CESifo WORKING PAPERS

10316
2023

March 2023

Scarcity and Consumption Priorities

Momi Dahan, Doron Sayag

CESifo

Impressum:

CESifo Working Papers
ISSN 2364-1428 (electronic version)
Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH
The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute
Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
Editor: Clemens Fuest
https://www.cesifo.org/en/wp
An electronic version of the paper may be downloaded
· from the SSRN website: www.SSRN.com
· from the RePEc website: www.RePEc.org
· from the CESifo website: https://www.cesifo.org/en/wp

CESifo *Working Paper No. 10316*

Scarcity and Consumption Priorities

Abstract

This paper focuses on whether households facing economic scarcity tend to change consumption priorities as measured by the share of spending on necessity goods relative to luxury goods in a large national supermarket chain in Israel for the years 2011–2018. Based on detailed weekly revenue data from that supermarket chain, we found that in weeks of economic scarcity (i.e., weeks without payments of social security allowances or salary), the spending on necessity goods, which are regulated products, is down by 4.8%, but the cut in spending on luxury goods is even more pronounced at 8%, and the difference between these two types of goods is up significantly by 3.2%. Within the luxury category, we observe a 10% or more decline in feast-related goods, indicating a "feast and famine" consumption strategy. Nevertheless, spending on food with label claims such as gluten-free and omega-3 eggs, is smaller (6%) than the overall spending on luxury goods in scarcity week but more than the overall spending on necessities.

JEL-Codes: D120, I300.

Keywords: scarcity, consumption, necessity, luxury.

*Momi Dahan**
School of Public Policy
Hebrew University of Jerusalem / Israel
momi.dahan@mail.huji.ac.il

Doron Sayag
The Israeli Bureau of Statistics
dorons@cbs.gov.il

*corresponding author

We thank Liram Aharoni for his excellent research assistance. We benefited from the comments in the seminar of the School of Public Policy and Governance, the Center for the Study of Rationality in the Hebrew University of Jerusalem and Hertie School. The Israeli Social Security (officially the National Insurance Institute) funded this research.

Introduction

Disadvantaged households spend and consume less at the end of the month, which deviates from the prediction of a standard consumption smoothing theory (Stephens 2003, 2006; Shapiro 2005; Mastrobuoni and Weinberg 2009; Gelman et al. 2014 and Carvalho et al. 2016). Although the decline in consumption and calorie intake over the course of the month is well documented, especially among Supplemental Nutrition Assistance Program (SNAP) recipients (Wilde & Ranney, 2000; Hastings & Washington, 2010; Castner & Henke, 2011; Damon, King, & Leibtag, 2013; Todd, 2015; Hamrick & Andrews, 2016; Smith et al., 2016; Kuhn, 2018; Goldin, Homonoff, & Meckel, 2022; Kuhn, 2021), the findings regarding the compositional change in consumption is rather scant and mixed. Todd (2015) and Kuhn (2018) show a noticeable decrease in the quality of diet over the benefits month for SNAP households, but Hasting and Washington (2010) find that benefit-receiving households in Nevada (food stamps and cash welfare assistance) substitute very little over the course of the month among mainstream, generic, and premium products. Agarwal et al. (2021) reached a similar conclusion based on the consumption response of individuals whose same-building neighbors experienced bankruptcy. They report that the spending decline on high-value purchases, which might capture "luxury" goods, equals the spending decrease on normal-valued purchases (online appendix: page 9).

Exploring the composition of consumption or spending over the monthly pay cycle could uncover the type of trade-offs households encounter at the end of the month, and it could enrich and challenge the theoretical understanding of consumption behavior. The observed end-of-the-month decline in spending or consumption might reflect a "spending less" strategy with a uniform fall in all items or an "efficient spending" strategy with substitution across product quality (e.g., necessity vs. luxury goods). Such spending behavior is in line with traditional explanations such as liquidity constraints and time inconsistency (hyperbolic discounting). It is also consistent with scarcity theory, which stipulates that economic scarcity might stimulate people to invest more effort (focus) in reaching better decisions in managing their limited family budget.[2] In days of scarcity, they may

[2] A series of studies suggested that individuals who live in poverty might behave due to scarcity itself in ways that might exacerbate their economic conditions (Bertrand, Mullainathan and Shafir 2004, Duflo 2006, Spears 2011, Shah et al. 2012, Mullainathan and Shafir 2013, Mani et al. 2013, Haushofer and Fehr 2014 and Bernheim et al. 2016). The focus on households invested in allocating efficiently their meager resources might result in distraction, a reduced stock of will power, and a lower level of available cognitive skills, which in turn, is associated with poorer quality of decision-making in areas outside of their focus ("tunneling effects"). The macroeconomic literature on income

prioritize spending on necessity needs such as food with a meticulous examination of the vitality of each considered good. Following this line of reasoning, households are expected to spend a larger share of their budget on necessity goods relative to luxury goods in weeks of economic scarcity.[3]

The "efficient spending" strategy could be accompanied with a deterioration in the (diet) quality of what is bought over the pay cycle in the form of spending more on cheap energy-dense products ("necessity") at the expense of spending less on expensive nutrient-dense products ("luxury"), which might represent the trade-off between poor nutrition and hunger.

A "feast and famine" strategy also predicts a decline in overall consumption over the pay cycle accompanied by a rising share of necessities, and households are expected to spend more on feast-related consumption in the beginning of the month relative to the rest of the month.[4] Unlike the previous "efficient spending" strategy, "feast and famine" implies seemingly an improvement in the (diet) quality of the items purchased over the pay cycle. However, the reduced overall nutritional quality over the entire month may associate with negative health consequences, but a few days of "feast" each month might be essential to meet psychological needs. A uniform decline in spending might be also consistent with the "feast and famine" strategy where feast reflects consuming a larger quantity at the beginning of the month at the cost of decreasing consumption during the rest of the month.

Based on weekly revenues in a large national supermarket chain in Israel for the years 2011–2018, this study shows that the size of spending on necessity goods, which we classify here by price-regulated products (or by an Engel curve approach), is lower by approximately 4.8% in scarcity weeks compared to weeks with at least one payday. We define a scarcity week here as a week that does not include a payday (one of two common monthly salary paydays) or a social security payday

inequality also implies that poverty itself may play a key role in perpetuating poverty due to capital market imperfections (e.g., Loury 1981, Banerjee and Newman 1991, Galor and Zeira 1993, Piketty 1997, Dahan and Tsiddon 1998).

[3] The literature devotes extensive attention to the negative sides of economic scarcity (tunneling). Gennetian and Shafir's (2015) survey, which presents the consequences of integrating the psychological dimension of scarcity, covers mainly research on the negative effects of scarcity and pays much less attention to the under-investigated benefits of scarcity.

[4] Based on administrative data, Dahan (2021a) shows that social security recipients spend more on lottery gambling on social security paydays relative to all other days. This finding is consistent with "feast and famine" behavior to the extent that gambling is considered a feast activity. See, for example, Conlisk (1993), who suggested that, "gambling confers utility merely from the pleasure of participation—is well recognized, but almost always resisted."

(one of four monthly paydays). Spending on luxury goods, which we classify here using an Engel curve approach, drops by 8% in weeks of scarcity, making the difference between the two groups of goods significant with a 3.2% size effect. Thus, the decline in overall spending is accompanied with a disproportionate change, substituting toward "necessity" products and away from "luxury" products rather than a uniform reduction in the quantity of the same products. The increasing share of necessity goods in times of scarcity remains when we restrict the estimation to certain product categories, such as cheese and bread, and when the classification of the necessity goods is in the spirit of the Engel curve.

In addition, we show that the fall in feast-related products, such as ice cream and cookies, in a scarcity week is even more substantial (10.2%) than overall spending on luxury goods is. Nevertheless, spending on food with label claims such as gluten-free and omega-3 eggs, is smaller (6%) than the overall spending on luxury goods but more than the overall spending on necessities. The data in this research are based on spending at the store level rather than consumption at the household level, which poses two challenges that we address below.

The empirical analysis reveals that the effect of scarcity is more noticeable in stores located in disadvantaged areas, which reduces the likelihood of ecological inference fallacy. By using relatively homogenous (smallest) statistical areas that the Israeli Central Bureau of Statistics draws as well as several robustness checks, we believe that the risk of ecological fallacy from employing a product-type-week-store level (in the absence of household level data) is small and the households' behavior could be deduced from aggregate data at the level of area around the store. To account for the difference between spending and consumption, the main hypothesis is also tested via restricting the set of products to those with a short shelf life. Moreover, our results' potential bias due to the consumption-spending gap is low in light of the strong correlation found between consumption and spending (Kuhn 2018).

Although we do not directly observe the of households' behavior, which is necessary to uncover the underlining mechanism, this study's findings allude to the types of constrains and choices certain households encounter. Based on store-level data, low-income households seem to adjust their spending patterns over the pay cycle as suggested by the larger fall in luxury goods, including an even more substantial decline in feast-related goods in a scarcity week. This might indicate (but we do not examine here) a choice between physical and psychological well-being. In addition, this

study documents a decrease in food with label claims (e.g., gluten-free bread and rich milk), which may suggest a trade-off between perceived healthy food (with a label claim) and cheap energy-dense products over the pay cycle. Thus, this paper advances the understanding regarding the behavior of people living in poverty, which scholars from diverse academic disciplines may find important.

This research's main findings may also have implications for public discourse regarding the image of people living in poverty. Taxpayers may doubt the justification for assisting people in need if they behave in a careless manner and spend their monetary support on unnecessary activities. Rose and Baumgartner (2013) demonstrate how the shift in public discourse from structural causes of poverty to portrayals of the poor as cheaters and chiselers has changed the extent of the welfare programs' generosity in the U.S.

Section 2 presents a simple conceptual framework on how scarcity affects consumption priorities, and Section 3 describes how the data set has been built. Section 4 surveys two methodologies of classifying the products sold in a large national supermarket chain in Israel into necessity, luxury and "undetermined" goods. The empirical analysis appears in Section 5, and Section 6 concludes with a summary and a short discussion of the main findings.

2. Consumption in times of scarcity

We present a conceptual background that guides the empirical analysis of consumption composition over the course of one month. People who face economic scarcity are expected to invest special effort (focus) in allocating their monetary resources between different spending items. The costs of a mistake for low-income households in such decisions are quite high, which justifies extra care as compared to other households. Following Mullainathan and Shafir's (2013) metaphor, individuals leaving their home for a few days demand more effort in packing a small suitcase than a large one. A small suitcase requires both denser and more efficient packing in the sense of accommodating for materials that are more essential when away from home. Thus, toward the end of the pay cycle, when scarcity peaks, households are expected to channel more of their slim resources to necessity goods.

Studies that documented a decline in spending or consumption attribute the diversion from consumption smoothing to limited access to capital market and the banking system that low-income households face (e.g., Stephens 2003), while others blame time inconsistency for that decline (e.g., Shapiro 2005). Liquidity-constrained households that encounter times without income inflow, together with the fact that they have to survive, will rely more on necessity goods instead of luxury goods. Such behavior suggests a rise in the share of basic goods in the items purchased. It may be accompanied by spending more on costlier nutrient-dense goods in weeks with paydays and switch to less healthy but energy-dense goods (e.g., standard bread) in times of scarcity. This type of model predicts a deterioration in the (diet) quality of the items purchased over the pay cycle. Although such consumption patterns may have a negative impact on an individual's health condition, it could mitigate hunger.

A decline in spending might also reflect preferences for variation in the quantity or quality of food consumed over the course of the month which in line with the nutrition literature that has found a "feast and famine" cycle among low-income households (Dinour et al. 2007). It might take the form of overeating when money is available followed by a period of food shortage when resources are depleted (variation in the quantity) or more feast-related goods such as ice cream in the beginning of the month and more basic goods in the end of the month (variation in the quality). This preference for variety model could also produce a decline in spending, together with a shift over the month in favor of necessity goods without present-biased preferences. That hypothesis implies an improvement in the (diet) quality of the items purchased over the course of the month, which our detailed data could test. In the empirical analysis, we categorize two groups of luxury goods: food with label claims and feast-related products to highlight the exact spending mixture over the pay cycle. Note that this consumption strategy may not be desirable regarding physical needs and may even exacerbate the health conditions due to reduced overall nutritional quality, but "feast" days might serve psychological needs and moderate mental stress (which is not examined here).

To test our central hypothesis that in times of scarcity, households spend relatively more on necessity goods and less on luxury goods, we compare weekly revenues from selling necessity goods and luxury goods in the weeks without paydays to the weeks with at least one salary or social security payday according to the following statistical models:

$$(1.1)\ Log(R_{nws}) = a_0 + a_1 NoPayday + H + W + M + Y + S + v_{nws}$$

$$(1.2)\ Log(R_{lws}) = b_0 + b_1 NoPayday + H + W + M + Y + S + e_{lws}$$

$$(1.3)\ Log(R_{nws}) - Log(R_{lws}) = c_0 + c_1 NoPayday + H + W + M + Y + S + u_{nlws}$$

R_{nws} represents weekly revenues from a certain group of necessity products (*n)* in store *(s)* in week *(w)* and R_{lws} denotes weekly revenues from a certain group of luxury products (*l)* in store (*s*) in week (*w)*. The next section demonstrates the methodology of classifying products into necessity and luxury categories. *NoPayday,* which represents in this research a time of economic scarcity, is a dummy variable that obtains a value of one in weeks without salary paydays and social security paydays and zero otherwise. In the next section, we describe how this measure is constructed. H, W, M, Y and S stand for fixed effects for holidays, week of the year, month of the year, a year and a store, respectively. u_{nlws} denotes the residual.

Estimating equations (1.1) and (1.2) should reveal a negative effect of *NoPayday* on the expenditures of the two product categories to justify (via a reliability check) our constructed proxy for scarcity. The coefficients a_1 and b_1 should have a negative sign to be in line with previous studies, which show that overall expenditures of low-income households decline toward the end of their pay cycle. Equation (1.3) presents the statistical model of the effect of scarcity on the revenues (and expenditures) of a large supermarket chain from selling a group of necessity goods relative to luxury goods.

The main coefficient of interest is that of *NoPayday*, which measures the percentage change in expenditures in weeks without a payday relative to weeks with at least one payday. We expect a positive coefficient in equation (1.3) together with negative coefficients in the other two estimated statistical models (1.1 and 1.2). We first estimate the effect of *NoPayday* on a group of necessity goods, using the full list of price-regulated products relative to a group of luxury goods, and then restrict the estimation to a subset of these two categories. For example, in equation (1), the dependent variable is weekly revenues from a group of breads, which are included in the price-controlled products relative to the weekly expenditures on all breads that our methodology classifies as luxury goods. We also estimate all the above equations for an additional three categories of products: milk (represents a short shelf life), cheese and

cooking and baking grocery supplies (e.g., salt and breadcrumbs). The regression analysis of products with a short shelf life, such as bread and milk, addresses the potential gap between spending and consumption that may bias the results. A declining spending pattern of storable (long shelf life) products over the course of the month might reflect employing a commitment device to avoid too low consumption at the end of the pay cycle. Low-income households may buy products such as rice or oil that have a long shelf life in the beginning of the month to hold them over and to consume them during the end of the month.

To allow for the heterogeneous effect by economic conditions, we also estimate all three equations separately for the bottom 20% and for the top 20% of the income ladder (measured by the income per capita level of the residents around the store). We expect a larger estimated effect of scarcity on consumption priorities in less-affluent areas. The empirical analysis also includes estimating all statistical models separately for orthodox and non-orthodox Jewish areas as an additional proxy for economic conditions, given the large income gap between these two social groups (Dahan 2021b). Additionally, we estimate all equations splitting the retailer chain into small neighborhood stores and large discount stores (typically outside residential areas) to account for the distance from the shopper's home and shopping costs that may affect spending preferences. Eizenberg et al. (2021) show that low-income households in Jerusalem tend to shop more often in small neighborhood stores, which are close to their place of residence despite higher prices, while high-income households tend to shop in hard-discount stores located in commercial districts and benefit from lower grocery prices. Thus, this type of estimation to some extent addresses the risk of the ecological inference fallacy.

3. Data

The empirical analysis rests on merged data from three different sources. The first source is a large national supermarket chain in Israel, which provides revenue data at the store level for 2011–2018, including weekly revenues from selling about 21,831 food products and cleaning supplies at the product barcodes level. The Israeli Central Bureau of Statistics (ICBS) is collecting the data as part of a new project designed to provide consumer price indexes based on scanner data. The detailed data of the product barcodes provides an advantage for this data set compared to the standard household expenditure survey, which allows us to test our hypothesis. For example, the

Israeli yearly household expenditure survey bundles both regular and rich milk into the same category (milk), but according to our methodology, the former is classified as a necessity product and the latter as a luxury product (see below).

Table 1 presents normalized revenue data by key variables to avoid disclosing the actual data due to the confidentiality agreement. Each column displays its own normalized revenues. For example, in column 1, we normalized the average weekly revenues per store to be 100. Columns 2, 3 and 4 are calculated in the same way but only for regulated products (necessity and luxury). Therefore, a comparison is meaningful across lines in the same column but not across columns. As the table shows, the average weekly revenues over the entire period from selling all types of products during weeks with no payday, which represent scarcity, is lower than weeks with one or more paydays of salary or social security benefits. This is true for both necessity and luxury goods, although the latter shows a larger decline, which is in line with our main hypothesis. In the empirical analysis, we test whether this finding still holds after taking into account store-specific characteristics, seasonality (fixed effects for a week, a month and a holiday) and general aggregate effects (year fixed effects).

Table 1 also shows that revenues in hard-discount stores are substantially higher compared to neighborhood stores, which indicates households' saving strategies, such as buying in bulk and accelerating purchases, are more common in discount stores. The higher prevalence of hard-discount stores in orthodox Jewish areas translates into high revenues in those neighborhoods. Table 1 reveals that revenues from necessity goods in orthodox neighborhoods are higher than in non-orthodox neighborhoods, while the opposite is true for luxury goods, which is consistent with high incidences of poverty among orthodox Jews (Dahan 2021b). At first glance, the negative correlation between revenue and income decile is surprising and reflects the greater tendency of locating hard-discount stores in disadvantaged neighborhoods (possibly due to lower land costs). However, note that this correlation becomes positive for luxury goods and more balanced when we calculate the revenues from all products for only neighborhood stores.

The second data source includes the regular publications of the ICBS, which cover data on socioeconomic and demographics for residents in the statistical areas. We utilize this data to estimate the degree of necessity for all products that are offered at a large supermarket chain and

to test the heterogeneous impact of scarcity on consumption priorities based on residents' characteristics. Starting in 2013, the ICBS publishes an index of socioeconomic at the municipality and statistical area levels every two years. We used income per capita at the statistical area level for the year 2015 (the middle year of our investigated period), which is a key variable in calculating the socioeconomic index. The ICBS has gathered data on population size and demographic composition at the statistical area level for the years 2011–2018. A statistical area/store is classified as orthodox if 50% or more of its residents voted for Haredi religious political parties (Yahadut HaTorah or Shas) in the 2015 national elections. A statistical area/store is classified as non-orthodox if the majority of its residents are Jewish and have not voted for Haredi religious-affiliated political parties.[5] A statistical area/store is defined as Muslim if most of its residents are registered as Muslim. A non-classified area is defined as an area where 50% or more of its residents do not belong to one of three main religions or where there is no clear majority of any single religion. Table 2 presents descriptive statistics.

We assume that consumers of a certain store mainly live nearby, which becomes more plausible as the distance gets shorter. Therefore, we compute the residents' socioeconomic and demographic characteristics, such as income per capita and demographic composition, to determine the weighted average of residents in statistical areas within a one-kilometer radius surrounding a particular store (excluding statistical areas with less than 5% of the area).

The third source of data is the Israeli Social Security (officially named the National Insurance Institute), which published the four paydays of social security benefits for the years 2016–2018. The data on paydays for the years 2011–2015 is based on Dahan and Nisan (2022), which the Israeli Social Security provided directly. The Israeli Social Security pays social benefits to about three million recipients, which includes long-term allowances such as old-age pensions and disability allowances that are deposited into their bank accounts on the 28th of each month. Income support allowances, unemployment benefits and child allowances are paid on the 12th (it was paid on the 14th until December 2016), 17th and 20th, respectively. When a social security payday falls on a Saturday or a holiday, the benefits are transferred on the following day. However, at the Ministry of Finance's discretion, social security benefits are paid earlier than standard paydays on

[5] https://www.bechirot20.gov.il/election/Pages/HomePage.aspx

two Jewish holidays (Passover and the Jewish New Year), two Muslim holidays (Eid al-Edha and Eid al-Fitr), one Druze holiday (Nabi Shu'ayb) and one Christian holiday (Christmas).

Salary paydays are additional potential factors that determine spending composition throughout the month. According to Israeli law, salaries must be paid no later than 10 days after the end of the previous working month. Most public employees receive their salary once a month on the first day of the month, whereas employers in the business sector are more diverse in their remuneration paydays. Large business organizations with strong labor unions, such as banks, pay their employees on the 1st of the month, whereas other organizations will pay their (usually less-organized) employees' salary on the 10th. The 1st of the month salary payday will move by one day if it falls on a Saturday or a holiday, but salary will be paid a day earlier if the 10th falls on a Saturday or a holiday.

3.1 Constructing *NoPayday* weeks

To define week-of-year, we follow the ISO-8601 for Israel. All weeks start on Sunday and end on Saturday; the first week of the year is the first week with four or more days begin in January. The numbering of week-of-year weeks used to construct our central measure of scarcity week is also employed for week-of-year fixed effects.

We use the data from four social security paydays and two salary paydays to construct weeks without any paydays. In the investigated period, we detected 159 weeks without social security paydays, 225 weeks without salary paydays and 40 weeks without either social security or salary paydays. Due to the multiple paydays and the available data at the product-type-store-week level rather than at the household or individual level, we deviate from the standard measure of scarcity established in previous studies that is based on the time since the last receipt of income. Therefore, our measure of scarcity could capture either the second, the third or the fourth week of the pay cycle.

Because of the lack of household level data, our first step in the empirical analysis is to examine whether such weeks are characterized by declining expenditures, which is consistent with the-end-of-the-month fall in consumption that was previously found. In addition, we run our baseline regression by separating weeks without social security paydays and weeks without salary paydays.

In addition, the effect of scarcity is estimated by comparing scarcity weeks (weeks without paydays) with a more continuous measure of varying number of paydays, including and excluding income support payday. Such specification allows us to offer additional heterogeneous effects of scarcity.

4. Classifying necessity and luxury goods

There is no one answer to what the list of necessity goods contains because circumstances, individual conditions and the interactions between them dictate necessity. For example, in 2006, approximately half of Americans reported that they perceive air-conditioning to be a necessity good compared to just a quarter of participants in a survey conducted back in 1973 (Morin and Taylor 2009). The list of necessity goods even varies for people in the same economic circumstances (poverty) because of their diverse characteristics, such as age, health conditions and cultural preferences.

Our empirical analysis employs two approaches to classify necessity goods. The first approach follows the widespread methodology in economics that defines a necessity good according to the joint evolution of consumption for a particular good and income, with everything else being equal, including its price (the Engel curve). Engel was the first to uncover the negative correlation between the share of food expenditures and income level, and even suggested predicting economic conditions by relying on the observed proportion of income spent on food.[6] This approach implicitly assumes that the products low-income households purchase are more essential and characterized by a higher marginal utility. The second approach to define necessity goods relies on the list of price-regulated products.

4.1 Classifying necessity goods in the spirit of Engel-Working-Leser Approach

A good is defined as a necessity if its income elasticity is between zero and one, but is classified as a luxury if its income elasticity is above one (Deaton and Muellbauer 1980).[7] With a range

[6] Heffetz (2011) suggests an intriguing underlining explanation for the observed Engel curve. The income elasticities relate to the visibility of consumer expenditures, which is consistent with a signaling-by-consuming model à la Veblen.
[7] Alternatively, a good might be defined as a necessity because of its price elasticity (Lipsey 1989, pp. 93–94). For example, a good with low (high) price elasticity might be defined as a necessity (luxury). Kemp (1996) postulates that researchers should rely on price elasticity because households experience changes in prices more frequently compared to changes in income.

between zero and one, the higher the income elasticity, the lower the degree of necessity. Equivalently, a good might be defined as a necessity if its share in total consumption decreases as income increases. Oftentimes, total consumption or expenditures is used instead of total current income because it may represent better permanent income and is less sensitive to factors that may affect savings. Working (1943) was the first to suggest employing a share of certain products in total expenditures, which received empirical support in Leser's (1963) work. Therefore, we named this the Engel-Working-Leser approach.

Classifying the products sold in the investigated supermarket chain depends on the correlation between the share of a particular (barcode) product in total revenues for a certain store and the income per capita of the residents living in the area surrounding that store. For every product purchased in neighborhood stores in the years 2011–2018, we estimate an income coefficient using the following statistical model:

$$(2)\ \frac{R_{ist}}{R_{st}} = a_1 I_s + a_2 R_{st} + a_3 V_{st} + a_4 Pop_{st} + a_5 \mathrm{Com}_{st} + REL_s + SF_s + \mathrm{Y} + \mathrm{C} + u_{ist}$$

R_{ist} represents yearly revenues from a certain product (i) in store (s) for year (t). R_{st} denotes the total yearly revenues in store (s) for year (t). $\mathrm{I_s}$ stands for income per capita in the year 2015 for the residents living near a particular store. $\mathrm{V_{st}}$ represents the number of products purchased in a store (s) for year (t) to control for product variety. $\mathrm{Pop_{st}}$ and $\mathrm{Com_{st}}$ stand for population size and composition (three age groups: 0–19, 20–64, 65+) of the residents living near a store (s) in year (t), respectively. $\mathrm{REL_s}$, $\mathrm{SF_s}$, Y and C represent the ethnic/religious affiliations of the residents living near a store (s) in 2015 (i.e., orthodox and non-orthodox Jews and Muslims), the sub-chain format, the year and the city's fixed effects, respectively.

The main coefficient of interest is a_1, which estimates the change in product share in total expenditures associated with a change in income. We define the products in the top third coefficients as luxury goods and define the products in the bottom third coefficients as necessity goods according to their income coefficient ranking (from the highest to the lowest value).

4.2 Classifying necessity goods according to a price-controlled list

The second approach to defining necessity goods in our empirical analysis depends on price-regulated products lists, which is in the spirit of Berry (1994), who suggested that the distribution of scarce luxury goods should be left to the market, whereas the distribution of scarce necessity goods should be subject to government intervention. Berry's suggestion represents how people's preference for allocating scarce goods varies depending on whether they perceive them as luxuries or necessities. Rabbi Jacob Ben-Asher advocated for a similar approach around 600 years ago that proposed (through a Jewish law) a price ceiling for necessity goods (including flogging those who violate it) while leaving the price of other goods for the market (Tur Hachoen). Kemp (1998) provides empirical support for Berry's conceptual analysis by finding a strong correlation between a good's necessity rating and a preference for government intervention in distributing that good (while distributing scarce luxury goods via market forces).

The regulation of selected products reveals Israeli society's preferences regarding necessity goods based on whether people accept Berry's conceptual analysis, although other motivations might drive price control, such as limited competition in certain product markets.[8] Table 1 in the Appendix shows the list of 22 regulated products in Israel. In fact, the law that regulates prices in Israel clearly states, "Price control on selected goods is needed because they are necessities and basic."[9] Note that using the list of price-controlled products as necessity goods leaves the definition of luxury goods open to interpretation. To fill this gap, we use the first approach, which defines luxury products according to the correlation between the share of a product in total revenue and income per capita.

4.3 Classifying necessity and luxury goods: Estimation results

The estimation of equation (2) is based on products that were sold at least 300 times in a neighborhood store during the investigated period because these stores' customers tend to live in nearby areas. In contrast, hard-discount stores, which offer lower prices, attract buyers from all areas, as documented by Eizenberg et al. (2021).[10] The number of examined products declines from 21,831 to 3,973 due to these two restrictions. Figure 1 presents the distribution of all 3,973

[8] The Ministry of Agriculture and the Ministry of Economics and Industry publish the list of price-controlled consumer products here: https://www.gov.il/en/departments/dynamiccollectors/food-price-control-search?skip=0
[9] https://www.nevo.co.il/law_word/law17/prop-2436.pdf
[10] The classification of neighborhood stores depends on the one the supermarket chain uses.

estimated income coefficients, which is a left-skewed distribution (more negative coefficients), implying a higher share of necessity goods. The final list that participates in estimating the effect of scarcity on consumption priorities consists of 667 products whose estimated income coefficients are significant at 5% (see Figure 2 for the distribution of estimated income coefficients). The list is sorted according to the products' coefficients from the highest to the lowest value, which has been divided into three equal groups. We classify the top third of products as the luxury group (222 products), the second third as the "undetermined" group and the bottom third as the necessity group. Appendix Table 2 shows selected coefficients (out of the 667 coefficients) of necessity and luxury products. The estimated income coefficients of all price-controlled products are negative and classified as necessity goods according to our methodology.

5. Results

Table 3 presents the main findings of this research, which consists of estimation results for expenditures from a group of 112 price-controlled products (different brands), a group of 222 luxury products (according to our methodology) and the difference between the two groups. As shown in the table, spending on necessity goods (measured by a group of price-controlled products) is 4.8% lower in weeks without paydays compared to weeks with one payday or more. The expenditures on a group of luxury products also decline by 8% in weeks with no paydays compared to weeks with at least one payday. These combined results convey two important messages. First, our indicator for economic scarcity of weeks with no payday is a plausible one. The fall in all types of goods in these weeks is in line with previous studies that documented the end-of-month decline in expenditures, consumption and calorie intake (see above). More importantly, Table 3 shows that the difference between expenditures of necessity and luxury goods in weeks with no paydays are positive and significant compared to weeks with at least one payday. This finding implies that the necessity share in total expenditures increases in times of scarcity, which is consistent with our central hypothesis. The rise in necessity share is also obtained by excluding cleaning supplies and employing the original statistical areas instead of the weighted average of residents in statistical areas within a one-kilometer radius surrounding the store (not reported here).

We implicitly assume that prices are stable throughout the month or do not correlate with the pay cycle. However, the retailer's response to increased demand in the beginning of the pay cycle may bias the results. The direction of the bias is unclear given the mixed findings in previous studies. While MacDonald (2000) and Chevalier et al. (2003) found evidence for counter-cyclical responses (decreasing prices in periods of high demand such as Christmas), Hastings and Washington (2010) document a relatively small pro-cyclical response that raises prices in times of high demand. Strategic behavior is not a concern for regulated products because retailers tend to charge the maximum allowed prices, which, by definition, the grocery chain does not control. However, the national supermarket chain may strategically change the prices of necessity goods that are not regulated and all of the luxury goods in response to a change in aggregate demand to maximize its profits. In our case, a strategic response of cyclical pricing is less likely because of six staggering paydays that generate a much less predictable demand cycle than one payday. Indeed, in our data, the prices of necessity and luxury goods behave similarly in weeks with no paydays relative to weeks with one or more paydays (Table 4). This result aligns with a recent study, which reveals that grocery chains do not strategically determine prices according to a SNAP pay cycle (Goldin et al. 2022).

The detailed data allows us to divide the group of luxury products further into two sub-sets of food with label claims and feast-related products. The food with label claims includes products such as gluten-free bread, omega-3 eggs and calcium-enriched milk, whereas feast-related products contains ice cream, candies (e.g., marshmallow, Kinder surprise), alcoholic beverages and soft drinks. Table 5 shows that feast-related products are significantly higher in sales in weeks with at least one payday and have a sizable estimated effect. This result provides suggestive evidence of people's desire for a few days of feast in the beginning of the month that so far has been rejected by indirect evidence (Shapiro 2005) and direct evidence (Hastings and Washington 2010). It implies that the quality of spending in terms of nutrient-dense foods improves over the course of the month. However, to the extent that our finding capture preference for a few days of feast driven by psychological needs, suggesting that disadvantaged households trade psychological and physical needs.

Tables 6 and 7 examine whether the expenditures of regulated products decline more modestly compared to luxury goods in times of scarcity across sub-categories of products, which are based

on the standard UN classification.[11] Some of the four sub-categories are more perishable (e.g., bread and milk) than others (e.g., cooking and baking supplies), with cheese in between. This test is more stringent due to reduced number of products and increased product similarity.[12] Table 6 shows that expenditures on fresh bread, regardless of whether it is classified as necessity or luxury, are lower in weeks without a payday compared to weeks with paydays, but the decline in luxury fresh bread is steeper. In all four examined sub-categories, the fall in luxury goods in times of scarcity is more pronounced compared to regulated products, which is in line with our central hypothesis. Notably, the coefficient of milk products is positive but not significant (Table 7).

Table 8 demonstrates the examination of our hypothesis using the Engel-Working-Leser approach to classify the necessity and luxury goods. The expenditures on necessity products (a group of 223 items) are shown to be down by 5%, whereas expenditures on luxury goods (a group of 222 items) are lower by 8% in weeks with no payday compared to weeks with at least one payday (Table 8). Estimating the difference between the two types of products reveals a rising share of necessity goods in times of economic scarcity. Note that the size effect of scarcity on necessity expenditures is almost the same in the two classification methods.[13]

Table 9 presents a separate regression analysis for stores in the bottom and top quintiles (20%) based on the income per capita of the residents living near the stores. This estimation allows for the heterogeneous effect of scarcity to impact consumption priorities according to income levels. We expect that the effect of scarcity is more pronounced in less affluent areas. Table 9 shows that the estimated coefficients are larger in the bottom income quintile, implying that expenditures on both necessity and luxury goods in weeks without a payday decline more sharply in stores located in low-income neighborhoods. In addition, the estimated difference between necessity and luxury in the bottom and top quintiles means less affluent areas experience a stronger impact of scarcity on consumption composition. The poor economic conditions of orthodox Jews offer an additional indirect look at the heterogeneous effect of scarcity according to income level. Table 10 reveals a

[11] United Nations, Classification of Individual Consumption According to Purpose (COICOP), 2018.
[12] For this estimation, the list of participating products is extended to 1,574 with a significant income coefficient at 30% to avoid an insufficient number of products. Too few products might bias the results due to special characteristics such as gluten-free or storable products. When restricting the estimation to the list of 667 products, the coefficient of scarcity indicator only remains positive and significant in the regression of cooking and baking supplies.
[13] The results are similar using an extended list of 1,574 products with estimated income coefficients that are significance at 30% level.

larger impact of scarcity on consumption priorities, which lends extra support to our main finding that orthodox Jewish areas are much more homogenous communities in the residents' characteristics. Across retail store formats (within the investigated grocery chain), expenditures on necessity goods decline more modestly than luxury goods do in times of scarcity, similar to our previous results (Table 11). The larger effect on hard-discount stores may reflect a greater inclination to locate such stores in disadvantaged neighborhoods. Table 12 shows how the effect of scarcity on "undetermined" goods is in between necessity and luxury goods, which lends additional credence to our main finding.

In Table 13, we replace our central proxy for scarcity with two separate measures: weeks with no social security payday and weeks with no salary payday. The estimation results show that the decline in spending comes almost entirely from weeks without social security payday, which is plausible due to the inferior economic conditions of recipients of social security benefits relative to salary paid households.

In Table 14, the weeks with paydays are divided according to the number of paydays, further separating weeks with and without income support payday. This separation allows us to compare weeks without a payday and weeks with a payday for income support recipients, a group with the highest incidence of poverty in Israel. The regression analysis documents a stronger scarcity effect on consumption priorities, as the estimated *NoPayday* coefficient implies (weeks with income support payday are the omitted variable).

6. Conclusion

This study examines detailed store level data on weekly revenues of a large chain retailer across all of its stores in Israel for the years 2011–2018. The results show that in times of economic scarcity, measured by weeks without a payday (compared to weeks with paydays), expenditures on necessity goods fall by 4.8%, whereas expenditures on luxury goods decline even more by 8%, with the difference between them being 3.2%. That difference expands to 5.2% in stores located in low-income neighborhoods and to 8.4% in orthodox Jewish communities. The findings regarding the effect of scarcity on consumption priorities survive a series of robustness checks, such as alternative classification of necessity goods, store retail format, shelf life and narrower

sub-categories of products. This paper also documents a sharp fall of 10.2% in feast-related products such as ice cream and cookies in scarcity week, which is more sizeable than the overall decline in spending on luxury goods. However, spending on food with label claims such as rich milk and gluten-free bread is smaller than the overall spending on luxury goods by 6% but larger than the overall spending on necessity goods.

This research presents an ecological analysis of the scarcity effect on the composition of consumption based on store/area level data, which might pose a challenge when interpreting the results. We believe that the natural concern of false deduction from the aggregate data on households' behavior is quite limited because of the relative homogenous area around most stores. The ICBS draws the lines of statistical areas to maximize the similarities among the residents' characteristics within its borders. Across economic areas and ethnic communities, we found a higher share of expenditures on necessity products in times of scarcity, which further reduces the risk of the ecological inference fallacy.

Exploring the cycle in the composition of spending contributes to the few studies on the effects of scarcity on the mix of spending, which advances our knowledge on the types of choices low-income households face. Our main finding reveals that low-income households appear to adjust their spending patterns over the pay cycle, which might suggest a choice between physical and psychological health (not examined here). In addition, this study shows a decrease in food with label claims, which may indicate a trade-off between perceived healthy food and cheap energy-dense products over the pay cycle.

Our finding of intra-category substitution, which is seldom recorded in previous studies, adds an overlooked channel that allows households to make flexible choices to smooth their consumption under negative circumstances. Although households might not be able to fully smooth the negative shock, they can still mitigate the negative impact within their own discretion by buying cheaper necessity goods rather than expensive luxury goods. Thus, a new channel is revealed here in addition to the one found in Gelman et al. (2020), who show that during a sudden negative shock on liquidity, the affected households reduce their consumption, mostly by postponing the payment of recurring spending (e.g., mortgage payments).

Our findings also contribute to the way the general public views people living in poverty. Exposing the positive consequences of consumption priorities in times of scarcity might promote a more favorable image of low-income households and affect the generosity of welfare programs. Previous research has conveyed that welfare is less generous when poor people are perceived as cheaters and chiselers.

References

Agarwal, Sumit, Wenlan Qian, and Xin Zou. "Thy neighbor's misfortune: Peer effect on consumption." *American Economic Journal: Economic Policy* 13.2 (2021): 1-25.

Banerjee, Abhijit V., and Andrew F. Newman. "Risk-bearing and the theory of income distribution." *The Review of Economic Studies* 58.2 (1991): 211-235.

Banerjee, Abhijit, and Sendhil Mullainathan. *The shape of temptation: Implications for the economic lives of the poor*. No. w15973. National Bureau of Economic Research, 2010.

Bernheim, B. Douglas, Debraj Ray, and Şevin Yeltekin. "Poverty and self-control." *Econometrica* 83.5 (2015): 1877-1911.

Berry, Christopher J. *The idea of luxury: A conceptual and historical investigation*. Vol. 30. Cambridge university press, 1994.

Bertrand, Marianne, Sendhil Mullainathan, and Eldar Shafir. "A behavioral-economics view of poverty." *The American Economic Review* 94.2 (2004): 419-423.

Braido, Luis HB, Pedro Olinto, and Helena Perrone. "Gender bias in intrahousehold allocation: Evidence from an unintentional experiment." *Review of Economics and Statistics* 94.2 (2012): 552-565.

Carvalho, Leandro S., Stephan Meier, and Stephanie W. Wang. "Poverty and economic decision-making: Evidence from changes in financial resources at payday." *The American economic review* 106.2 (2016): 260-284.

Castner, Laura, and Juliette Henke. *Benefit redemption patterns in the supplemental nutrition assistance program*. No. b746c9a56cb34547b475799386b0182a. Mathematica Policy Research, 2011.

Chevalier, Judith A., Anil K. Kashyap, and Peter E. Rossi. "Why don't prices rise during periods of peak demand? Evidence from scanner data." *American Economic Review* 93.1 (2003): 15-37.

Conlisk, John. "The Utility of Gambling", *Journal of Risk and Uncertainty* 6(3) (1993), 255–275.

Dahan, Momi, and Daniel Tsiddon. "Demographic transition, income distribution, and economic growth." *Journal of Economic growth* 3.1 (1998): 29-52.

Dahan, Momi. "Poverty and economic behavior: gambling on social security paydays." *International Gambling Studies* 21.1 (2021a): 38-58.

Dahan, Momi. "Income Inequality in Israel: A Distinctive Evolution." *The Israeli Economy, 1995–2017: Light and Shadow in a Market Economy,* edited by A. Ben-Bassat, R. Gronau & A. Zussman, Cambridge: Cambridge University Press, 2021b. pp. 362-396.

Dahan, Momi, and Udi Nisan. "Late payments, liquidity constraints and the mismatch between due dates and paydays." *Water Resources Research* (2022): e2021WR030303.

Damon, Amy L., Robert P. King, and Ephraim Leibtag. "First of the month effect: Does it apply across food retail channels?" *Food Policy* 41 (2013): 18-27.

Deaton, Angus, and John Muellbauer. "An almost ideal demand system." *The American economic review* 70.3 (1980): 312-326.

Dinour, Lauren M., Dara Bergen, and Ming-Chin Yeh. "The food insecurity–obesity paradox: a review of the literature and the role food stamps may play." *Journal of the American Dietetic Association* 107.11 (2007): 1952-1961.

Duflo, Esther. "Poor but rational." *Understanding poverty* 24, (2006): 367-379.

Eizenberg, Alon, Saul Lach, and Merav Oren-Yiftach. "Retail prices in a city." *American Economic Journal: Economic Policy* 13.2 (2021): 175-206.

Galor, Oded, and Joseph Zeira. "Income distribution and macroeconomics." *The review of economic studies* 60.1 (1993): 35-52.

Gelman, Michael, Shachar Kariv, Matthew D. Shapiro, Dan Silverman, and Steven Tadelis. "Harnessing naturally occurring data to measure the response of spending to income." *Science* 345, no. 6193 (2014): 212-215.

Gennetian, Lisa A., and Eldar Shafir. "The persistence of poverty in the context of financial instability: A behavioral perspective." *Journal of Policy Analysis and Management* 34.4 (2015): 904-936.

Goldin, Jacob, Tatiana Homonoff, and Katherine Meckel. *Issuance and incidence: Snap benefit cycles and grocery prices*. No. w28221. National Bureau of Economic Research, 2020.

Hamrick, Karen S., and Margaret Andrews. "SNAP participants' eating patterns over the benefit month: a time use perspective." *PloS one* 11.7 (2016): e0158422.

Haushofer, Johannes, and Ernst Fehr. "On the psychology of poverty." *science* 344.6186 (2014): 862-867.

Heffetz, Ori. "A test of conspicuous consumption: Visibility and income elasticities." *Review of Economics and Statistics* 93.4 (2011): 1101-1117.

Israeli Central Bureau of Statistics, The 2008 Israeli integrated census of population and housing, March 2005.

Israeli National Insurance Institute, *Annual Report*, 2016.

Kemp, Simon. "Perceiving luxury and necessity." *Journal of economic psychology* 19.5 (1998): 591-606.

Kuhn, Michael A. "Who feels the calorie crunch and when? The impact of school meals on cyclical food insecurity." *Journal of Public Economics* 166 (2018): 27-38.

Kuhn, Michael A. "Electronic Benefit Transfer and Food Expenditure Cycles." *Journal of Policy Analysis and Management* 40.3 (2021): 744-773.

Leser, Conrad Emanuel Victor. "Forms of Engel functions." *Econometrica: Journal of the Econometric Society* (1963): 694-703.

Lipsey, R.G. "An Introduction to Positive Economics", 7th ed. *Weidenfeld and Nicolson, London* (1989): 93-94.

Loury, Glenn C. "Intergenerational transfers and the distribution of earnings." *Econometrica: Journal of the Econometric Society* (1981): 843-867.

MacDonald, James M. "Demand, information, and competition: why do food prices fall at seasonal demand peaks?." *The Journal of Industrial Economics* 48.1 (2000): 27-45.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. "Poverty impedes cognitive function." *science* 341, no. 6149 (2013): 976-980.

Mastrobuoni, Giovanni, and Matthew Weinberg. "Heterogeneity in intra-monthly consumption patterns, self-control, and savings at retirement." *American Economic Journal: Economic Policy* 1.2 (2009): 163-189.

Morin, Richard, and Paul Taylor. *Luxury Or Necessity: The Public Makes a U-turn*. Washington, DC: Pew Research Center, 2009.

Mullainathan, Sendhil, and Eldar Shafir. *Scarcity: Why having too little means so much*. Macmillan, 2013.

Piketty, Thomas. "The dynamics of the wealth distribution and the interest rate with credit rationing." *The Review of Economic Studies* 64.2 (1997): 173-189.

Rose, Max, and Frank R. Baumgartner. "Framing the poor: Media coverage and US poverty policy, 1960–2008." *Policy Studies Journal* 41.1 (2013): 22-53.

Shah, Anuj K., Sendhil Mullainathan, and Eldar Shafir. "Some consequences of having too little." *Science* 338.6107 (2012): 682-685.

Shapiro, Jesse M. "Is there a daily discount rate? Evidence from the food stamp nutrition cycle." *Journal of public Economics* 89.2 (2005): 303-325.

Smith, Travis A., et al. "The effects of benefit timing and income fungibility on food purchasing decisions among supplemental nutrition assistance program households." *American Journal of Agricultural Economics* 98.2 (2016): 564-580.

Spears, Dean. "Economic decision-making in poverty depletes behavioral control." *The BE Journal of Economic Analysis & Policy* 11.1 (2011).

Stephens Jr, Melvin. "" 3rd of tha Month": Do social security recipients smooth consumption between checks?" *American Economic Review* 93.1 (2003): 406-422.

Stephens, Melvin. "Paycheque receipt and the timing of consumption." *The Economic Journal* 116.513 (2006): 680-701.

Todd, Jessica E. "Revisiting the Supplemental Nutrition Assistance Program cycle of food intake: Investigating heterogeneity, diet quality, and a large boost in benefit amounts." *Applied Economic Perspectives and Policy* 37.3 (2015): 437-458.

Wilde, Parke E., and Christine K. Ranney. "The monthly food stamp cycle: shopping frequency and food intake decisions in an endogenous switching regression framework." *American Journal of Agricultural Economics* 82.1 (2000): 200-213.

Working, Holbrook. "Statistical laws of family expenditure." *Journal of the American Statistical Association* 38.221 (1943): 43-56.

Table 1: Descriptive statistics

Category			Weekly revenues index per store			
	Sub-category		All products (1)	Regulated products (2)	Necessity products (3)	Luxury products (4)
All			100	100	100	100
By payday	Weeks without payday		94	94	93	91
	Weeks with at least one payday		101	101	101	101
By income decile (2015)	1-2		119	115	136	68
	3-5		125	124	132	105
	6-8		83	85	74	105
	9-10		66	69	51	119
By retail format	**Neighborhood stores**		**62**	**63**	**56**	**81**
	By income decile	1-2	61	60	68	36
		3-5	67	66	72	50
		6-8	54	56	47	71
		9-10	68	70	51	128
	Hard discount stores		**153**	**152**	**158**	**138**
By social groups	Non-orthodox Jews		95	96	93	102
	Orthodox Jews		148	140	178	65
	Muslims		167	169	163	166
By income decile and payday	1–2	Weeks without payday	113	109	128	61
		Weeks with at least one payday	**120**	**115**	**137**	**68**
	3–5	Weeks without payday	117	116	122	95
		Weeks with at least one payday	**126**	**124**	**133**	**106**
	6–8	Weeks without payday	77	81	68	95
		Weeks with at least one payday	**83**	**86**	**74**	**106**
	9–10	Weeks without payday	62	66	47	109
		Weeks with at least one payday	**66**	**69**	**51**	**120**

Note: The table presents normalized revenue data where each column displays its own normalized revenues.
The number of weeks with and without paydays are 376 and 40, respectively.

Table 2: Descriptive statistics at the store level

Variable	Average
Population size	4,619
Age 0–19, % (the last available year)	32
Age 20–64, % (the last available year)	54
Age 65 and over, % (the last available year)	14
Share of stores in non-orthodox Jewish areas, %	89
Share of stores in orthodox Jewish areas, %	7
Share of stores in Muslim areas, %	2
Share of stores in unclassified areas, %	2
Share of neighborhood stores, %	33
Share of hard-discount stores, %	47
Share of other stores, %	20

Table 3: Expenditures regressions, regulated versus luxury products

	The dependent variable – log expenditures on:		
	Regulated	Luxury	Difference
NoPayday week	−0.048***	−0.080***	0.032***
	(0.001)	(0.003)	(0.003)
Constant	10.584***	8.735***	1.849***
	(0.015)	(0.019)	(0.014)
Number of observations	104,691	104,691	104,691
R^2	0.174	0.549	0.487
Number of products	112	222	334

Note: The regression includes store, week, month, year and holiday fixed effects. Clustered standard error in parentheses. *, **, *** denote 10%, 5% and 1% level of significance, respectively.

Table 4: Price regressions, necessity versus luxury products

	The dependent variable – log price of:	
	Necessity products	Luxury products
NoPayday week	−0.006***	−0.009***
	(0.0009)	(0.002)
Constant	2.014***	2.628***
	(0.009)	(0.009)
Observations	12,554,335	6,922,334
R^2	0.030	0.039

See note to Table 3.

Table 5: Expenditures regressions, regulated versus food with label claims and feast-related luxury goods

	The dependent variable – log expenditures on:					
	Regulated	Luxury: food with label claims	Difference	Regulated	Luxury: Feast-related goods	Difference
NoPayday week	−0.048***	−0.060***	0.013***	−0.048***	−0.102***	0.053***
	(0.001)	(0.003)	(0.003)	(0.001)	(0.004)	(0.004)
Constant	10.585***	7.873***	2.712***	10.584***	7.898***	2.687***
	(0.015)	(0.024)	(0.020)	(0.015)	(0.020)	(0.018)
Observations	104,430	104,430	104,430	104,652	104,652	104,652
R^2	0.177	0.436	0.352	0.180	0.430	0.345
Number of products	112	82	194	112	94	206

See note to Table 3.

Table 6: Expenditures regressions, fresh bread and cooking and baking supplies

	The dependent variable – log expenditures on:					
	Fresh bread			Cooking and baking supplies		
	Regulated	Luxury	Difference	Regulated	Luxury	Difference
NoPayday week	−0.046***	−0.089***	0.043***	−0.032***	−0.112***	0.081***
	(0.003)	(0.007)	(0.006)	(0.003)	(0.006)	(0.007)
Constant	8.700***	5.505***	3.195***	5.067***	5.382***	−0.315***
	(0.018)	(0.029)	(0.029)	(0.022)	(0.028)	(0.031)
Observations	90,684	90,684	90,684	99,539	99,539	99,539
R^2	0.416	0.096	0.102	0.149	0.170	0.148
Number of products	10	5	15	4	18	22

See note to Table 3.
For this estimation, the list of participating products is extended to 1,574 with an income coefficient that is significant at 30%.

Table 7: Expenditures regressions, milk products and cheese

	The dependent variable – log expenditures on:					
	Milk products			Cheese		
	Regulated	Luxury	Difference	Regulated	Luxury	Difference
NoPayday week	−0.036***	−0.041***	0.005	−0.054***	−0.088***	0.034***
	(0.001)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)
Constant	9.426***	7.273***	2.153***	8.945***	6.760***	2.185***
	(0.014)	(0.029)	(0.025)	(0.020)	(0.024)	(0.022)
Observations	101,180	101,180	101,180	103,906	103,906	103,906
R^2	0.184	0.747	0.740	0.492	0.090	0.175
Number of products	30	7	37	23	37	60

See note to Table 3.
For this estimation, the list of participating products is extended to 1,574 with an income coefficient that is significant at 30%.

Table 8: Expenditures regressions, necessity versus luxury products

	The dependent variable – log expenditures on:		
	Necessity	Luxury	Difference
NoPayday week	−0.050***	−0.080***	0.030***
	(0.001)	(0.003)	(0.003)
Constant	10.291***	8.735***	1.555***
	(0.015)	(0.019)	(0.015)
Observations	104,694	104,694	104,694
R^2	0.498	0.549	0.234
Number of products	223	222	445

See note to Table 3.

Table 9: Expenditures regressions by income per capita deciles

	The dependent variable – log expenditures on:					
	Bottom 20%			Top 20%		
	Regulated	Luxury	Difference	Regulated	Luxury	Difference
NoPayday week	−0.057***	−0.109***	0.052***	−0.041***	−0.062***	0.021***
	(0.004)	(0.009)	(0.007)	(0.002)	(0.004)	(0.004)
Constant	10.773***	8.339***	2.435***	10.216***	8.934***	1.282***
	(0.039)	(0.053)	(0.031)	(0.027)	(0.034)	(0.025)
Observations	21,051	21,051	21,051	20,769	20,769	20,769
R^2	0.565	0.612	0.206	0.366	0.408	0.146

See note to Table 3.

Table 10: Expenditures regressions by social group

	The dependent variable – log expenditures on:					
	Orthodox Jewish areas			Non-orthodox Jewish areas		
	Regulated	Luxury	Difference	Regulated	Luxury	Difference
NoPayday week	−0.065***	−0.149***	0.084***	−0.047***	−0.075***	0.028***
	(0.008)	(0.019)	(0.014)	(0.001)	(0.003)	(0.002)
Constant	10.938***	8.073***	2.865***	10.544***	8.779***	1.765***
	(0.101)	(0.117)	(0.106)	(0.014)	(0.018)	(0.013)
Observations	6,660	6,660	6,660	94,607	94,607	94,607
R^2	0.521	0.586	0.193	0.316	0.303	0.083

See note to Table 3.

Table 11: Expenditures regressions by retail format

	The dependent variable – log expenditures on:					
	Neighborhood stores			Hard-discount stores		
	Regulated	Luxury	Difference	Regulated	Luxury	Difference
NoPayday week	−0.040***	−0.057***	0.017***	−0.059***	−0.093***	0.035***
	(0.001)	(0.003)	(0.003)	(0.002)	(0.004)	(0.004)
Constant	10.388***	8.690***	1.698***	11.170***	9.143***	2.027***
	(0.016)	(0.019)	(0.024)	(0.024)	(0.030)	(0.017)
Observations	37,629	37,629	37,629	50,906	50,906	50,906
R^2	0.403	0.677	0.514	0.155	0.506	0.495

See note to Table 3.

Table 12: Expenditures regressions, regulated versus "undetermined" products

	The dependent variable – log expenditures on:		
	Regulated	"Undetermined"	Difference
NoPayday week	−0.048***	−0.056***	0.008***
	(0.001)	(0.002)	(0.002)
Constant	10.584***	8.629***	1.955***
	(0.015)	(0.016)	(0.008)
Number of observations	104,695	104,695	104,695
R^2	0.174	0.578	0.534
Number of products	112	222	334

See note to Table 3.

Table 13: Expenditures regressions, separating social security and salary *NoPayday* weeks

	The dependent variable – log expenditures on:		
	Necessity	Luxury	Difference
NoPayday week: social security	−0.043***	−0.070***	0.027***
	(0.001)	(0.002)	(0.002)
NoPayday week: salary	−0.016***	−0.012***	−0.004**
	(0.001)	(0.002)	(0.002)
Constant	10.618***	8.786***	1.831***
	(0.015)	(0.019)	(0.014)
Observations	104,691	104,691	104,691
R^2	0.175	0.550	0.487
Number of products	112	222	334

See note to Table 3.

Table 14: Expenditures regressions by number of paydays

	The dependent variable – log expenditures on:		
	Regulated	Luxury	Difference
NoPayday week	−0.055***	−0.096***	0.041***
	(0.002)	(0.005)	(0.004)
Weeks with a payday	−0.015***	−0.022***	0.008**
No income support payday	(0.002)	(0.004)	(0.003)
Weeks with 2 paydays	0.001	−0.012***	0.014***
No income support payday	(0.002)	(0.004)	(0.004)
Weeks with 2 paydays	0.008***	0.011***	-0.003
with income support payday	(0.002)	(0.004)	(0.004)
Weeks with 3–4 paydays	0.058***	0.043***	0.015**
No income support payday	(0.004)	(0.008)	(0.007)
Weeks with 3–4 paydays	0.023***	−0.007	0.030***
with income support payday	(0.003)	(0.005)	(0.004)
Constant	10.595***	8.752***	1.843***
	(0.014)	(0.019)	(0.014)
Number of observations	104,691	104,691	104,691
R^2	0.177	0.550	0.487
Number of products	112	222	334

See note to Table 3.
The omitted variable is a week with an income support payday only.

Appendix Table 1: The estimated income coefficient of selected regulated products

Regulated products	Income coefficient [a]	Previous update date	Last update date	Price (₪)
Eggs – 12 pack, medium size (M)	−0.0500	24.5.2011	22.1.2019	10.40
Eggs – 12 pack, large size (L)	−0.1150	24.5.2011	22.1.2019	11.30
Eggs – 12 pack, extra-large size (XL)	−0.0060	24.5.2011	22.1.2019	12.40
Semi-hard cheese, 22% fat (1kg)	−0.0180	24.5.2011	11.6.2019	40.59
Semi-hard cheese, 28% fat (1kg)	−0.0360	24.5.2011	11.6.2019	42.70
White cheese 5% (250gr)	−0.0050	10.2.2016	11.6.2019	4.75
Fresh milk in a carton, 1% (1 liter)	0.0005	10.2.2016	11.6.2019	5.59
Fresh milk in a carton, 3% (1 liter)	−0.0130	10.2.2016	11.6.2019	5.94
Fresh milk in a bag, 1% (1 liter)	−0.0002	10.2.2016	11.6.2019	4.81
Fresh milk in a bag, 3% (1 liter)	−0.0310	10.2.2016	11.6.2019	5.17
Sour milk, 4.5% fat regular (200ml)	−0.0220	11.6.2019	11.6.2019	1.61
Sour milk, 3% fat (200ml)	−0.0260	11.6.2019	11.6.2019	1.44
Sour cream, 15% fat regular (200ml)	−0.0060	11.6.2019	11.6.2019	2.28
Whipped cream, 38% fat (250ml)	−0.0500	11.6.2019	11.6.2019	6.18
Challah bread, (500gr)	−0.0531	27.5.2018	3.2.2019	5.17
Unpacked bread dark and white (750gr)	−0.0004	1.10.2015	27.5.2018	5.12
Dark bread pre-sliced and packaged (750gr)	−0.1390	1.10.2015	3.2.2019	7.11
White bread pre-sliced and packaged (500gr)	−0.0030	1.4.2016	27.5.2018	6.10
Table salt (1kg)	−0.0002	2.6.2013	1.10.2015	2.07
Regular kitchen salt (1kg)	−0.0020	2.6.2013	1.10.2015	2.07
Regular butter (100gr)	−0.0020	10.2.2016	11.6.2019	3.94

a. The coefficients are multiplied by 1,000

Appendix Table 2: Selected necessity and luxury products by estimated income coefficient

Necessity products	Income coefficient	Luxury products	Income coefficient
Bread pre-sliced & packaged, 750gr	−0.1536	Omega-3 eggs	0.0163
Fresh milk, 3% (1L plastic bag)	−0.0346	Rich milk, 1%, 1L carton	0.0050
Sour cream, 15% fat regular, 200ml	−0.0260	Organic milk, 3%, 1L carton	0.0040
Buttermilk (Revion), 1L carton	−0.0232	Sweet Challah bread, 500gr	0.0034
Mayonnaise, 500gr	−0.0129	Chocolate–box, 250gr	0.0032
Tuna chunk in oil can, 4×158gr	−0.0096	Kinder Surprise (3 Pieces)	0.0031
Soda, 4×1.5L	−0.0075	Chicken shashlik	0.0028
Chicken sausages (unpacked)	−0.0070	Goat cheese labane, 5%, 250gr	0.0026
Margarine, 200gr	−0.0068	Goat milk yogurt, 180gr	0.0024
Cottage cheese, 5%, 400gr	−0.0063	Chocolate fudge ice cream, 500gr	0.0015
Hummus spread, private label, 1kg	−0.0044	Cereal snack pack (6 pieces)	0.0009
Yogurt, 3%, 8×150gr	−0.0039	Whiskey, 750ml	0.0004
Soybean oil, private label, 1L	−0.0034	Organic ketchup, 750gr	0.0004
Thai rice, 1kg	−0.0025	Sesame oil, 150ml	0.0002
Tea, 100 bags	−0.0022	Sweet tablets, 150	0.0163

a. The coefficients are multiplied by 1,000

Figure 1: The distribution of estimated income coefficient (×1,000), all 3,973 products

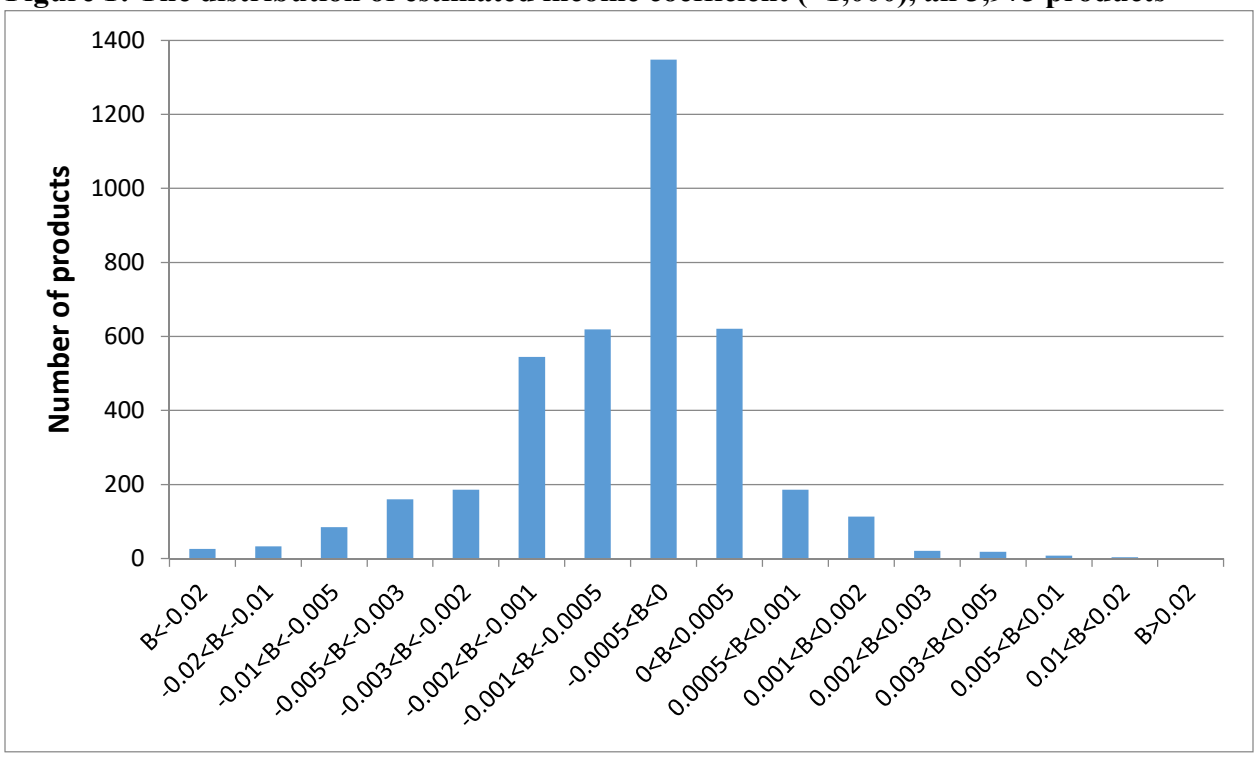

Figure 2: The distribution of income coefficient (×1,000) significant at 5%, 667 products