

## EPSO NUMERICAL REASONING EXERCISE

(suggested time for all 10 questions: 18 minutes)

Household expenditure by category for six EU countries in 2023									
including the 6 major categories									
	% of Household expenditures spent on:						Mean consumption expenditure	# of households	Population
Country	Housing, Water, Electricity, Fuels	Food and Non-Alc Beverages	Transport	Recreation and Culture	Restaurants and Hotels	Miscellaneous Goods	in € per household	in million	in million
Czechia	32.4%	15.0%	10.0%	8.0%	6.0%	5.0%	9,690	4.55	10.86
Denmark	27.9%	12.0%	14.0%	10.0%	7.0%	6.0%	33,197	2.82	5.96
France	27.0%	14.0%	13.0%	9.0%	6.0%	5.0%	24,738	32.00	68.29
Ireland	26.3%	11.0%	15.0%	10.0%	8.0%	6.0%	31,105	1.8	5.31
Estonia	25.7%	16.0%	12.0%	9.0%	7.0%	5.0%	11,549	0.65	1.37
Belgium	24.6%	13.0%	14.0%	9.0%	7.0%	6.0%	26,370	5.1	11.79

### QUESTIONS:

1. What percentage of Denmark's per-household expenditure on Miscellaneous Goods and Services did Estonia's per-household spending in this category represent?
- 1a. What percentage of total Danish household expenditure on Miscellaneous Goods and Services did Estonia's total spending in this category represent? (*Mind the rephrasing*)
2. In 2023, what was the total amount of unclassified household expenditures in Denmark?
3. How much more (or less) money was spent on Housing, Water, Electricity, and Fuels in Czechia compared to Ireland in 2023?
4. What was the average number of individuals per household in Belgium in 2023?
5. How much was spent on Recreation and Culture in France in 2023?
6. What was the average percentage of total household expenditures on Transport for the sample countries?
- 6a. What percentage of the (categorized) total household expenditures did Transport account for? (*Mind the rephrasing*)
7. In 2023, how much did each individual in Ireland spend on Food and Non-Alcoholic Beverages?
8. What is the average uncategorized expenditure per Irish individual?

## SOLUTIONS:

1. What percentage of Denmark's per-household expenditure on Miscellaneous Goods and Services did Estonia's per-household spending in this category represent?



Denmark's percentage on Miscellaneous Goods and Services: 6%

Estonia's percentage on Miscellaneous Goods and Services: 5%

Estonia's expenditure as a percentage of Denmark's:  $(5/6) \times 100 = 83.33\%$

Thus, Estonia's per-household spending on Miscellaneous Goods and Services was 83.33% of Denmark's respective expenditure.

1a. What percentage of total Danish household expenditure on Miscellaneous Goods and Services did Estonia's total spending in this category represent?



Denmark's amount on Miscellaneous Goods and Services:  
 $2,820,000 * 33,197 * 6\% = €5,617$  mln.

Estonia's amount on Miscellaneous Goods and Services:  $650,000 * 11,549 * 5\% = €525,48$  mln.

Estonia's expenditure on Miscellaneous Goods and Services as a percentage of Denmark's:  $525,48 \text{ mln} / 5,617 \text{ mln} \approx 9.36\%$

Estonia's total spending on Miscellaneous Goods and Services approximates 9.36% of Denmark's respective expenditure.

2. In 2023, what was the total amount of unclassified household expenditures in Denmark?



Assuming that "unclassified household expenditures" refers to the **remaining percentage** after subtracting all the *classified expenditure categories* from **100%**, we can calculate it as follows:

From the table, Denmark's classified expenditure categories for 2023 add up to:

$$27.9\% + 12.0\% + 14.0\% + 10.0\% + 7.0\% + 6.0\% = 76.9\%$$

Therefore, the Unclassified Percentage can be calculated as:  $100\% - 76.9\% = 23.1\%$

The Mean household expenditure in Denmark (2023) \* Number of households = Total expenditure across all households:  $€33,197 * 2.82 \text{ million} = 93,608.54 \text{ million } €$ .

Since the Unclassified expenditure accounts for 23.1% of total it will be approximately:

$$93,608.54 \times 0.231 = 21,628.57 \text{ million } €$$

3. How much more (or less) was spent on Housing, Water, Electricity, and Fuels in Czechia compared to Ireland in 2023?



Czechia's household expenditure:  $€9,690 * 32.4\% \Rightarrow €3,140.76$  per household spent on HWEF

Ireland's household expenditure:  $€31,105 * 26.3\% \Rightarrow €8,182.62$  per household spent on HWEF

Total spending (all households):

Czechia:  $3,140.76 \times 4.55$  million = 14.29 billion €

Ireland:  $8,182.62 \times 1.8$  million = 14.73 billion €

Difference:  $14.73 - 14.29 = 0.44$  billion € or 440 million €

Thus, in 2023, Czechia's expenditure on Housing, Water, Electricity, and Fuels was €0.44 billion (440 million euros) less than Ireland's expenditure in these categories.

4. What was the average number of individuals per household in Belgium in 2023?



Belgium's population: 11.79 million and Belgium's number of households: 5.1 million

Average household size:  $11.79 / 5.1 = 2.31$

Thus, the average number of individuals per household in Belgium for 2023 was 2.31.

5. How much was spent on Recreation and Culture in France in 2023?



France's household expenditure: €24,738. Percentage spent on Recreation and Culture: 9%

Total amount spent per household on R&C:  $24,738 \times 9 / 100 = 2,226.42$  €

Total amount for all households:  $2,226.42 \times 32.00$  million = 71,245.4 million € was spent on Recreation and Culture in France.

6. What was the average percentage of total household expenditures on Transport for the six sample countries?



Transport expenditure percentages:

- Czechia: 10%
- Denmark: 14%
- France: 13%
- Ireland: 15%
- Estonia: 12%
- Belgium: 14%

Answer: The average transport expenditure among the sample countries was 13%.

*Careful with the far more demanding 6a rephrased question:*

6a. What percentage of the (categorized) household expenditures did Transport account for?



Expend. in € per household	# of households in million	Total exp for all households in million	% of total on Transport expend.	Total Transport expend.	Country
9,690	4.55	44,089.5	10.0%	4,408.9	Czechia
33,197	2.82	93,615.5	14.0%	13,106.2	Denmark

24,738	32.00	791,616.0	13.0%	102,910.1	France
31,105	1.8	55,989.0	15.0%	8,398.4	Ireland
11,549	0.65	7,506.9	12.0%	900.8	Estonia
26,370	5.1	134,487.0	14.0%	18,828.2	Belgium

The total expenditure for all households (sum of the 3<sup>rd</sup> column) is 1,127,303.9 million €

The sum of the Transport Expenditures (sum of the 5<sup>th</sup> column) is 188,233.2 million €.

Thus, the Transport amount (188,233.2) is **16.70%** of the total Expenditure sum (1,127,303.9) for the 6 sample countries.

### 7. In 2023, how much did each individual in Ireland spend on Food and Non-Alcoholic Beverages?



Ireland's household expenditure: €31,105 and % of that spent on Food and Non-Alcoholic Beverages: 11%

Total spent per household on F&nAB:  $31,105 \times 11/100 = 3,421.55$  €

Total household expenditure on food (for all households):  $3,421.55 \times 1.8 = 6.16$  billion €

Per capita spending:  $6.16/5.31 = 1.16$  thousand €

Answer: Each individual in Ireland spent approximately €1,160 on F&nAB in 2023.

### 8. What is the average uncategorized expenditure per Irish individual?



First, calculate the Unclassified Expenditure Percentage for Ireland. From the table,

Ireland's classified expenditure categories sum up to  $26.3\% + 11.0\% + 15.0\% + 10.0\% + 8.0\% + 6.0\% = 76.3\%$ .

Thus, the unclassified expenditure percentage would be  $100\% - 76.3\% = 23.7\%$ .

Next, we calculate Total Unclassified Expenditure. Since the mean household expenditure in Ireland for 2023 was €31,105 with an existing number of households 1.8 million, total household expenditure should be

$31,105 \times 1.8 = 55,989$  million €.

With the Unclassified expenditure estimated at 23.7% of total =  $55,989 \times 0.237 = 13,275.4$  million €. Since the Population of Ireland is 5.31 million, we can compute the Per Capita Unclassified (uncategorized) Expenditure at:

$13,275.4 / 5.31 = 2,500.08$  €