

FOOD OUTSHOPPING IN REMOTE RURAL AREAS OF ITALY: LESSONS FROM A NATURAL EXPERIMENT

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Abstract: The increasing number of supermarkets and hypermarkets poses a risk to the survival of small local shops in rural areas. As a result, people living in remote areas might need to travel several kilometers to obtain food, and this can create objective difficulties for those who do not drive or cannot afford the cost of owning a car. This study uses a natural experiment to analyze outshopping practices in Italian remote areas using the database of the multipurpose survey on Italian families carried out by Italian National Institute of Statistics. For this study, we used the COVID-19 lockdown as a state of nature when long-range shopping trips were less frequent, and we compared it with the pre-COVID-19 habits, in order to identify changes in consumption and shopping behavior. Our study is the first to explore outshopping behaviors in remote areas of Italy, offering original insights into food access and healthy eating where research is currently lacking. We performed a difference-in-difference analysis, comparing remote areas with other areas in Italy, to highlight the effect of outshopping in remote areas. Our results show how a considerable share of consumer food expenditure is paid to firms outside the local area, supporting the hypothesis of financial resources shift from the local business to large retailers. Moreover, we found limited food access and diet issues in Italian internal areas when outshopping practices are constrained.

Keywords: outshopping practices, remote rural areas, food expenditure, households' behaviours

Highlights

- The research provides the first quantitative evidence on food outshopping in remote Italian areas using the COVID-19 lockdown as a natural experiment.
- Outshopping improves access to healthy and affordable food.
- Demographic decline and weak local services exacerbate food accessibility gaps in remote areas.
- Our conclusions contribute to the European debate on food deserts and rural resilience by contextualizing the Italian case.

1. Introduction

Many remote rural areas are experiencing a significant demographic decline due to emigration, aging of the population and an increase in social mobility (Woods, 2005; Brezzi et al., 2011). This leads to a substantial reconfiguration of rural populations and the emergence of new issues and challenges in the structure of commerce, with the opening of supermarkets, hypermarkets, and discount stores in more densely populated areas, far from remote rural areas (Lewis & Lee, 2016; Yeager and Gatrell, 2014). The aim of this research is to investigate outshopping behaviors in the context of remote rural areas in Italy, assessing whether outshopping is an essential practice for enabling access to large retailers in remote areas, and if difficulties in outshopping impact the quality of food consumption in these territories.

One consideration of this research is that in many high-income countries households in remote rural areas allocate a larger proportion of their overall expenditure to food compared to those living in urban regions (Liese et al., 2007; Larsen and Gilliland, 2009; Morris et al., 1992). Sometimes, they may also have worse diets and poorer health than urban households because they normally only have access to small local shops to purchase groceries, which are usually quite expensive and have a relatively narrow range of food products (Mseke et al., 2024, Chen et al., 2016; Tsang et al., 2007). In fact, healthy foods (for example, fruits and vegetables) are more expensive and less available at smaller retailers compared to supermarkets (Revoredo-Giha & Russo, 2022). In this regard, it is widely recognized by the scientific literature that households in areas with restricted access to supermarkets, hypermarket, or discount, tend to pay more for almost all food categories (Latham and Moffat, 2007; Chung and Myers, 1999; Barratt, 1997).

Currently, in Italy, larger retailers account for 61% of the food market (predominantly located in urban areas), and 81% of agri-food purchases are made through these retailers (CREA-PB, 2024).

In this context, outshopping – defined as buying food from retailers outside of local municipalities – is a crucial factor for remote rural households to mitigate the impact of high food prices and limited availability. By traveling to other areas for food shopping, households can access a wider range of food sources and obtain a more affordable and diverse (Revoredo-Giha & Russo, 2022).

The objectives of our study are: i) to evaluate whether outshopping is a crucial practice to ensure access to large retailers for households in remote areas, and ii) to describe the potential consequences of restrictions on outshopping practices.

The novelty of our research lies in the fact that it is the first study to examine outshopping in remote areas of Southern Europe, specifically in Italy. This makes our study particularly significant as it addresses a gap in existing literature and provides new insights into healthy eating and food access in these regions.

2. Literature Review

The purpose of this section is to provide an overview of studies that examine the challenges of maintaining a healthy diet in rural and remote areas and explores outshopping as a means to mitigate the food supply constraint.

Several authors have studied the impact of household spatial distribution and the accessibility of healthy food. Ward et al. (2012) demonstrated that the cost of healthy food is generally higher in rural areas compared to urban areas, with costs being even higher in more remote rural areas. Coderoni et al. (2017) found that living in peripheral regions in Italy is associated with a shift in expenditure away from healthy food. While Laraia et al. (2004) pointed out that consumers living in rural areas on average eat less healthy food and have a greater body mass index (BMI) than do urban consumers. Other studies have also highlighted that among people living in rural areas, there is a higher prevalence of overweight and obesity (Phillips and McLeroy, 2004; Lutfiyya et al., 2007). Some other studies have found the disproportionately high cost for households of maintaining a healthy diet relying on average weekly salary (Tsang et al., 2007; Palermo et al., 2008).

As shown by Dutko et al. (2012), access to one's own car significantly influences the ability to obtain sufficient, healthy and affordable food. In general, people living in remote rural areas have to travel more miles to obtain food and other goods for daily living (Glasgow, 2000). For this reason, the percentage of vehicle ownership is generally higher in rural areas compared to urban areas and people living in these areas have higher average transportation costs (including cost for gasoline and other related costs) compared to those in urban areas (Dutko et al., 2012; Meziani et al., 2023).

Some studies found that households in remote areas with high transportation costs face limited food availability (including less variety and lower quality of fresh produce and meat compared to suburban and urban stores) and affordability (food prices can be above the national average) (see for example, Kaufman, 1999; Beaulac et al., 2009; Whelan et al., 2018; Mendoza et al., 2011). Other studies have assessed the prices of standard food baskets and identified notable price disparities between rural and urban areas (Dawson et al., 2008). This disparity, referred to as the "remoteness premium", signifies that households incur higher food costs solely due to their remote locations (Cummins et al., 2010; Hirsch et al., 2013; Hirsch et al., 2016; Tsang et al., 2007; Palermo et al., 2008; Ward et al., 2012; Pollard et al., 2014; Ferguson et al., 2016; Bardenhagen et al., 2017; Naylor et al., 2020). This matter is especially troubling because remote rural areas, as already underlined above, often also have low per capita income (Bock et al., 2014; Sørensen, 2014) and few, if any, large retailers or even grocery stores available (Morton et al., 2005).

Limited access to low-cost food sources is considered a significant factor contributing to the remoteness premium (Marshall et al., 2018) and the reduction of the availability of affordable and healthy food options (Shanks et al., 2015).

In particular, Dawson et al. (2008) highlighted that the scarcity of medium and large stores in some areas reduces the availability and affordability of healthy food. This scarcity can lead also to the risk of “Food Deserts” (Dutko et al., 2012; Yeager & Gatrell, 2014).

Going into detail about what is meant by “Food Desert”, the US Department of Agriculture (USDA, 2009) indicated that “Food Deserts are those regions that often have a high proportion of households with low incomes, insufficient access to transportation, and a limited number of food retailers offering fresh produce and healthy groceries at affordable prices. Moreover, the USDA (2009) has also assessed the distance to the nearest health-food retailer, using the locations of supermarkets as a proxy for identifying the risk of food deserts. According to Larsen and Gilliland (2008), most of the research on food deserts has been conducted on urban areas. The reason could be that for a long time, it was thought that rural and remote areas could have a certain degree of self-sufficiency with local production, self-production, zero-mile sales and proximity shops. Instead, while it is true that these areas generally rely heavily on agriculture as their main source of income and the combination of that with the demographic decline and the aging population, brings new challenges for residents of these remote rural communities (Brezzi et al., 2011). So, it becomes increasingly clear that remote rural areas also experience a risk of food deserts due to some market dynamics described above. In particular, as the spatial distribution of food stores shifts, many rural areas are increasingly becoming food deserts because there are no, or very few, grocery stores here (Ramos-Truchero, 2024; Furery et al., 2001; Lang and Caraher 1998; Paddison et al., 2007; Bitto et al., 2016). This structural fragility was further exposed during the Covid-19 pandemic, when mobility restrictions and social distancing measures forced households to depend mainly on local retailers. The sparse presence of large retailer formats in many rural communities made these limitations especially severe, highlighting how external shocks can amplify existing vulnerabilities in food accessibility (Cattivelli, 2022). In this regard, although Italy is sometimes considered less exposed to food desert risks, thanks to its relatively high commercial density and the persistence of itinerant markets, recent studies indicate that these structural features are insufficient to offset the vulnerabilities of remote territories (Clerici, 2024). Remote rural areas, in particular, continue to suffer from reduced access to large retail formats, a condition exacerbated by depopulation, population aging, and weak service provision (Clerici et al., 2024; Arlotti, 2024; Nilsson, 2023). Moreover, while itinerant trade remains a culturally rooted practice, its irregular and uneven presence cannot substitute for stable retail outlets (Belletti et al., 2024).

Rural areas are showing a process of social isolation due to the dynamics whereby older people remain in rural areas, while young people tend to increasingly urbanize. This process also jeopardizes local food production, particularly in terms of both the quantity and variety of food needed for a balanced diet (Peterson et al., 2010; Sharkey et al., 2010). Furthermore, it is often the case that remote rural areas are less developed and defined by families on a single income and greater challenges related to employment and education compared to non-rural areas (Bock et al., 2014; Shucksmith et al., 2009; Beatty, 2010; Sørensen, 2014).

Meloni et al. (2023) found that a gap in various dimensions of well-being exists between rural and urban areas in Europe, generally favoring urban areas. This gap tends to be minimal or even slightly reversed in high-income countries, while it widens as a country's income level decreases.

Bardenhagen et al. (2017) in a study conducted in northeast Lower Michigan pointed out that smaller grocers in rural areas often struggle to keep healthy foods in stock for their customers. On the contrary, they found that the supermarkets and hypermarkets had a greater variety and quality of produce. For this reason, the practice of outshopping significantly increases the availability of healthy foods in remote rural areas (Revoredo-Giha & Russo, 2021).

The existence of outshopping to access fresh and better-quality food and thus counteract the risk of food deserts has been quite debated over the last 15 years in some areas of the world, specifically in the US, UK and Canada (USDA, 2010; Cummins and Macintyre, 2006; Shaw et al., 2006; Hubley, 2011; Revoredo-Giha & Russo, 2022). However, according to Revoredo-Giha and Russo (2021), **outshopping** practices can also have negative effects. They intensify competitive pressure in remote areas, leading to a decrease in the trade volume of local businesses as customers opt for food sources farther away. Households in remote regions encounter a typical arbitrage problem: if the travel cost is less than the price difference

between local stores and large retailers in other regions, then shopping outside the local area becomes a more economical option. This creates an equilibrium where households with high transportation costs endure high prices and limited availability at local stores, while those with lower transportation costs benefit from outshopping.

The competitive pressure on local stores has a dynamic aspect. As small retailers in remote areas close down due to outshopping practices, residents are further incentivized to travel elsewhere for food (Bardenhagen et al., 2017; Beaulac et al., 2009). This situation is especially challenging for low-income families, who tend to shop less frequently due to limited access to their own vehicle and the absence of public transportation. This creates a vicious cycle where outshopping leads to local store closures and higher local prices, which in turn encourages even more outshopping (Bailey, 2010; Whelan et al., 2018).

The dynamics of the outshopping process emphasize its significance for the sustainable development of rural areas. Our study adds to the academic research on outshopping in remote areas by offering a quantitative assessment of this practice in Italy's rural regions.

From this review, we derive the following research questions:

- To what extent does outshopping enable households in remote areas to access large-scale retailers such as supermarkets and discount stores?
- What are the dietary consequences of limiting outshopping practices in terms of healthy food consumption and overall food expenditure?

3. Methodology

To evaluate outshopping in remote-area households and potential consequences on food quality of restrictions on outshopping, since outshopping practices cannot be directly observed without specific surveys, we estimated their intensity and effects using a natural experiment.

The sample of respondents used for our analysis includes a large panel of 25,247 observations over four years. They were chosen to be representative of the demographic composition of the municipalities and are distributed across all regions.

We compared households' behavior in scenarios where shopping trips are feasible with those where such trips are either impossible or significantly discouraged. By holding all other factors constant, any differences between these scenarios can be appropriately ascribed to outshopping. For this reason, we utilize the COVID-19 lockdown as a natural experiment in which shopping trips were significantly restricted.

We conducted a comparative analysis of Italian household behavior during the lockdown, utilizing data from a corresponding pre-lockdown period of unrestricted movement to identify potential differences.

To investigate the presence of structural breaks in consumer behavior during 2020 across remote and non-remote areas, we adopted a time-series prediction interval approach based on linear trend extrapolation. Specifically, we assessed whether the 2020 values for a set of outcome variables deviate significantly from the trends observed between 2017 and 2019.

For each variable and area type (remote vs. other areas), we estimated a simple linear regression model over the pre-2020 period:

$$y_t = \alpha + \beta t + \varepsilon_t$$

Where y_t denotes the observed value of the variable of interest (for example, share of consumers shopping at supermarkets in remote areas) in year t and $t \in \{1, 2, 3\}$ corresponds to years 2017 to 2019. The model captures a linear trend in the outcome variable. Using this model, we predicted the value for 2020 ($t=4$) and constructed a 95% prediction interval around the forecasted value:

$$\hat{y}_{2020} \pm t_{\alpha, v} SE(\hat{y}_{2020})$$

Where $t_{\frac{\alpha}{2},v}$ is the critical value of the t-distribution at the 95% confidence level with $v=1$ degree of freedom (since only three observations are used), and $SE(\hat{y}_{2020})$ is the standard error of the forecast.

We then compared the actual 2020 value with this interval. If the observed value falls outside the interval, we interpreted this as evidence of a structural break at the 95% confidence level. To quantify the statistical significance, we calculated a two-tailed p-value for the null hypothesis that the 2020 value belongs to the distribution implied by the pre-2020 trend. Significance is annotated using conventional thresholds ($p < 0.10$, $p < 0.05$, and $p < 0.01$).

This methodology aligns with established practices in structural change detection in small-sample time series settings (Clements & Hendry, 1999; Bai & Perron, 2003) and is particularly useful when limited data preclude more complex models.

Because the SARS-CoV-2 pandemic affected consumer behavior in multiple ways beyond simply limiting movement, including heightened stress and anxiety, health-related concerns, and shifts in dietary habits, we implemented several measures to minimize the impact of confounding factors in our analysis.

First, we conducted a difference-in-difference analysis, comparing the results from remote areas (“aree interne” as are defined by ISTAT) with those from other Italian regions. In our research, the concept of remote areas corresponds to the Italian “aree interne”, as defined within the Italian National Strategy for Inner Areas (SNAI)⁴. The National Strategy for Inner Areas (SNAI) is an experimental policy designed to counteract the marginalization and depopulation affecting Italian territories located at a significant distance from essential public services and infrastructures (Barone et al., 2023). These areas are identified based on their distance from essential services (e.g., schools, hospitals, etc.) (CREA-PB, 2020). According to the official classification, “aree interne” are subdivided into intermediate, peripheral, and ultra-peripheral areas, depending on their degree of remoteness from these service hubs (OECD, 2016). By adopting this framework, we can clearly separate remote from non-remote areas according to ISTAT’s operational definition, thereby guaranteeing that the dynamics observed in consumer behavior are understood in the light of Italy’s distinctive territorial structure.

Assuming that other factors affected households in both remote and non-remote areas in a similar manner, we considered households in non-remote areas as the control group, while those in remote areas as the treatment group. Second, we conducted a comparative analysis of data from the lockdown period (March – June 2020) with corresponding data from the same months in 2017 and 2018 (i.e., before the pandemic) to account for seasonal effects and potential lasting changes in consumption patterns resulting from Covid-19 pandemic.

This approach was applied to the ISTAT dataset of the “*Indagine sulle spese delle famiglie*” from 2017 to 2020. The ISTAT dataset offers detailed information on the food expenditures of Italian households, categorized by product type and by retail outlet, ranging from small family-run stores to hypermarkets. However, it does not include information regarding the specific locations where the purchases were made.

To investigate outshopping, we tested two hypotheses:

1. During the Covid-19 lockdown, purchases conducted at large-scale retail outlets (i.e., supermarkets, hypermarkets and hard-discount stores) declined more substantially in remote areas compared to other regions. This test enables us to evaluate the significance of outshopping practices in providing access to low-cost, diverse outlets for households in remote areas.
2. During the Covid-19 lockdown, the consumption of healthy foods (specifically fruits, vegetables, fresh fish, and meat) was significantly lower compared to non-remote areas.

We employed this test to draw conclusions regarding the impact of outshopping on the affordability and accessibility of healthy food options.

⁴ For a comprehensive overview of the National Strategy for Inner Areas (SNAI), see the website of the Italian Agency for Territorial Cohesion: <https://www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/?lang=en>.

4. Results and discussion

The main characteristics of the household sample used in the analysis are reported in Table 1. Across the years considered, approximately 22% of households are located in remote areas, while 78% are in other areas. However, this distribution varies significantly at the regional level. Indeed, some regions have a very high percentage of families located in remote areas, such as Basilicata, where almost 80% of the families interviewed live in remote areas. Similarly, Calabria and Molise are strongly affected, with around 60% of respondents residing in remote areas. By contrast, in Lombardy, Friuli Venezia Giulia, and Tuscany, less than 10% of households on average are located in remote areas over the years considered.

Tab 1. Distributions of households per region. Source: author's own elaboration based on ISTAT data

Region	2017			2018			2019			2020		
	Remote areas	Other areas	Total	Remote areas	Other areas	Total	Remote areas	Other areas	Total	Remote areas	Other areas	Total
Piemonte	43	291	334	45	309	354	47	313	360	19	474	493
Valle d'Aosta	45	119	164	23	143	166	21	151	172		142	142
Lombardia	59	631	690	85	630	715	90	646	736	99	966	1.065
Trentino Alto Adige	65	164	229	114	235	349	122	262	384	110	198	308
Veneto	34	334	368	52	324	376	42	334	376	78	455	533
Friuli-Venezia Giulia	15	173	188	14	193	207	16	189	205	15	188	203
Liguria	26	247	273	8	279	287	8	285	293	10	187	197
Emilia-Romagna	49	292	341	49	299	348	52	309	361	81	458	539
Toscana	14	279	293	24	291	315	24	297	321	30	541	571
Umbria	44	107	151	47	134	181	44	138	182	70	133	203
Marche	8	127	135		184	184		183	183	23	208	231
Lazio	168	342	510	158	373	531	163	389	552	206	492	698
Abruzzo	60	94	154	55	102	157	51	97	148	76	121	197
Molise	119	71	190	86	102	188	119	76	195	109	68	177
Campania	39	326	365	39	340	379	40	343	383	92	388	480
Puglia	39	322	361	57	306	363	55	302	357	60	220	280
Basilicata	152	30	182	154	32	186	156	31	187	135	40	175
Calabria	130	82	212	138	96	234	141	96	237	164	88	252
Sicilia	110	215	325	114	235	349	122	241	363	144	329	473
Sardegna	40	94	134	66	137	203	74	140	214	107	43	150
Total	1.259	4.340	5.599	1.328	4.744	6.072	1.387	4.822	6.209	1.628	5.739	7.367

Generally, the head of the household answers the survey, but information on family composition is also collected. Indeed, the data analyzed show that the largest percentage of respondents, approximately 33%, are families of two people. There is also a high percentage of families with only one member (about 30%), followed by those with three or more members, up to a maximum of 12 members, although this occurred in only one case.

The average age of household heads is around 60, with no significant differences across areas or years. If we look at all components of families interviewed, the average age is 46, rising slightly to 47 in 2019, but in remote areas, it is slightly higher, reaching 48 in 2017 and 47 in subsequent years. Figure 1 illustrates the distribution of households by the age class of the head, indicating that generally, the majority of households are in the intermediate age range between 41 and 64. In remote areas, while the percentage of household heads of retirement age, 65 and over, is slightly higher.

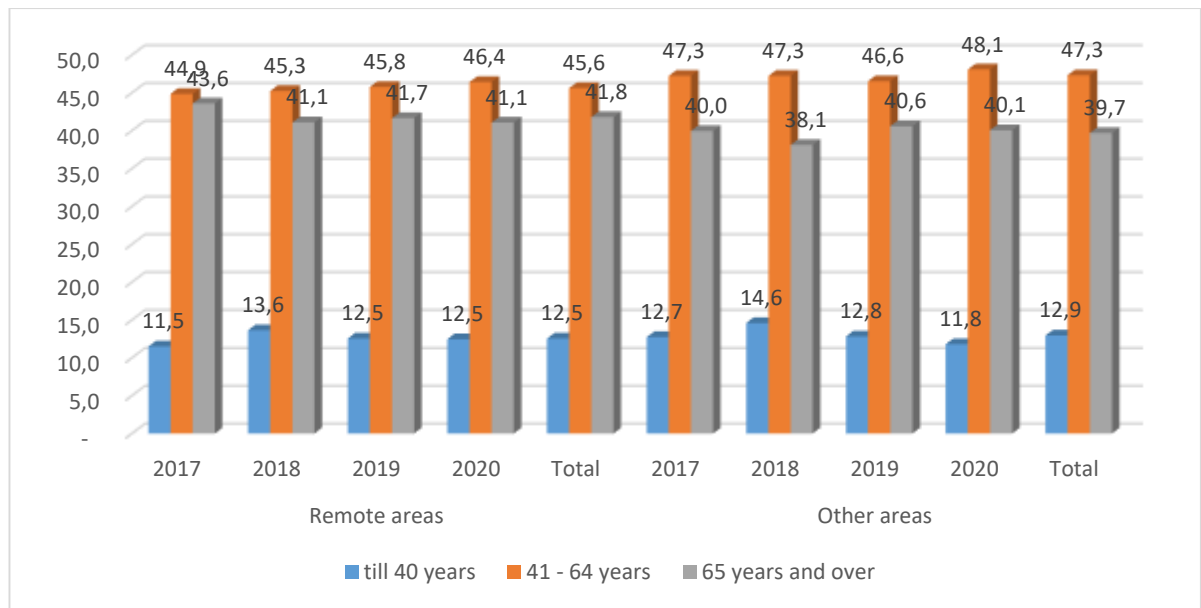


Fig 1. Distribution of households per age class of head of the family. Source: author's own elaboration based on ISTAT data

The ISTAT dataset classifies the types of stores frequented by Italian households during the considered period into a seven-item classification: Supermarkets and Hypermarkets, Hard discounts, Malls and chain stores, Online stores, Traditional shops, Markets and peddlers, and On-farm retail.

We compute the empirical probabilities (i.e., relative frequencies) of households shopping at each store type, as well as the probability that a household made no purchases at hard-discount stores or supermarkets (i.e., large retailers).

The relative frequencies are presented in Table 2, with data covering the period from March to June of each year, ensuring that the 2020 data align with the lockdown period while remaining comparable with earlier years.

Tab 2. Share of households by purchasing channel. Source: author's own elaboration based on ISTAT data

	Remote areas				Other areas			
Year	2017	2018	2019	2020	2017	2018	2019	2020
Number of households	1259	1328	1387	1628	4340	4744	4822	5739
Super & Hypermarkets	0.861	0.863	0.867	0.874	0.909	0.899	0.891	0.899
Hard discount	0.253	0.267	0.286	0.244	0.234	0.241	0.268	0.208
Malls & chains	0.056	0.038	0.044	0.035	0.049	0.045	0.043	0.028
Online stores	0.010	0.006	0.012	0.013	0.007	0.008	0.009	0.015
Traditional shop	0.809	0.733	0.728	0.613	0.679	0.626	0.616	0.496
Markets and peddlers	0.278	0.229	0.240	0.130	0.222	0.199	0.178	0.097
On farm retail	0.100	0.110	0.102	0.053	0.097	0.088	0.083	0.040
No large retailers	0.043	0.032	0.029	0.035	0.027	0.035	0.026	0.030

Over 85% of households in rural remote areas shop at supermarkets and hypermarkets, and more than 95% source their food purchases from large retailers. Our estimates align with findings from other studies, confirming that the supermarket revolution has affected even the most remote regions of Italy (Revoredogiha and Russo, 2022).

The pandemic lockdown functions as a natural experiment to evaluate the impact of outshopping on facilitating access to large retailers. Specifically, if shoppers in remote areas need to travel significant distances to reach large retailers, we would expect to see a decline in the proportion of households using these large retailers during the COVID-19 lockdown.

Since the data in Table 2 show trends, we conducted a trend analysis to evaluate the impact of the lockdown. A time trend was derived for each variable in Table 3 based on data collected from 2017 to 2019. Next, we checked whether the confidence interval for the 2020 share fell outside the confidence interval for the predictions obtained from the trend analysis. This predicted confidence interval is adjusted to reflect the fact that the data represent sample means and are subject to sampling errors. We recognize that three observations might be insufficient to establish a robust trend; however, considering the limitations of the data and the high R^2 values for the variables related to remote areas, we concluded that the analysis continues to provide valuable insights. The trend analysis is presented in Table 3:

Tab 3. Trend analysis for large retailers. Source: author's own elaboration based on ISTAT data

Share of households shopping at:	Remote areas				p-value		R^2
	lower 95% CI	$\hat{y}_{2020}$	upper 95% CI	y_{2020}			
Super & Hypermarkets	0.851	0.870	0.889	0.874	0.211		0.964
Hard discount	0.254	0.302	0.349	0.244	0.041	**	0.992
Malls & chains	-0.193	0.034	0.261	0.035	0.964		0.429
Online stores	-0.083	0.011	0.106	0.013	0.860		0.107
Traditional shop	0.003	0.676	1.348	0.613	0.446		0.796
Markets and peddlers	-0.357	0.211	0.779	0.130	0.321		0.546
On farm retail	-0.064	0.106	0.276	0.053	0.158		0.036

Other areas							
Share of households shopping at:	lower 95% CI	$\hat{y}_{2020}$	upper 95% CI	y_{2020}	p-value		R^2
Super & Hypermarkets	0.863	0.882	0.901	0.899	0.055	*	0.996
Hard discount	0.092	0.282	0.471	0.208	0.127		0.897
Malls & chains	0.021	0.040	0.059	0.028	0.081	*	0.964
Online stores	0.010	0.010	0.010	0.015	0.000	***	0.999
Traditional shop	0.170	0.577	0.985	0.496	0.239		0.866
Markets and peddlers	0.137	0.156	0.175	0.097	0.016	**	0.999
On-farm retail	0.037	0.075	0.113	0.040	0.054	*	0.974

Comparison of observed (y_{2020}) and predicted ($\hat{y}_{2020}$) 2020 values of shares of households shopping at various retail formats, including lower and upper bounds of the 95% confidence interval of predictions, p-value of the t-test on the difference between observed and predicted values, and R^2 of the trend regression in remote and other areas

During the lockdown, households in remote areas experienced a decline in access to hard discount stores, which contrasted with the upward trend observed in previous years. The actual share was 0.244, compared to the predicted share of 0.302, and this difference is statistically significant at the 95% confidence level. Similarly, households in other areas showed comparable patterns. However, there was no evidence to suggest that the COVID-19 lockdown affected the proportion of households in remote

areas utilizing supermarkets and hypermarkets, as the observed value for 2020 aligned with the upward trend from 2017 to 2019.

In non-remote areas, the lockdown effect was more complex. The share of hard-discount users decreased by -0.07 relative to the predicted trend value; at the same time, a 0.17 increase in the share of supermarket users was found, which contradicted the downward trend seen in prior years (statistically significant at the 90% confidence level). The use of online stores was higher than expected (+0.05 compared to the prediction), suggesting that in non-remote areas, reduced mobility led to a substitution of brick-and-mortar stores with online purchases. A reduction was also observed in the share of households using on-farm retail, markets, and peddlers.

The analysis showed that remote and non-remote areas reacted differently to the restriction in mobility. In non-remote areas, access to large retailers (hypermarkets, supermarkets, and discount stores) was not affected. The most evident reaction was a boost of internet purchases and a reduction in the use of formats associated with crowding of shoppers (such as markets or malls). Thus, in non-remote areas, behavioral changes can be explained with the need to limit personal interactions when shopping to reduce the probability of contagion. In remote areas, the observed reduction in the share of household shopping at discount stores was the only reaction. This is consistent with the spatial distribution of retail formats. While supermarkets are relatively widespread even in remote areas, discount stores are still concentrated in areas with higher population density. We interpreted these results as evidence of outshopping in rural areas, where households travel to find low-price outlets. In fact, under restricted mobility, rural households lost access to discount stores and were not able to adjust their shopping strategy.

The ISTAT dataset does not allow tracking of specific households across time. Therefore, we could not observe the effects of individual households losing access to large retailers. Even so, we can compare descriptive statistics for groups across two periods.

Table 4 presents the average values of selected expenditure variables for 2019 and 2020, offering a comparison between households lacking access to large retailers and the rest of the sample in remote areas.

Tab 4. Assessment of the average values for selected variables in households situated in remote areas, classified by their access type to large retailers. Source: author's own elaboration based on ISTAT data

	Household in remote areas: not shopping at large retailers		Other households in remote areas	
	2019	2020	2019	2020
	$\mu_{N,19}$	$\mu_{N,20}$	$\mu_{O,19}$	$\mu_{O,20}$
Age of respondents	64.6±5.963	65.2±4.292	60.3±0.847	59.4±0.776
Share of female respondents	0.325±0.12	0.421±0.12	0.309±0.02	0.297±0.02
Food expenditure per person	180.32±57.9	84.356±28.81	234.7±10.40	230.4±7.35
Expenditure on healthy food on total food expenditure	0.067±0.018	0.042±0.016	0.083±0.003	0.094±0.003
Non-food expenditure per person	1051.6±338.5	655.3±96.8	885.7±36.2	752.4±32.0

Bold font: $\mu_{G,19} \neq \mu_{G,20}$ at 95% confidence level with G =N, O (comparing same group, different year).

Italic font: $\mu_{N,T} \neq \mu_{O,T}$ at 95% confidence level with T =2019, 2020 (comparing same year, different group).

The findings indicated that limited access to large retailers is associated with a lower proportion of spending on healthy foods (such as fruits, vegetables, fresh fish, and meat) in relation to total food expenditure, as well as a reduced overall average food expenditure. This trend was particularly pronounced during the lockdown period. Interestingly, among households with access to large retailers, the share of expenditure on healthy food increased during the lockdown, whereas it declined among those lacking such access. Furthermore, while total food expenditure remained stable for households with access to large retailers during the lockdown, it decreased for those without access, leading to a significantly lower total expenditure in comparison to the former group.

Given that outshopping was likely discouraged during the lockdown, the findings imply that outshopping may benefit households in remote areas, particularly if it enhances their access to large retailers. However, a definitive assessment of this hypothesis requires further research.

5. Conclusions

Households in rural remote areas often have a distinct experience of the “food environment” compared to those living in densely populated urban and suburban areas. These remote rural residents, due to limitations in transportation options, typically face greater difficulties in accessing healthy and affordable food than people residing in urban areas. Moreover, residents in these disadvantaged areas face a limited number of grocery stores and higher food prices in small local markets. This contrasts with urban and suburban areas, where a higher density of food retailers and better transportation infrastructure generally make it easier for residents to access a variety of food options, including fresh produce and other healthy items. The disparity in food environment accessibility between these different living areas can contribute to significant differences in diet quality and overall well-being (Cohen & Greaney, 2023).

While Italy boasts an abundance of food, rising obesity rates highlight significant disparities in food distribution and access based on location and demographic factors. Over the past century, globalization and industrialization have profoundly changed the Italian agrifood system, resulting in the strengthening of the large-scale food retail industry. This shift has left some rural and inner-city areas struggling with inadequate food resources. The infrastructure of a community’s food system plays a crucial role in determining access to food, which can significantly affect residents’ health and well-being. Research indicates that people with restricted or no access to grocery stores often face a narrow range of food options – healthy or otherwise – at reasonable prices, ultimately impacting their health status negatively (Morton et al., 2005; Hendrickson et al., 2006). Moreover, remote rural residents may have to travel by car to distant locations from their place of residence in order to purchase healthy, fresh, and minimally processed food. This poses significant challenges for senior citizens and low-income people residing in rural regions.

All these factors highlight the significant gap between rural and non-rural areas, making it a critical concern for policymakers. Addressing these disparities is essential to ensure equitable access to healthy food resources and improve overall community health.

In this context, our paper explores the topic of outshopping practices in Italian remote areas. We discovered that outshopping is essential for maintaining access to discount stores – a significant source of low-cost food – for a notable portion of households. Consistent with findings from other European regions (e.g., Revoredo-Giha & Russo, 2023), large retail chains already serve a substantial share of the population, even in remote areas. This indicates a high level of competition for local businesses.

The significance of outshopping practices highlights the genuine threat to local economies. A considerable portion of consumer food expenditure is directed to firms outside the local area, resulting in a drain of financial resources from local businesses. However, this trend appears to promote healthier eating habits among consumers. If public policies are proposed to limit the opening of additional large retailers in local areas, regulators must consider that their impact may be minimal. Widespread outshopping practices already ensure that a significant portion of the population in remote areas purchases most of their food from outside their local communities. Moreover, any trade restrictions may inadvertently exacerbate inequalities between residents who can afford to make shopping trips and those who cannot due to high transportation costs.

Additionally, our results provide valuable insights for Italian policymakers. Acknowledging the dynamic of food access has direct implications for policymakers, as it highlights the need for targeted efforts aimed at remote areas, which tend to have a higher proportion of elderly residents who may face greater challenges in engaging in outshopping practices. The effectiveness of any actions implemented by policymakers will require collaboration between scientific research and the development of food policies.

Finally, it is important to note that these conclusions were drawn using the COVID-19 lockdown as a natural experiment to assess outshopping. Since the pandemic influenced food consumption in various ways, the results should be interpreted with caution. The difference-in-difference approach, which compares the households of interest with control groups, was designed to mitigate the impact of potential confounding factors.

A further limitation of this study lies in the use of ISTAT household expenditure data, which, while highly detailed in terms of food categories and retail formats, does not provide information on the geographic location of outlets. As a result, outshopping can only be inferred indirectly from changes in expenditure distribution across retail formats, without capturing the actual travel radius of households. Future research should integrate expenditure data with mobility surveys or georeferenced information to better disentangle the spatial dimension of food shopping practices in remote rural areas.

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