Food prices in remote areas of Scotland: A natural experiment measuring the out-shopping effect

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Abstract

An important aspect of the survival of remote rural areas in a country is whether the food prices that their citizens face are similar to those elsewhere. There is a conflictive literature about existence and magnitude of a "remoteness premium" (i.e., whether households in remote areas pay more for food than the average prices paid in the country). This paper investigates the effect of out-shopping on food expensiveness in remote rural areas in Scotland. For this purpose, a natural experiment was used. An expensiveness index was constructed using home scanner data. Food expensiveness was compared during the 2020 COVID-19 lockdown, when travel restriction prevented out-shopping, with the data from the same period in 2019. It was assumed that the difference – after controlling for the change in the purchased bundle of goods – may be attributed to the lockdown effect, preventing out-shopping. The results find that the premium paid in remote rural areas was small and out-shopping is an important factor limiting food expensiveness in remote areas of Scotland.

Keywords: Remote rural areas, food prices, rural development, consumer behavior, home-scanner data.

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1. Introduction

There is a consistent literature investigated whether food prices in remote areas are higher than those in cities and urban areas, with conflicting results. In this respect, several studies measuring store prices in remote areas found significant differences, depending on the study location and the goods in the food basket that was considered in the investigation. Examples of these studies are: in the case of Scotland, they include Dawson et al. 2008 Cummins et al. 2010, Hirsch et al. 2013, Hirsch et al. 2016, Dumfries and Galloway Citizen Advice Service 2015; 2017, BBC 2016; Hirsch et al. 2013; 2016, studies on Australia include Tsang et al. 2007, Palermo et al. 2008, Beaulac et al. 2009, Ward et al. 2012, Pollard et al. 2014, Ferguson et al. 2016; studies on the USA and Canada include Bardenhagen et al. 2017, Naylor et al. 2020.

The aforementioned studies share a similar structure: a "reference basket" is chosen (usually, composed of healthy food products for a balanced diet or subsistence goods), then shelf prices of the basket are collected at representative stores in remote and urban areas and compared and determinants of the differences are identified (e.g., type of store, household characteristics, level social deprivation in the area).

One aspect that was found of particular importance was that lack of access to large scale distributors (supermarket chains and discount stores) was a key determinant of high prices in remote areas. The majority of those studies found large "remoteness premium" (i.e., difference in prices, with food in remote areas being more expensive). In Scotland the premium ranges between 10 and 40 per cent depending on the type of goods in the basket, location, and store type (e.g., Hirsh et al. 2013).

A recent study using a different approach did not confirm the above results. Revoredo-Giha and Russo (2022) used actual household purchases from a home-scan survey instead of collecting shelf-prices and concluded that the difference in food expensiveness was statistically significant but economically irrelevant (less than 1 per cent).

The remarkable difference between the estimates may be due to several causes. First, the reference baskets that are used in shelf-price analyses may differ from actual purchases. In theory, consumers in a remote area might purchase cheap items that are sold at prices that are similar to the ones in urban areas. This hypothesis is consistent with the conclusions by Whelan et al. (2018) suggesting that it may be difficult to buy healthy food in remote areas either because it is too expensive, or it is not available. From this perspective, shelf-price analysis and

actual-purchase studies may differ because households in remote areas do not buy the reference baskets.

The second reason is that consumers living in remote areas might shop elsewhere, for example in accessible areas where they work or may go for shopping trips. This "out-shopping" behavior was described by Marshall et al. 2018, Bardenhagen et al. 2017, Whelan et al. 2018, who identified a vicious circle where out-shopping results in lower demand and competitive disadvantage for local stores and, ultimately, the higher prices provide incentives to further out-shopping. According to this hypothesis, the results of shelf-price analysis and those of actual-purchase analysis differ because consumers do not buy food at local stores.

This paper investigates the effect of out-shopping on food expensiveness in rural areas. For this purpose, a natural experiment is used. Thus, a comparison of food expensiveness during the 2020 COVID-19 lockdown (when travel restrictions prevented out-shopping) with the data from the same time of the year in 2019. It is assumed that the difference – after controlling for the change in the purchased bundle of goods – may be attributed to the out-shopping effect.

The objective of the empirical analysis is to assess if out-shopping can explain the difference in the estimates of the remoteness premium. This is an important question due to its policy implications.

If out-shopping is a major purchasing behavior in remote areas, one can assume that the remoteness premium is the result of spatial arbitrage. Local stores can apply high prices to households with high transportation costs, while other households shop outside the local area. This can be considered a typical price-discrimination scheme based on difference in transportation costs. This implies that high food prices affect households with costly travel arrangements more, for example because of deficiency of public and private transportation, or bad road infrastructures. In this case, supporting these household and to local stores (to break Whelan et al.'s 2018 vicious circle) is a priority policy objective. Instead, if out-shopping is not a key determinant and the observed difference in food expensiveness estimates is due to mainly to basket composition or other factors, the main policy objectives relate to make healthy and quality food baskets affordable and available, changing store assortments and relative prices of goods. From this perspective, our evaluation of the out-shopping effect supports the design of effective public policies to improve health and nutrition in remote areas and to support local economy.

The paper is organized as follows. Section 2 illustrates the measure of food expensiveness, Section 3 introduces the testing strategy for out-shopping effects, Section 4 presents results, and Section 5 concludes.

2. Approach to measure food expensiveness and remoteness premium

Following Revoredo Giha and Russo (2022), this study uses the Aguiar and Hurst index (AHEI) to measure food expensiveness at household level. AHEI is obtained from the ratio between the actual food expenditure in the time of reference and the cost of the same bundle if prices of each good were equal to the quantity-weighted average of prices paid by all households. The index is computed as follows.

Consider household *i* running T^i shopping trips in the period of interest *m*, each time choosing a bundle of goods from the set J of available food products. Household *i*'s food expenditure is:

$$E_m^i = \sum_{j=1}^{J} \sum_{t=1}^{T^i} p_{j,t}^i q_{j,t}^i$$

Where *p's* are actual prices paid by the household, *q's* are purchased quantities (can be zero), and subscripts *j* and *t* refer to products and shopping trips, respectively. The quantity-weighted price average of product *j* in period *m* is defined as

$$\bar{p}_{j,m} = \sum_{i=1}^{N} \sum_{t=1}^{T^i} p_{j,t}^i \left(\frac{q_{j,t}^i}{\sum_{i=1}^{N} \sum_{t=1}^{T^i} q_{j,t}^i} \right)$$

Where is the total number of consumers.

If the household paid the quantity-weighted prices for the same basket of goods, the cost is:

$$\tilde{E}_m^i = \sum_{j=1}^{J} \sum_{t=1}^{T^i} \bar{p}_{j,m} q_{j,t}^i$$

Given the ratio:

$$R_m^i = \frac{E_m^i}{\tilde{E}_m^i}$$

The AHEI is a normalized R_m^i so that in each month the index is centered on 1000:

$$AHEI_m^i = \frac{R_m^i}{N^{-1} \sum_h^N R_m^h} \times 1000$$

The $AHEI_m^i$ is defined at household level over the period of interest (i.e., it can include multiple shopping trips). For the sake of simple notation, we drop the subscript *m* and superscript *i* in the remainder of the paper. A value of AHEI that is greater (lower) than 1000 indicates that on average household *i* paid more (less) for their food basket than they would have bought it at average prices.

AHEI has several interesting features that make it an appropriate measure of food expensiveness. A key problem in comparing food expenditure is that consumers buy heterogeneous bundles of goods. Therefore, simply comparing total expenditure does not provide meaningful information. If households in urban areas buy different bundles of goods than those in remote areas, different values of total food expenditure are not proof of a remoteness premium. Shelf-analysis studies control for this problem because they use an exogenously determined reference basket that is the same for all households (e.g., a healthy basket or a subsistence bundle). The downside of this approach is that the reference basket may not reflect the actual purchases. If the reference bundle is not representative of actual purchases, the result of the analysis might be irrelevant, and inference of the remoteness premium might be biased.

Actual-purchase studies must control for heterogeneous bundles in different ways. The AHEI addresses the issue comparing the expenditure of each household with the expenditure for an identical bundle at quantity-weighted average prices. Hence, the AHEI compares actual purchases and prices with a sort of reference prices (i.e., the quantity-weighted average prices) for the same bundle. In this way, differences in the quality of composition of households' baskets do not affect the results, because each observation is compared to an identical bundle.

The advantage of the AHEI approach is that the analysis is based on actual consumption and there is no need to impose a reference basket a-priori. The downside is that there is no reason to expect that households kept their purchases constant if they were exposed to different prices (i.e., if they buy at the quantity-weighted average prices instead of actual prices) and the AHEI must be interpreted with care because it ignores price elasticity of demand and substitution effects For this reason, the AHEI is not a measure of food expenditure, but a measure of food expensiveness.. It is an index measuring how much – on average – actual prices are higher than the quantity-weighted average prices for the observed bundle.

It should be noted that the AHEI is an average measure; for example, values close to 1000 can be achieved either if all prices are close to the quantity-weighted average or if a set of prices is remarkably higher and another set is remarkably lower than the average so that the two effects offset each other. This feature provides a possible explanation why shelf-analysis studies provides different estimates of the remoteness premium. If the reference basket (for example, heathy food) is expensive but other products (e.g., junk food) are cheap, the shelf-analysis estimates high remoteness premium, while actual-purchases studies obtain lower estimates.

AHEI can be used to compute the remoteness premium (or any difference in expensiveness between groups). The premium can be measured in two ways. The *absolute* premium is the

difference between the average AHEI of the group and the baseline value (1000), the *relative* premium is the difference between the average AHEI of two groups. For example, consider a group R of household living in remote areas and a group composed of all other households (NR). The absolute remoteness premium (AP_m^R) and the relative remoteness premium ($RP_m^{R,NR}$) in period *m* are $AP_m^R = \sum_{r \in R} AHEI_m^r - 1000$ and $RP_m^{R,NR} = \sum_{r \in R} AHEI_m^r - \sum_{nr \in NR} AHEI_m^{nr}$. Intertemporal comparison of remoteness premia is possible, but it must be interpreted carefully. For example, if an increase in the in the absolute premium is observed (i.e., $AP_{m+1}^R > AP_m^R$) it is not possible to conclude that food expenditure increased. In fact, the inequality is satisfied even if expenditure decreases, if the cost of the bundle at quantity-weighted average prices decreases even more. Furthermore, it is not possible to conclude that prices of a given bundle increase, because the bundles in the two period are likely to differ. The inequality simply means that the relative magnitude of the difference between actual prices and quantity-weighted average prices increased, without considering the composition of the two baskets. A key advantage of AHEI in intertemporal comparison is that it controls for changes of the food bundle over time. Because in each period the actual expenditure is compared with the cost at average prices of the same bundle, variation in consumption does not affect the estimates. This point is of particular importance in the natural experiment that is described in the next section.

3. The effect of out-shopping on food expensiveness in remote areas.

In order to assess the impact on out-shopping on food expensiveness a natural experiment was used. The AHEI was measured from a sample of households in remote and urban areas of Scotland during the COVID-19 lockdown in the UK (from March 26rd to June 23rd 2020) and the same period in 2019.

The key assumption of the natural experiment is that movement restrictions that were imposed during the lockdown limited out-shopping opportunities. People was required to stay at home, permitted to leave for essential purposes only, such as buying food or for medical reasons and non-essential business were closed. Movement between municipalities was restricted as well. Shopping outside local areas was more difficult and therefore it is expected that most shopping happened at local store during the lockdown.

If prices at local stores in remote areas are high and households were out-shopping to contain expenditure, movement restrictions result in an increase in food expensiveness and AHEI in remote areas. If the out-shopping hypothesis is true, the effect of lockdown on food

expensiveness in urban areas is expected to be lower, because shoppers do not have to travel far to find low-price stores. Consequently, it is possible to test the effect of out-shopping comparing the relative remoteness premium between remote and urban areas before and during lockdown. If lockdown constrained out-shopping effectively and if out-shopping was effective in reducing food expensiveness in rural areas, the relative remoteness premium is expected to increase.

It must be noted that the AHEI can be applied even if consumption patterns changed during the lockdown. In fact, because of the stay-at-home regulation, the number of at-home meals increased, leading to an increase in the per-capita expenditure for grocery. Also, the psychological impact of the pandemics was expected to affect food choices either to a healthier diet or to an increase in the consumption of comfort food (e.g., Russo et al. 2021, Revoredo-Giha & Russo 2021, 2022). AHEI can control for these changes, because in each period the actual expenditure is compare with the cost at quantity-weighted average prices of the current basket, and not with the expenditure of a fixed basket in a reference period. Following the discussion of the index properties in Section 2, an increase (decrease) of average AHEI in remote areas during lockdown compared to 2019 indicates that – on average – the difference between food prices in remote areas and food prices in other areas of Scotland increased (decreased), but it does not provide any information about the absolute value of prices (i.e., if prices increased or decreased with respect to previous year). Because the goal of this paper is to assess the remoteness premium (difference in averages), AHEI is an appropriate measure.

Food expensiveness in remote and urban areas was measured computing the average AHEI in a sample of 1441 Scottish households from the Kantar HomeScan dataset.[2] The sample was obtained selecting the households in the dataset that were observed in both periods, in order to assess the lockdown effect at household level. The high number of observations can be considered sufficient to provide meaningful insights.

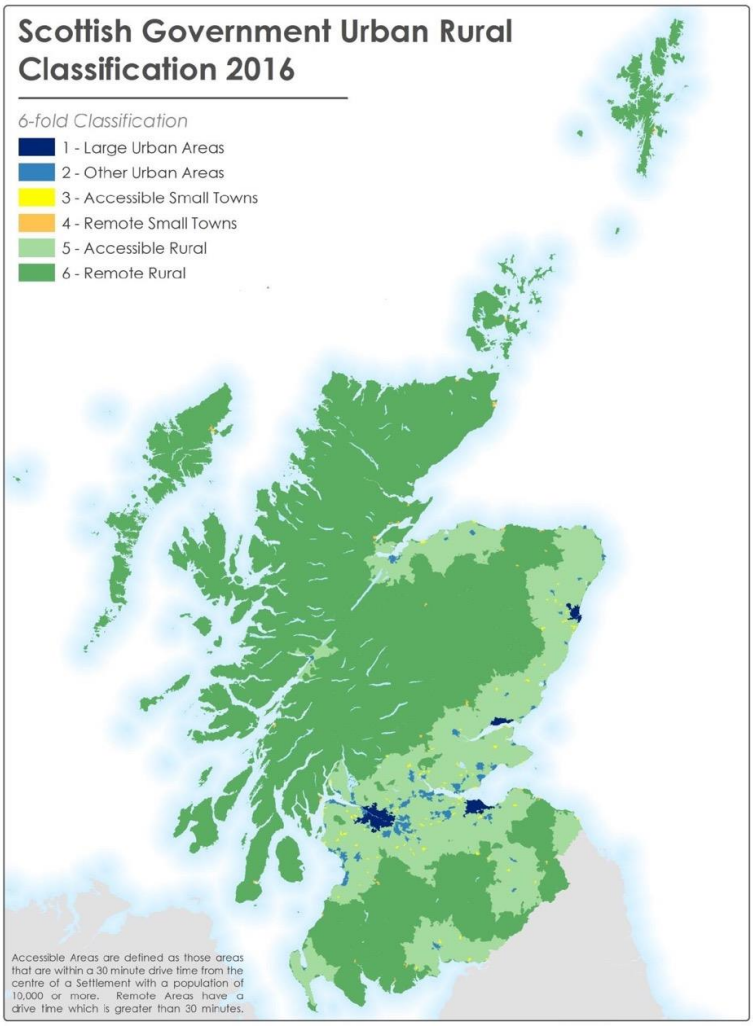
The Scottish Neighborhood Statistics (SNS) classification was used to divide the households into three groups depending on their location in Remote Areas, Accessible Areas, and Urban Areas according to 2016 SNS classification.[3] Figure 1 provides a map of Remote Areas in

[2] Kantar HomeScan dataset is a scanner panel dataset that includes information about food and drink purchases (at the level of the actual product, including bulk products) of a sample of households.

[3] According to the 2016 Scottish Government Urban Rural Classification, 6-fold, Remote areas are municipalities with population less than 10,000 and more than a 30-minute drive apart from a Settlement of 10,000 population. They include Remote rural areas (with a population of less than 3,000) and Remote small towns (with a population between 3,000 and 9,999). Accessible Areas are municipalities with population less than 10,000 and less than a 30-minute drive apart from a Settlement of 10,000 population. They include Accessible rural areas (with a population of less than 3,000), Accessible small towns (with a population between 3,000 and 9,999). Urban areas

Scotland. The case study is important because approximately 9% of Scotland population lives in Remote areas according to the 2019 UK Census (6% in remote rural areas and 3% in remote small towns).

Figure 1: Scotland - Map with areas classification



Source: Scottish Government (www.gov.scot)

4. Results

Table 1 presents descriptive statistics of the sample, reporting basic demographic information by area. The data refer to the primary shopper, that is the person who is more often in charge of grocery shopping. As expected, primary shoppers in urban areas are younger than those in other areas, and the average number of persons in the household is smaller.

include Other urban areas (settlements of a population between 10,000 and 124,999) and Large Urban areas (settlements of a population of 125,000 and more).

Table 1: Descriptive statistics of the sample

	Urban Areas	Accessible Areas	Remote Areas	Total
N. Of households	1020	271	150	1441
Average age of primary shopper ***	48.44	50.13	51.40	49.07
Share of female primary shopper	0.71	0.76	0.71	0.72
Average n. of adults in the household**	1.99	2.11	2.08	2.02
Average n. of children in the household**	0.47	0.59	0.59	0.50

Anova rejected the null hypothesis of equality of means at 99 (***) or 95 (**) per cent confidence level.

The first hypothesis to be tested is whether the COVID-19 lockdown effectively changed the shopping behavior of Scottish households and constrained out-shopping. The specific location of the store where grocery was purchased from was not reported in the dataset. Consequently, out-shopping was not observable. Nevertheless, Table 2 reports the changes a set of variables describing household shopping behavior between before and during the lockdown.

Table 2: Change in variables describing shopping behavior before and during COVID-19 lockdown (95% confidence intervals)

		Urban Areas	Accessible Areas	Remote Areas	ANOVA p-value
Average n. of stores visited/week	2019 value	4.433	4.402	3.713	0.001
	Variat. 2020-19	-0.218±0.078	-0.243±0.156	-0.518±0.186	0.025
Average n. of shopping trips/week	2019 value	2.522	2.412	2.105	0.001
	Variat. 2020-19	-0.131±0.045	-0.154±0.079	-0.168±0.090	0.782
Avg. expenditure HH concentration index	2019 value	0.519	0.521	0.581	0.006
	Variat.2020-19	0.012±0.009	0.011±0.018	0.048±0.025	0.016
Average expenditure share in supermarkets	2019 value	70.548	68.728	80.327	0.001
	Variat.2020-19	0.025±1.016	2.860±2.256	1.045±2.428	0.047
Average expenditure share in discounters	2019 value	20.935	22.228	13.347	0.001
	Variat.2020-19	-0.075±0.923	-2.222±2.050	-1.155±2.117	0.108

The ANOVA p-value refers to the test of equality of the means of the three groups.

Data in Table 2 show that households in remote areas, on average, visit less stores in a week, make a lower number of shopping trips and concentrate their expenditure in a more limited

number of stores than households in urban areas. They spend a lower share of their food expenditure at discounters than urban households.

The change in the average values of the variables during the lockdown was relatively small, when statistically significant. This implies that the effect of lockdown on shopping habits was limited. Households in remote areas exhibit larger changes in absolute values than urban households, but the variations are statistically different only in the case of the average number of stores visited per week and the average Herfindahl-Hirschman concentration index of grocery expenditure.

In order to investigate the effect of lockdown in remote areas, we classified households based on the change in the share of expenditure for food bought at discounters. Discount chains such as Lidl or Aldi are committed to low food prices and use price leadership as main competitive strategy. If lockdown restrictions resulted in a loss of access to these stores, food expensiveness is expected to increase.[4]

Table 3: Distribution of households by area and class of change in the expenditure share for food bought at discounters.

Change in expenditure share at discounters	Urban areas		Accessible areas		Remote areas		Total	
	n. of hh.	%	n. of hh.	%	n. of hh.	%	n. of hh.	%
Gained access	71	6.96	22	8.12	9	6.00	102	7.08
Increase/stable	354	34.71	84	31.00	28	18.67	466	32.34
Decrease	360	35.29	107	39.48	45	30.00	512	35.53
Lost access	77	7.55	18	6.64	19	12.67	114	7.91
No access	158	15.49	40	14.76	49	32.67	247	17.14
Total	1020	100.00	271	100.00	150	100.00	1441	100.00

χ^2 test on the association between the two variables rejected the null hypothesis of independence at 95% confidence level (p-value: <0.001, $\chi^2(8) = 42{,}389$)

A χ^2 test of association concluded that the change in expenditure share at discounters and the household location are not independent variables. Table 3 shows that the share of households

[4] The groups are defined based on the comparison between the share of food expenditure at discounters in 2019 (DISC19) and 2020 (DISC2020). "Gained access" includes households with DISC19=0 and DISC20 >0, "Increase/stable" households with DISC20≥DISC19>0, "Decrease" households with 0<DISC20<DISC19, "Lost Access" households with DISC19>0 and DISC20 = 0, "No access" households with DISC19=DISC20=0.

in the classes “Lost access” and “No access” is higher in remote areas, while the share of households increasing or keeping constant their share of expenditure at discounters is lower. These results support the hypothesis that lockdown restriction affected food sourcing in remote area. The overall effect on food expensiveness has two components: the changes for the households who were able to keep their access to low-price food sources, such as discounters, and those who were not.

Table 4 reports the average AHEI by area and class of change in expenditure share for food bought ad discounters. Consistently with previous studies (Revoredo-Giha & Russo, 2022), a remoteness premium is paid by households living in remote areas in the measure of 3.4 AHEI points in 2019 and 5.2 points in 2020. However, the average increase by 1.8 points is not statistically different from zero (the standard error being 1.2).

Table 4: Distribution of average AHEI by area and class of change in the expenditure share for food bought at discounters.

Change in expenditure share at discounters	Urban Areas			Accessible Areas			Remote Areas			Total		
	2019	2020	Variat.	2019	2020	Variat.	2019	2020	Variat.	2019	2020	Variat.
Gained Acc.	1002.6	1001.1	-1.5	1002.0	1002.6	0.6	1002.1	998.3	-3.8	1002.5	1001.2	-1.3
	(2.0)	(2.1)	(1.8)	(3.6)	(3.1)	(2.0)	(8.6)	(4.3)	(8.4)	(1.7)	(1.7)	(1.5)
Increase	996.1	994.9	-1.2	997.3	997.9	0.6	999.3	997.2	-2.0	996.5	995.6	-0.9
	(0.8)	(0.7)	(0.7)	(1.4)	(1.4)	(1.4)	(2.8)	(2.2)	(2.5)	(0.7)	(0.6)	(0.6)
Decrease	998.2	998.0	-0.2	997.3	998.9	1.7	998.0	1001.6	**3.6**	998.0	998.5	0.5
	(0.7)	(0.7)	(0.7)	(1.0)	(1.1)	(1.1)	(2.0)	(1.8)	**(1.3)**	(0.6)	(0.6)	(0.6)
Lost Access	1005.3	1005.9	0.6	1002.2	1007.9	5.8	998.7	1005.2	**6.6**	1003.7	1006.1	2.4
	(1.8)	(1.9)	(1.5)	(4.6)	(5.1)	(3.8)	(4.3)	(4.6)	**(3.1)**	(1.6)	(1.7)	(1.3)
No Access	1006.9	1006.5	-0.3	1007.5	1007.4	-0.1	1012.6	1014.3	1.7	1008.1	1008.2	0.1
	(2.0)	(1.4)	(1.9)	(2.3)	(2.9)	(2.2)	(3.3)	(2.7)	(2.7)	(1.5)	(1.1)	(1.3)
Total	999.6	999.0	-0.6	999.5	1000.7	1.3	1003.4	1005.2	1.8	1000.0	1000.0	0.0
	(0.5)	(0.5)	(0.5)	(0.8)	(0.9)	(0.8)	(1.6)	(1.4)	(1.2)			

Numbers in parenthesis are standard errors of the mean, bold fonts indicate variations that are statistically different from zero at 95% confidence level.

Only households in remote areas who experienced a decrease in the share of food expenditure at discounters or stopped purchasing there altogether exhibit an increase in the absolute remoteness premium. The size of the increase was larger for households who lost access (6.6

AHEI points) than for those who experienced a decrease in discounter expenditure share (3.6 points). This result is consistent with an out-shopping effect. Only in the case that lockdown restrictions resulted in a limitation in the use of low-price food sources, food expensiveness increases.

The comparison of urban and remote households who lost access to discounters, shows that during lockdown they exhibited similar values of average AHEI (1005.9 versus 1005.2, respectively). Yet, the values before lockdown in 2019 were different (1005.3 for urban households versus 998.7 for remote ones). This finding suggests that loosing access to discounters may have a different effect in urban and remote areas, with a much larger impact in the latter case. Although more evidence is needed for a conclusion, a possible explanation is that discounters in urban areas were substituted with similar sources (e.g., supermarkets), while in remote areas they were substituted with more expensive alternatives (e.g., local stores). This result is consistent with the existence of an out-shopping effect.

5. Conclusions

This paper investigated the effects of out-shopping on food expensiveness in remote areas of Scotland using COVID-19 lockdown as a natural experiment. The study confirms previous with similar approach (Revoredo-Giha and Russo, 2022) finding that a remoteness premium exists, but its magnitude is limited (in 2019 it was 3.4 points on a 1000 scale).

The estimate of the out-shopping effect accounts for a fraction of the difference between the findings of shelf-analysis studies and actual-purchase investigation. This implies that other factors should explain the gap, including the difference between the reference basket that is used in the study and the actual baskets that are purchased by households in remote areas.

The empirical analysis found that lack of access to low-price food sources like discounter is a key driver of food expensiveness. This result is consistent with previous literature pointing out that accessibility and affordability of healthy food is affected by the presence of medium and large stores in the area (Dawson et al., 2008). When the movement restrictions that were imposed during the lockdown resulted in a loss of access to discounters, the food-expensiveness measure AHEI in rural areas increased on average by 6.6 points, a value that is almost double of the average remoteness premium. Consistently, if lockdowns resulted in reduction in the use of discounters, an increase of average food expensiveness in remote areas are observed. Similar trends were not detected in urban areas.

The study supports the hypothesis that out-shopping is an important factor limiting food expensiveness in remote areas of Scotland. The conclusion has several policy implications. The issue of high food prices at local stores in remote areas may be less severe than predicted by shelf-analysis studies, for the majority of households who are able to travel to nearby sources of low-price food. However, there were 32 per cent of remote households in the study sample that did not shop at discounters who paid a premium of 12.6 AHEI points in 2019 and 14.3 points in 2020, values that are between three and four times higher than the average remoteness premium. Although the values are still relatively small (approximately 1 per cent of food expenditure), there is a possible distribution effect of high local food prices that may harm household who are unable to travel for food shopping. Also, it must be noted that this study does not consider the dietary implications that may arise from higher prices for healthy food baskets. In fact, the estimate is based on actual purchases and household may substitute healthy product with cheaper alternatives to reduce food expensiveness (Dawson et al., 2008).

According to the results of this study facilitating access to discounters and other large retailers is an effective strategy to reduce food expensiveness in remote areas. Yet, the effect of these measures on local economy and food availability is difficult to evaluate (for example, Blanchard & Tyson, 2002).

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