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## **Impact of WIC program participation on food expenditures**

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# Impact of WIC Program Participation on Food Expenditures

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## Abstract

OUR STUDY INVESTIGATES the relationship between participation in the Special Supplemental Nutrition Assistance Program for Women, Infants, and Children (WIC) and purchases of WIC related foods. Data from the Nielsen Homescan data 2009 to 2010 provide information on food expenditures, household demographics and reported WIC participation status during a period of changes in the program benefits. In this analysis, we assess how participation in the WIC program relates to purchases of whole grain products.

THE WIC PROGRAM is designed to improve healthy eating behaviors of the targeted groups of people: pregnant and lactating women, infants, and young children less than 5 years old. Under the program, participants are able to acquire specific foods designated in the WIC food package. Although WIC is one of the major US food assistance programs, there are relatively few studies about the effect of WIC on food acquisition.

Among recent studies there is some evidence of a positive association between WIC participation and consumption for some foods in the WIC package (Oliveira and Chandran, 2005; Ponza, et al., 2004). Better understanding of the relationship between WIC participation and food acquisition can help to improve the design and effectiveness of the WIC program.

## Empirical Methodology

### Treatment Effect

Our approach to WIC program evaluation adopts the counterfactual framework by Rubin (Rubin, 1974). The treatment variable,  $w_i \in \{0,1\}$  refers to whether household  $i$  participates in the WIC program or not. Let  $y_{ui}$  and  $y_{o_i}$  be the outcomes with treatment and without treatment. The observed outcome for household  $i$  is given by  $y_i = w_i y_{ui} + (1-w_i) y_{o_i}$ . Our objective is to identify the average treatment effect on the treated (ATT).

$$ATT = E[y_{ui} - y_{o_i} | w_i = 1] = E[y_{ui} | w_i = 1] - E[y_{o_i} | w_i = 1]$$

## Background

**Propensity Score Matching**

**Participation model:** Based upon the main assumptions for adequate matching, we first conduct an estimation of the program participation model to characterize the propensity score using a Logit model (Rosenbaum and Rubin, 1983).

**Matching estimators:** After we characterize the expected probability of program participation, the propensity score, the next step is to determine the matching estimator which will combine a treated group with a non-treated group with equal propensity score to estimate the

counterfactual outcome. We compare the results employing different matching algorithms :nearest neighbor matching and kernel matching.

## Data

### WE USE THE NIELSEN HOMESCAN

data for 2009 and 2010 which provide a representative sample of U.S. households that report all food purchases for each shopping trip. We aggregated the data to a weekly basis. The demographic characteristics include WIC program participation status, household income, age, education and employment of household head, race and ethnicity, marital status, and presence of children (by age). Purchases of grain products include bread, ready-to-eat cereals, rice and tortillas (Table 1).

Households were classified on potential WIC-eligibility by poverty status (we used  $\leq 200\%$  poverty income here) and demographics (woman of childbearing age and presence of children  $< 5$  years old) and reported WIC status (Figure 1).

## Discussion

- WIC households have higher whole grain expenditures (Figure 2).
- Households participating in WIC at least one-year have more whole grain expenditures than non-participating households (Table 2).
- These results are consistent across different matching procedures.
  - When whole grains expenditures were expressed as a ratio of whole grains to total grains expenditures, there were no differences observed across all groups and methods.

**Table 1. Summary statistics of monthly weighted average grain expenditures (all households)**

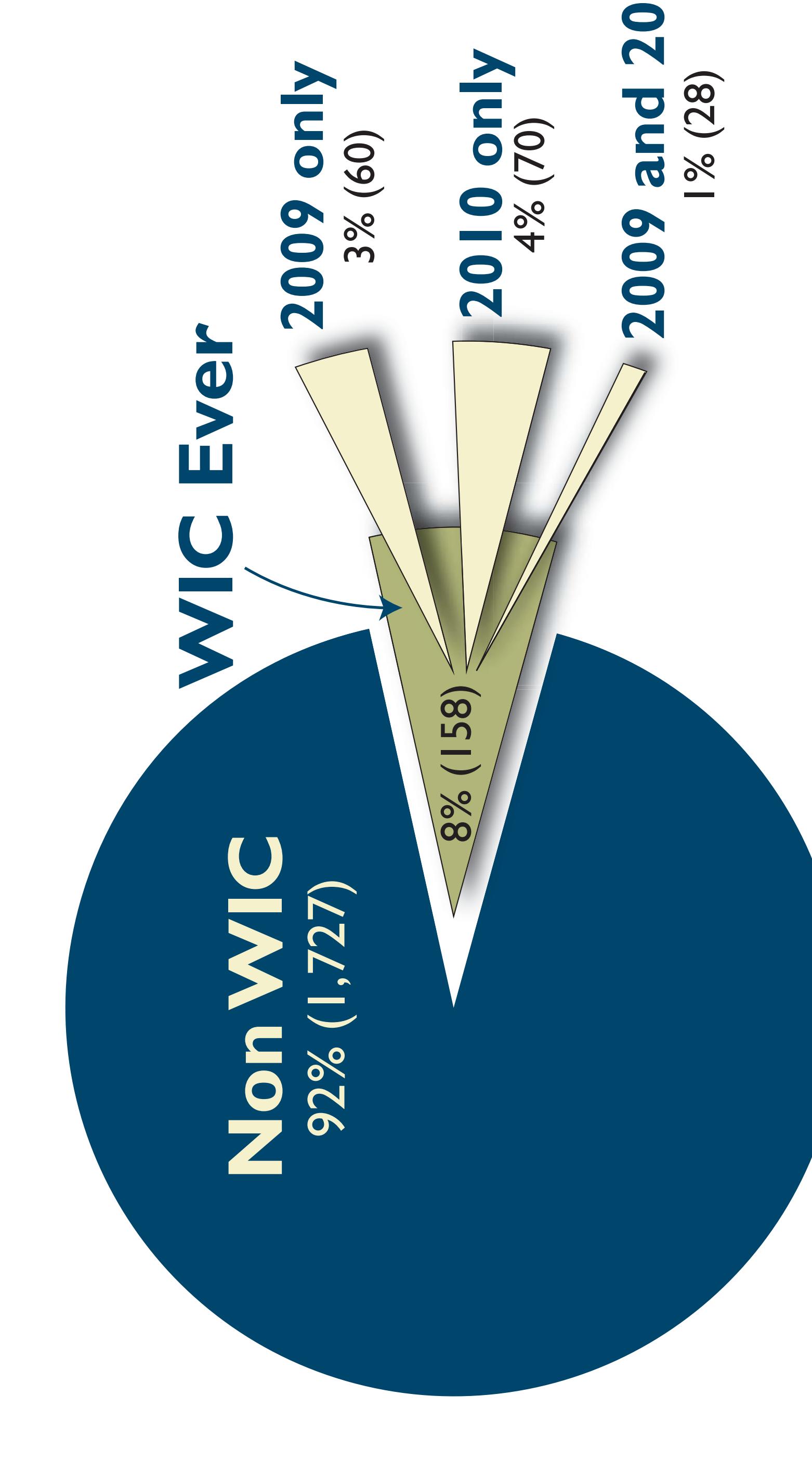
Expenditure	Mean	Standard Deviation	Minimum	Maximum
<b>Dollars</b>				
Refined Grain	11.12	7.20	0.98	64.38
Whole Grain	5.88	3.64	0.00	43.29

**Table 2. Treatment effects of WIC participation on whole grain expenditures**

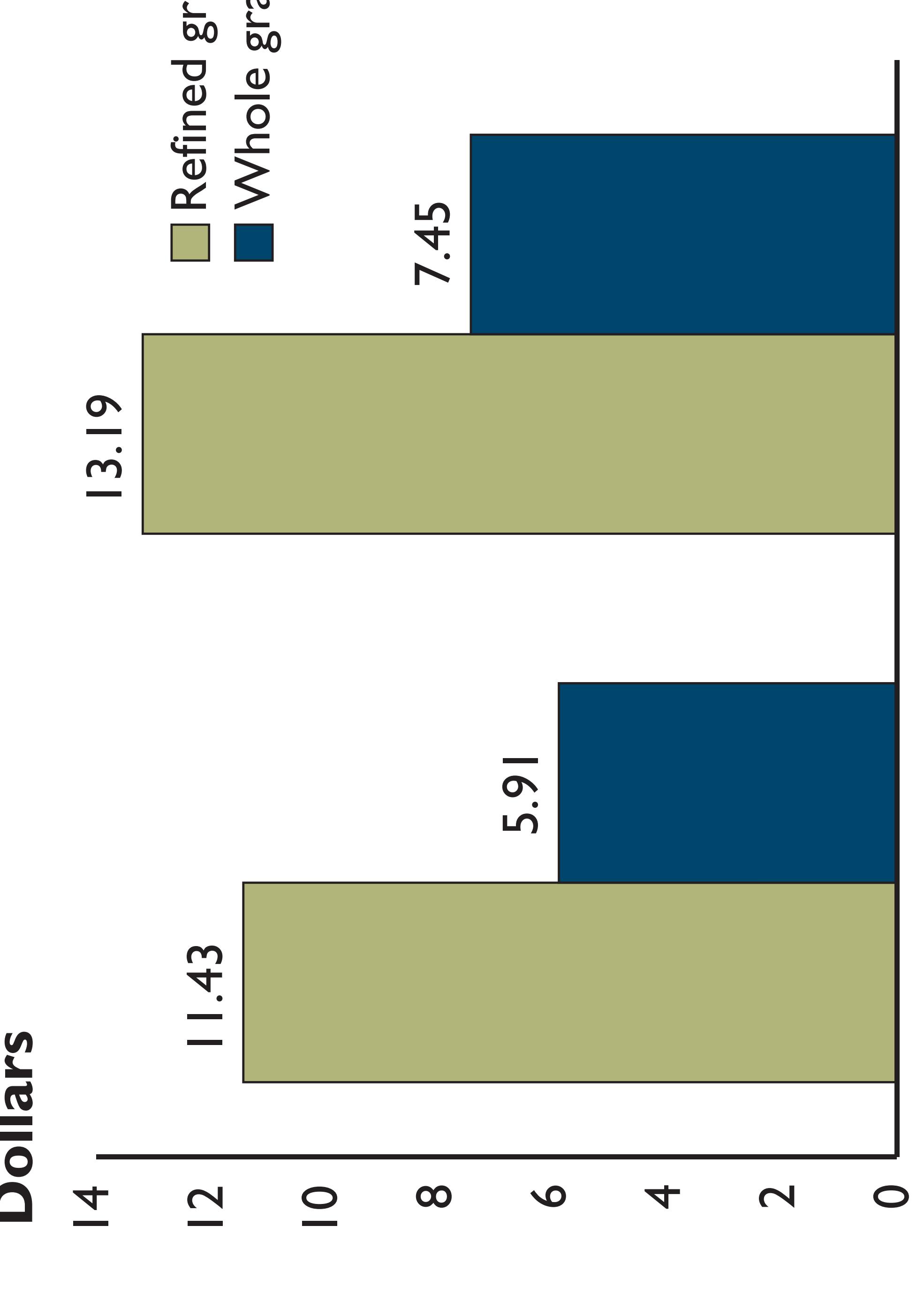
Outcome = Dif. in Average Expenditures of Whole Grain (Monthly)	Nearest Neighbor (N=5)	Kernel Matching (N=10)	Radius (r=0.06)	Unmatched (r=0.05)	
Participation either in 2009 or 2010	1.0135** (0.468)	1.262*** (0.427)	1.093*** (0.417)	1.159*** (0.373)	1.453*** (0.436)
One-Year Participation	1.1545** (0.532)	1.2307** (0.518)	1.0357*** (0.497)	1.1165** (0.498)	1.5269** (0.460)
2009 Participation	0.928 (0.681)	0.5443 (0.751)	0.7152 (0.693)	0.7982 (0.613)	1.2191* (0.579)
2010 Participation	0.8302 (0.604)	0.8776* (0.479)	0.7808*** (0.510)	0.9102** (0.434)	1.4749** (0.400)

Source: Nielsen Homescan 2009/2010

Note: Standard errors are reported in parenthesis. \*\*\*significat at the 1 percent level, \*\*significat at the 5 percent level, \*significat at the 10 percent level.



**Figure 1. Potentially eligible households with two years of grain purchases**



**Figure 2. Monthly average grain expenditures by group**

## References

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