UNITED STATES DIETARY RECOMMENDATIONS AND GROCERY SPENDING : A COHORT ANALYSIS

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INTRODUCTION

- Grocery shopping patterns with regards to changing dietary recommendations
- Generational approach

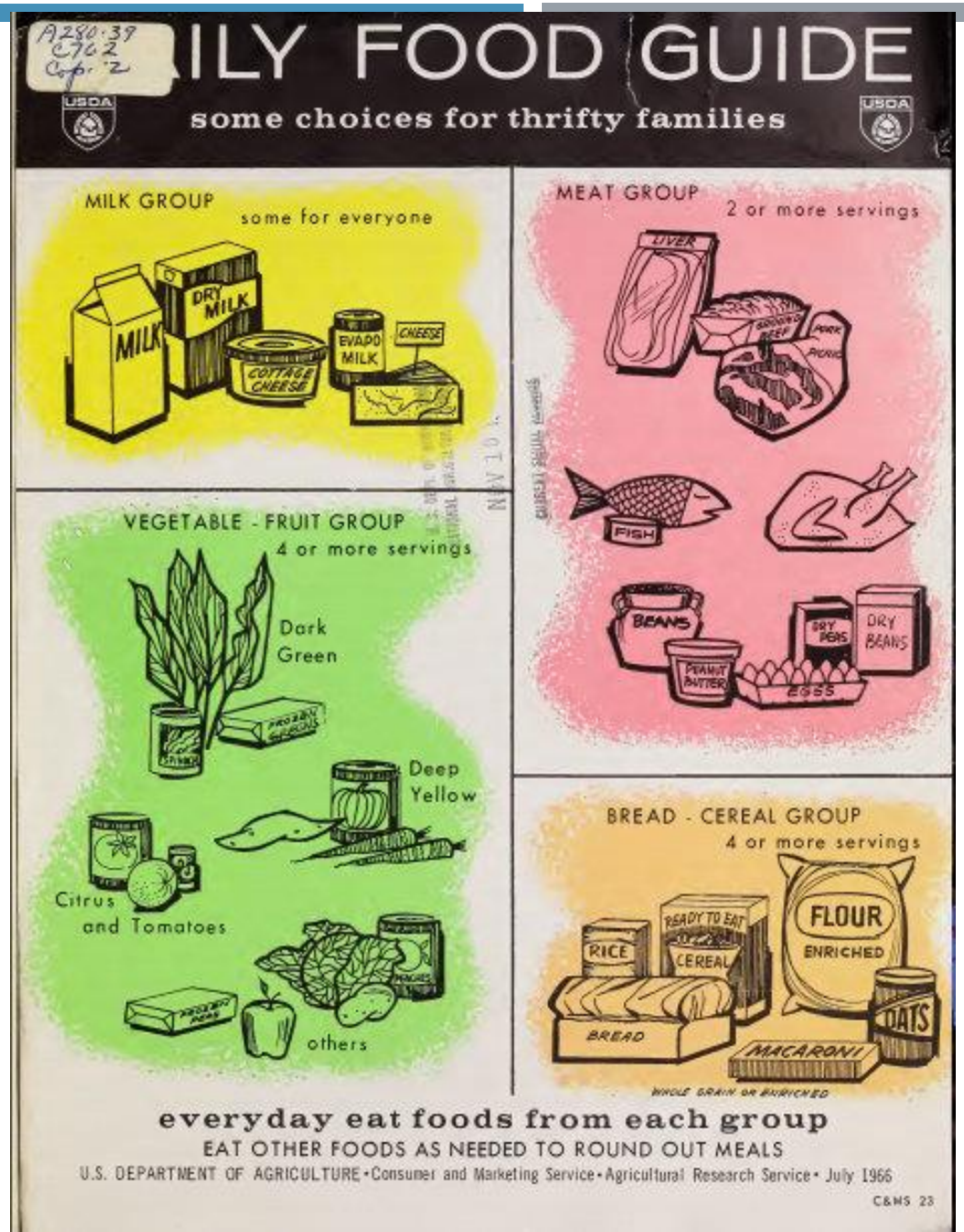
BACKGROUND

USDA DIETARY RECOMMENDATIONS

- 1943
  - *US National Archives and Records/USDA*

USDA DIETARY RECOMMENDATIONS

- 1958
- *USDA*

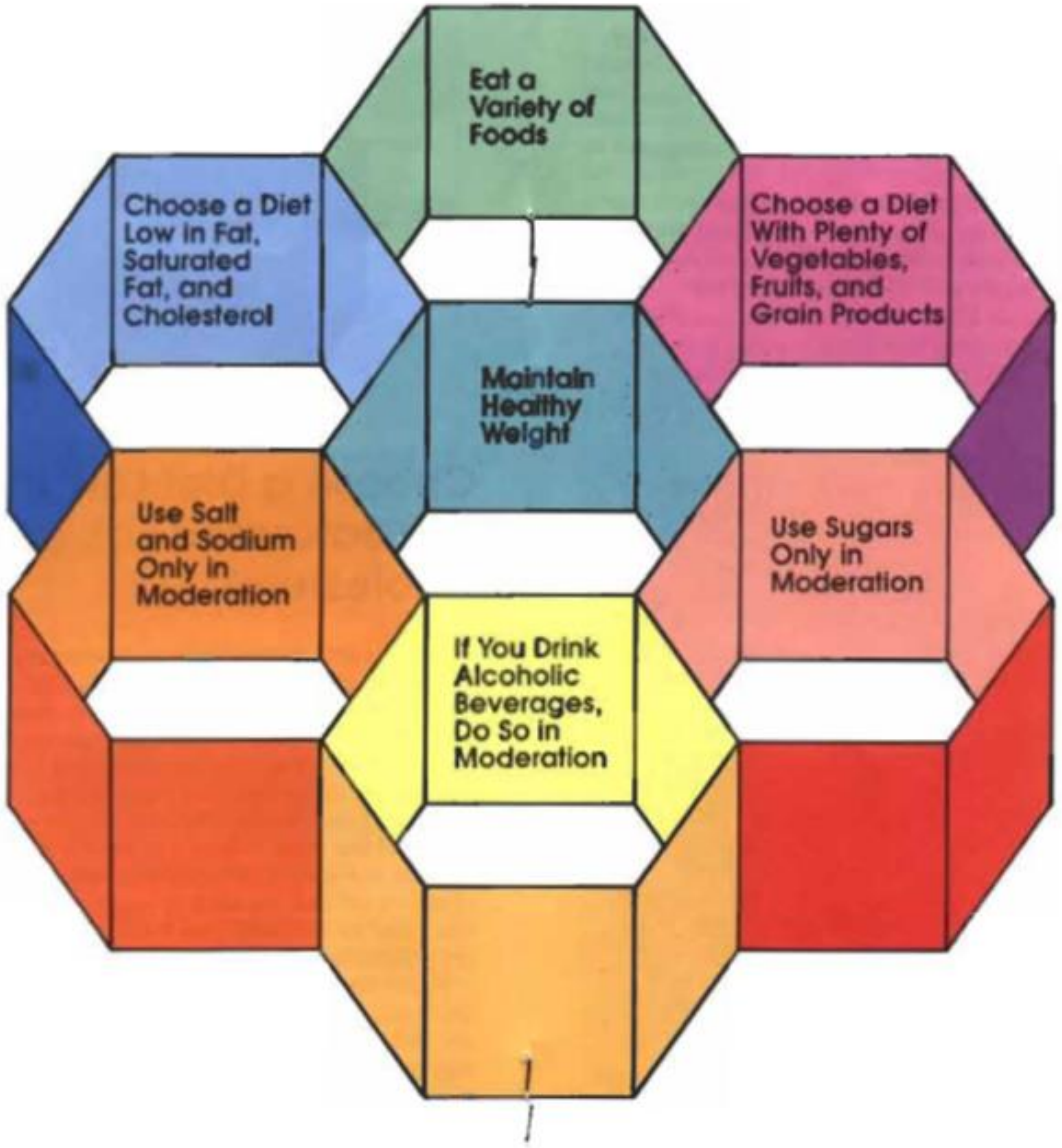


USDA DIETARY RECOMMENDATIONS

- 1980
- *USDA*

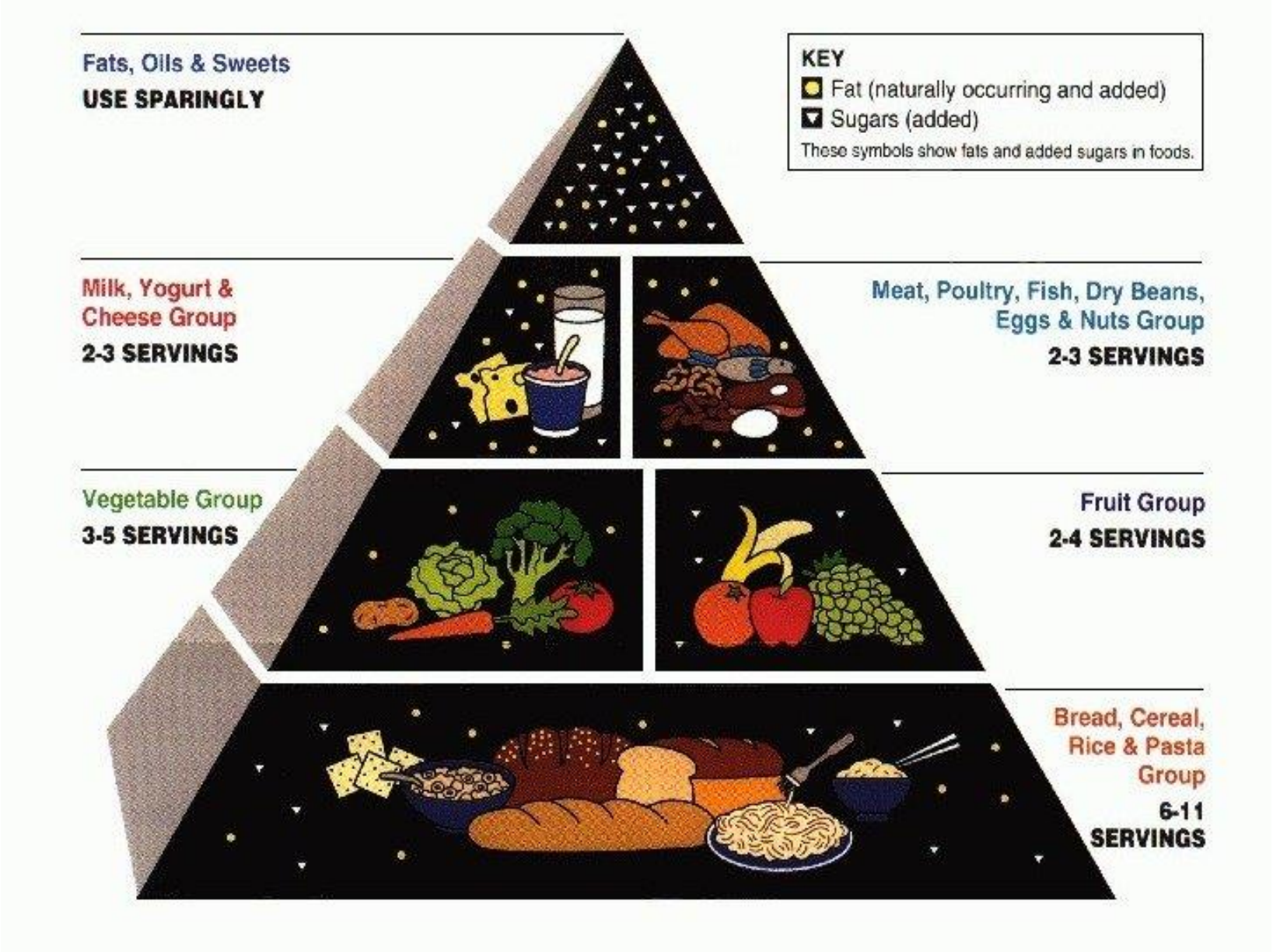
USDA DIETARY RECOMMENDATIONS

- 1990
  - *USDA*



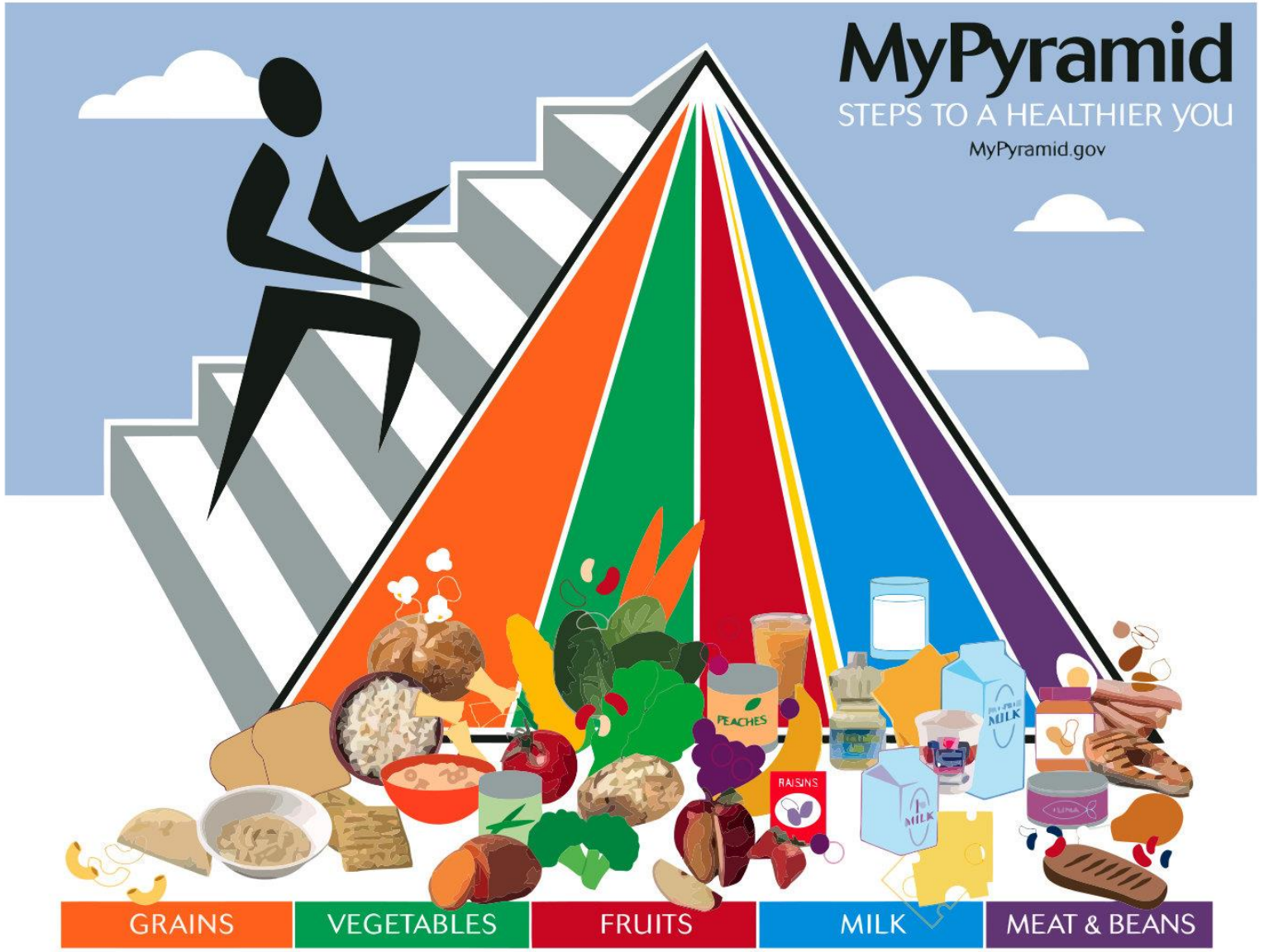
USDA DIETARY RECOMMENDATIONS

- 1995
  - *USDA*



USDA DIETARY RECOMMENDATIONS

- 2005
  - *USDA*



COHORT STUDIES OF EATING HABITS

- Individuals grouped according to birth year to study impact of historical conditions
- Learning and habit formation theory → eating habits may be retained throughout lifetime

METHODOLOGY

Birth year	Period in primary school	Cohort number
1929-1933	late 30's, early 40's	1
1934-1938	early to late 40's	2
1939-1943	late 40's, early 50's	3
1944-1948	early to late 50's	4
1949-1953	late 50's, early 60's	5
1954-1958	early to late 60's	6
1959-1963	late 60's, early 70's	7
1964-1968	early to late 70's	8
1969-1973	late 70's, early 80's	9
1974-1978	early to late 80's	10
1979-1983	late 80's, early 90's	11
1984-1988	early to late 90's	12
1989-1993	late 90's, early 2000's	13
1994-1998	early to late 2000's	14

COHORT STUDY

FIVE-YEAR GROUPINGS OF BIRTH YEARS

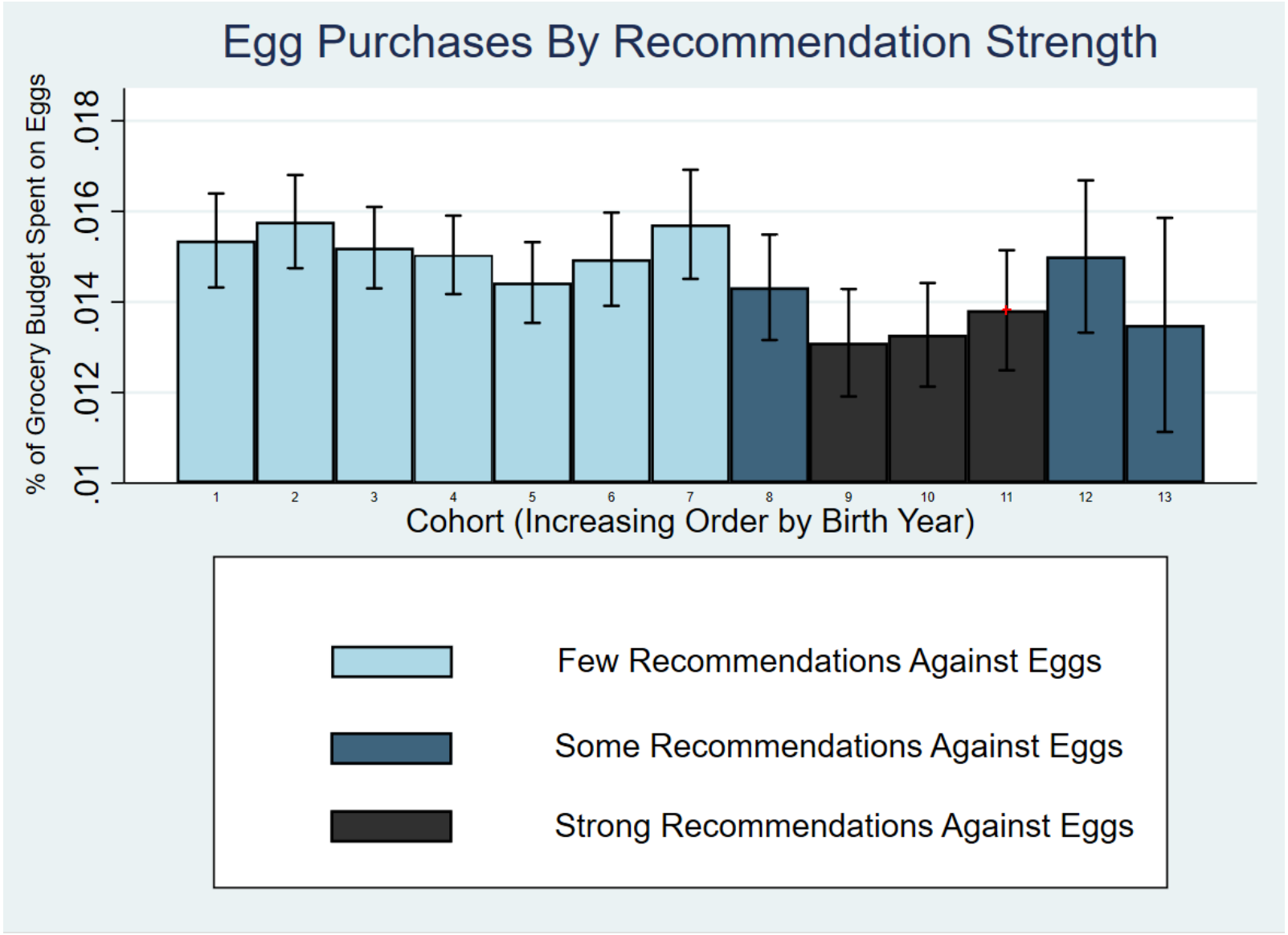
DATA USAGE

- Consumer Expenditure Survey : 1996-2014
  - Diary Survey : FMLD, EXPD
- Primary variables
  - *Age_ref, age2, strtyear,* [to construct cohorts]; *cost* [to calculate budget shares]; *beef, poultry, milkprod,* etc. from FMLD or *UCC* from EXPD
  - *Educ_ref, fam_size, fincaftx* used as controls in regression

ANALYSIS

EGGS

- Late 1970's – 1990 : Strong recommendations against eggs
- 1990 onward : Some recommendations against eggs
- Early – late 1970's : Some recommendations against eggs



REGRESSION ESTIMATION

$$\text{Percentage} = \beta_0 + \beta_1 EggPrice + \beta_2\, SubstitutePrice + \beta_3\, ComplementPrice + \beta_4\, IncomePerCap + \beta_5 Educ + \beta_6 Over40 + \beta_7 Rec_{Agst} + \varepsilon$$

- Run on egg expenditures ; patterns demonstrate most correlation with recommendations
- Tobit model
  - $Y^* = \beta_i X_i + \beta_2 X_2 \ldots . + \beta_i X_i + \varepsilon_i$
  - $Y = Y^*$ if $Y^* > 0$
  - $Y = 0$ otherwise

eggp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eggprice	-.0119283	.0051999	-2.29	0.022	-.02212	-.0017365
meatprice	-.0089906	.0054799	-1.64	0.101	-.0197312	.00175
baconprice	.0303504	.0156884	1.93	0.053	-.0003989	.0610997
cerealprice	-.0391045	.0097382	-4.02	0.000	-.0581914	-.0200176
incomepercap	-2.15e-06	5.29e-07	-4.05	0.000	-3.18e-06	-1.11e-06
educ						
2	-.0087499	.0016379	-5.34	0.000	-.0119603	-.0055396
3	-.0157136	.0017187	-9.14	0.000	-.0190823	-.0123449
4	-.0153555	.001586	-9.68	0.000	-.018464	-.012247
1.rec_agst	-.0034427	.0016642	-2.07	0.039	-.0067046	-.0001808
1.over40	.0090449	.0014302	6.32	0.000	.0062418	.0118481
_cons	-.0134025	.0090743	-1.48	0.140	-.0311882	.0043832
var(e.eggp)	.0083519	.0000957			.0081665	.0085416

TOBIT REGRESSION RESULTS

ISSUES/QUESTIONS WITH DATA

TARGETING INFLUENCE OF RECOMMENDATIONS

- Reference person's age used, but other HH members could be influencing purchasing decisions
  - This study limits the data to single person HH's or HH's that include only members of the same cohort
- Assumes childhood exposure to dietary recommendations
  - Respondents who moved to US during adulthood not denoted

FOOD GROUPINGS V NUTRITIONAL INFORMATION

- Food group variables large, but UCC's can further narrow
- Ex. Butter, margarine, and oils can be distinguished from MILKPROD & OILS
- Some product groupings do not lend themselves to our nutritional analysis; "Fresh Milk" doesn't distinguish whole v skim

COMPLETENESS OF OBSERVATION OF DIFFERENT AGE GROUPS

- Stage in life affects food consumption choices (ie preferences for drinking milk)
- Although data spans 18 years, cohorts are still observed at different ages
- Age variable in regression
- Better results as more years of data become available

TIME ISSUES

- Relative prices between goods may be different over time (eg butter v margarine)
- Oldest cohorts are observed in earlier time period than youngest cohorts
- Because data doesn't contain quantity or price, information must be pulled from elsewhere to account for price

CONCLUSIONS

- Some evidence that some individuals remain influenced by childhood dietary recommendations
- Limits of the data in terms of nutritional information disallow thorough investigation of some food groups

THANK YOU

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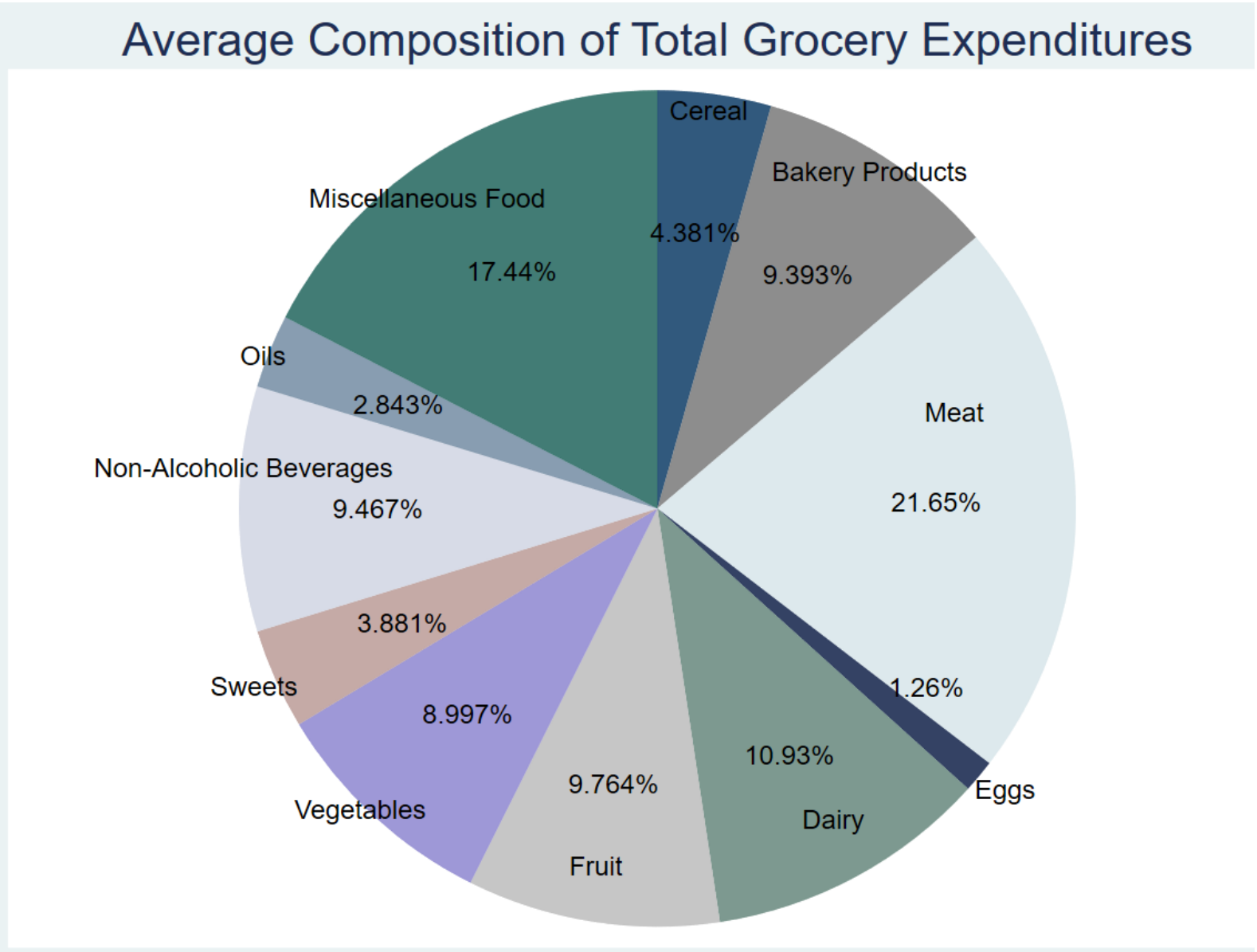


COHORT STUDY

GROCERY BASKET ANALYSIS

DIETARY GUIDELINES FOR AMERICANS, 1980 TO 2000

1980 7 Guidelines	1985 7 Guidelines	1990 7 Guidelines	1995 7 Guidelines	2000 10 Guidelines, clustered into 3 groups	
Eat a variety of foods	Eat a variety of foods	Eat a variety of foods	Eat a variety of foods		
Maintain ideal weight	Maintain desirable weight	Maintain healthy weight	Balance the food you eat with physical activity—maintain or improve your weight	Aim for a healthy weight	Aim for Fitness
				Be physically active each day	
Avoid too mu ch fat, saturated fat, and cholesterol	Avoid too much fat, saturated fat, and cholesterol	Choose a diet low in fat, saturated fat and cholesterol		Let the Pyramid guide your food choices	Build a Healthy Base
Eat foods with adequate starch and fiber	Eat foods with adequate starch and fiber	Choose a diet with plenty of vegetables, fruits and grain projects	Choose a diet with plenty of grain products, vegetables, and fruits	Choose a variety of grains daily, especially whole grains	
				Choose a variety of fruits and vegetables daily	
				Keep food safe to eat	
			Choose a diet low in fat, saturated fat and cholesterol	Choose a diet that is low in saturated fat and cholesterol and moderate in total fat	Choose Sensibly
Avoid too much sugar	Avoid too much sugar	Use sugars only in moderation	Choose a diet moderate in sugars	Choose beverages and foods to moderate your intake of sugars	
Avoid too much sodium	Avoid too much sodium	Use salt and sodium only in moderation	Choose a diet moderate in salt and sodium	Choose and prepare foods with less salt	
If you drink alcohol, do so in moderation	If you drink alcoholic beverages, do so in moderation	If you drink alcoholic beverages, do so in moderation	If you drink alcoholic beverages, do so in moderation	If you drink alcoholic beverages, do so in moderation	

Changes to USDA Dietary Recommendations Over Time

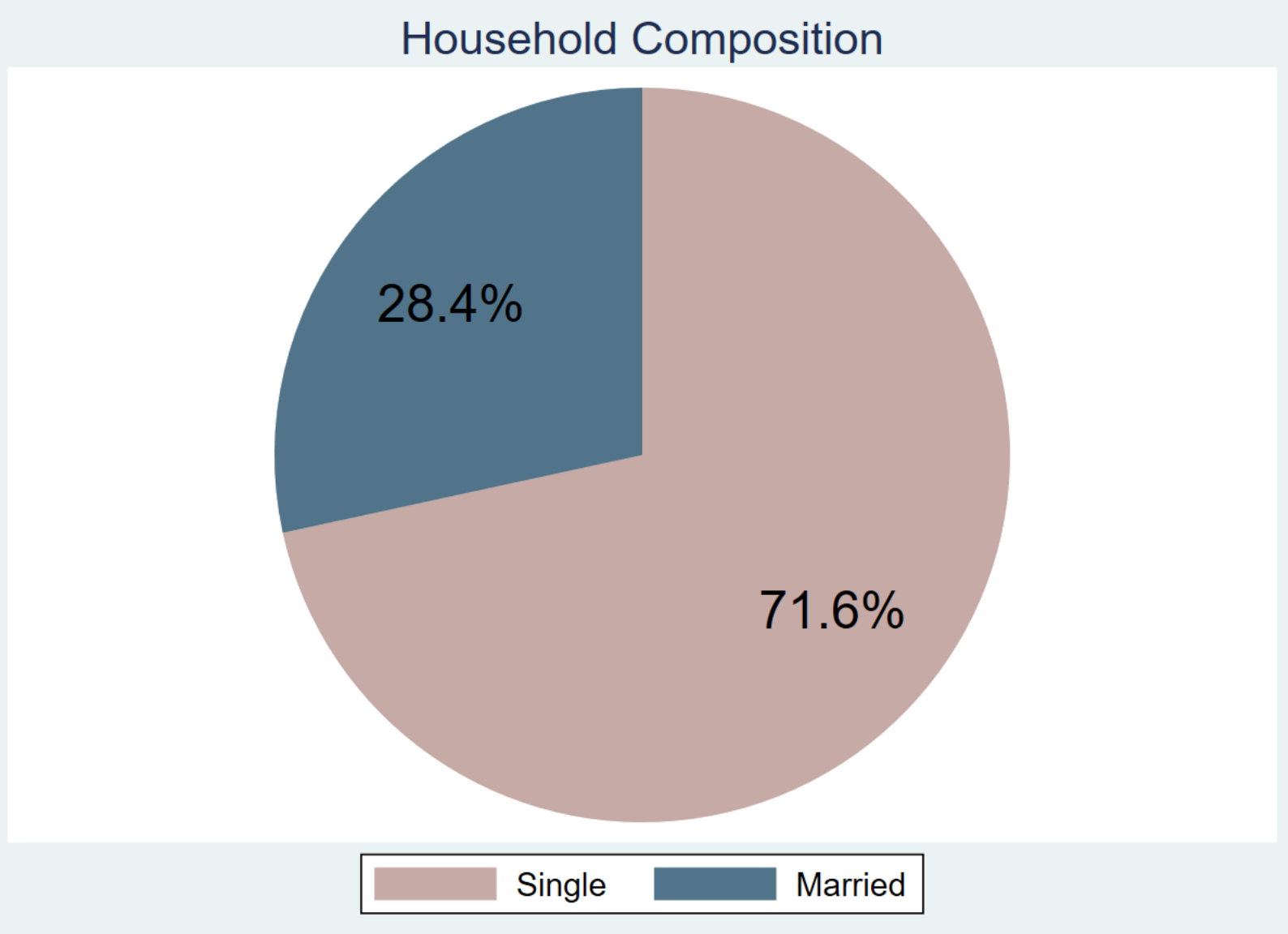
Time	*Recommendations*	
1940s	7 main food groups to eat every day: Green/Yellow vegetables, Oranges/Tomatoes/Grapefruit, Potatoes/Other Vegetables and fruits, Milk/Milk Products, Fish/Poultry/Eggs/Meat, Bread/Flour/Cereals, Butter/Margarine	"In addition to the basic 7, eat any other foods you want"
1950s	Food groups reduced to 4; "eat other foods as needed to round out meals"	Daily needs: "4 or more servings" of vegetables/fruits and breads/cereals, "2 or more" of meat group, milk: "some for everyone"
1980-1985	Increase consumption of carbohydrates	Limit calories from fat
	Avoid too much sugar, purely to avoid tooth decay	
1985-1990	Choose lean meat, fish, poultry. Moderate use of egg yolks. Trim fat off meats. Limit intake of fats and oils	Substitute starchy foods for those that have large amounts of fats and sugars

1990-1995	Phrasing change: *"avoid"* fat, cholesterol, sugar, sodium changed to *"choose a diet low in"*	Risk of being "too thin" first published in addition to risks of being "too fat"
	Addition of quantified (in cups) suggested servings	More explicit promotion of increased fruit, vegetable, and whole grains consumption
1995-2000	1st appearance of the claim that some fat is needed for proper health	
2000-2005	*Popularity of low-carbohydrate diet grows**	
2005-2010	"Food Pyramid" becomes "My Pyramid" with more abstract visual proportions of food groups	5 groups: Fruits, Vegetables, Grains, Meats & Beans, Dairy (oils are part of healthy eating, but not their own food group)
	1st statement that underconsumption of fat can lead to deficiency of Vitamin E and essential fatty acids	1st mention of trans fats
2010-2015	"My Pyramid" becomes "MyPlate"	Meats & Beans group changed to "Proteins"
	Emphasis on eating patterns rather than individual nutrients	But, still keep sugars and saturated fats each below 10% of total calorie intake
	Suggested servings become personalized by gender, height, weight, age, physical activity	

COHORT COMPOSITION

cohortref	Freq.	Percent	Cum.
1	6,528	7.38	7.38
2	7,052	7.97	15.35
3	8,460	9.56	24.92
4	9,983	11.29	36.21
5	9,887	11.18	47.38
6	8,834	9.99	57.37
7	7,334	8.29	65.66
8	6,253	7.07	72.73
9	6,147	6.95	79.68
10	6,194	7.00	86.68
11	6,053	6.84	93.53
12	3,839	4.34	97.87
13	1,683	1.90	99.77
14	202	0.23	100.00
Total	88,449	100.00	

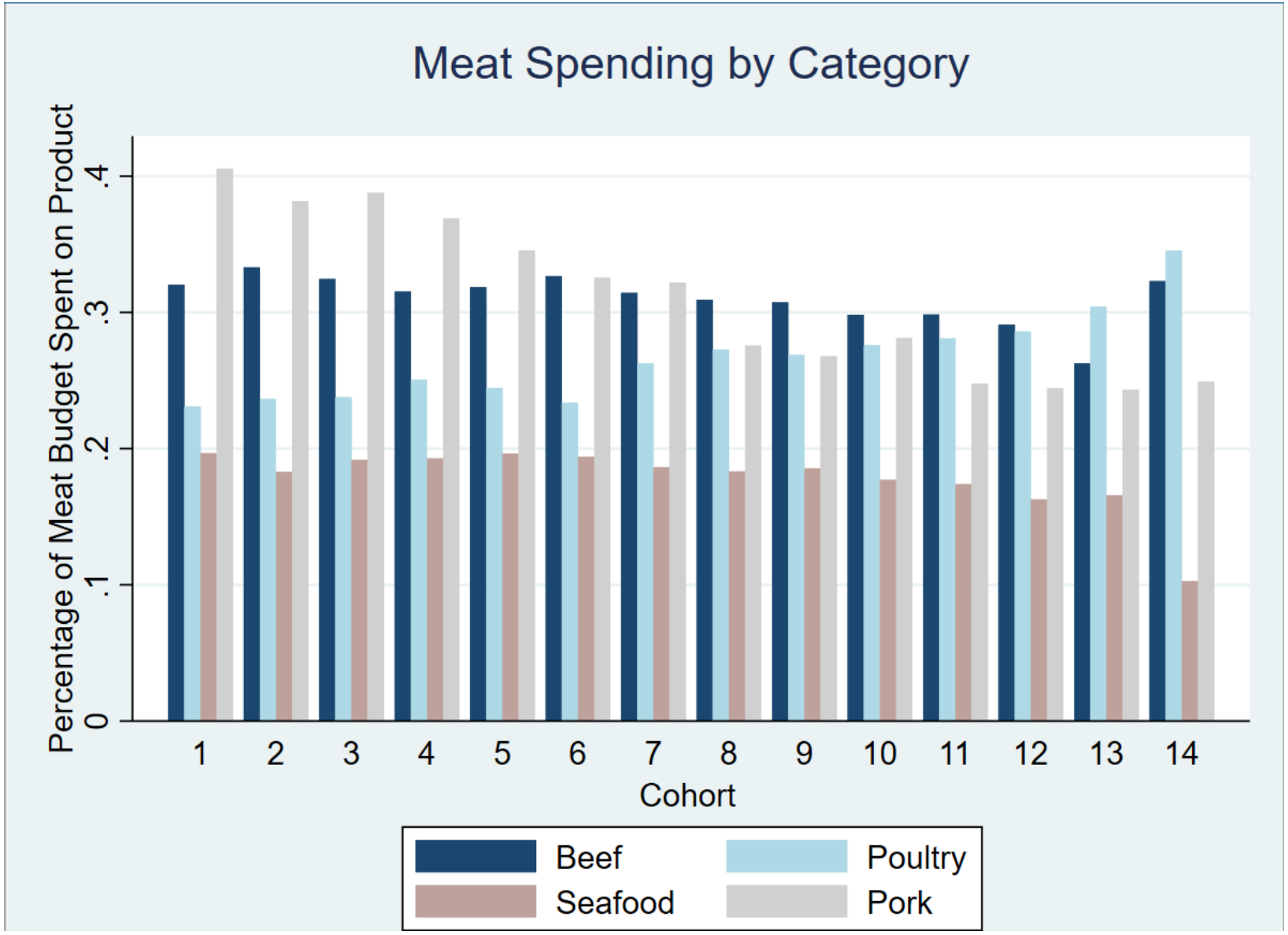
HOUSEHOLD TYPES



Cohort	Ages of observation
1	67-83
2	62-78
3	57-73
4	52-68
5	47-63
6	42-58
7	37-53
8	32-48
9	27-43
10	22-38
11	17-33
12	12-28
13	7-23
14	2-18

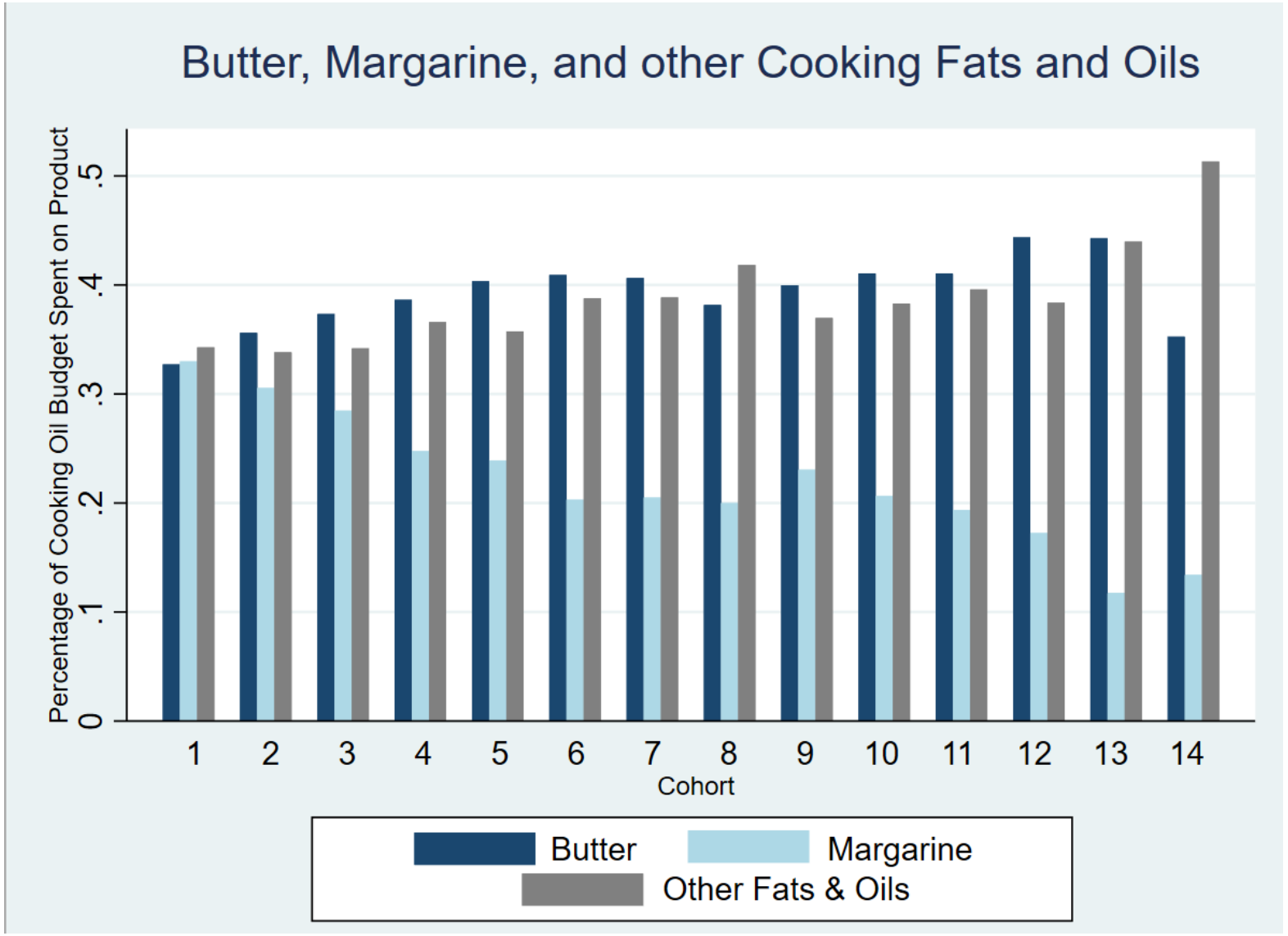
MEAT

- Types of meat analyzed as a percentage of total expenditures on meat

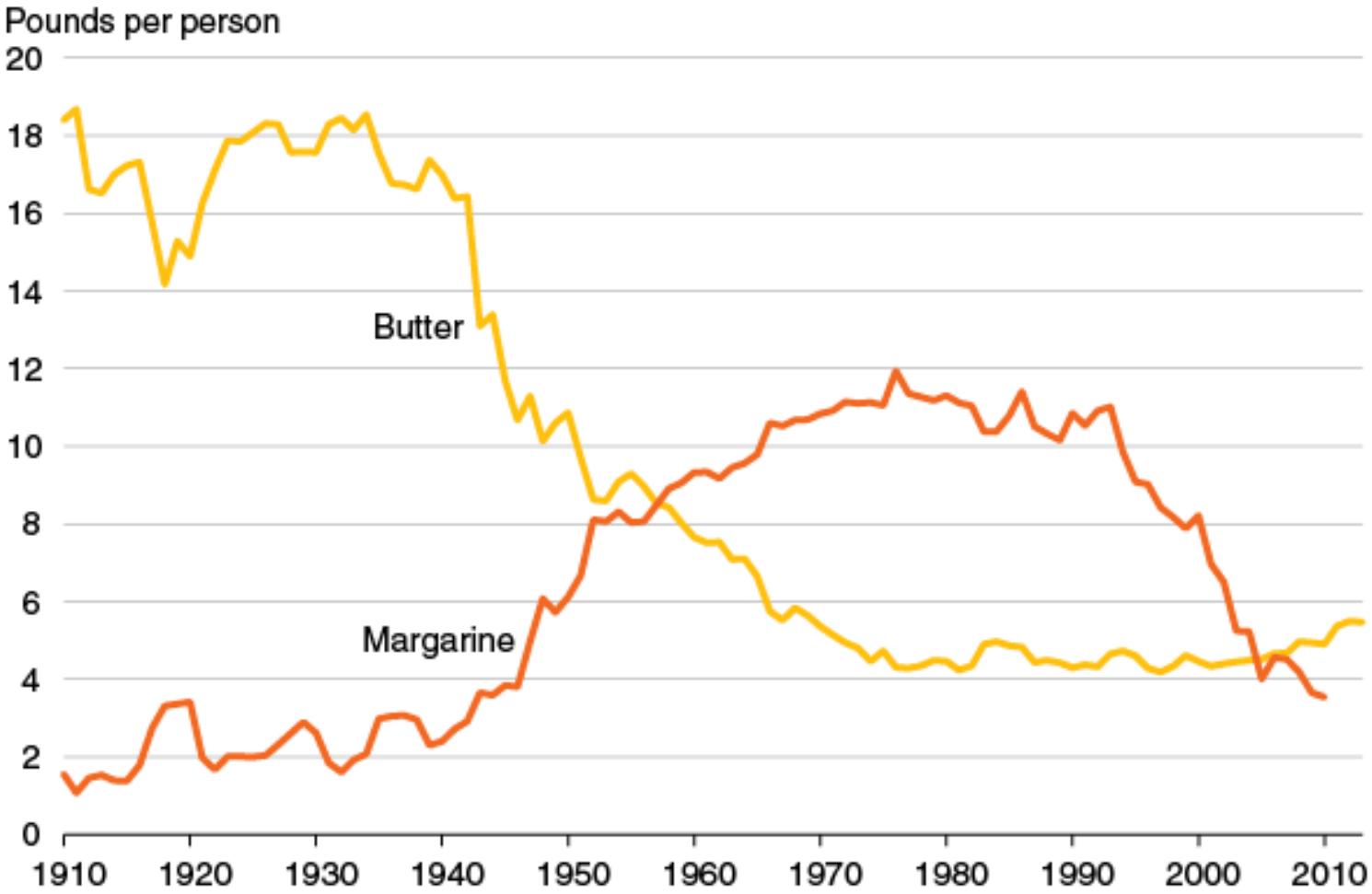


COOKING FATS AND OILS

- Types of cooking oils as a percentage of total spent on all fats and oils

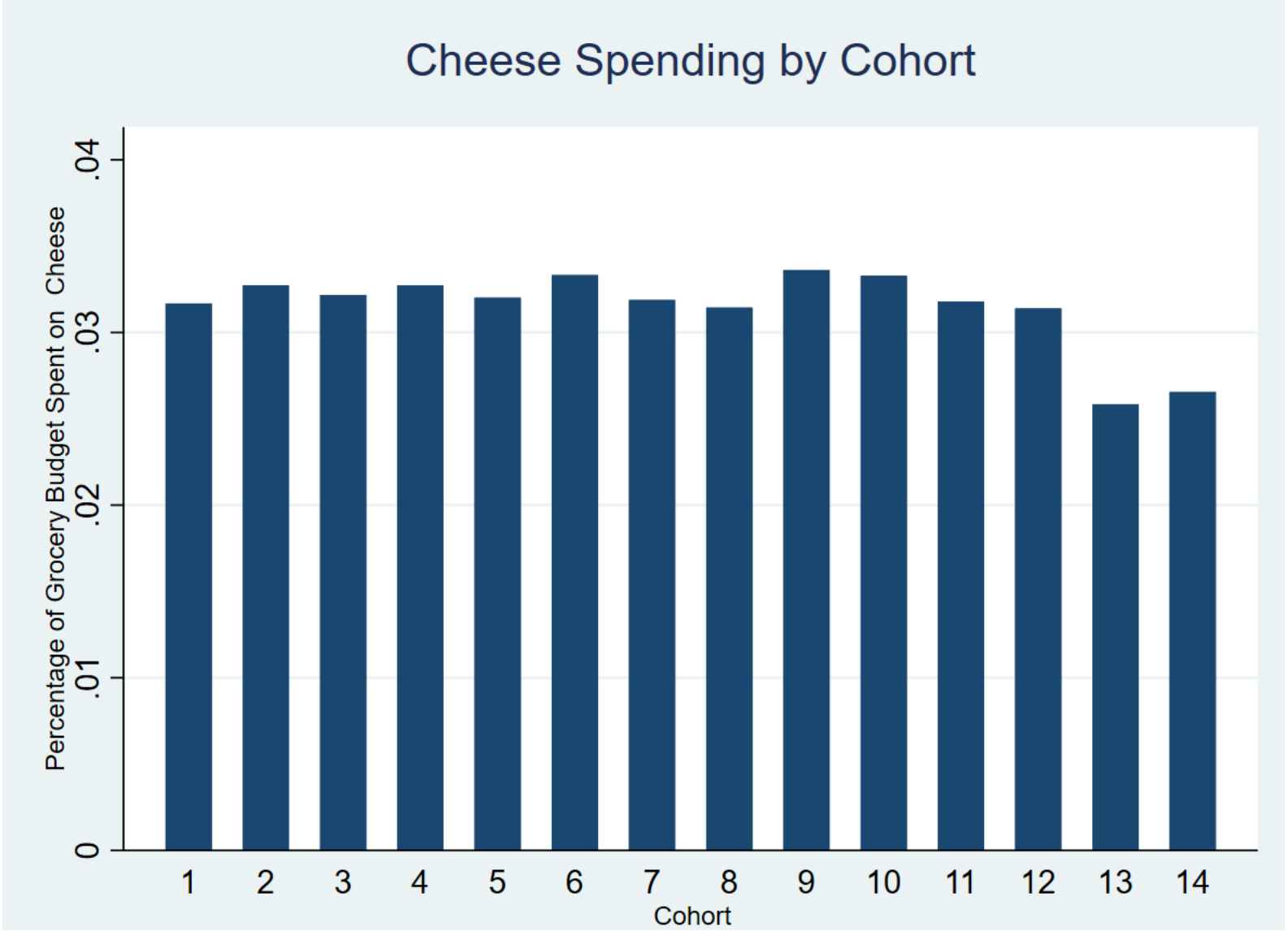


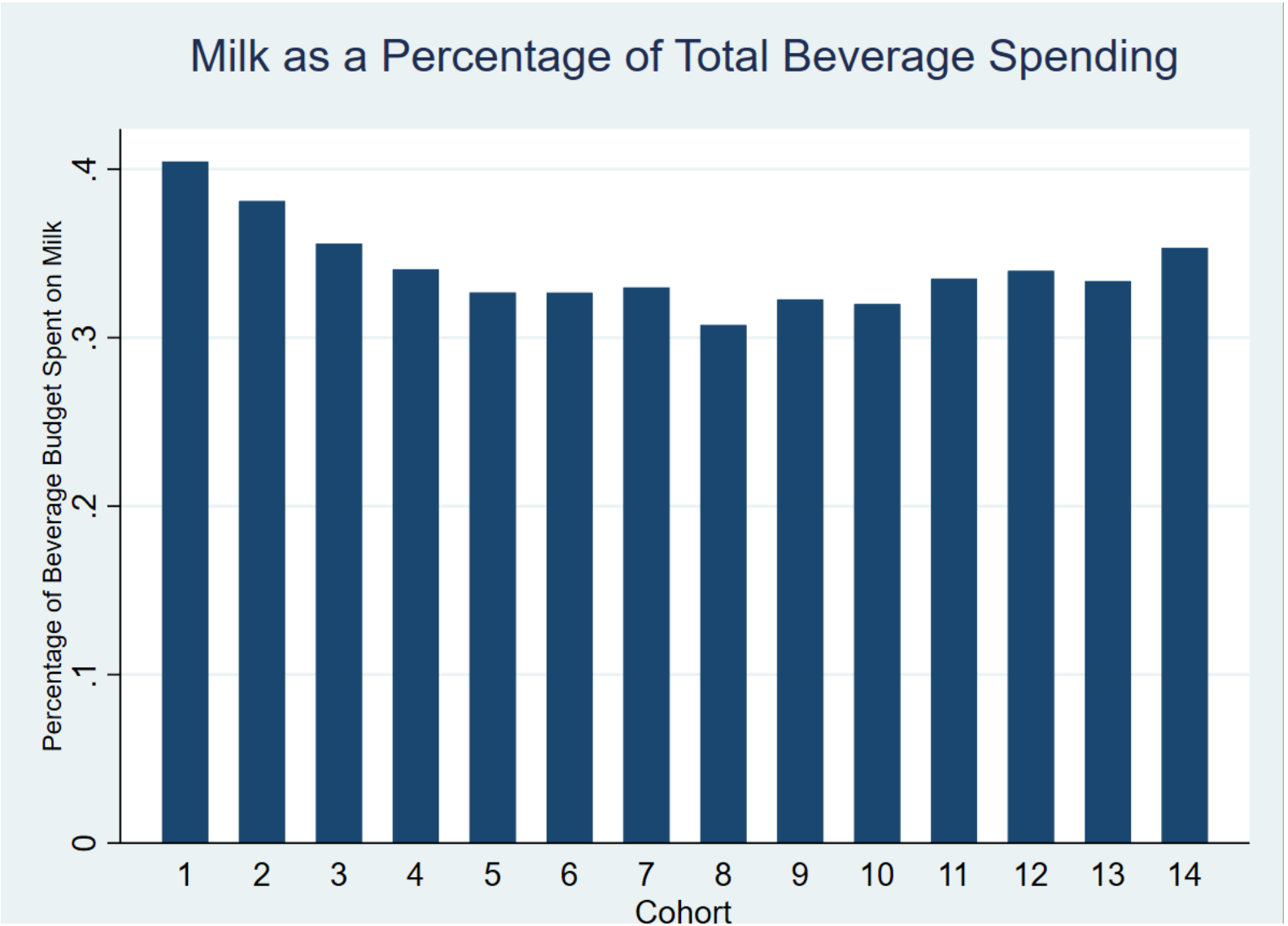
After a steep and long decline following World War II, U.S. per person butter consumption began rising in 2005



Source: USDA, Economic Research Service, Food Availability Data.

CHEESE


Cheese Spending by Cohort
Percentage of Grocery Budget Spent on Cheese
0
.01
.02
.03
.04
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Cohort

MILK

- Milk as a percentage of spending on all non-water, non-alcoholic beverages
- *Consideration* : milk consumption declines with age