Electronic Benefit Transfer and the Women, Infants and Children Participation Rate: Evidence from Oklahoma EBT Transition

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Abstract

The WIC participation rate has been declining since 2010. Evidence suggests the low participation rate results in part from participant dissatisfaction with the benefit delivery system. The WIC Reauthorization Act of 2010 requires all WIC state agencies to implement Electronic Benefit Transfer (EBT) by October 1, 2020. The EBT transition reduces WIC participants' transaction cost and could potentially alleviate the negative stigma associated with benefits redemption. The hope is that the implementation of EBT could incentivize more eligible people to join the program. This paper uses the Oklahoma WIC benefits issuance and redemption data to study the impact of EBT transition on WIC participation. We find no relationship between EBT transition and WIC participation.

Introduction

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) provides food assistance, health care, and nutrition education to low-income pregnant and postpartum women, infants and children up to age five. WIC is the third largest federal nutrition assistance program in the U.S. with roughly $6.7 billion appropriated in fiscal year (FY) 2015. Of the 6.7 billion, 70% was spent on the food benefits portion of the program (Oliveira and Frazao 2015). Established as a pilot program in 1972 and made permanent in 1974, the WIC program provides assistance to over one-half of all newborn infants and one-quarter of all children under the age of five in the United States (Davis 2007).

The literature surrounding the nutritional effects of the WIC program finds that the program participation improves the health status of women, infants, and children. For example, the WIC program has been shown to mitigate iron deficiency anemia in children (Miller, Swaney, and Deinard 1985), positively influence birth weights (Currie and Rajani 2015; Hoynes, Page, and Stevens 2011; Kowaleski-Jones and Duncan 2002), and improve participants' overall nutritional status (Kropf et al. 2007; Lee and Mackey-Bilaver 2007). WIC participation is a good indicator of prenatal and early childhood nutrition and health environments. Consequently, this is strongly linked to cognitive development, academic learning, and eventually socioeconomic attainment (Jackson 2015.).

Despite all the positive benefits WIC could provide recipients, only 55% of eligible people were enrolled in the program in 2014 (USDA 2014) and most participants did not fully redeem the benefits to which they are entitled. According to Phillips et al. (2014), only 12.6% of all WIC-eligible families in Kentucky, Michigan, and Nevada in 2012 fully redeemed their WIC food benefits. Furthermore, since 2010, the program participation rate has been declining and the

number of participants has decreased by 16 percent (USDA 2017). One of the primary factors causing low rates of participation and participants under utilizing their food benefits is the way in which benefits are delivered (Johnson et al. 2015).

As of 2018, about 60% of states deliver WIC benefits through paper vouchers, known as food instruments (FIs), which specify the types and quantities of eligible foods that can be redeemed at WIC-authorized vendors. Vendors then return vouchers to states for reimbursement. Through this system, WIC participants are able to redeem a paper voucher for a group of approved foods (e.g., 1 gallon milk, 64 oz. of bottled juice, and 16 ounces of whole grains). However, in most voucher states participants must redeem the entire package in one transaction or risk losing the unredeemed food benefits.

Recently an increasing number of states have been transferring to the Electronic Benefit Transfer (EBT) system. EBT replaces paper vouchers with debit cards for food benefit issuance and redemption at authorized WIC grocery stores. According to federal regulation, all state WIC agencies are required to implement an EBT system by October 1, 2020. As of March 2018, 22 WIC state agencies have fully developed and implemented EBT systems. The remaining states are in various stages of planning, developing or implementing EBT.

The EBT transition changes the channels of benefit issuance, distribution, and redemption. It provides a much more convenient experience for WIC participants. With an e-WIC card, they can enjoy more flexibility in terms of when and where to redeem their food benefits. Unlike with paper vouchers, benefits issued for a given food instrument can be redeemed with e-WIC through multiple transactions at different WIC authorized vendors and during different shopping trips.

In addition, the implementation of EBT could potentially reduce the psychological stigma experienced by WIC participants. Under the paper voucher system, when WIC consumers bring checks to stores to redeem food benefits, cashiers need to check each food item individually to ensure the item is both WIC authorized and listed on the FI that the participant is attempting to redeem. Paper vouchers not only increase the transaction time cost, a concern with long checkout lines, but also make WIC consumers more easily identified by other consumers in the store. Alternatively, under the EBT system, cashiers only need to scan the Uniform Product Code (UPC) label of each food item and the computer program within the store's cash register system automatically determines if items are WIC-eligible and if they are available to the participant (i.e., have not yet been redeemed). Fellow shoppers do not need to wait behind recipients as long and it is more difficult to identify WIC recipients, potentially reducing negative stigma (Manchester and Mumford 2010, 2012).

Given the advantages of the EBT system, it is likely that the transition to EBT will increase WIC participation. A survey conducted by the Altarum Institute on WIC participants suggests that most people are satisfied with the shopping experience with EBT (Phillips et al. 2014). Participants find EBT to have significant benefits, such as improved convenience, portability, and less participant stigma. The survey results suggest that the transition to EBT could encourage more eligible low-income women, infants and children to join the program. Rigorous econometric analysis is needed, however, to test whether these perceptions translate into improved participation.

Hanks et al. (2017) examined the impact of EBT on WIC recipient behavior. They find that the introduction of EBT does not increase the probability that eligible women and children enroll in the WIC program, and WIC recipients redeem more benefits two to four months after

the EBT transition compared to pre-EBT redemptions. However, they only have enrollment data for five states and the data is aggregated to the state level. This level of aggregation limits the authors' ability to detect any potential effects from EBT, especially considering that their models lack state specific control variables.

Manchester and Mumford (2010) construct a structural model to decompose the psychological cost of welfare participation into "external" and "internal" components. Then they use the estimates from the structural model to conduct policy simulations. They find that the implementation of EBT, which effectively eliminated the external psychological costs (or at least those costs incurred upon benefit redemption) associated with Food Stamp Program, increased take-up rates by 30 percent. They estimate that a similar EBT policy for WIC would increase take-up rates by 23 percent.

In this paper, we investigate how the transition to EBT in the state of Oklahoma affects WIC participation rates. While other studies have considered this question on a more macro scale (i.e., multiple states in the U.S.), this paper is the first to consider this question using individual WIC transaction-level data. Given that EBT was rolled out in waves across counties in Oklahoma in different stages, these data provide us with a unique opportunity to identify the immediate and more persistent impacts associated with a WIC agency's transition to EBT. Overall, our results show EBT implementation in Oklahoma has no effect on WIC participation rates.

Data

In order to estimate the impact that the EBT transition has on WIC participation rates, we combine two different datasets from Oklahoma WIC: i) benefit issuance and redemption data

and ii) demographic information on WIC participants and information about WIC-authorized vendors. This is then combined with county-level population and demographic data. While county-level enrollment data is not available, the number of participants in each county can be inferred from the benefit issuance and redemption data.

The benefit redemption data contain approximately 3.5 million observations from January 2015 to December 2016 under the paper voucher system, and 5 million observations under the eWIC system from February 2016 to February 2017. Each observation in the data contains the food redemption information (food package number, quantity, redeemed price, etc.) and the identification number (ID) of vendors where the benefits were redeemed. In addition, since the pre-eWIC data is at an individual level and e-WIC data is at a household level, each observation in the pre-eWIC data is tied to an individual ID whereas the eWIC data is tied to a household ID. The benefit issuance files contain detailed information about each food category prescribed to each participant, including the issued quantity and participants' individual ID and household ID under the e-WIC system.

The dataset on WIC participant information contains the individual ID and its corresponding household ID, address information and individuals' date of birth. We merge this dataset with the benefit redemption data through individual ID/household ID to get the number of participants/households in each county in each month. Since not all the individuals and households in the redemption data can be merged with the WIC participant data, we use the address of stores where participants redeem their food benefits to proxy for their county of residence. This procedure is used to infer county location for 40% of households in the pre-eWIC data and 10% of households in the eWIC data. In situations where participants redeem their

benefits at stores located in different counties, we use the county where the participant most frequently redeemed her benefits.

To convert household level e-WIC participation to the individual participant level, we need to know the average household size. The average household size in each county in each month is obtained from the e-WIC benefit issuance data, which contains the identification number of households participating in the program and number of individuals within each household.

In this study, participation in a given month is defined as redeeming at least one item within this month. Although some people may have joined the program and been issued benefits in a given month, they would not be counted as a participant until they redeemed their first food item. This methodology was employed for two reasons: First, prior to implementing EBT, Oklahoma WIC did not maintain a benefit issuance database. Thus, to maintain consistency across the time periods when the EBT system was implemented, we used redemptions for our accounting of participation. Second, given it is our goal to study the number of people who are redeeming food benefits and the potential effects of EBT on that population, actual redemptions is the appropriate metric to study.

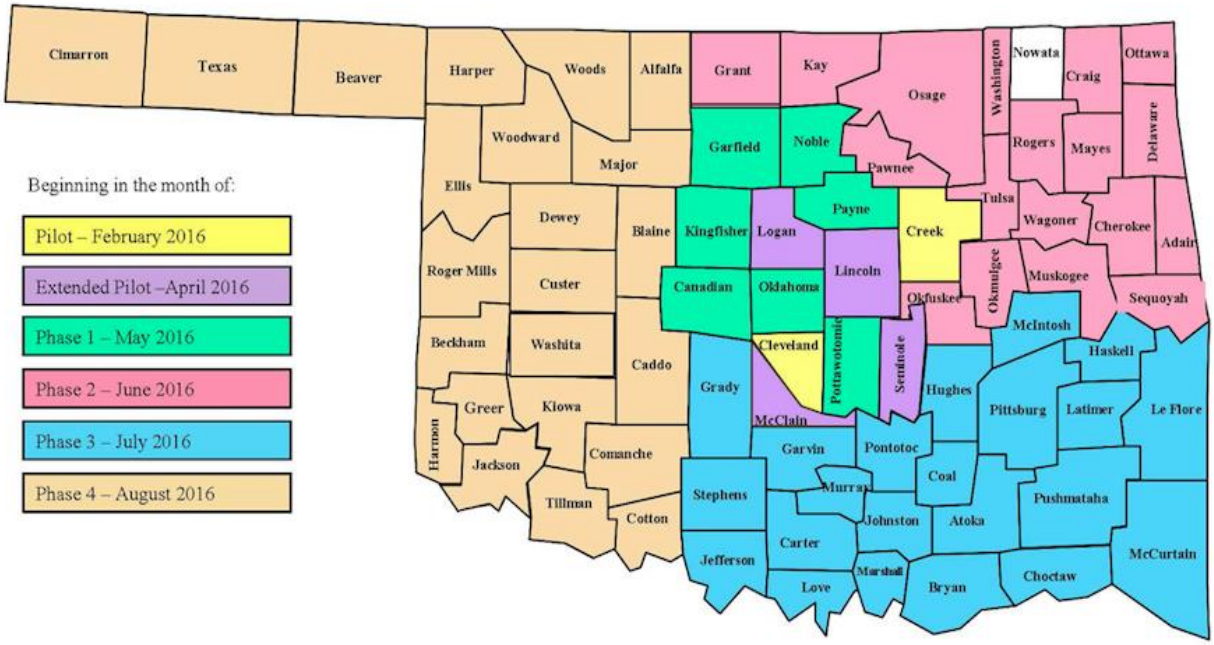
To supplement the data provided by Oklahoma WIC, we obtained population by race, sex, and age from 2010-2016, and the poverty rate in 2016 from United States Census Bureau. These data are county-level annual figures.

Methodology

There are 77 counties in Oklahoma. In order to roll out e-WIC, Oklahoma classified all the counties into six regions based on their locations, and applied e-WIC to vendors and WIC clinics

in each region from February to August 2016. Figure 1 shows the geographic location of these six regions and the EBT roll out timeline.

Figure 1. eWIC Roll Out Map: Oklahoma



We calculate the total WIC participation and population in each of these six regions by aggregating the county level data. Our outcome variables are the total region participation share of the region population. The data we used for the empirical specification span from August 2016 to February 2017, which covers the EBT transition period, as well as six months prior and six months post-EBT implementation. Given we have multiple groups (regions) implementing EBT in different time periods, a general difference-in-difference (DID) specification (Bertrand, Duflo, and Mullainathan 2004) provides the best empirical framework to estimate the impact of EBT transition on WIC participation rates.

To get the estimated treatment effect, the DID model compares the average change over time in the outcome variable for the treatment group with the average change over time for the

control group. Since it compares the differences of the change, not the change itself, it mitigates the effects of extraneous factors and selection bias. In the case of EBT transition, if some unobservable factors affected WIC participation rates in the period of EBT transition, failing to control for them would not affect the DID results as long as they have the same effect on participants residing in different regions.

However, factors that generate differential impacts on WIC participation across regions need to be controlled. In 2016, there were no other factors (e.g., policy implementation, large population migrations, etc.) that would have generated unparalleled trend for WIC participation in EBT regions and non EBT regions. Figure 2 shows the trend of WIC participation rate in each region before EBT transition. From the graph, we can see that the parallel trend assumption is valid most of the time, though the participation trend in region 2 and region 3 are a little different from other regions in the last two months. Thus, the non-EBT regions' change in WIC participation rate can be interpreted as the change EBT regions would have experienced, had they not enrolled in EBT. The baseline model is as follows:

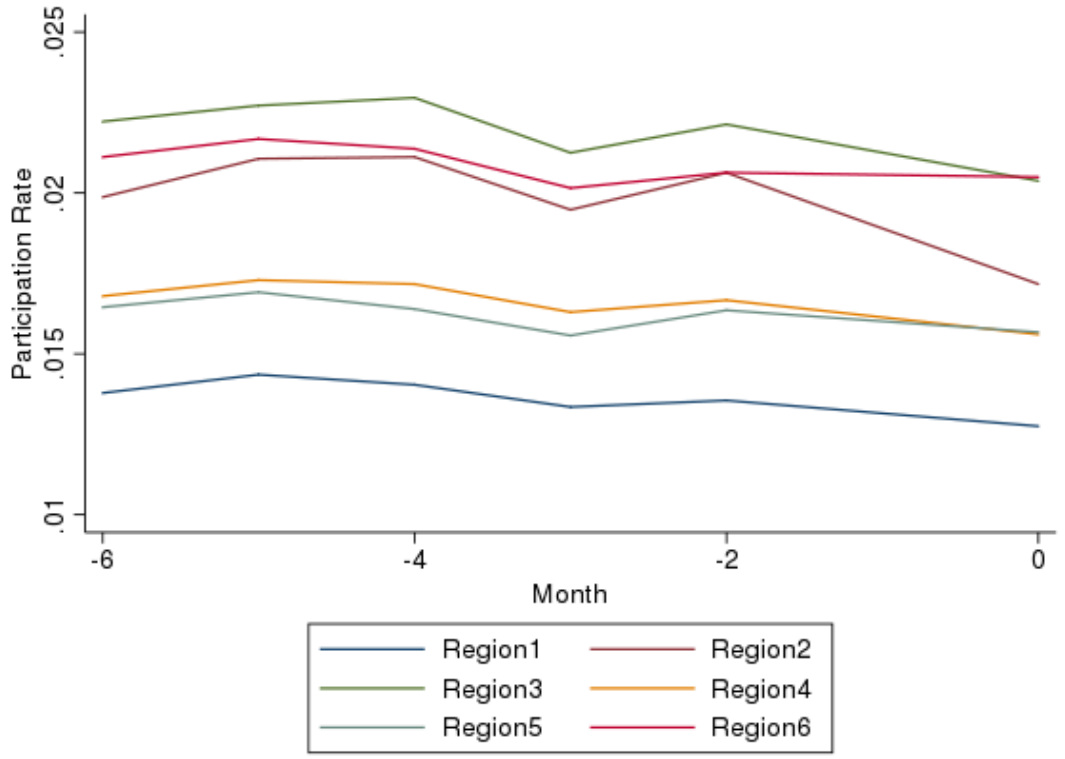
$$Participation\ Rate_{it} = \alpha_i + \lambda_t + \beta I_{it} + \gamma Z_{it} + \varepsilon_{it}$$

where $i = 1, \ldots, 6$, t = 1, . . ., T, α_i is region fixed effect, λ_t is month-year fixed effect, I_{it} is the policy variable (whether EBT is in implementation in region *i* at time *t*), and Z_{it} is a vector of exogenous control variables. β is the coefficient of interest.

For the control variables, we consider the number of WIC-eligible people in each region as the most important one. Since the region level eligibility data are not readily available, we included factors that could potentially affect people's WIC eligibility. To be eligible for WIC, the individual has to be woman, infant, or child under five years old. Therefore, we added the percent of women, the share of children under age 4 (share of children under age 5 is not

available) in each region to control for the heterogeneous effect generated by eligible population. Also, as a food assistance program, WIC eligibility is tied closely to potential participant's income. Eligible participants must have a household income at or below 185% of the federal poverty level. For this reason, we also chose the average poverty rate, which is calculated as the number of people in poverty in each region divided by the region population, as a control variable.

Figure 2. WIC Participation Rate before EBT Transition



Besides the number of WIC-eligible people, race may also have an effect on the WIC participation. Since most people residing in Oklahoma are Caucasian or African American, we include the non-Caucasian share of the total region population into the model to control for the differential effect generated by race.

Notably, the participation trends in region 2 and region 3 are parallel, and they are slightly different from other states. Both region 2 and region 3 are located in the middle of the state, and consisted of counties, like Canadian, Oklahoma, and Logan Counties, which have high populations and the highest per capita incomes in the state. Thus, it is possible that people residing in this region have better access to media, public services and other networks to receive information and thus respond more quickly to the policy change. In our second specification, we created a treatment variable for these two regions and another treatment variable for the rest of the four regions. This allows us to obtain a differential treatment effect for these two groups.

The baseline model will provide the average effect of EBT transition on WIC participation over the post-implementation period in the data. However, we also seek to investigate how participants and those eligible to participate in WIC may change their behavior over time. For example, some potential participants may not be aware immediately of the conversion to eWIC and may join the program a few months after the EBT transition. Some people might change their behavior a few months before EBT transition because the upcoming EBT implementation changed their future expectations of WIC. To study people's participation behavior over time, we create 12 indicator variables corresponding to the 6 months prior to and 6 months after the EBT transition. The alternative specification allows us to track the effect of the policy in each month leading up to adoption and then following adoption.

$$Participation\ Rate_{it} = \alpha_i + \lambda_t + \beta_1 I_{pre} + \beta_2 I_{post} + \gamma Z_{it} + \varepsilon_{it}$$

where I_{pre} and I_{post} are matrices of the indicator variables to account for anticipation effects and lagged implementation effects, respectively. Element in matrices β_1 and β_2 measure the effect of EBT on WIC participation in specific month before and after EBT transition. α_i and λ_t are the region fixed effects and month-year fixed effects as described in the base model.

Results

Results in table 1 show that EBT transition does not have a positive impact on the WIC participation rate in Oklahoma as expected. Actually, the EBT transition creates some negative

Table 1. Regression Results

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Poverty Rate	0.000536***	0.000531***	0.000545***
	(3.16e-05)	(3.16e-05)	(3.01e-05)
Five months prior to EBT			6.18e-05
			(0.000226)
Four months prior to EBT			-0.000267
			(0.000229)
Three months prior to EBT			-9.77e-05
			(0.000233)
Two months prior to EBT			9.92e-05
			(0.000235)
One month prior to EBT			0.000320
			(0.000238)
One month post EBT			-0.000147
			(0.000238)
Two months post EBT			-0.000261
			(0.000237)
Three months post EBT			-0.000259
			(0.000235)
Four months post EBT			-0.000339
			(0.000255)
Five months post EBT			-0.000250
			(0.000250)
Group1 Effect		-2.66e-05	
		(0.000245)	
Group2 Effect		-0.000334	
		(0.000215)	
EBT Implementation Effect	-0.000233		
	(0.000206)		
Constant	0.00618***	0.00632***	0.00601***
	(0.000568)	(0.000571)	(0.000541)
Observations	109	109	109
R-squared	0.985	0.985	0.986

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.01

influence on WIC participation rate, though it is not statistically significant. Also, Transitioning to EBT does not have differential impact on potential participants in region 2 and region3, compared with the effect on participation in other regions.

The third column of table 1 reports the impact of EBT transition on WIC participation in each month before and after EBT implementation. The results are consistent with the first two models. Insignificant negative impacts on participation rate are found for most of the periods surrounding EBT conversion except the last two months prior to EBT. Therefore, potential participants do not change their enrollment behavior either before EBT implementation or after the transition. Also, most of the control variables are omitted in the regression because of collinearity, except poverty rate, which is positively related to the participation rate.

Conclusion

The EBT transition has a substantial effect on the way the WIC benefits are issued and redeemed, and could potentially change WIC recipients' participation, behavior, and redemption patterns. Yet, to date there have been few studies that have examined the impact of EBT transition on WIC participants.

In this study, individual WIC transaction-level data was used to study the impact of EBT transition on Oklahoma WIC's participation rate. First, we calculated the number of WIC participants in each county in each month and aggregated them to region level. Then a generalized DID model was employed to study the average effect of the transition, and how people changed their participation behavior over time after EBT implementation. We find no evidence that WIC program participation rate was changed because of EBT transition, which is consistent with the result of Hanks et al. (2017).

Given that 40% of states have transferred to EBT system, and all the other states will complete the transition by 2020. This topic has very important policy implications. The insignificant relationship between EBT conversion and participation should provide impetus for WIC to search for other strategies to increase participation, so that the program can deliver its demonstrated health benefits to a larger segment of the eligible population.

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