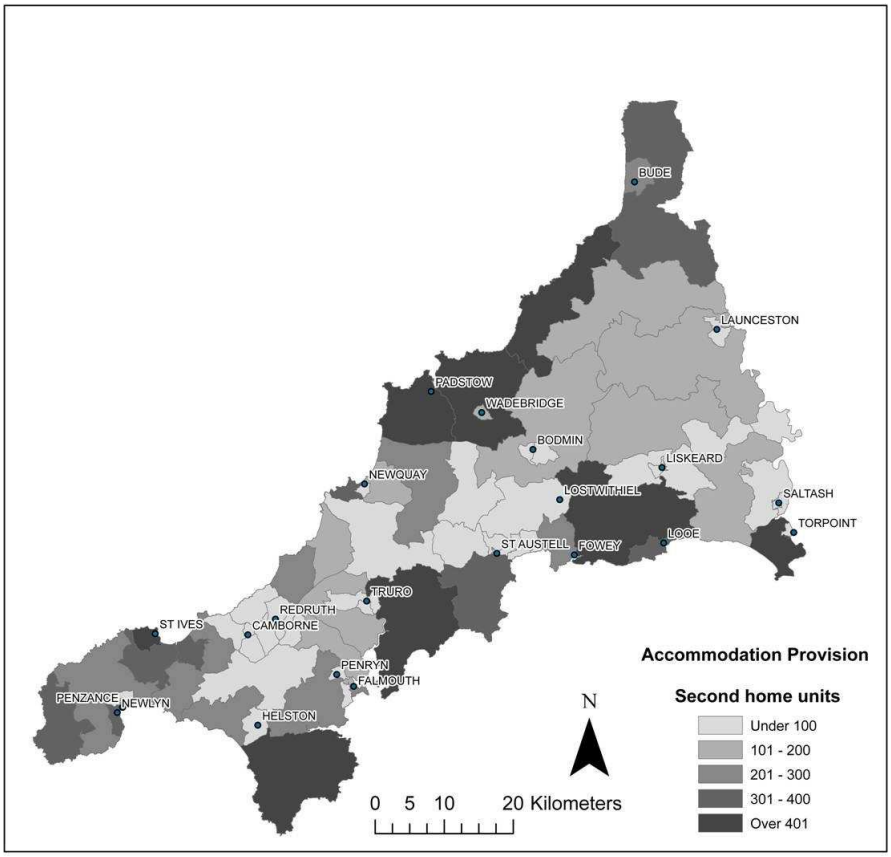

Figure 4 - Number of second home units (December 2010) - estimated at Census MSOA. Source: Supplied by Cornwall Council.

When considered in isolation, accommodation provision may not be a reliable indicator of potential visitor expenditure, since the existence of an accommodation unit does not necessarily imply that visitors will be present or spending within the local economy. The actual expenditure will be driven by accommodation provision in conjunction with occupancy and expenditure rates, which vary throughout the year. In the following section we

briefly explore the seasonal accommodation occupancy for serviced and self-catering accommodation.

Accommodation occupancy

Occupancy rates are readily available at the regional (South West) or county (Cornwall) level for most forms of serviced and self-catering accommodation listed on Table 1 and are routinely collected to assess the performance of the tourism sector at a local/regional level and to benchmark against similar destinations (White, 2010). Occupancy rates are shown in table 2 and have been derived from a series of reports produced by South West Tourism and Visit Cornwall, based on monthly in-house surveys using a recruited sample of visitor accommodation providers. Figure 5 (i) and (ii) demonstrate the spatial patterns of accommodation utilisation at the OA level, taking occupancy rates into account. Specifically, they consider the number of rooms (serviced) and units (non-serviced) that are thought to be occupied in January and August (using 2010 occupancy data). It is clear from Figure 5 (ii) that during the peak summer season (August) all forms of accommodation enjoy high occupancy rates, with 94% of all available units occupied. The spatial distribution of occupied visitor accommodation largely follows the spatial distribution of accommodation provision shown on Figure 2. Tourist campsites in particular enjoy high occupancy rates at this time of year and, as such, the stretch of coastline between St Ives and Bude on the north coast (incorporating the resorts of Newquay and Padstow), and parts of the south coast, notably around Penzance and between Falmouth and Looe demonstrate a high number of occupied units due to the provision of this type of accommodation in these areas.

Occupancy rates are not collected for second home units, except where these units are rented as self-catering accommodation through agencies. Nonetheless we have demonstrated the likely importance of this form of accommodation in determining grocery demand in some

areas and it has been assumed that second home utilisation follows a similar pattern to rented cottage/apartment occupancy rates (indeed, many units will be rented as such at certain times of year).

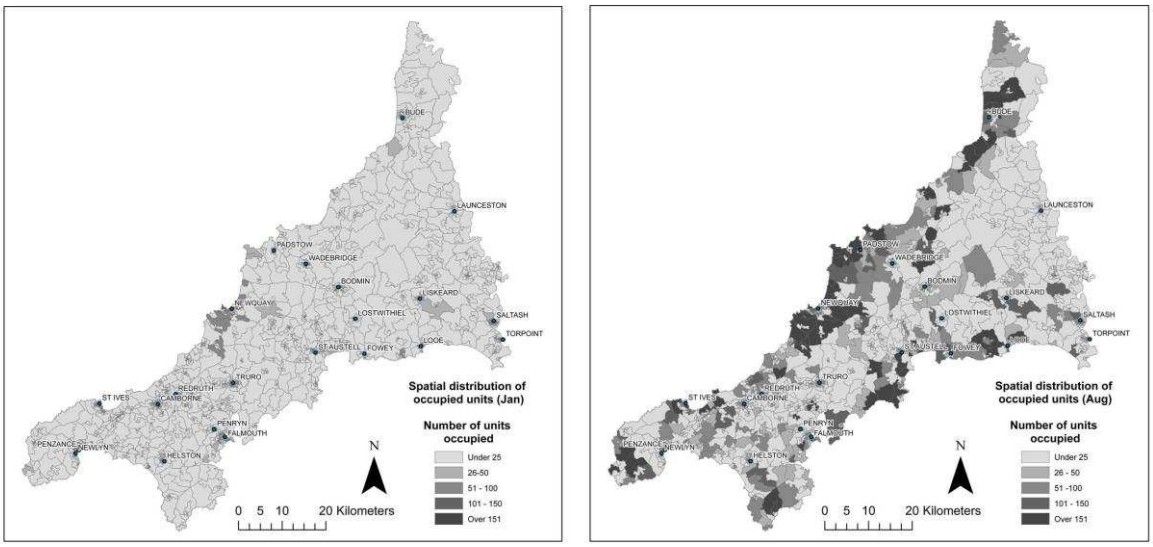

Figure 5 - Spatial distribution of occupied accommodation units/rooms/pitches based on published occupancy rates for (i) January and (ii) August (2010 data at Census OA)

Table 2 - Monthly occupancy rates and expenditure rates by accommodation type

	Hotel	Guest Accom	Tourist Campsites	Tourist Campsites	Holiday centres and villages	Holiday centres and villages	Youth Hostels	Rented cottage/ apartment	Rented cottage/ apartment	Second home units	Second home units
	Occupancy	Occupancy	Occupancy	Expenditure	Occupancy	Expenditure	Occupancy	Occupancy	Expenditure	Occupancy	Expenditure
Month	% of rooms occupied	% of rooms occupied	% of pitches occupied	Per pitch per week	% of units occupied[7]	Per unit per week	% of bedspaces occupied[8]	% of units occupied	Per unit per week	% of units occupied[8]	Per unit per week
Jan	28	25	8	£66.08	12	£79.76	25	12	£96.19	12	£78.55
Feb	40	35	12	£66.08	29	£79.76	35	29	£96.19	29	£78.55
Mar	43	38	9	£66.08	29	£79.76	38	29	£96.19	29	£78.55
Apr	56	48	44	£66.08	60	£79.76	48	60	£106.51	60	£78.55
May	62	57	64	£66.08	62	£79.76	57	62	£106.51	62	£78.55
Jun	71	67	70	£66.08	67	£79.76	67	67	£106.51	67	£78.55
Jul	75	72	76	£66.08	77	£79.76	72	77	£106.51	77	£78.55
Aug	79	74	97	£78.23	94	£79.76	74	94	£107.84	94	£78.55
Sept	69	68	46	£66.08	82	£79.76	68	82	£96.19	82	£78.55
Oct	54	51	34	£66.08	42	£79.76	51	42	£96.19	42	£78.55
Nov	33	26	13	£66.08	12	£79.76	26	12	£96.19	12	£78.55
Dec	31	22	19	£66.08	24	£79.76	22	24	£96.19	24	£78.55

All occupancy rates listed are percentages as reported by accommodation providers via 'South West Tourism' and 'Visit Cornwall' occupancy reports (see below for specific sources). Where necessary, data for 2010 has been used, substituted with comparable rates from 2009.

[7] Rates listed for 'Self-catering accommodation' have been used here.

[8] Rates listed for 'Guest accommodation' have been used here.

In January, by contrast, the overall number of occupied units is far lower, with just 9% of units occupied, since much of the touring and holiday park provision is closed at this time of year, with those that are open achieving low occupancy. Most notably, when considering Figure 5(i), it is clear that the spatial distribution of occupied visitor accommodation bears little resemblance to the spatial patterns evident in residential demand and therefore any attempt to estimate sales uplift driven by visitors will be misleading if based solely on any form of up-scaling from residential demand. As Figure 5 demonstrates, the spatial distribution - and overall number - of occupied units (and therefore staying visitors) varies considerably between the high and low season, and these forms of tourism are clearly not driven by residential demand. We now explore this further, attempting to estimate small area grocery demand originating from self-catering accommodation at different times of year.

Estimating small area visitor grocery demand for self-catering accommodation.

This section aims to estimate small area visitor expenditure at different times of year for all forms of rented self-catering accommodation, including tourist campsites, holiday centres, rental cottages/apartments and second homes. Available weekly expenditure is calculated by multiplying the accommodation provision (by type) by the given occupancy and expenditure rates and summed on an OA-by-OA basis across all accommodation types. Here we compare high season (August school summer holiday) with the low season (January). All rates used refer to weekly grocery expenditure (food and drink only) and, with occupancy rates available on a monthly basis, average weekly visitor grocery expenditure can be calculated separately for each month.

Expenditure rates for visitors using self-catered accommodation are difficult to obtain due to the broad range of accommodation provision within this sector and a lack of previous research. Each form of self-catering accommodation will attract different demand segments,

at different times of the year, each with their own expenditure habits (See Newing et al., 2014 for a discussion of visitor characteristics by socio-economic group using customer loyalty card data). Headline visitor surveys such as the IPS and UKTS are not helpful here, since they do not collect information on visitors' grocery expenditure habits. We have therefore relied on alternative industry or academic surveys in order to obtain expenditure rates, as outlined in the following sub-sections.

Tourist Campsites

Visitor expenditure data for this sector is traditionally difficult to obtain, in part a result of the fragmented and variable nature of camping and caravanning provision, made up of a number of small, private operators coupled with large, commercial sites operated by organisations such as the Camping and Caravanning Club (CCC). The expenditure estimates used here are based upon the findings of a detailed national survey undertaken by the CCC, a membership organisation operating 100 sites across the UK for tourers with tents, trailer tents, caravans or campervans (motor-caravan). The 2007 CCC visitor survey aimed to identify the contribution of visitors to the local economy at CCC sites across the UK. Excluding site fees themselves, the survey identified that the highest spend is on supermarket provisions, closely followed by expenditure on other sources of food and drink, including eating in local pubs and restaurants. Overall expenditure on groceries per-pitch per-week was £66.08, but this was seen to vary by type of unit, with tent campers tending to spend more than those using caravans, particularly on food and drink, perhaps due to a lack of space or facilities to store fresh food. The CCC average rates do, however, take into account the breakdown of CCC membership by type of unit. Within our expenditure estimates, the summer expenditure rate (for families) of £78.23 has been applied for the summer school holidays (August). At other times of year, the average groceries expenditure per pitch per week of £66.08 has been applied.

Holiday centres and villages including sites with static caravans

These large parks tend to incorporate a variety of accommodation, much of which will be rented on a short-term basis to visitors, whilst some may also be privately owned and used in a similar form to a second home. Indeed, the facilities provided vary considerably, with some large parks providing on site entertainment and leisure facilities, and other services such as grocery stores and catering facilities, which mean that holiday makers may spend little time outside the site and need spend little on groceries within local stores. The British Holiday and Home Parks Association (BH+HPA) have carried out a range of comprehensive studies to demonstrate the positive economic impact of these parks on local economies (e.g. BH&HPA, 2012). In one such study, a face-to-face survey of 517 visitors to 21 parks was used to understand more about expenditure in the local community by visitors. The survey identified that visitors spent an average of £98 per trip (equating to £79.76) per week on 'food and drink for self-catering' purchased off-park (therefore excluding purchases from an on-site convenience store). This value will be employed here.

Rented cottage/apartment

This form of self-catering includes properties managed by major companies such as Haven or Hoseasons and available year round, or alternatively, may be privately owned second homes only available to rent at certain times of year. There is an absence of studies within either the academic literature or the industry itself that examine, via a robust and representative sample, the grocery expenditure patterns of visitors using any form of self-catering cottages/apartments. One of the most detailed existing studies was carried out by Mottiar (2006) in a localised area within County Wexford, Ireland. She considers the self-catering market in the form of 'rented house/apartment'. Her survey suggested that those in a rented house/apartment spend an average of €24.24 per party per day on groceries but does not

include details on party size or length of stay, and the expenditure may be determined by characteristics of the destination itself, which makes it difficult to directly apply expenditure from a localised study such as this to the whole of Cornwall.

Nonetheless, the rates identified by Mottiar can be used as a guide for estimating expenditure associated with self-catering accommodation, coupled with insight taken from a series of surveys of visitors to Newquay (undertaken in 2004) and to Cornwall (undertaken in 2008/9). These surveys found that visitors self-reported expenditure on all forms of shopping, including 'sweets, drinks, food (not consumed in a restaurant, cafe or pub) and other purchases' ranged from £8.63 to £9.51 per person per day (South West Tourism, 2005b; Visit Cornwall, 2009). Assuming that half of this expenditure was on some form of groceries (in the absence of any further sub-division of expenditure), and an average party size of 3.24 people during the peak summer season (Visit Cornwall, 2009), it is suggested that this form of visitors spend up to £15.41 per unit/party per day on groceries, which equates to £107.84 per week). With an average party size of 2.89 people in Autumn/Winter and 3.20 in the Spring (Visit Cornwall, 2009), this equates to an average total spend per party/unit per week of £96.19 and £106.51 respectively at these times of year. This is broadly in line with Mottiar's findings and is thus employed within this analysis.

Second home owners

Once again there is an absence of studies within the literature that attempt to identify grocery expenditure by second home owners. Nonetheless, a recent qualitative study in Ireland interviewed some second home owners and identified a range of approaches to the provision of groceries, including those who tend to bring most food from home, stating that "fresh food down here wouldn't be as good as what you'd get, say in Tesco, just the variety, so I would tend to shop before I came down and bring a lot of fresh food with me" (Quinn, 2010, p198).

Others typically shop within the vicinity of their second home claiming "...we would tend to bring down some food to keep us going for a day or two. But they have a shop here and it stocks everything, and then over in Wellington Bridge there's a bigger supermarket" (Quinn, 2010, p166). Furthermore, many second home owners are likely to keep their home stocked with everyday items and therefore will not be required to purchase these from scratch on each trip, which may be the case for those renting accommodation. At this stage a value of £78.55 per property per week has been used, taken from the LCF (2010 data) (ONS, 2011). This value represents the average weekly household expenditure on food and drink by households with the highest gross income (top 20%) since the LCF itself, supported by broader evidence (e.g. National Housing and Planning Advice Unit et al., 2008) suggests that these income groups are far more likely to record household expenditure associated with ownership of a secondary dwelling.

Based on these expenditure values, which are also shown in table 2, and coupled with the accommodation provision and occupancy rates, we have been able to estimate small area visitor grocery demand for various points within the tourist season. The following section explores the spatial pattern of visitor grocery demand driven by self-catering accommodation in January and August.

Small area visitor grocery demand estimates.

Based solely on visitor demand from self-catering cottages, tourist campsites and holiday parks, we estimate a total weekly visitor grocery spend of around £4.5m per week during the peak summer season. This is considerably more than the £3.5m estimated by up-scaling residential demand. However, our estimations based on small-area accommodation provision notes that visitor expenditure falls to just £275,225 during an average January week, due to far lower average occupancy rates and accommodation site closures. Our estimates for

August are shown on Figure 6 and can be compared with the spatial distribution of residential demand (Figure 1). As expected, and in line with our analysis of accommodation provision and occupancy rates, the spatial distribution of visitor expenditure in August is heavily geared towards coastal locations, particularly the north coast between St Ives and Bude, where the provision of occupied self-catering accommodation is greatest.

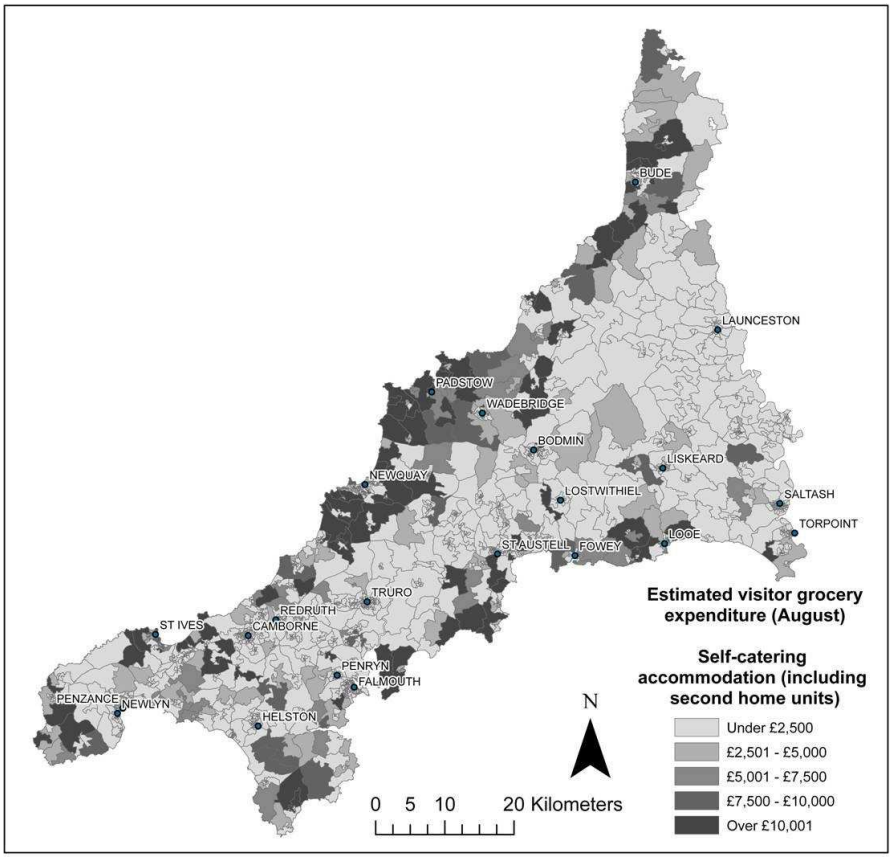

Figure 6 - Estimated visitor grocery expenditure using accommodation provision, occupancy and expenditure rates - August (Census OA)

During the peak season, three OAs are each estimated to generate over £100,000 per week of visitor grocery spend, housing a large holiday park and/or touring site, and together generating over £425,000 worth of visitor expenditure. By contrast, residential demand in these same OAs totals only £33,251 per week, and as such, it is essential that estimates of visitor spending take full account of the small-area accommodation provision. Additionally, our estimates identify that almost half the OAs in Cornwall have no recorded self-catering

visitor accommodation, with the exception of second home units. Consequently, our estimations for August identify around £300,000 per week originating from these OAs, entirely driven by second home units. This highlights that it is important to consider all forms of overnight self-catering accommodation, including individual second homes and cottages/apartments to rent and not just the major accommodation sites.

We have used a production-constrained SIM to demonstrate the utility of our demand estimates as a visitor demand later, distinct from residential demand. The production-constrained model (Wilson, 1971; Wilson, 2010), is the most commonly used in grocery retail applications and bases overall expenditure flows on the estimated expenditure available in each origin zone, in this case Census OA. The model has been used to model the interactions between the underlying demand and the store network. The model itself, which will be reported more fully in subsequent work, allocates the estimated expenditure (residential demand and visitor spend) to grocery stores in Cornwall by modelling the estimated flows of expenditure from origin zones (the OAs containing residential/visitor expenditure) to competing stores. The model (equation 1) assumes that the expenditure available (O_i) within any given small area (i) is shared by competing retailers (j) in a geographically proximate area based on their accessibility and relative 'attractiveness' (W_j). Their accessibility is a function of the relative 'cost' in terms of distance (C_{ij}), calibrated using a distance decay parameter (β) which reflects the willingness or ability of consumers to travel to stores in the region. In this case store attractiveness is determined using store size and distance is reflected by travel time estimated on an OA-to-OA basis.

$$\boldsymbol{S_{ij} = A_i O_i W_j \, exp^{-\beta C_{ij}}} \quad (1)$$

Where: S_{ij} represents the interaction or expenditure flow between zone $_i$ and store $_j$

A_i is a balancing factor which takes account of competition and ensures that all demand is allocated to stores within the region. It is calculated as:

$$Ai = \frac{1}{\sum_j W_j \ exp^{-\beta C_{ij}}}$$

O_i represents the demand or expenditure available in residential zone $_i$

W_j accounts for the attractiveness of store $_j$

$exp^{-\beta C_{ij}}$ is the distance deterrence term, incorporating β, the distance decay parameter, and C_{ij}, the distance between zone $_i$ and store $_j$.

Source: Birkin et al. (2002, p152)

On a store-by-store basis, the model thus estimates weekly revenue derived from residential and visitor demand. In common with Newing et al. (2012; 2014) we have store trading data for four supermarkets operated by a major grocery retailer within Cornwall. We are therefore able to compare the estimated store revenue using the SIM with the actual revenue recorded in store by the company, although to preserve confidentiality we are unable to reveal the retailer or location of the stores themselves.

Table 3 shows the proportion of the recorded store revenue (average weekly revenue for August 2010) that is accounted for when using the SIM model in conjunction with our residential demand estimates. For each store, residential demand estimates alone are unable to account for the full in-store expenditure during the tourist season, with the proportion of recorded store revenue (food and drink) estimated using residential demand varying from between 50% and 60% at stores in coastal resorts, with the remainder of the store revenue likely to be attributable to visitor demand. By contrast, the residential demand estimates account for upto 84% of recorded store revenue in our non-resort based study stores.

Table 3 – Proportion of store revenue (average weekly revenue, Aug 2010) estimated by SI model

Store	Residential demand	Residential and visitor demand
Coastal resort store X	50.1%	84.1%
Coastal resort store Y	57.7%	87.5%
Non-coastal store A	79.5%	96.1%
Non-coastal store B	84.0%	98.9%

Our visitor expenditure estimates perform well, with overall revenue estimated (taking into account residential and visitor demand) rising to between 84% and 88% of recorded store revenue at coastal-resort stores and over 95% at non-coastal stores. Table 3 reveals that even after accounting for self-catering visitor demand, modelled store revenue is still underestimated by upto 15%. Our estimates do not currently include additional spending by visitors staying within serviced accommodation or spend by day visitors and so it is likely that additional demand exists around these stores, which would increase estimated revenue further. Indirectly, additional demand may be induced by visitors, such as purchases by those hosting friends or relatives, or the purchase of supplies in grocery stores by the operators of accommodation (particularly small scale B&Bs and guest houses) or other services for visitors. These issues will be addressed further in future work. We will also seek to improve the input data used for the expenditure estimates, allowing us to take into account expenditure rates which may vary by time of year, party size or even the grade/rating of accommodation.

The use of a SIM supports our suggestion that estimates of small-are visitor demand should be built using accommodation supply and utilisation. Other approaches, based on the up-

scaling of residential demand are unable to account for the spatial distribution of, and seasonal variation within, accommodation provision and utilisation. The expenditure estimates reported in this paper provide a clear indication of the small-area spatial patterns of visitor grocery demand, identifying suitable data sources and outlining a clear methodology through which visitor expenditure can be estimated at a local and sub-regional level from a demand side perspective. In the following section we briefly consider some of the opportunities and challenges this form of expenditure estimation may pose for retailers, and consider some of the broader applications.

Incorporating visitor expenditure estimates in store location planning

We have identified that the use of small-area visitor expenditure estimates, in conjunction with a SIM, can be used to estimate store level revenue originating from visitors. At this stage the visitor expenditure estimates are driven by the provision of self-catering accommodation, coupled with occupancy and expenditure rates for each unit of accommodation. This approach builds on the practice employed by some retailers, who identify the location and capacity of principal accommodation sites and use them to add an additional population to their modelling. The approach used here incorporates all self-catering units and seeks to create a specific visitor demand layer for use in this modelling, rather than simulating visitors via additional demand in existing residential layers.

Although the benefits of this approach have been outlined, putting it into practice requires manpower and investment on the part of a retailer, and this may not always be feasible. For example, Wood and Reynolds (2011) note than in many retailers, location planning may represent an individual or very small team attached to a property or marketing department, lacking the resources, expertise or senior management support to seek major new data sources or analysis approaches. Nonetheless, in the most proactive and well resourced

departments we believe that this form of analysis could offer demonstratable benefits in generating robust revenue predictions on the context of store investment decisions in tourist areas.

Nonetheless challenges remain, for example identifying the actual supply of visitor accommodation at a small area level may be tricky, since no comprehensive database exists or is openly available. Most tourism organisations, such as regional or local destination marketing organisations (e.g. 'Visit Cornwall', 'Visit Newquay' or their colleagues working in local council tourism departments) will hold some form of database listing visitor accommodation. However, this may only represent accommodation that has been quality assessed by them, and may not offer a complete listing of the smaller, individual properties, especially those maintained by agencies, where only the agency itself is listed.

We benefitted from access to a database held by SWT, and whilst this was the most complete listing of visitor accommodation available for Cornwall, considerable data cleansing was required before the database could be used for analysis, including updating missing or miscategorised units, adding missing postcodes and amending incomplete details about the number of units, bedrooms and bedspaces through web searches, contact with visitor/tourist information centres, agencies and accommodation operators. Whilst this information is freely available via advertisements and accommodation guides, some operators were reluctant to provide this information on their accommodation stock, and so considerable time was spent filling in property details based on advertisements and accommodation listings.

It is unrealistic for even the largest location planning teams to undertake this sort of task for large areas, and there may be scope here for consultancies to carry out this work and make such a product available for retailers to purchase, as the value it may bring to location planning can be demonstrated. Where retailers are proposing new retail facilities and

associated services in tourist areas, there may be support from local councils who may hold some of this data and be willing to make it available for the purpose of demonstrating the need for additional retail provision. Nonetheless, due to the fragmented nature of accommodation provision, the lack of compulsory registration and the ease of entry and exit from this sector, any database, even after considerable updating, is inevitably likely to exclude some provision (Johns and Lynch, 2007).

The approach outlined here uses occupancy rates to control the overall level of visitor demand, determining the number of units which represent demand in any given month. Occupancy surveys are routinely administered and results published by local tourist organisations, and also feeding into the national (England) occupancy survey, making this form of data available routinely and at little cost to retailers. Data is reported on a monthly basis, and seasonal visitor demand can be estimated on a month-by-month basis, allowing revenue originating from visitors to be calculated for 12 separate time periods in the year. Retailers commonly estimate store revenue on a weekly basis, and as such this key indicator can be identified separately for each monthly period. Since many forms of self-catering accommodation are also rented on a weekly basis, the use of average weekly expenditure rates for visitors is also meaningful.

Estimates of the likely expenditure by a typical visitor occupying an accommodation unit are difficult to identify and not commonly reported within the literature. Throughout this paper we have identified some sources that can be used, but this is an area where this work will be developed further by the authors and reported subsequently. Larger retailers may also have the resources to carry out local surveys to identify visitor spend on food and drink – either in partnership with an accommodation operator, around existing stores in coastal resorts or via consumer panels.

Since the visitor expenditure estimates are driven by the provision and utilisation of visitor accommodation, our findings have wider implications beyond estimating visitor spend within grocery stores, and could be developed further by potential end users Other forms of visitor expenditure could be estimated using a similar methodology, allowing a range of local economic impacts driven by visitor demand to be identified; a crucial requirement being the distribution and accompanying occupancy rates for appropriate forms of visitor accommodation at a small-area level. These forms of data are not routinely utilised, even though many sub-regional authorities and tourist boards will maintain some form of accommodation database.

An understanding of accommodation provision and occupancy/utilisation rates, disaggregated at a small area level, allows a broader range of localised economic and social impacts to be identified. For example, knowledge of the location and likely numbers of overnight visitors assists greatly with the provision of health services which, in areas such as Cornwall, face considerable strain from seasonal population influxes. Whilst there clearly remain some challenges in terms of retailers' ability to develop these forms of expenditure estimates, we believe that we have demonstrated the potential use of such an approach.

Conclusions – implications for service delivery

Our small-area expenditure estimations demonstrate that visitor grocery spend is clustered around certain resorts, destinations and accommodation sites far more than residential expenditure, with clear implication for service provision and store location planning in these areas. The findings presented in this paper are part of a broader study which aims to incorporate small area visitor expenditure within location planning in the grocery industry. Having previously identified that stores in major Cornish coastal resorts experience a significant sales uplift during the tourist season (Newing et al., 2012), this demand side

approach helps to demonstrate why the degree of sales uplift varies so much on a store-by-store and week-by-week basis. In particular, we demonstrate that visitor demand is spatially clustered far more than residential demand and is also seen to vary throughout the year.

Visitor demand of this form is driven by visitor accommodation, and we have demonstrated that small-area accommodation provision, coupled with occupancy and expenditure rates, can be used to estimate seasonal visitor expenditure. When coupled with a SIM we have shown that the use of visitor expenditure estimates can generate robust revenue estimates, with further developments proposed to account for other forms of visitor expenditure, such as spending by day visitors and by those hosting friends and relatives.

Tourism is clearly an important driver of demand in many retail sectors, especially grocery, and to maintain optimum provision of retail services in those areas, accurate estimations of small-area demand are needed. We identify that there remain some challenges in obtaining and preparing the data required to generate such estimates, particularly among under-resourced location planning teams. Nonetheless we believe that this investment would be worthwhile, since store level modelling of this form would provide a valuable tool to assist store location planners in maintaining viable services to meet demand in tourist areas.

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