Food Secure In 30 Minutes or Less: The Relationship Between Time Use and Food Security

PRELIMINARY AND INCOMPLETE - DO NOT CITE

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Abstract

This paper examines the relationship between household food security status, SNAP participation, and time used in food preparation and acquisition. Using the American Time Use Survey linked with the Current Population Survey's Food Security Supplement, we find that food insecurity and SNAP participation are positive predictors of number of minutes single adult households use in food preparation. Meanwhile, SNAP participation is a negative predictor of food acquisition. Although these results do not imply a causal relationship, they do reveal reflect that food insecure households and households that participate in the SNAP program use time differently than food secure and non–participating households.

1 Introduction

Household meals are the result of a household production process that requires two main inputs: ingredients and preparation time. Households face both time constraints and budget constraints that restrict the household production process and may lead to food insecurity. While the relationship between income and food insecurity has been exhaustively studied in recent years, the relationship between time constraints and food insecurity has been overlooked. We close this gap by examining the relationship between time use and constraints and household food insecurity.

Households must be able to overcome increased time constraints by substituting more goods for less time, such as purchasing more prepared meals that require minimal time inputs. But low income households also face limited budgets as well as limited time and this can prevent them from increasing goods inputs when available time inputs drop. Decreased time for food production coupled with limited income can prevent households from accessing sufficient food to meet its nutritional needs.

Time use and constraints are factors in the quality and quantity of food consumed by households and may, in turn, be a factor contributing to food insecurity in households. In this paper, we examine how time use and constraints related and unrelated to food preparation affect the food security status of a household.

Previous studies that examine the determinants of food insecurity tend to focus on constraints associated with individuals' or households' income and financial assets. Olson et. al. (2006) found that heads of households with greater financial skills tend to be more food secure. Furness et. al (2004) concluded that food security status is inversely related to income. None have explored the relationship between household production, time constraints and food insecurity.

Time use studies have focused on food expenditure, time allocated toward eating and eating related activities and the value of time for meal production. Aguiar and Hurst (2005) use two sets of data to explore the relationship among food expenditure, preparation time, and food consumption. The study finds as time and budget constraints change due to retirement, individuals spend less money on food and more time in food preparation and grocery shopping. This suggests retired households substitute time for goods as time becomes more available and food budget tightens and therefore time is a critical tool when examining food consumption.

In a series of papers, Hamermesh (2007, 2008 and 2010) explores how time inputs such as food preparation and grocery shopping and good inputs such as food ingredients and kitchen appliances differ over income, wage rate and employment. In these studies, he finds that increased wage rates cause married households to increase their utilization of good inputs and decrease time inputs while increased income causes an increase in use of both time inputs and goods inputs. He also finds that time inputs are positively correlated with food expenditure and argues this results suggests that good inputs and time inputs are difficult to substitute for one another. Lacking sufficient time for meal preparation cannot be overcome by purchasing more ingredients or other food inputs for meal preparation. Davis and You (2010, 2010) address specifically the money value of time use in home-produced meals and examine how it differs over different income groups. They find that SNAP participants and SNAP participants following the Thrifty Food Plan have much higher total costs of meal production due to the high cost of labor time required for home-produced meals. They find labor costs to be more constraining than food costs for low income households. Although time use studies are critical to understanding the value of time used in home production and the ability of households to substitute goods inputs for time inputs, no studies have examined how time use relates to food security. This is the first study to directly examine this relationship.

This study leverages two data sets that contain information on time use, food expenditure and food security status: the American Time Use Survey (ATUS), its Eating and Health Module, and the CPS Food Security Supplement. We link these data sets to examine how time requirements of daily activities related and unrelated to food preparation and eating are related to overall household food security status, SNAP participation and overall food expenditure. The time frame from 2004-2009 permits us to capture any time sensitive changes, including political and economic, that could affect time allocation or food security status of respondents. This detail permits us to make explicit conclusions regarding the value of time and food security status. In this paper we examine whether food security status is related to different levels of time use in food preparation.

The paper proceeds as follows. Section 2 describes the two data sets we used for the analysis and explains the merging process. Section 3 describes the summary statistics of key variables in the data. Section 4 outlines our empirical approach for our analysis. Section 5 discusses the results and Section 6 concludes.

2 Data

The American Time Use Survey (ATUS) and the Current Population Survey-Food Security Supplement (FSS) are subsets of the Current Population Survey, a survey conducted by the Bureau of Labor Statistics. We are able to observe relationships between time use data from the ATUS and food security and expenditure data from the FSS.

The Current Population Survey is a monthly survey that includes information on about 50,000 households from the civilian non-institutionalized population of the United States. The CPS is a two-stage stratified sample for each state and within each state on a county level.

The information collected includes employment, income and demographic characteristics such as age, race and gender. We will analyze data from years 2004 until 2008 of the FSS and years 2005 through 2009 of the ATUS. The details of the separate data sets and how we combined these data sets follow.

2.1 Food Security Supplement

The FSS has been conducted one month out of each year since 1995. This supplement includes information on household food access and expenditure as well as participation in government programs such as Women, Infants and Children (WIC) and the Supplemental Nutrition Assistance Program (SNAP). The survey also includes an 18-item questionnaire that classifies respondent households into different categories of food security. In years 2005 through 2009, households are categorized as food secure or marginally food secure, low food secure or very low food secure. In years 1995 through 2004, households are categorized as food secure, food insecure without hunger and food secure with hunger. In addition to the food access and expenditure information, the FSS also includes information on labor force participation, household size, income and state-level geographical information. This allows us to control for other characteristics related to food security status of households.

2.2 The American Time Use Survey

After the household has completed its eighth and final survey for the CPS, households represented in the ATUS are randomly selected from the CPS Sample. A household member who is age 15 or older is then selected to be the designated respondent. The individual is asked to report their activities from the "sample day" where the "sample day" assigned to the respondent is randomized, 50% occur on the weekday and 50% occur on the weekend.

The data reported from the telephone administered interview includes labor force information, income and wage information, marital status and number of children as well as other demographic variables that correspond with the CPS. The information recorded in the time diary includes all activities in which the respondent participated on the sample day. These activities are then categorized into seventeen activity groups. For our analysis, we use all time use data on and related to eating. This includes food preparation, grocery shopping, non-grocery food shopping and eating and drinking.

3 Summary Statistics

We present summary statistics on the differences in time use in minutes for eating-related activities such as food preparation, grocery shopping and eating itself. We also look at non-eating activity time use such as working, household activities, leisure and social time. In these tables, we observe differences in SNAP participants below 180% of the Federal Poverty Guideline (FPG) and non-participants who are above 180% FPG as well as food insecure households below 180% FPG and food secure households above 180% FPG. It is important to note that the ATUS

respondent is not necessarily the individual responsible for preparation of the meals, therefore the mean time use reported in the summary statistics may be inaccurate.

3.1 Food Stamp Participants

In Table 1, we separate our sample into three groups: households whose income is above 180% of FPG, households below 180% of FPG who are non-participants in the SNAP program, and households below 180% of FPG who are SNAP participants. Following the previous literature, we then report married households and single adult households separately assuming that time allocation differs between married and single adult households. For both single and married households, we compare SNAP participants households' time use to time use of non-participant households above 180% of the FPG.

Single adult households who participate in SNAP spend 31 minutes more in food preparation and clean up activities than higher income non-participating households, but, at the same time, spend eight minutes less in the actual act of eating. Married household who participate in SNAP spend eleven minutes more in food preparation and clean up than non-participating households and ten minute less eating. We then calculate the mean food expenditure dollars per one minute spent on food preparation to observe how far households must stretch their food budget. We can see single adult households who participate in SNAP spend 53% fewer dollars per food preparation minute than non-participating households while married households who participate in SNAP spend 50% less than married non-participant households.

Average time spent acquiring food varies less than food preparation within groups. Single adult households who participate in SNAP spend slightly more time in grocery shopping and traveling than single non-participating households. Meanwhile, married households who participate in SNAP spend slightly less in both activities than married non-participating households. Finally, single adult households as well as married households who participate in SNAP spend less money for every minute spent grocery shopping than non-participating single and married households.

Using the Eating and Health Module we observe mean time in primary eating, secondary eating and secondary drinking where secondary eating and drinking occur during other activities. Single adult households who participate in SNAP spend 12 minutes less in primary eating but six minutes more in secondary eating. For married participant households, primary eating time is nearly identical to non-participant households but these households spend nine fewer minutes in secondary eating than married non-participant households.

3.2 Food Security

Table 2 reports the summary statistics for the sample and is separated into three groups: households above 180% FPG, households below 180% FPG who are food secure and households below 180% FPG who are food insecure. We further separate these groups into married and single households as above. As before, we compare food insecure households to food secure households above 180% FPG for this discussion.

Food insecure households spend nearly 20 minutes more in food preparation than higher income food secure households. Similarly, married food insecure households spend 12 minutes more in food preparation than married higher income households. Total eating time is shorter for single adult and married households who are food insecure than eating time for food secure households. Likewise, married and single food insecure households spend half as much food expenditures per minute in food preparation than higher income households.

Food acquisition remains similar between food secure and food insecure households. Single food insecure households spend slightly more time grocery shopping whereas married food insecure households spend slightly less time in grocery shopping than married food secure households. Both married and single food insecure households spend fewer dollars per grocery shopping minute than married and single food secure households.

Similar to SNAP participating households, single adult food insecure households allocate 38 more minutes in total household activities than single food secure households. But married food insecure households spend seven fewer minutes than married food secure households. But single and married food insecure households spend less time working, single food insecure households spend 44 minutes less than single food secure households while married food insecure households spend 64 fewer minutes working.

Finally, examining the Eating and Health Module, we observe that both sets of food insecure households spend less time in primary eating than higher income households. At the same time, single food insecure households spend 14 more minutes in secondary eating than single adult food secure households. As expected, married food insecure households allocate less time to total eating than food secure households while food insecure single adult households spend more time in total eating than higher income households, reflecting the high proportion of secondary eating than single food secure households.

4 Empirical Approach

For our empirical strategy, we examine the relationship between SNAP participation, food security status and two measures of time inputs for eating: time use in food preparation and clean up and time use in food acquisition such as grocery and non-grocery food shopping and travel for grocery and non-grocery food shopping. Because we predict level of food expenditure must be a factor in these relationships, we also create models to examine the relationship of food preparation minutes per dollar of usual food expenditure and food acquisition minutes per dollar of usual food expenditure with SNAP participation and food security. We assume minutes in food preparation and food acquisition per dollar will be positively correlated with increased food or budget stress.

For our analysis, we create four dependent variables: food preparation, food acquisition, food preparation per dollar and food acquisition per dollar. We then create dummies for our variables of interest: our SNAP variable is assigned a value of one if the respondent is a participant and zero if a non-participant; our food insecure variable is assigned a value of one if the responses from the CPS-FSS questionnaire indicate the household has low food security or very low food

security.

Because respondents selected to participate in the ATUS are not always the primary food preparer in the household, we limit our sample to respondents who report positive time allocation to food preparation or food acquisition; including those respondents with zero food preparation time would bias our results. Finally, previous time use literature has found that married households allocate food preparation time differently than single adult households (Crossly and Lu 2005). Because of this, we run separate regressions for married and single households for each dependent variable.

We include other explanatory variables to control for household-level characteristics. These include number of children under 18 in the household, number of adults in the household, gender, age, race, income and WIC receipt. Our income indicator is separated into sixteen dummy variables that indicate different levels of income ranging from $5,000 and under to $150,000 and above. We also control for unobservable state and year factors that will affect food security, SNAP participation and time use. To do this we include state and year level fixed effects.

5 Results

Tables 3 through 6 summarize our main findings. Note we include a dummy variable for employment and a continuous variable of usual food expenditure in order to control for employment and food expenditure. Because recent literature has found an endogenous relationship between SNAP participation and food security status (Ratcliffe and McKernan 2010, Gundersen and Kreider 2008, Nord and Golla 2009), we do not ascribe any causal relationship to our findings. Rather they reflect correlations. Our results indicate food security or SNAP participation are significant predictors of time use, but they do not indicate food security or SNAP participation affect time use.

Table 3 shows the results for time allocated toward food preparation and clean up. Food insecurity is positively associated with food preparation in single households and has no significant relationship in married households. SNAP participation and employment have significant negative relationships with food preparation in married households while SNAP has a positive association with time for food preparation in single households. Finally, usual weekly food expenditure only has a positive association with time for preparation in single households.

Table 4 illustrates the relationship between our variables of interest and food acquisition. Neither food insecurity nor SNAP are significant predictors of food acquisition. Usual food expenditure does have a positive and significant association with food acquisition in married households. Employment has opposite relationships with food acquisition in the separate subgroups; employment has a positive relationship with food acquisition in married households and a negative relationship in single households.

Tables 5 and 6 show the results for minutes of food preparation and food acquisition per dollar of usual food expenditure. In married households, SNAP participation and working have a negative and significant relationship with food preparation minutes per dollar. In single adult

households, neither SNAP nor food insecurity have a relationship with minutes per dollar.

Finally, Table 6 reveals the relationships between SNAP, food insecurity and employment with food acquisition minutes per dollar of food expenditure. SNAP has a negative and significant relationship with food acquisition per dollar in both households. Conversely, neither food insecurity nor being employed has an association with food acquisition per dollar.

6 Conclusion

Our results indicate that food insecure households allocate food preparation and acquisition time differently than those households that are food secure, but the relationship between food security and food preparation is dependent on whether the household consists of a single adult or a married couple. We also find that SNAP participating households use time differently than non-participating in food preparation which also depends on whether the household consists of a single adult or a married couple. Food acquisition and food insecurity or SNAP participation does not yield such strong results. Our results do not imply a causal relationship between food insecurity or SNAP participation and time use in food preparation or food acquisition, but they do imply that those households that are food insecure or those who participate in SNAP use time differently. Further investigation must be done in order to assess whether a causal relationship exists.

References

[1] Aguiar, M., and Erik Hurst (2005), "Consumption Versus Expenditure," Journal of Political Economy, 113: pp. 919–48.

[2] Davis, George and Wen You (2010). "The Thrifty Food Plan Is Not Thrifty When Labor Cost is Considered". *The Journal of Nutrition*, Vol. 140, Issue 4: pp. 854–857.

[3] Davis, George and Wen You (2010). "The Time Cost of Food at Home: General and Food Stamp Participant Profiles". *Applied Economics*, Vol. 42, Issue 20: pp. 2537–2552.

[4] Furness, Bruce, Paul Simon, Cheryl Wold, Johanna Asarian–Anderson (2004). "Prevalence and predictors of food insecurity among low-income households in Los Angeles County." *Public Health Nutrition*, Vol. 7: pp. 791–794.

[5] Gundersen, Craig, and Brent Kreider (2008). "Food Stamps and Food Insecurity: What Can Be Learned in the Presence of Nonclassical Measurement Error?" *Journal of Human Resources*, Vol. 43 No. 2: pp. 35282.

[6] Hamermesh, Daniel (2007). "Time to Eat: Household Production Under Increasing Income Inequality." *American Journal of Agricultural Economics*, Vol. 89, Issue 5: pp. 852–863.

[7] Hamermesh, Daniel (2008). "Direct Estimates of Household Production". *Economics Letters*, vol. 98: pp. 31–34.

[8] Hamermesh, Daniel (2010)."Incentives, Time Use and BMI: The Roles of Eating, Grazing and Goods". *Economics and Human Biology*, Vol. 8, No. 1: pp. 2–15.

[9] Nord, Mark, and Anne Marie Golla (2009). "Does SNAP Decrease Food Insecurity? Untangling the Self-Selection Effect." Washington, DC: USDA, Economic Research Service, Economic Research Report Number 85.

[10] Olson, Christine, Barbara Rauschenbach, Edward Frongillo, Jr., Anne Kendall (1996). "Factors Contributing to Household Food Insecurity in a Rural Upstate New York County". Institute for Research on Poverty. Discussion Paper no. 1101-96.

[11] Ratcliffe, Caroline and Signe-Mary McKernan (2010). "How Much Does SNAP Reduce Food Insecurity? The Urban Institute, March 2010, accessed from http:www.urban.orguploadedpdf412065_reduce_food_insecurity.pdf.

A Appendix

A.1 Merging the ATUS with the CPS-FSS

Because the ATUS and FSS are selected from the same CPS sample, individual identifiers for both data sets can be merged. Respondents in the CPS follow a cycle of interviews that ensure an equal number of respondents fall in each CPS monthly interview. If the respondent's first interview is in September of 2004 (The CPS refers to this as Month-in-Sample 1, he also participates October, November and December surveys of that year. The respondent is next interviewed eight months later for four consecutive months. For example, the same respondent would then be interviewed September through December of 2005. The ATUS would then occur two to five months after the final interview. For this example, our respondent would participate in the ATUS survey at some point between February and July of 2006. We restrict our FSS sample to only those in the final four months of the CPS interview cycle, Month-in-Sample 5 through 8 in order to include only the most recent FSS survey for each household.

Following the documentation, we merge the ATUS to the FSS using the common variables HRHHID, HRHHID2 and PULINENO. We then crosscheck the merge by comparing SEX and PESEX as well as the race variables for each data set, RACE and PTDTRACE, to verify the same individual was merged.

Table 1: Summary Statistics for SNAP Participation and Non-Participation

	(1) Above 180% of FPG	(2) Below 180% No SNAP	(3) Below 180% SNAP	(4) Above 180% of FPG	(5) Below 180% No SNAP	(6) Below 180% SNAP
Time Use	Single	Single	Single	Married	Married	Married
Food Prep	15.47	27.58	46.6	38.24	46.32	49.84
Dollar/Minute Food Prep	0.60	0.29	0.18	0.27	0.18	0.14
Grocery Shop	3.33	4.02	3.73	6.89	6.11	6.71
Travel Grocery	1.79	2.39	2.94	3.5	3.31	2.88
Dollar/Grocery Shop	2.76	1.97	2.20	1.53	1.35	1.07
Eating	56.95	51.48	48.07	68.97	63.98	58.22
Total Food Activities	77.54	85.47	101.34	117.60	119.71	117.65
Work	158.92	143.00	116.19	267.07	225.60	158.03
Travel to Work	13.55	11.48	8.96	23.56	18.51	15.41
Household Activities	48.97	54.83	73.33	83.49	82.38	89.73
Childcare	23.78	41.44	74.49	78.67	71.17	75.35
Total Household Activities	72.74	96.26	147.82	162.16	153.55	164.98
Social Time	58.11	58.72	48.16	45.68	46.54	76.74
Leisure Time	188.13	211.10	234.78	146.85	181.11	178.98
Total Observations	3552	3552	3552	6481	6481	6482
Eating and Health Module						
Primary Eating	53.52	55.27	41.74	60.57	62.02	60.13
Secondary Eating	18.67	26.14	24.88	19.20	16.80	10.50
Secondary Drinking	63.47	52.68	61.49	74.49	57.38	59.15
Total Eating (No Drink)	72.19	81.41	66.62	79.77	78.82	70.63
Primary Eating/Total	0.74	0.68	0.63	0.76	0.79	0.85
Secondary Eating/Total	0.26	0.32	0.37	0.24	0.21	0.15
Total Observations	3552	3552	3552	6481	6481	6482

Table 2: Summary Statistics for Food Secure and Food Insecure

	(1) Above 180% of FPG	(2) Below 180% Food Secure	(3) Below 180% Food Insecure	(4) Above 180% of FPG	(5) Below 180% Food Secure	(6) Below 180% Food Insecure
Time Use	Single	Single	Single	Married	Married	Married
Food Prep	15.44	29.00	34.46	38.68	45.41	50.03
Dollar/Minute Food Prep	0.58	0.27	0.24	0.27	0.18	0.15
Grocery Shop	3.39	3.41	5.10	6.92	6.54	5.24
Travel Grocery	2.02	2.03	3.39	3.46	3.60	2.39
Dollar/Grocery Shop	2.66	2.30	1.62	1.51	1.28	1.45
Eating	57.20	52.54	47.62	69.49	64.00	61.70
Total Food Activities	78.06	86.98	90.57	118.55	119.54	119.36
Work	158.46	150.51	114.27	265.20	224.69	201.85
Travel to Work	13.17	12.65	7.85	23.52	18.12	18.32
Household Activities	49.51	55.98	62.00	83.05	81.84	86.57
Childcare	23.28	46.37	48.49	79.08	72.85	75.35
Total Household Activities	72.79	102.35	110.49	162.13	154.68	155.03
Social Time	58.11	58.25	54.24	45.30	47.73	55.10
Leisure Time	188.42	209.72	225.97	148.02	178.831	186.16
Total Observations	3552	3552	3552	6481	6481	6482
Eating and Health Module						
Primary Eating	57.72	51.75	45.67	69.77	63.46	57.15
Secondary Eating	18.24	19.27	32.44	22.18	16.44	13.79
Secondary Drinking	48.04	56.54	54.02	63.70	61.33	45.88
Total Eating (No Drink)	75.97	71.03	78.11	91.95	79.90	70.94
Primary Eating/Total	0.76	0.73	0.58	0.76	0.79	0.81
Secondary Eating/Total	0.24	0.27	0.42	0.24	0.21	0.19
Total Observations	2097	2097	2097	3832	3832	3832

Table 3: Food Prep

VARIABLES	(1) Married	(2) Single
Food Insecure	0.66	4.87***
	(3.003)	(1.530)
SNAP	-9.60***	4.82*
	(3.347)	(2.442)
Usual Food Exp	0.00	0.02**
	(0.010)	(0.011)
Employed	-15.47***	-0.11
	(1.893)	(1.006)
Observations	7,590	6,982
R-squared	0.141	0.084
Number of States	50	50
Other covariates include race, WIC, female, age, income, MSA, no. of children, no. of adults, state, year and month fixed effects		
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Table 4: Food Acquisition

VARIABLES	(1) Married	(2) Single
Food Insecure	0.24	0.71
	(1.784)	(1.350)
SNAP	0.06	-0.44
	(2.328)	(1.380)
Usual Food Exp	0.02**	0.01
	(0.007)	(0.008)
Employed	-1.97*	1.76**
	(1.022)	(0.859)
Observations	7,590	6,982
R-squared	0.015	0.011
Number of States	50	50
Other covariates include race, WIC, female, age, income, MSA, no. of children, no. of adults, state, year and month fixed effects		
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 5: Food Prep Min/Dollar of Food Expenditure

VARIABLES	(1) Married	(2) Single
Food Insecure	0.20	0.16
	(0.291)	(0.199)
SNAP	-0.83***	0.42
	(0.204)	(0.261)
Employed	-0.34*	-0.09
	(0.200)	(0.082)
Observations	6,982	6,280
R-squared	0.017	0.024
Number of States	50	50
Other covariates include race, WIC, female, age, income, MSA, no. of children, no. of adults, state, year and month fixed effects		
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 6: Food Acquisition/Dollar of Food Expenditure

VARIABLES	(1) Married	(2) Single
Food Insecure	-0.09	-0.11
	(0.088)	(0.075)
SNAP	-0.18*	-0.32**
	(0.102)	(0.160)
Employed	0.01	0.04
	(0.145)	(0.117)
Observations	6,982	6,280
R-squared	0.007	0.011
Number of States	50	50
Other covariates include race, WIC, female, age, income, MSA, no. of children, no. of adults, state, year and month fixed effects		
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		