

# Lab 2: Effects of Aging on Snap Subsidy

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## Contents

<b>1</b>	<b>Introduction and Context</b>	<b>1</b>
<b>2</b>	<b>Data and Methodology</b>	<b>1</b>
<b>3</b>	<b>Results</b>	<b>2</b>
3.1	Individual Demographics Model . . . . .	2
3.2	Family Demographics Model . . . . .	3
<b>4</b>	<b>Discussion</b>	<b>3</b>

# 1 Introduction and Context

Social welfare programs such as the Supplemental Nutrition Assistance Program (SNAP) play a critical role in supporting vulnerable populations in the United States. However, ensuring equitable access to these programs poses a significant challenge. Opponents of SNAP funding argue that the program is abused by recipients, encourages dependency by certain populations, or acts as a disincentive to work. <sup>1</sup> Our analysis examines demographics targeted by welfare programs to inform political discourse around the effectiveness and accessibility of similar public assistance initiatives. In particular, we address the research question:

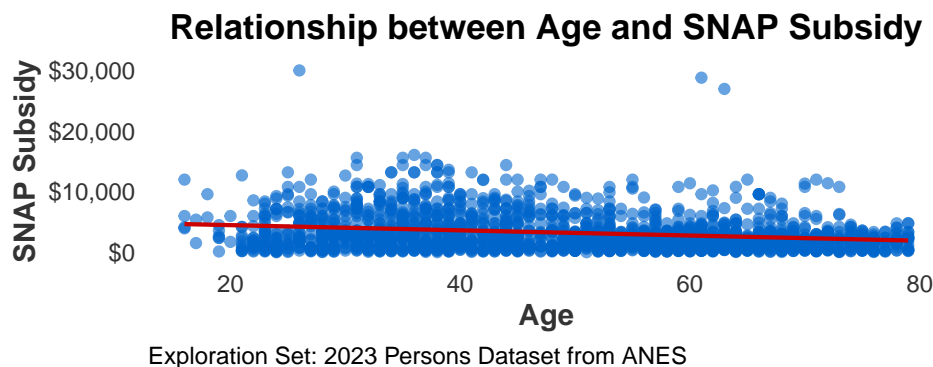
*How does the distribution of SNAP income vary across ages, utilizing linear regression to reveal underlying age-related trends?*

The dataset for our analysis comes from the Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS). The survey is administered at the household level and a “reference person” generally responds on behalf of their household. <sup>2</sup> It also employs the supplementary poverty measure (SPM) to more accurately measure poverty nationwide by taking into account in-kind benefits and regional economic differences. SPM statistics are compiled for each person within a unit. A unit expands upon the traditional family unit used in the original poverty measure by including cohabiters that may share resources. One person is recorded as the head of each unit.

## 2 Data and Methodology

We concentrate on two distinct groups of features to characterize the population across age groups: individual and family demographics. We identify variables from the ASEC dataset that operationalize features of these two groups and develop two separate sets of models to describe their effects on aging and SNAP subsidy. SNAP recipients are operationalized by SPM unit heads, and corresponding individual and family characteristics are operationalized by their responses.

The sample data contains 146,133 individual responses to the ASEC. Because ages 80 and up are recorded in categorical variables, we exclude individuals over the age of 79 to maintain the metric integrity of our age variable. We isolated SPM unit heads and excluded observations reporting zero SNAP income. SNAP allotments are only uniform across the 48 contiguous states, so we excluded recipients located in Alaska or Hawaii. Our final dataset consequently contains 6,048 observations.



To maintain the large-sample regression assumptions, we note that the CPS sample design prioritizes independent and identically distributed (IID) sampling through the use of random multi-stage stratified

<sup>1</sup>The Washington Post. "That is a claim we tend to hear alot – that SNAP discourages work, or that adults on SNAP aren't working." (2017)

<sup>2</sup>United States Census Bureau: "The person who responds is called the “reference person” and usually is the person who either owns or rents the housing unit. If the reference person is not knowledgeable about the employment status of the others in the household, attempts are made to contact those individuals directly." (2021)

sampling. To maintain the assumption of a unique best linear predictor (BLP), we used kurtosis tests and covariance matrices to ensure finite covariance between variables, and used VIF tests to inform our exclusion of perfectly collinear variables.

### 3 Results

Our initial regression analysis examines the relationship between SNAP subsidy and recipient age and reveals a statistically significant, negative effect of age on SNAP subsidy. This suggests that, on average, each additional year of age is associated with a decrease of -42.86 in SNAP subsidy.

#### 3.1 Individual Demographics Model

To elaborate on the unexplained variance represented by the error term in our preliminary model, we extend our analysis to a more comprehensive model that includes the individual's race, gender, college degree attainment, and receipt of social security income.

Table 1: Individual Characteristics Regression Results

	Base	Full
(Intercept)	5422.469*** (159.357)	5211.483*** (256.504)
Age	-42.862*** (2.822)	-42.888*** (3.975)
Male		-2064.508*** (318.960)
American Indian/Alaskan Native only		1056.510** (401.590)
Asian only		-505.461* (216.369)
Black only		-163.177 (112.590)
Hawaiian/Pacific Islander only		2383.366 (1426.413)
Hispanic only		196.892 (118.220)
Mixed race		304.991 (296.295)
Degree		-345.408** (109.022)
R2 Adj.	0.049	0.073
F	230.766	32.521

We observe the interaction term effect on the age coefficient, concluding an estimated dollar -10.91 dollar decrease per year of age for male SNAP recipients compared to a -42.89\*\*\* decrease for female SNAP recipients. The socioeconomic variable coefficients indicate that individuals without a college degree receive -345.41\*\* lower SNAP subsidies and individuals without social security benefits are generally allocated to 606.64\*\*\* more SNAP subsidies.

When examining race, we observe in particular that individuals of American Indian/Alaskan Native descent experience 1056.51\*\* more SNAP subsidy respectively compared to individuals self-identified as white, all else equal. These effects cannot be attributed to differing state allotments because of our exclusion of residents of Alaska and Hawaii.

### 3.2 Family Demographics Model

	Sociodemographic	Socioeconomic	Full
(Intercept)	2671.413*** (210.847)	3260.948*** (364.247)	1446.332*** (210.008)
Age	-7.968* (3.565)	-22.801*** (6.763)	-9.134** (3.080)
Male	-800.251** (292.510)		
Num. Kids	1093.118*** (51.660)		1112.194*** (50.749)
Age:Male	13.339* (5.177)		
Not in Labor Force		1474.193*** (352.856)	674.348*** (99.114)
Num. Adults		504.854*** (60.677)	341.575*** (53.533)
Renter		867.926* (344.243)	390.732*** (88.293)
Age:Not in Labor Force		-23.137*** (6.726)	
Age:Renter		-12.617* (5.969)	
R2 Adj.	0.234	0.077	0.251
F	172.975	59.650	150.724

The SPM unit framework allows us to better assess the impact of the number of children and adults on SNAP subsidy received because of its inclusion of unmarried partners, foster children, and other relationship types. First, we include the number of children as a separate variable to elaborate the effect of gender on age and SNAP. We note a small gender gap: for each year aged, males receive 13.34\* more in SNAP subsidy than females. Across genders, each additional child in the resource unit results in a marginal change of 1093.12\*\*\* in SNAP income, which is robust to the inclusion of other family characteristics.

Our next model shows that each additional adult in the unit increases SNAP subsidy by 504.85\*\*\*. Notably, we find that the effect of not participating in the labor force on age implies receiving -23.14\*\*\* less than working adults each year. The effect of renter status on age compared to non-renters is also slightly negative.

The final model describes that when accounting for number of children, the extra subsidy received per each additional adult in the unit decreases by nearly one third, and the extra subsidy received for non-working adults is only 341.58\*\*\*. We also see that renters are only expected to receive 390.73\*\*\* more SNAP subsidy than non-renters. This number is lower than expected, considering that the 2023 American average for apartment rent was 1,372.<sup>3</sup>

## 4 Discussion

The consistently negative coefficient for age across models seems to describe that, contrary to a dependency on SNAP that continues for life, older participants receive less than younger participants. This effect persists across different demographics, including race. While including number of children as a feature appears to absorb some of the effect size, age remains negatively related to SNAP. We do see more SNAP subsidy received nonworking adults but, for each year of age, these recipients benefit less from SNAP than if they were working. A similar effect is shown for renter recipients, which should be considered against rising rent prices nationwide. Overall, our models describe that regardless of demographics, older recipients receive less benefits – an effect not explained simply by differences in socioeconomic burden over different stages of life. We conclude that in the descriptive context of both individual and family impacting characteristics, the negative effect of aging on SNAP would hinder the possibility of subsidy dependency.

<sup>3</sup>Forbes: “The average national rent price in the United States is \$1,372, according to August 2023 rental market data from Apartment List.” (2023)