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### **PATTERNS OF EXPENDITURE ON FOOD IN ISRAEL**

Dov Chernichovsky and Eitan Regev

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# Patterns of Expenditure on Food in Israel

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Dov Chernichovsky and Eitan Regev\*

## *Abstract*

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*The issue of food insecurity is at the top of the public agenda in Israel. This chapter attempts to define the normative per capita expenditure on food in Israel; the normative expenditure refers to one that is neither insufficient nor excessive. It also examines the composition of food expenditure by income levels in order to assess the possible consequences of that composition on nutrition. In this manner, the chapter aims to help formulate policies that could alleviate the distress of households that are unable to meet the normative expenditure. The findings indicate that the normative per capita expenditure on food in Israel – not including the costs of “dining out” and alcoholic beverages – is about NIS 600 monthly. Families in the lowest decile need an additional NIS 170 per capita per month to reach this amount, while families in the second lowest decile need about NIS 90 to reach it. Likewise, differences were found in the various foods that were avoided when necessary. As per person income declines, households tend to maintain their expenditures on meat and poultry, bread and baked goods, and vegetable oils at a relatively stable level, but tend to forgo eggs, milk and dairy products, and especially fruit and vegetables, even though they constitute the basis for a healthy Mediterranean diet.*

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\* Prof. Dov Chernichovsky, Chair, Taub Center for Social Policy Studies in Israel Health Policy Program; Chair, National Council for Food Security; Department of Health Systems Management, Ben-Gurion University of the Negev. Eitan Regev, researcher, Taub Center for Social Policy Studies in Israel; doctoral candidate, Department of Economics, The Hebrew University.

## ***Introduction***

The issue of food insecurity has been greatly discussed in Israel, both in the context of poverty and on its own. According to statistics from the National Insurance Institute, about 320,000 households in Israel – nearly a million people – suffer from food insecurity (Endeweld et al., 2012). The National Council for Food Security estimates that, based on objective eligibility tests, about 110,000 households are eligible for support in purchasing food (National Council for Food Security, 2014). The recently published State Comptroller's Report (2014) also refers to the state's responsibility in this area.

This chapter attempts to examine the subject using data from the 2011 *Household Expenditure Survey* conducted by the Central Bureau of Statistics (CBS), and thus to help formulate a policy for alleviating this type of distress by defining the minimum normative per capita expenditure on food in Israel. From the perspective of the entire consumer public, this expenditure should be sufficient but not include luxury foods.<sup>1</sup> Once a normative level has been defined, it is easier to examine the extent and characteristics of food insecurity in Israel in terms of expenditure, and to contend with it using appropriate tools related to guaranteed income and food prices.

### ***1. Data on Food Expenditure in Israel***

The average monthly per capita expenditure on food in Israel is about NIS 800 and the average monthly household expenditure is NIS 2,260. This sum amounts to 17.1 percent of total net household income, and to 21.4 percent of overall household expenditure.<sup>2</sup> In the distribution among

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<sup>1</sup> A definition from a subjective viewpoint lies at the basis of defining relative poverty – in contrast to absolute poverty, which is determined by income level (Chernichovsky and Navon, 2012). This also applies to food insecurity.

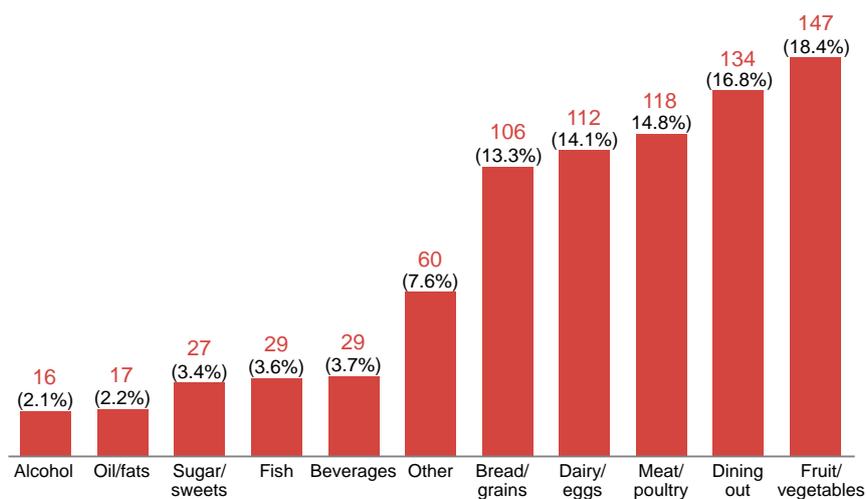
<sup>2</sup> Net cash income and expenditures (not including in-kind income and expenditure for homeownership).

food groups, expenditure on fruit and vegetables is the highest at 18 percent of total food expenditures. It is followed by the expenditure on dining out (17 percent), meat and poultry (15 percent), eggs, milk and dairy products (14 percent), and bread, grains and baked goods (13 percent) (Figure 1).

Figure 1

**Monthly per person food expenditure by food group**

in shekels and as a percent of all household expenditure on food, 2011



Source: Dov Chernichovsky and Eitan Regev, Taub Center

Data: Central Bureau of Statistics, *Household Expenditure Survey 2011*

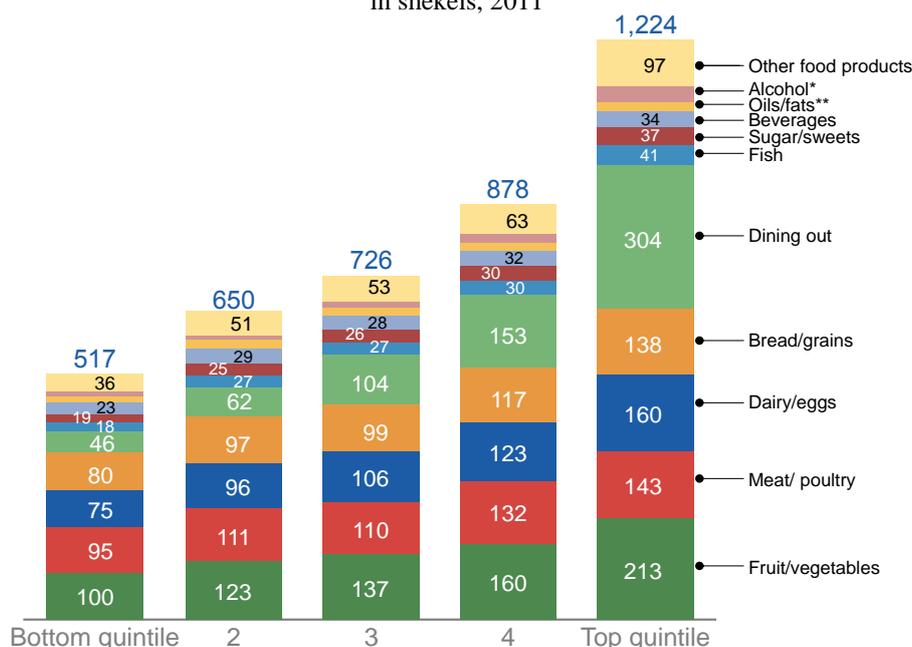
### *Distribution of Food Expenditure by Income Level*

The per capita expenditure on food in the bottom income quintile is NIS 517 per month.<sup>3</sup> In the top income quintile, the expenditure stands at NIS 1,224 monthly – 2.4 times that of the bottom quintile<sup>4</sup> (Figure 2).

Figure 2

#### **Monthly per person food expenditure by income quintiles**

in shekels, 2011



\* Expenditure on alcoholic beverages (in shekels): top quintile (32); 4<sup>th</sup> quintile (18); 3<sup>rd</sup> quintile (13); 2<sup>nd</sup> quintile (9); bottom quintile (9)

\*\* Expenditure on vegetable oils and fats (in shekels): top quintile (19); 4<sup>th</sup> quintile (17); 3<sup>rd</sup> quintile (18); 2<sup>nd</sup> quintile (18); bottom quintile (14)

Source: Dov Chernichovsky and Eitan Regev, Taub Center

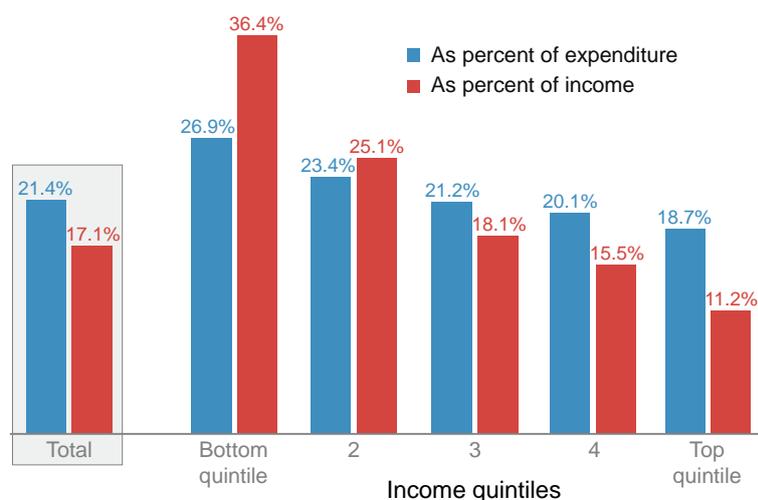
Data: Central Bureau of Statistics, *Household Expenditure Survey 2011*

<sup>3</sup> The chapter will refer alternately to income quintiles and deciles when discussing the income distribution, depending on the topic and the level of detail of the analysis.

<sup>4</sup> It should be noted that the differences between the quintiles in expenditures on food do not necessarily represent differences in the quantities of food

As expected, in the lower income quintiles, the expenditure on food constitutes a larger part of both income and expenditures. Households in the bottom quintile spend about 36.4 percent of their income on food – 3.5 times more than households in the top quintile, which spend only about 11.2 percent of their income on food (Figure 3).

Figure 3  
**Food expenditure as percent of income and expenditures\***  
 by household, by income quintiles, 2011



\* Net cash income and expenditures (not including income from in-kind services)

Source for both figures: Dov Chernichovsky and Eitan Regev, Taub Center

Data for both figures: Central Bureau of Statistics, *Household Expenditure Survey 2011*

consumed; they are also dependent on food prices, including different kinds of foods in the same group (e.g., various types of bread). Nonetheless, it is assumed that there is a certain correspondence between the amount of the expenditure and the quantities of food purchased, especially when the different quintiles' expenditures in each of the food groups are compared.

<sup>5</sup> These terms are equivalent to elasticity in economics. For details of the measurement method, see the appendix.

The distribution of expenditure by food groups reveals that households in the top quintile tend to spend relatively large sums on dining out, whereas in the lower quintiles (1-3), this expenditure is relatively small. The top quintile's expenditure on food products such as fruit and vegetables, eggs and dairy products, bread, grains and baked goods are also high relative to that of the bottom quintile – differences in expenditure of 113, 113, and 73 percent, respectively.

### *“Essential Expenditure” on Food*

Expenditure on food varies greatly and includes the purchase of staples, as well as expenditure on what can be considered luxuries, such as dining out in restaurants or buying food products that might be considered extravagant. In order to assess the necessity of the expenditure by food items from the perspective of the average household in Israel, the effect of household income and size on both the total food expenditure and the expenditure on various food groups was examined. That is, the extent to which expenditure on various food groups changes due to changes in the income or size of the household was examined.<sup>5</sup> Expenditure items that change relatively little when there is a change in income, but change a great deal when there is a change in the number of household members were defined as essential expenditure items. This approach assumes that if despite a drop in income of a household of a given size, the household nonetheless does not reduce its expenditure on a certain food group, then it perceives the expenditure on this food group as an essential expenditure. Likewise, if a household grows in size and the expenditure also increases (i.e., the increase in the number of household members does not significantly reduce the per capita expenditure on a certain food group), that food group is considered an essential expenditure.<sup>6</sup>

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<sup>5</sup> These terms are equivalent to elasticity in economics. For details of the measurement method, see the appendix.

<sup>6</sup> Obviously a household may change the composition of the expenditure to cheaper products, almost certainly within the same food group.

In accordance with these assumptions, a summary measure of the two effects – the effect of income and the effect of household size – was defined for the purchase of food in general, and for the various food groups in particular. The measure presents the relative necessity of an expenditure as the ratio between the extent to which it is affected by household size and the extent to which it is affected by income level.<sup>7</sup> A higher score on the measure attests to a greater effect of household size relative to a smaller effect of income – that is, it represents a more essential expenditure.

Table 1 presents the effects of household income and family size on various expenditure items, as well as the Essential Expenditure Measure.<sup>8</sup> The calculation was done for a 10 percent change in the average household income (NIS 13,136) and average household size (3.2 members). Full details of the methodology are presented in the appendix to this chapter. As can be seen, an increase of 10 percent in income prompts an increase of 4.6 percent in food expenditure.

With regard to the various food groups, the effect of income on expenditure on meat, poultry and fish seems to be relatively small. Similarly, the expenditure on cooking oils is affected only slightly by income level. In contrast, the relatively large effect of income on the expenditure on fruit and vegetables, as well as on milk, dairy products and eggs is noteworthy.

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<sup>7</sup> For more on this, see Chernichovsky (in preparation).

<sup>8</sup> The full estimates on which these data are based are presented in detail in Chernichovsky and Regev (in preparation).

Table 1. **Effects of household income and size on food expenditure and Essential Expenditure Measure by food group**

<b>Food group</b>	<b>Effect of household income*</b>	<b>Effect of household size*</b>	<b>Essential Expenditure Measure**</b>
Total food expenditure	4.6%	4.1%	0.89
Meat/poultry	1.6%	5.2%	3.06
Bread/baked goods	2.6%	7.1%	2.72
Vegetable oils	1.0%	2.2%	2.24
Beverages	1.6%	3.5%	2.24
Milk, dairy and eggs	3.0%	5.7%	1.85
Fish	1.7%	2.8%	1.56
Fruit/vegetables	3.3%	4.9%	1.45
Sugar/sweets	2.7%	3.2%	1.17
Other food products	3.2%	3.1%	0.95
Dining out	9.0%	-4.3%	–
Alcohol	3.5%	-2.1%	–

\* Percent change in expenditure for a 10 percent change in income or household size

\*\* Effect of household size divided by effect of income

Source: Dov Chernichovsky and Eitan Regev, Taub Center

Data: Central Bureau of Statistics, *Household Expenditure Survey 2011*

At the same time, the elasticity of the total expenditure on food relative to the number of household members is 0.41. That is, on average, an increase of 10 percent in the number of household members leads to an increase of 4.1 percent in total household food expenditure. The explanation for this lies in the advantage of size and in the change in the components of the food basket for larger families. For example, the expenditure on bread and baked goods is affected to a relatively large extent by family size (an average increase of 7.2 percent in expenditure with an increase of 10 percent in household size), as is the expenditure on meat and poultry (5.0 percent), and dairy products and eggs (5.6 percent). In contrast, the expenditure on dining out is negatively and significantly

affected by family size (-4.3 percent). In other words, when all other household characteristics are the same, as household size increases, expenditure on bread and dairy products rises while expenditure on dining out declines.

The leading expenditure items on the Essential Expenditure Measure are meat and poultry, bread and baked goods, cooking oils, and beverages; alcoholic beverages and dining out are ranked at the bottom of the list. The expenditure items ranked in the middle are milk and dairy products, fish, and fruit and vegetables. The significance of these findings is that as per capita income declines, there is a greater tendency to forego milk and dairy products, fish, and fruit and vegetables. In contrast, spending on meat and poultry, bread and baked goods, cooking oils, and beverages<sup>9</sup> remains relatively stable.

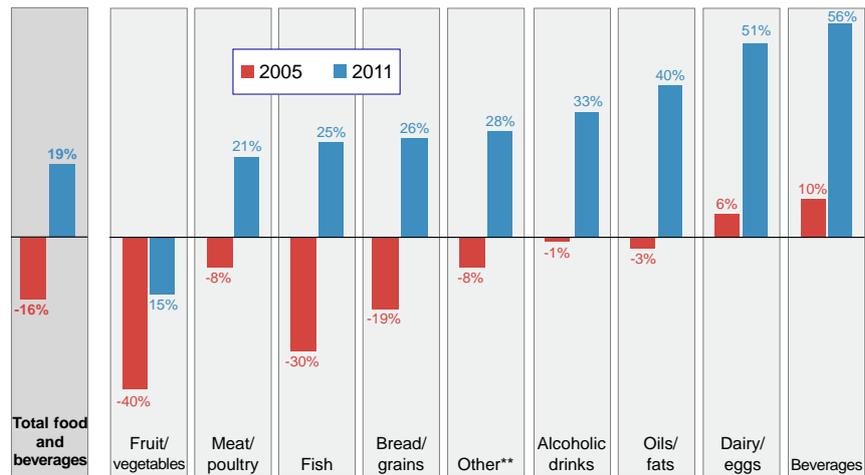
The tendency for poorer households to forego dairy products and fish appears to stem from the substantial price rises in these food categories over the past few years (Figure 4). In 2005, most food products in Israel were less expensive relative to the OECD, however in just six years, all food categories in Israel, except for fruit and vegetables, have become more expensive. Dairy products were only 6 percent more expensive in 2005, yet in 2011, they reached a price level 51 percent higher than the OECD average. Fish were 30 percent cheaper in 2005, but in 2011 they were 25 percent more expensive than the OECD average. As noted, fruit and vegetables remained less expensive relative to the OECD, however, in 2005, they were considerably cheaper (40 percent) while in 2011, they were only 15 percent cheaper. While the price of most vegetables sold in Israel is relatively low, the price of many fruits is not cheap, especially those that are on the one hand expensive to grow in Israel and on the other hand not imported from other countries. This appears to be the reason that the expenditure on fruit and vegetables in Israel is especially sensitive to income level – poorer families buy mainly cheaper

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<sup>9</sup> Although beverages are not an essential food group from a nutritional aspect, it would appear that Israeli households consider them a subjectively important item, as expenditure on beverages remains rather stable among lower-income households, as well.

vegetables, while more well-off families also buy expensive fruits. From a broader perspective, it is apparent that the substantial rise in food prices over the past few years in Israel has also had a negative effect on the composition of food consumption – especially among poorer families.

Figure 4  
Differences in food prices between Israel and the OECD average\*  
2005 and 2011



\* The difference between prices in Israel and the average OECD price

\*\* Other foods: instant food mixes, prepared meals (frozen or dried), granola, baking aids, baby food, deliveries of prepared food, chewing gum, milk and soy desserts, dried beans and legumes, coffee and tea, sauces, spices, meat and cheese substitutes

Source: Dov Chernichovsky and Eitan Regev, Taub Center

Data: OECD

### *Normative Expenditure*

In order to determine the normative expenditure on items with a positive value on the Essential Expenditure Measure, the average monthly expenditure (in 2011) in each food group was examined by income deciles (Figures 5A-5D). The purpose was to ascertain in which income ranges the per capita expenditure remains relatively fixed even when per capita income changes.<sup>10</sup> The assumption is that expenditure will remain fixed in those income ranges where the household income is high enough to purchase all the food that the household requires, but not high enough to purchase food that would be defined as a luxury in terms of quality and quantity. The logic behind this assumption is that if household income is insufficient to buy all the food that the household requires, a rise in income may be expected to prompt an increase in expenditure on food. Similarly, if household income is high enough to purchase luxury food, a rise in income may also be expected to prompt an increase in expenditure. However, when the expenditure on food does not change within a certain income range, it is reasonable to assume that the income of households in this range is high enough to purchase all the food that they require, but not high enough to purchase luxury food. In other words, the expenditure that remains fixed within a broad enough income range represents the normative, or broadly accepted, essential expenditure. In the absence of sufficient data on quantities, prices and quality of food products consumed by households, there is no way to directly determine which part of the population forgoes a certain food (or compromises on its quality) and to what extent. Nonetheless, finding the income range in which the expenditure on a certain food is relatively stable makes it possible to determine with high probability that the households located below this range are forced to make certain concessions in food consumption (in quantity, quality, or both). Furthermore, this approach makes it possible to calculate the monetary value of these concessions.

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<sup>10</sup> The examination is done by income deciles rather than quintiles, in order to get a more detailed picture of the expenditure patterns according to income.

In Figures 5A-5D, the normative expenditure range is indicated in green, the food insecurity range in red, and the luxury range in blue.

Starting with a comprehensive view on total food spending, the average monthly per capita expenditure stabilizes at around NIS 662 (Figure 5A).<sup>11</sup> As the figure shows, the second decile's expenditure on food is lower by NIS 99 per month than the normative expenditure, while the lowest decile spends NIS 192 less than the normative expenditure on food. When unnecessary items (i.e., dining out and alcoholic beverages) are eliminated from the analysis, the gaps are NIS 90 and NIS 169, respectively, as detailed in Table 2.

Normative expenditures for specific food groups were also determined using this same method (Table 2). The food items for which the normative expenditures were the highest (in absolute amounts) were fruit and vegetables – NIS 137; meat and poultry – NIS 110; and milk, dairy products and eggs – NIS 101.

In the meat and poultry category, the second decile appears to spend a sum close to the normative expenditure, while the lowest decile lacks NIS 27 per capita per month for this item – which accounts for 25 percent of the normative expenditure (Figure 5B). In contrast, it is evident that the lowest two deciles, which are below the poverty line, make a relatively significant concession in their expenditures on dairy products and eggs; the average expenditure of households in the second decile on food items in this group is NIS 22 lower than the normative expenditure (a concession of 22 percent), while the lowest decile's expenditure is NIS 29 lower (a concession of 29 percent). An even more significant concession is evident in the category of fruit and vegetables, where the second decile lacked NIS 25 (a concession of 18 percent) to match the normative expenditure, and the lowest decile lacked NIS 48 (35 percent of the normative expenditure) (Figures 5C and 5D). Thus, with respect to

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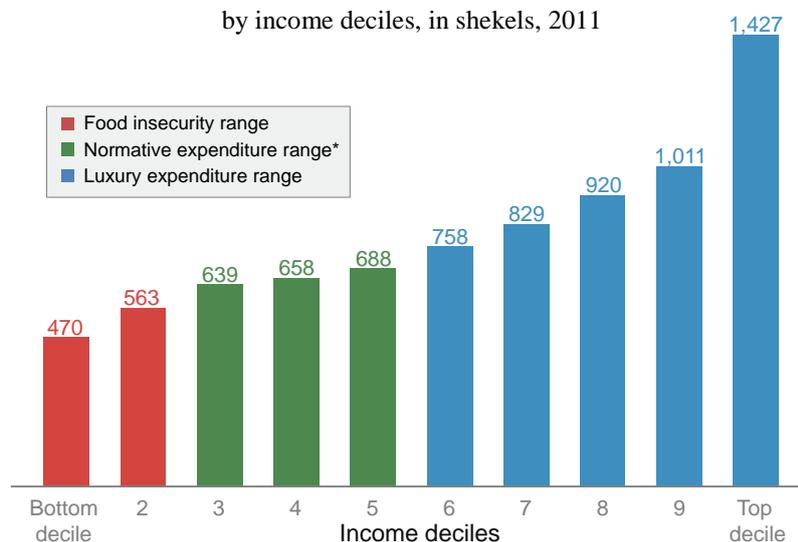
<sup>11</sup> Stabilization of food expenditure is defined as occurring when the differences in expenditure between adjacent deciles are minimal.

these food groups, a picture emerges of insufficiency within the lowest two deciles and relative stability from the third decile upwards.<sup>12</sup>

Figure 5 (continued on next pages)

**A. Average monthly per person expenditure on food**

by income deciles, in shekels, 2011



\* The normative expenditure range is defined as the lowest group of income deciles with minimal differences in food expenditures.

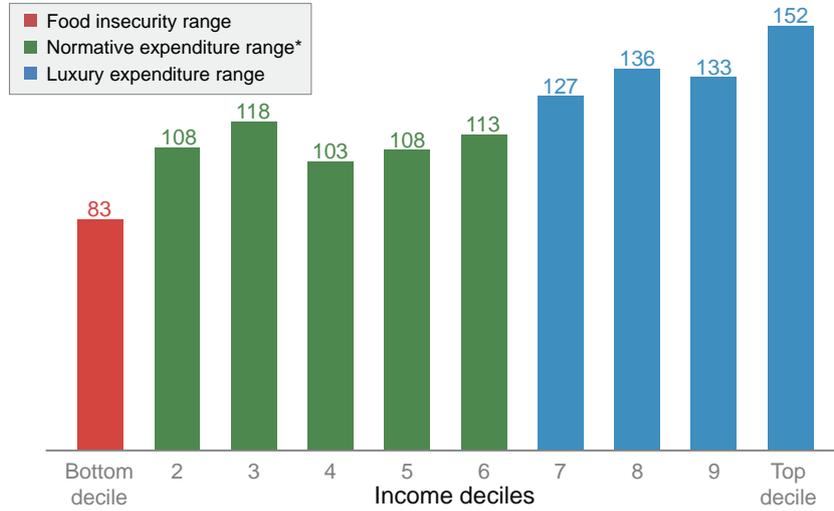
Source: Dov Chernichovsky and Eitan Regev, Taub Center

Data: Central Bureau of Statistics, *Household Expenditure Survey 2011*

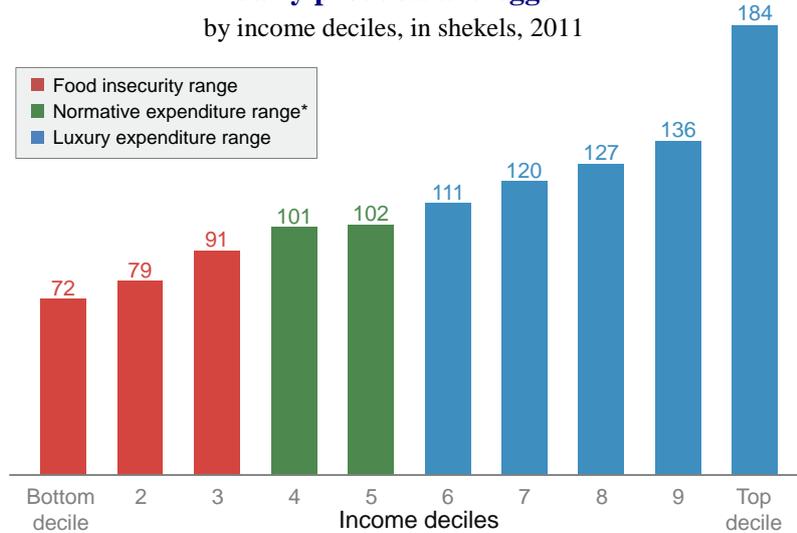
<sup>12</sup> It is important to note that regarding certain food items, expenditure stabilizes only in the fourth decile (e.g., milk and dairy products), whereas regarding other food groups, expenditure stabilizes by the second decile (e.g., meat and poultry). As noted, stabilization of expenditure for a certain food category in the second or third deciles indicates that – from the households' perspective – this food group is essential, or one that is hard to go without.

Figure 5 (continued from previous page)

**B. Average monthly per person expenditure on meat and poultry**  
by income deciles, in shekels, 2011



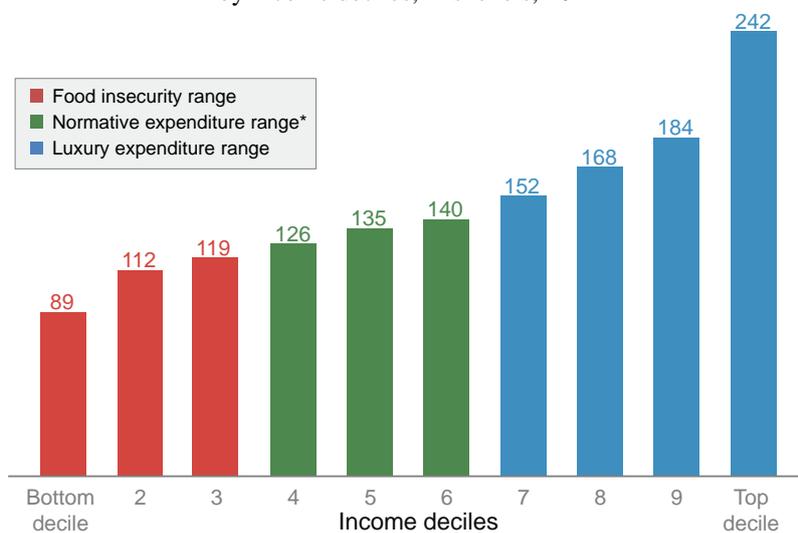
**C. Average monthly per person expenditure on dairy products and eggs**  
by income deciles, in shekels, 2011



\* The normative expenditure range is defined as the lowest group of income deciles with minimal differences in food expenditures.

Source for both: Dov Chernichovsky and Eitan Regev, Taub Center  
Data for both: Central Bureau of Statistics, *Household Expenditure Survey 2011*

Figure 5 (continued from previous pages)

**D. Average monthly per person expenditure on fruit and vegetables**  
by income deciles, in shekels, 2011

\* The normative expenditure range is defined as the lowest group of income deciles with minimal differences in food expenditures.

Source: Dov Chernichovsky and Eitan Regev, Taub Center

Data: Central Bureau of Statistics, *Household Expenditure Survey 2011*

Table 2. **Normative expenditure on food and its difference from the expenditures of the lowest two income deciles**  
by food groups, 2011

Food group	Normative expenditure	Difference between normative expenditure and expenditure of 2 <sup>nd</sup> lowest income decile	Difference between normative expenditure and expenditure of lowest income decile
	NIS*	NIS	NIS
Total food expenditure	662	99	192
Meat/poultry	110	2	27
Bread/baked goods	95	10	12
Vegetable oils	19	3	6
Beverages	29	5	8
Milk, dairy and eggs	101	22	29
Fish	27	6	11
Fruit/vegetables	137	25	48
Sugar/sweets	26	6	8
Other food products	52	11	20
Total without dining out and alcohol	596	90	169

\* Normative expenditure is the average expenditure of the deciles marked in green in Figures 5A-5D. For more detail regarding food groups not included in these figures, see Chernichovsky and Regev (in preparation).

## *2. Summary*

The pattern of food expenditure in relation to income among Israeli households is unsurprising. The share of expenditure on food in relation to income is greater the lower the per capita household income level. Nonetheless, the changes that occur in the composition of food expenditure when there are changes in household income and size are interesting and somewhat surprising. The burden is especially great regarding those products that households regard as most essential (i.e., items for which households do not decrease their consumption despite a decline in per capita income): principally meat and poultry, bread and baked goods, and vegetable oils. In contrast, there are food groups that households “cut back” on relative to others when there is a decline in income or an increase in household size: milk, dairy products and eggs, and especially fruit and vegetables. In effect, the expenditure on fruit and vegetables exhibits a pattern similar to that of spending on luxury foods.

In the absence of sufficient knowledge concerning the cost of food for the various income groups (since food prices vary from one place to another, as does the quality of the purchased products), it is difficult to assess precisely the full significance of this study’s findings with regard to the quantity and quality of actual food consumption. Nonetheless, it may be assumed that these patterns of expenditure are liable to have nutritional consequences relating to poverty – especially when comparing the middle deciles to the two deciles that are below the poverty line. With the decline in income, households tend to continue consuming protein from meat and poultry, carbohydrates from bread, baked goods and vegetable oils, but are likely to find it challenging to consume sufficient amounts of milk and dairy products, and especially fruit and vegetables, which are the basis for a healthy Mediterranean diet. The findings also align with public sentiment regarding the high cost of food, which has been expressed in, among other things, the “cottage cheese protest” and other attempts to lower fruit and vegetable prices through public protests and independent organizing efforts by citizens.

## *Appendix*

### *Method of Calculating Elasticity in Food Expenditure*

The elasticity figures shown in Table 1 are based on an analysis of the Central Bureau of Statistics' 2011 *Household Expenditures Survey*. The analysis includes OLS regressions, in which the explained variable (for all food categories) is the household's log monthly expenditure on the relevant food category (Chernichovsky and Regev, in preparation). The explanatory variables are various household characteristics: log net income, log number of household members, log age of head of household, home ownership, whether the head of household is female, whether the family is Haredi, whether the family is Arab Israeli, and whether the family resides in the country's geographic periphery.

The effect of the household characteristics on the level of food expenditure is different for each food group. Nonetheless, when the effect of these characteristics on total food expenditure is examined, the bigger picture becomes somewhat clearer. As can be seen in Tables 1 and 2, the elasticity of the total expenditure on food relative to income is about 46 percent, and the elasticity relative to family size is about 41 percent. As expected, these two variables are very distinct (for all the food categories). The elasticity of expenditure relative to age of head of household is about 10 percent.

Interestingly, when household income and size are taken into account, the sex of the head of household has no distinct effect on the level of food expenditure, nor does belonging to the Haredi sector. In contrast, it appears that belonging to the Muslim or Druze sector increases a household's food expenditure by about 21 percent – mainly because of greater expenditure on meat products among these populations (Regev, 2014). Residing in the periphery also increases the expenditure on food by about 6 percent. Somewhat surprisingly, home ownership (without a mortgage) does not increase food expenditure in comparison to renting, while home ownership (with a mortgage) reduces expenditure by about 9 percent. The fact that homeowners do not spend more on food than

renters may reflect the overall budgetary constraints in place after buying a home which are necessary in order to meet the payments and commitments that go along with such a purchase.

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