

Assessment of LIHEAP and WAP Program Participation and the Effects on Wisconsin's Low-Income Population: An Examination of Program Effects on Arrearage Levels and Payment Patterns

Johna Roth and Nick Hall, TecMarket Works

ABSTRACT

This paper examines the differences in the Wisconsin Home Energy Assistance Program and the Weatherization Assistance Program's effects over a short-term period of six months before participants receive an Energy Assistance (EA) payment, compared to the six-month period following the receipt of the payment. This study examined the differences between the pre- and post-EA payment periods for both WHEAP-only participants and those enrolled in both WHEAP and WAP for the following metrics:

- Arrearage level (the amount of past due debt owed to the utility)
- Days to pay a utility bill when paid
- Percent of the utility bill paid when paid

The results of this study indicate that participant arrearages are substantially reduced by the program payments and this effect lasts most of the year that follows the receipt of the program payment. The arrearage level carried by participants returns to pre-participation levels in about nine months.

Introduction

Energy efficiency program managers have long hypothesized that LIHEAP (Low-Income Home Energy Assistance Program) payments improve payment performance by lowering utility bills so participants are better able to pay their bill. They have also assumed that weatherization services coupled with LIHEAP payments (or Energy Assistance/EA payments) compound the advantage, providing longer-term impacts on participants' ability to pay their bills. This is the first study in the energy efficiency evaluation field to verify these suggested benefits via a comparison of utility billing and customer payment histories of participants and demographically matched non-participants over multiple years of pre- and post-program payment performance. The results of this study confirm that LIHEAP and weatherization programs lower arrearage levels, that arrearage levels for weatherized customers are less than non-weatherized customers, and that the benefits of the program to the customer receiving the LIHEAP payment and the utility companies lessened debt load last somewhat longer than the benefits to the non-weatherized group.

Terminology

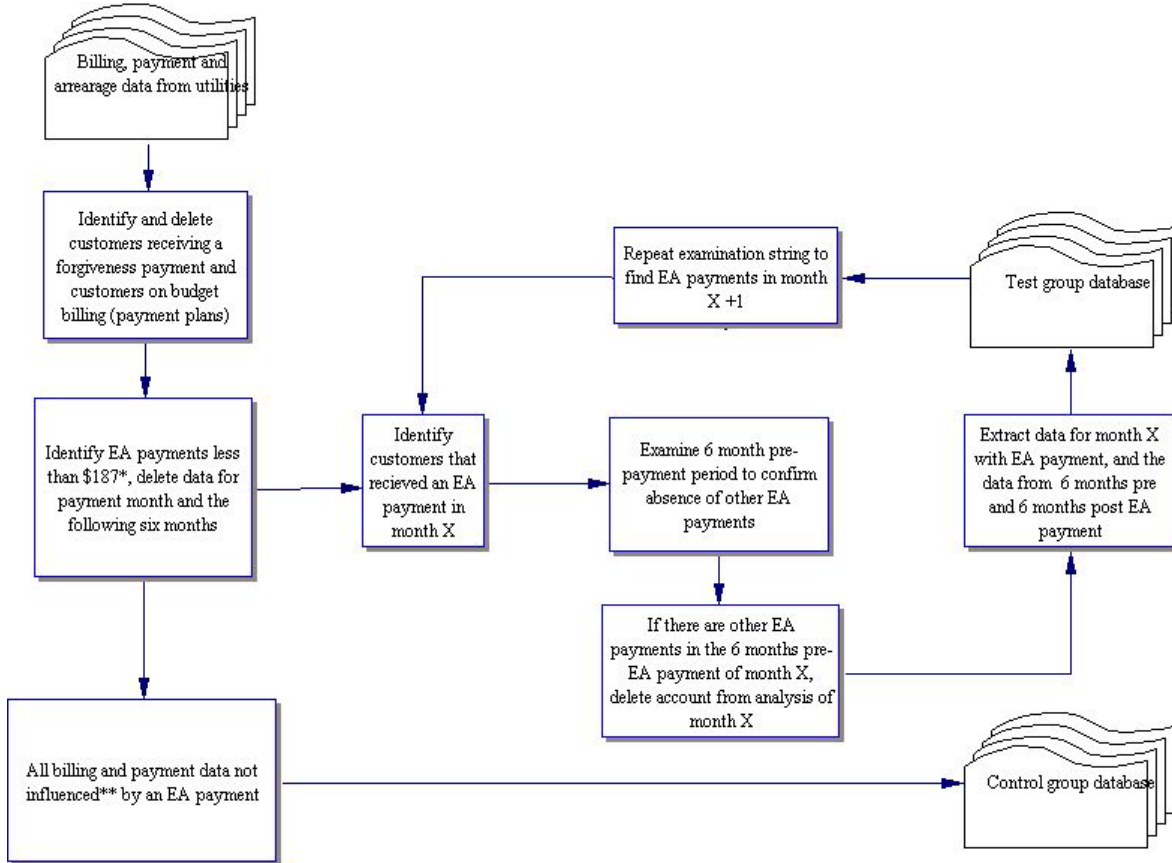
The LIHEAP is a federal energy assistance payment program. In Wisconsin this program is called WHEAP (Wisconsin Heating and Energy Assistance Program). WHEAP participants can also receive weatherization services from the federal Weatherization Assistance Program, WAP, and in this paper, they are referred to as “WHEAP+WAP” participants. In Wisconsin, all WAP participants receive WHEAP energy assistance (EA) payments in addition to the weatherization services. If the participant did not receive weatherization services, they are referred to as “WHEAP-only” in this paper. This study assessed the effects of these Wisconsin programs on low-income customer debt (arrearage) to the utility.

Methodology

This study evaluates the impacts of the Wisconsin Home Energy Assistance Program (WHEAP) and the Wisconsin Weatherization Assistance Program (WAP) on participant arrearage levels and bill payment patterns. The period of time examined in this study begins January of 2001 and ends in October of 2003. In all, 11,463 low-income customer billing and payment records were examined in this assessment to develop an analysis database of 7,966 customers. To conduct this analysis, we examined the billing and payment histories for 7,110 WHEAP-only participants and 856 additional customers who participated in both the WHEAP and WAP (WHEAP+WAP) programs, that is, they had their homes weatherized and received WHEAP assistance.

The analysis used in this study is more complex than typically used in the field of non-energy benefits evaluation research. The primary reasons for this complexity is the need to conduct the effects analysis at the monthly level, yet roll the results up into an aggregation that can be used to make conclusive statements about the program’s aggregate effects. This is further complicated by the need to use participation data that changes every month, as individual participants move in and out of the test and control group analysis depending on the year and the month being examined, which raises the need for a methodology to isolate the effects of the program. That is, a participant can be a LIHEAP participant starting in May of 2001, then not be a participant in all of 2002, and then be a participant in August of 2003, making it possible for participants to theoretically have numerous possible participation combinations depending on the specific months in which they receive their energy assistance payment(s). This also means that the participation and non-participation (control) periods need to be set differently for every individual included in the analysis. For a summary of the approach used, we present each of the steps involved in the evaluation process in Figure 1, and an example of the data structure used to support the analysis in Figure 2. While the methodological approach will be presented and discussed during the presentation, readers can download a copy of the complete report, detailing the methodological approach at www.tecmarket.net.

Figure 1. Database Development Steps



* \$187 was consensus-group-identified as the expected cut-off below which impacts are not expected and are excluded from the assessment. The rationale for this limitation on the analysis is that an EA Payment of \$10 would not have the same effect as a \$500 payment. In order to be able to identify expected effects, the Focus on Energy Evaluation Management Team made a policy decision which concluded that, for this study, the assessment would focus on those EA payments that were greater than the mean Energy Assistance Payment found in the sample data, less one-half of a standard deviation from that mean, equal to \$187. This was not a choice made by TecMarket Works, but a State instruction to TecMarket Works on the recommended approach. We agree that payments below this amount would be difficult to see in the arrearage levels.

** Not influenced, defined as a period seven months or more following a payment, in which no other assistance payments were received. Monthly data that contained a payment of less than \$187 was deleted from the database along with the account history for the following six months following the payment of less than \$187.

Figure 2. Example of Data Structure

		Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02	
Jan_2002	arrearage	VALID	39	48	59	62	188	202	172.21	133	241	225	213	204	193		
		MEAN	292.51	231.5	229.07	264.5	222.29	257.82	291.21	131.58	36.97	130.98	200.85	217.99	237.05		
		ST DEV	325.66	256.29	239.32	266.06	237.7	250.47	268.08	317.3	320.24	321.77	310.75	293.81	292.94		
	days	VALID	54	76	93	87	215	205	125	81	132	179	229	237	241		
		MEAN	17.2	17.1	19.2	18.3	17	1604	15.1	18.4	18.1	16.9	16.5	17.2	17.2		
		ST DEV	8.3	7.4	6.8	7.5	8.1	802	706	8.7	8.3	8.5	8	8.9	8		
	percent	MEAN	1.215	0.816	1.04	1.026	0.93	1.052	0.841	0.92	0.73	0.761	0.786	0.886	0.875		
		ST DEV	1.389	0.376	1.037	0.775	0.497	1.108	0.508	0.877	0.372	0.374	0.499	0.683	0.607		
		VALID	96	117	144	148	378	396	406	405	404	401	399	398	395		
	Feb_2002	arrearage	VALID	55	65	70	159	160	177	157	119	174	169	166	156	163	
MEAN			314.72	290.21	306.22	253.9	308.71	358.61	437.79	340.62	184.46	230.29	247.18	250.99	261.21		
ST DEV			326.69	313.53	334.42	315.48	336.61	357.27	393.56	365.85	428.37	394.41	381.63	344.33	352.63		
days		VALID	73	81	77	133	114	141	114	84	119	139	163	156	185		
		MEAN	16.3	16.2	16.1	16	17.6	15.9	15.2	17.8	17.1	16.1	17.2	15.4	16.9		
		ST DEV	8.2	7.2	7.1	8	7.9	7.9	7.8	8.2	8.5	8.1	8.7	7.8	7.7		
percent		MEAN	0.799	0.825	0.858	0.93	0.899	0.951	0.781	0.757	0.699	0.719	0.83	0.757	0.877		
		ST DEV	0.433	0.446	0.479	0.385	0.453	0.87	0.495	0.932	0.534	0.407	0.769	0.381	0.595		
		VALID	128	145	156	273	288	323	325	325	325	324	322	321	320		
March_2002		arrearage	VALID	89	96	179	201	214	241	190	163	194	199	185	186	182	
	MEAN		311.85	326.09	258.67	287.62	340.09	413.61	419.16	277.71	222.47	243.05	252.92	249.39	211.18		
	ST DEV		3459.24	354.69	324.79	331.56	334.55	361.01	348.87	361.76	378.49	369.62	349.99	341.31	248.61		
	days	VALID	96	104	146	147	157	154	127	111	138	164	159	184	178		
		MEAN	16.4	16.1	17.2	19.2	17.5	17.1	17.1	17.9	17.8	18.9	16.8	17.8	16		
		ST DEV	6.7	7.5	8	8.7	8.2	7.9	9	7.6	8.3	10.4	7.6	8.2	7.8		
	percent	MEAN	0.891	0.99	0.927	0.859	0.714	0.734	0.712	0.67	0.744	0.79	0.799	0.806	0.905		
		ST DEV	0.469	0.957	0.908	0.498	0.413	0.699	0.869	0.405	0.504	0.589	0.825	0.525	0.789		
		VALID	192	201	318	324	331	331	333	332	332	332	332	330	325		

Research Findings

There were multiple objectives associated with this research, such as researching poverty levels and energy burdens, however, for this paper we will focus priority on arrearage and payment effects, but also offer highlights of other aspects of the researchable issues.

Arrearage Levels

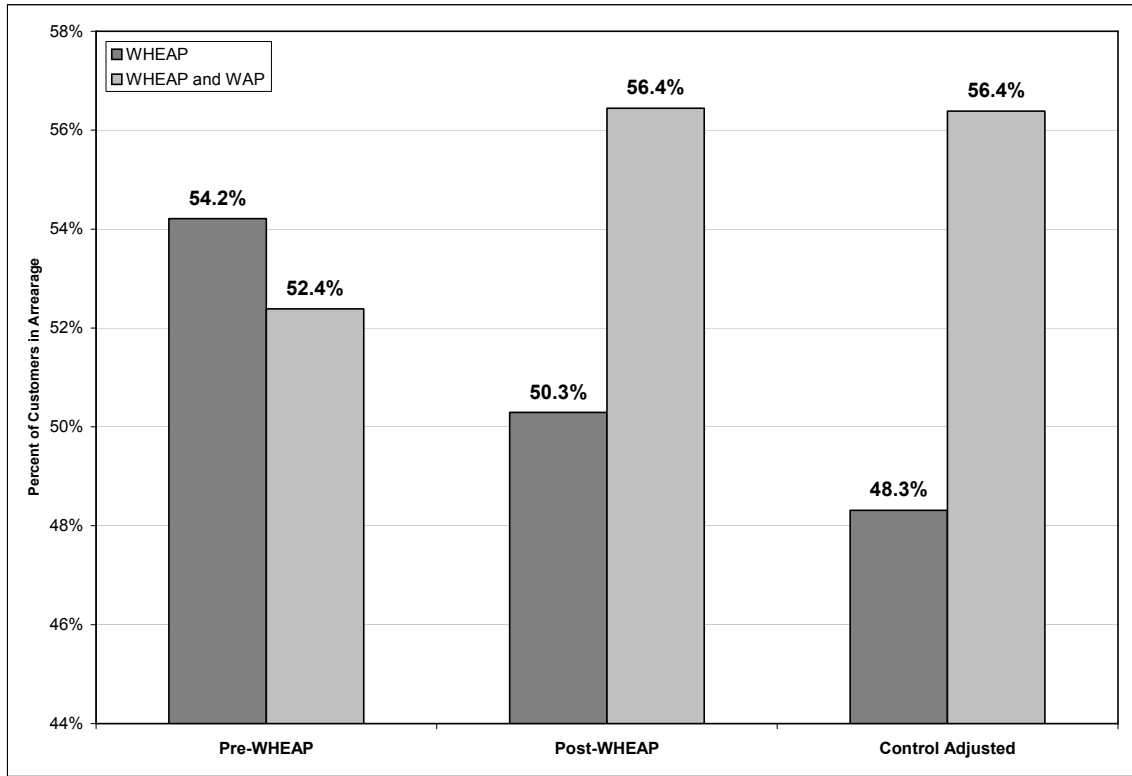
Percent of WHEAP customers with an arrearage. Not all of the low-income customers that received energy assistance payments are in arrears, but overall, energy assistance payments reduced the number of WHEAP participants in arrears in a typical month. Figure 3 shows that the percent of participants in WHEAP with arrearages in their account for a typical month over the post-Energy Assistance (EA) payment period was reduced by about 4% (54.2% to 50.3%) across the examination period. This means that of the 7,110 participants in our sample, about 280 participants who had an arrearage before the EA payment were able to avoid an arrearage condition for at least the six-month post-EA payment period.

In contrast, WHEAP+WAP participants experienced just the opposite effect. About 4 percent of these participants who did not have an arrearage before their EA payment, had an arrearage following their payment. It should be noted that these are not the same individuals as the WHEAP-only participants, that is, the movements are independent of one another. This indicates that of the 856 customers who were weatherized, 34 of them acquired an arrearage that was not present during the pre-EA payment period. While these two movements are identical in percent, the WHEAP-only group is much larger than the weatherized (WHEAP+WAP) group, a total of 246 participants were able to eliminate their arrearage during the post EA assessment period.

WHEAP and WAP customers are just as likely to be in arrears, regardless of whether they receive an energy assistance payment. Note in Figure 3 that the percent of the low-income customers in the WHEAP-only control group is 48.3%. Of those customers who were in the WHEAP and WAP control group, 56.4% were in arrears, which is equal to the percent of WHEAP+WAP customers that received an EA payment in the previous six months. This

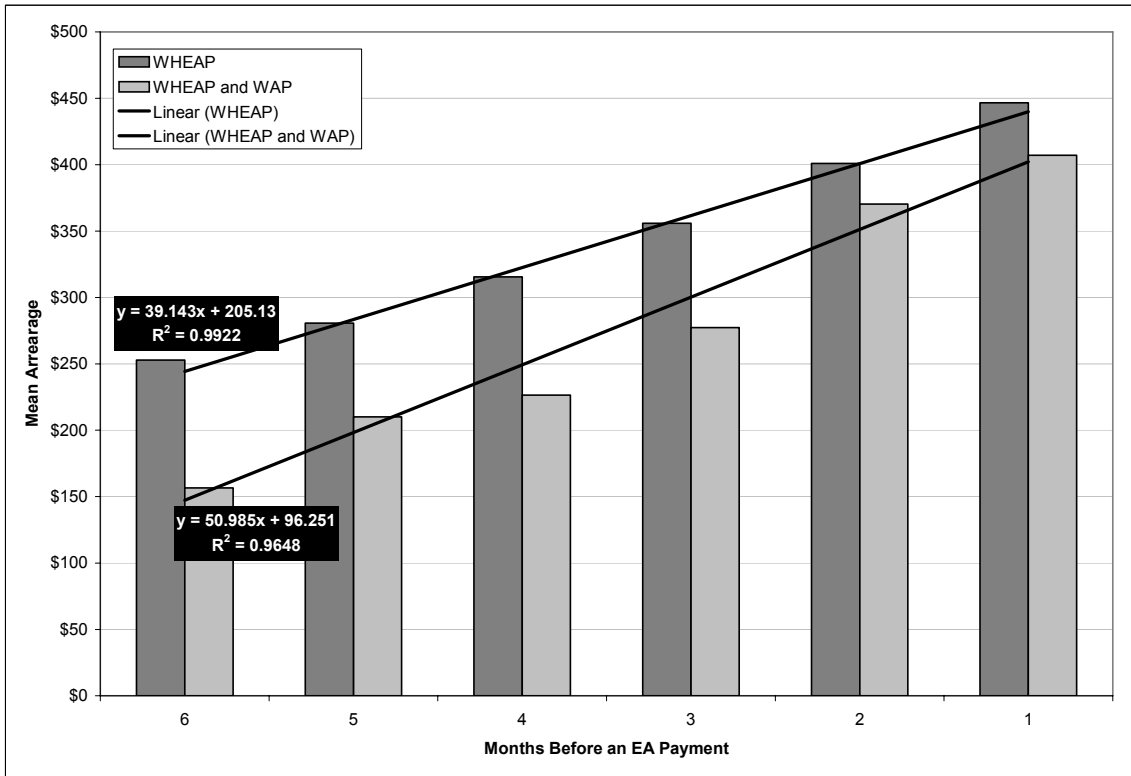
suggests that that WHEAP+WAP customers are just as likely to be in arrears as those who did not receive an energy assistance payment.

Figure 3. Mean Percent with Arrearage Before and After an EA Payment for All Customers



How weatherization and energy assistance payments effect arrearage levels. Arrearage levels steadily and consistently climbed over each month of the pre-EA payment period for both WHEAP-only and WHEAP+WAP participants. These increasing arrearages levels were significantly reduced as a result the EA payments, but then steadily and consistently climbed each month following the EA payment. By the end of the sixth month following an EA payment, WHEAP-only participants had accumulated 68 percent of their pre-EA payment arrearage level and WHEAP+WAP participants had acquired 60 percent of their pre-EA payment arrearage level. If this rate of increase holds, the post-EA payment arrearage levels will reach their pre-EA payment levels in about nine months following receipt of their payment. These trends are demonstrated in Figures 4 and 5.

Figure 4. Mean Arrearage Levels Before an Energy Assistance Payment



See Figure 6 for a graphic presentation of the difference between the pre-EA payment 6-month arrearage average and the post-EA payment average arrearage for the months of the study. The gray areas include all participants who carry an arrearage for that month, but exclude those that do not. This allows the presentation of the level of arrearage for those who have an arrearage. Again, an arrearage is the level of debt owned to the utility beyond the current period billing debt.

In Figure 6 we look at the seasonal effects and see that the annual arrearage “run-up” or peaks can be easily seen. These are the “peaks” with the steep slopes running down into the summer months. Together these two data points for each month of the study period allow the reader to see the average arrearage due for those low-income customers that have not received an EA payment and those that have received a payment in the last six months. Together, the points on Figure 6 display the effects of the EA payment on WHEAP-only participant arrearage levels for those that carry a past-due utility debt, in that there is a significant reduction in average arrearages. The post-EA payment arrearage plots represent the average arrearage for the month of those that have received an EA payment in the past six months. Because the EA payment is often a one-time payment, the participant has time to rebuild their arrearage level to some degree after the EA payment and this effect is influenced by the time of the year in which the examination periods occur. It is also important to note that customers are also making their own payments into these accounts over these pre- and post-periods and that these payments can often exceed the levels of payments made by the WHEAP program. It is also important to understand that each month represents a somewhat different set of participants over this 6-month average period, as people move into and out of having a debt with their utility, and people move in or out of the 6-month moving window of analysis. For some, the debt is eliminated with an EA

payment, for others the debt is reduced and this effect is influenced by the time of the year in which the EA payment is made. If the EA payment is made in the early winter months following a period of time in which the customer has paid down their debt, the EA payment can push the account into a credit condition by the time the EA payment is applied to the account. If the EA payment is paid during the time in which the customer has ramped up their debt due to high winter costs and the inability of the utility to disconnect these customers, the EA payment will typically erode, but not eliminate the debt. This effect is visible in Figure 6 as summer and fall months allow the participant to decrease their arrearage to a level in which, on average, the arrearaged accounts move slightly into a positive credit balance for the average participant who had an arrearage. This graphic displays the ramping down of the level of debt following an EA payment during the previous low-debt buildup months, to establish a mean credit for this group in the months of December or January.

Figure 5. Mean Arrearage Levels After an Energy Assistance Payment

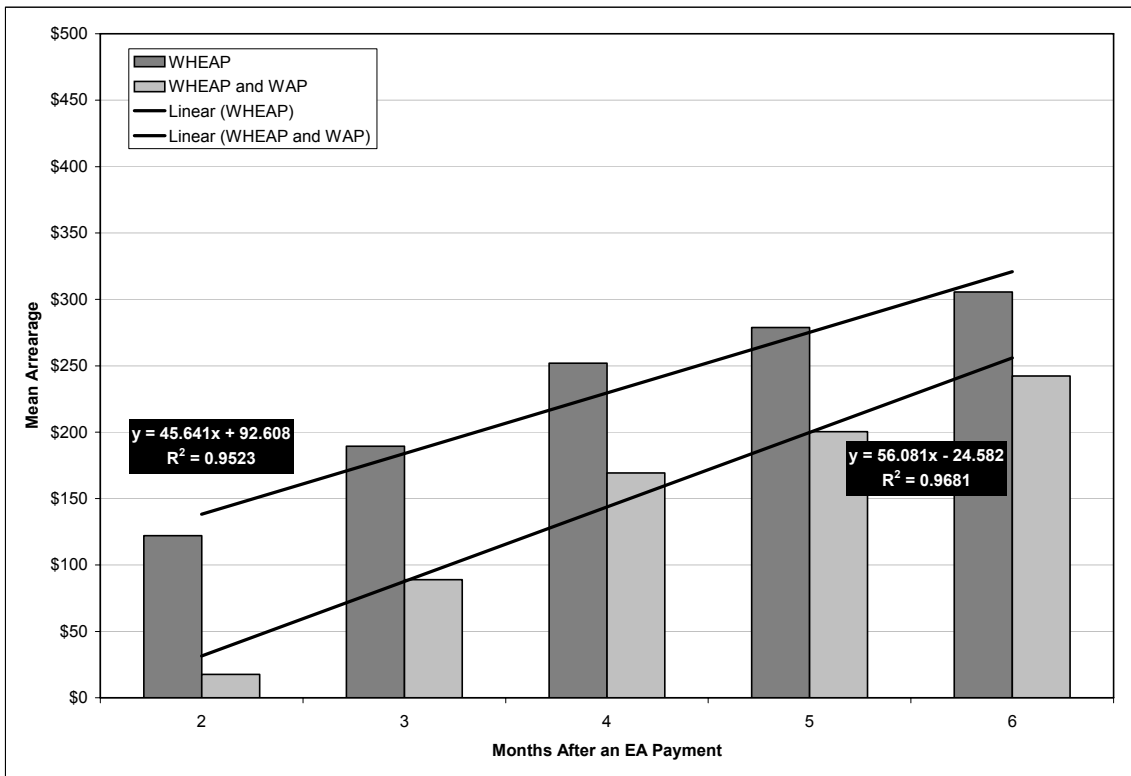
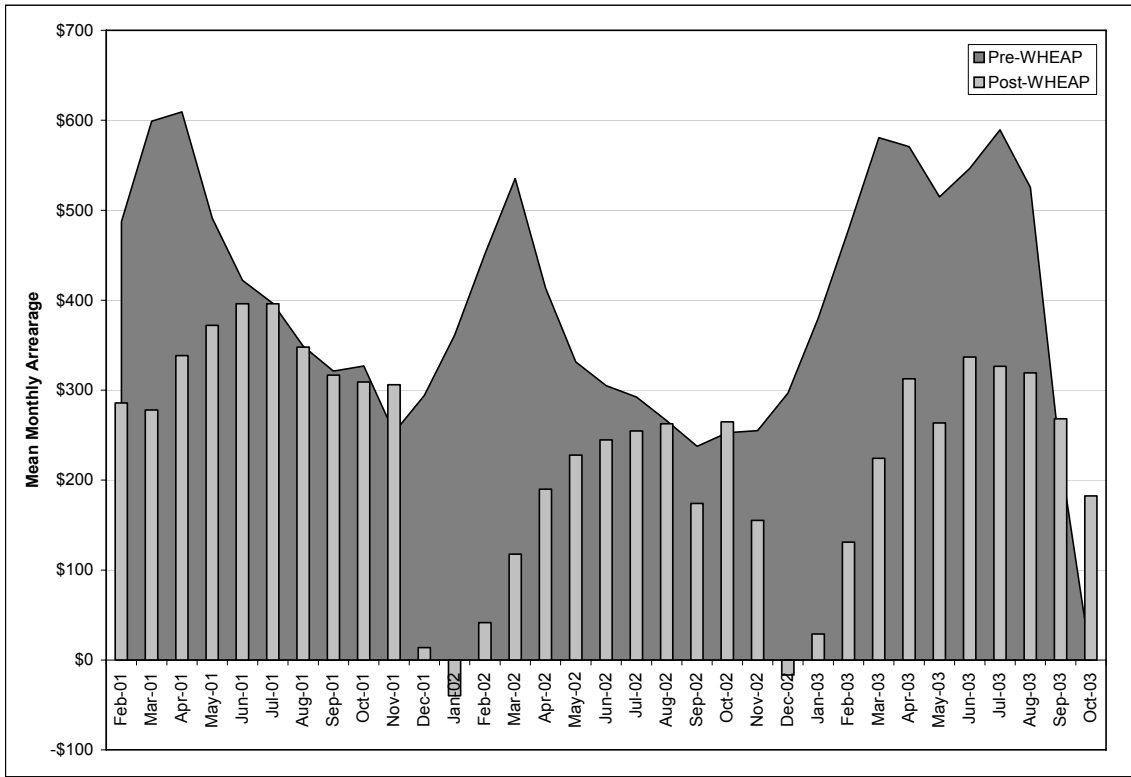


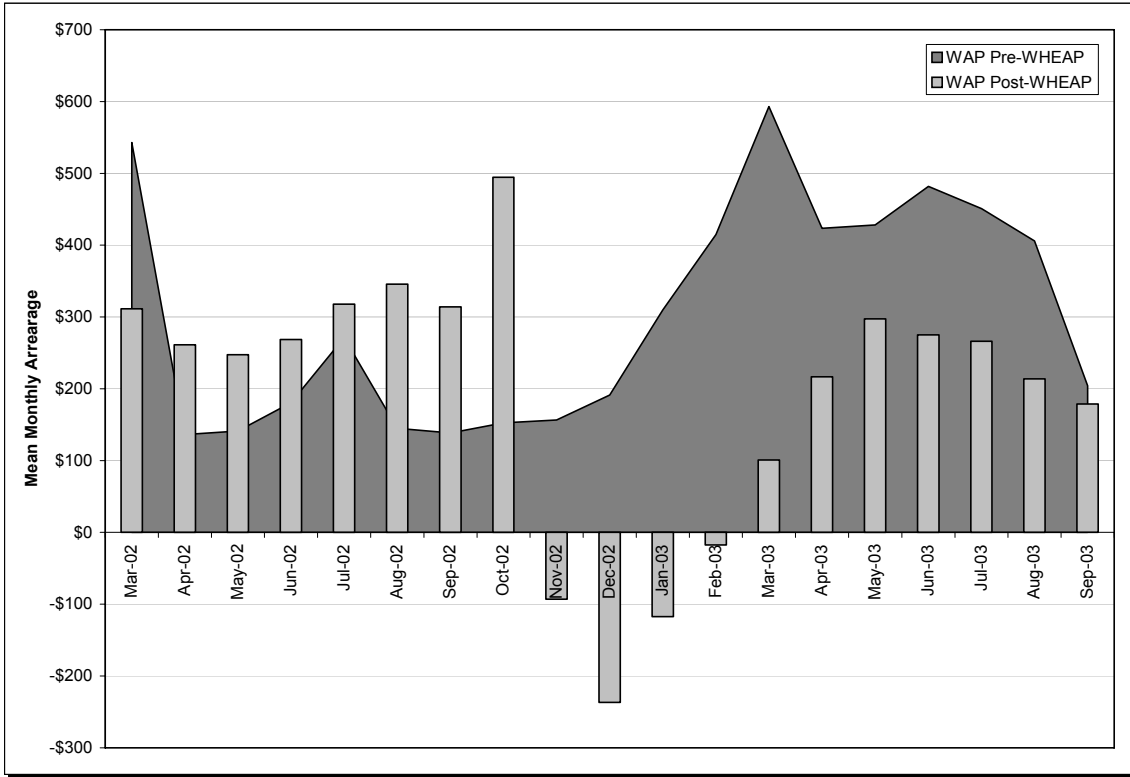
Figure 6. Mean Arrearage of WHEAP Participants Over Time, Six Months Before and After an EA Payment



WHEAP payments had a positive influence on debt reduction for participants. The average (non-control group adjusted) level of debt reduction for a WHEAP participant was 38 percent, moving from an average arrearage of \$354 over the six months prior to receipt of an EA payment, to \$219 over the six months following receipt of the payment. Because the control group’s arrearage levels were increasing during this period of time, the net change in arrearage levels between the pre- and post-EA payment periods was a 41 percent reduction in the average arrearage levels owed (net = \$354 to \$209). The average EA payment to this group of customer was \$433.

WHEAP+WAP participants also experienced positive debt reduction, but it was more significant than the WHEAP-only participants. The average level of debt reduction for a WHEAP+WAP participant was 56 percent, moving from an average arrearage of \$281 over the six months prior to receipt of an EA payment, to \$124 over the six months following receipt of the payment. Because the control group’s arrearage levels were increasing during this period of time, the net change in arrearage levels between the pre- and post-EA payment periods is a 72 percent reduction in the average arrearage levels owed (net movement = \$281 to \$79). The average EA payment to this group of customer was \$420. Figure 7 below shows the fluctuation in debt for this group.

Figure 7. Mean Arrearage of WHEAP+WAP Participants Over Time, Six Months Before and After an EA Payment



WHEAP+WAP participants who carry an arrearage have significantly lower debt compared to non-weatherized WHEAP-only participants who carry an arrearage, suggesting that weatherization is a significant factor in helping maintain lower levels of utility debt for those customers who typically carry an arrearage. Non-weatherized participants who maintained an arrearage had an average debt of \$354 over the six months before they received their EA payment compared to the average debt of \$281 for the same period for the weatherized participants (21 percent or \$72 lower). For the entire population of WHEAP-only and WHEAP+WAP participants, across the three years of analysis (those with arrearage and those without for 2001-2003) the difference is significant, but to a lesser degree. The average pre-EA payment debt for non-weatherized participants is \$162 dollars versus \$143 for weatherized participants (12% lower). These data indicate that participation in weatherization programs helps maintain an average debt reduction of \$19 a month in Wisconsin, meaning the average weather payment assistance participant would owe \$19 dollars less every month to a utility if they participated in a weatherization program.

In order to strengthen the analysis we collapsed all arrearage data into their representative months to obtain an “aggregate” multi-year monthly difference between the pre-and post-EA payment debt. This allowed us to increase our single-year sample size for both analysis groups. The following two graphics present the weighted means of each month of the aggregated year. For example, January data is the weighted mean (by sample size) of January 2001, 2002, and 2003. This graphic (Figure 8) displays mean arrearages for each aggregated month for both the pre- and post-EA payment periods. Figure 8 presents the pre- and post-payment periods for WHEAP participants. Figure 9 provides the same data for the WHEAP+WAP participants. The

results of this aggregation allowed the average number of monthly sample points for the WHEAP-only participant groups to be 1,894 for the pre-EA payment participants and 2,204 for the post-payment participants. The average monthly sample for the weatherized group is 82 for the pre-EA payment group and 78 for the post-EA payment group. These sample points include all customers with arrearage levels.

Figure 8. Aggregated 3-Year Mean Arrearage of WHEAP-only Participants Six Months Before and After an EA Payment, by Month

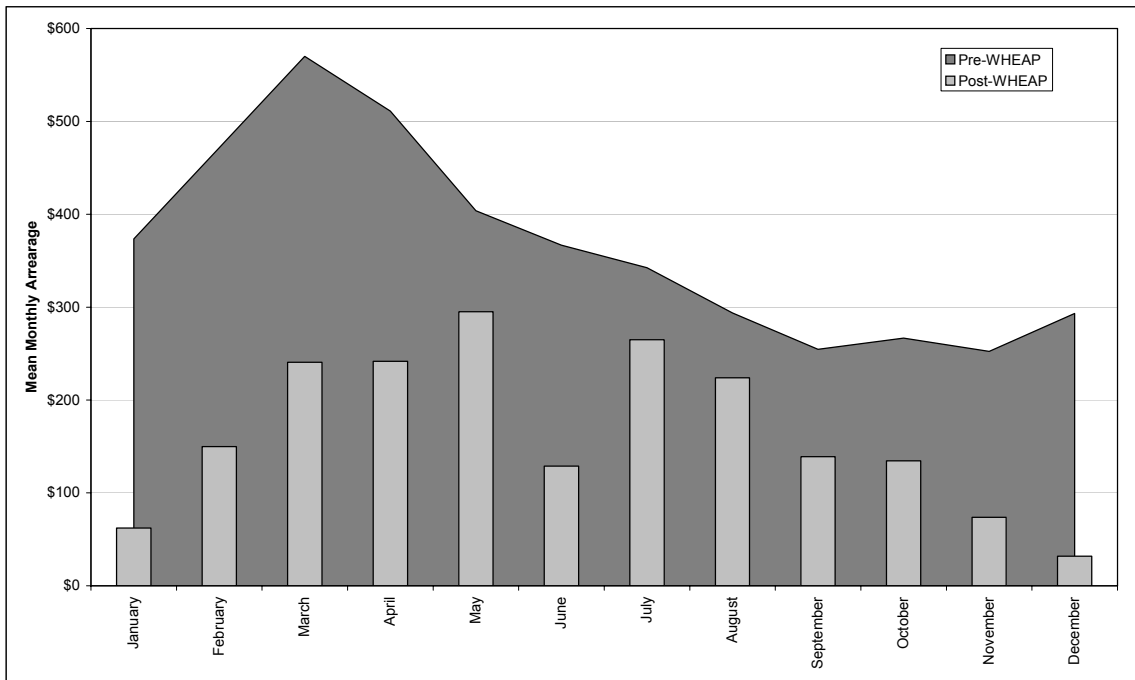
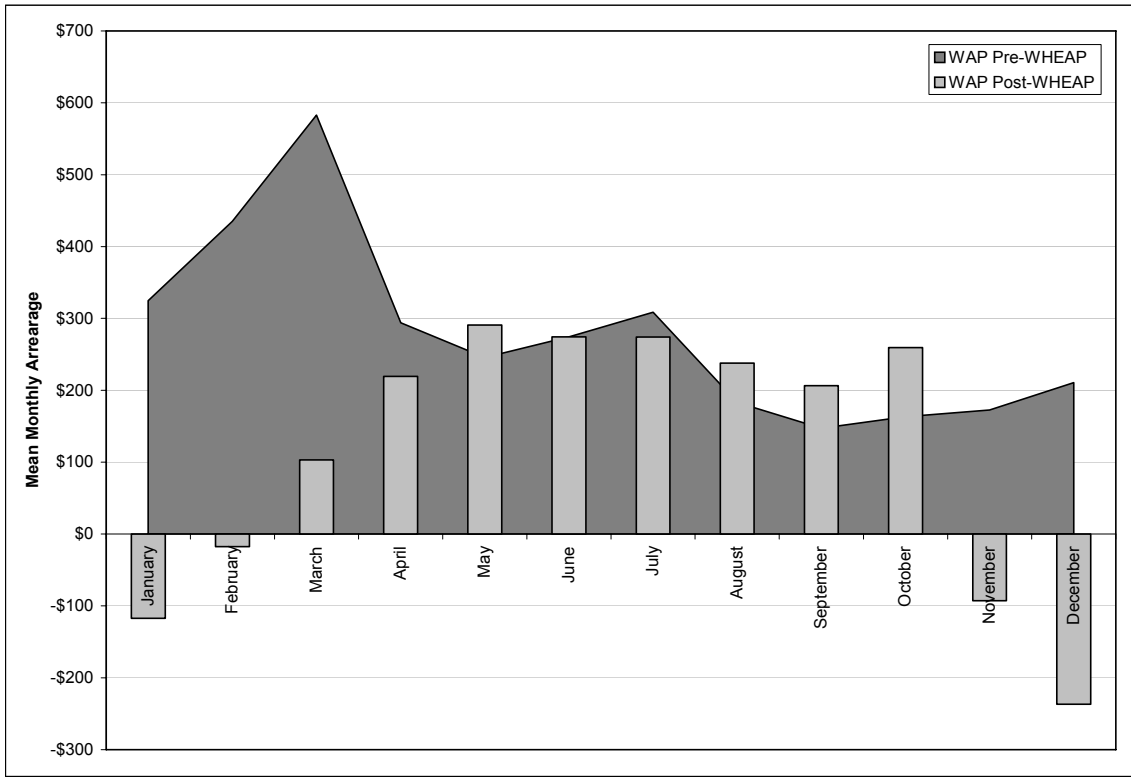


Figure 9 displays similar aggregated arrearage data for the WHEAP+WAP participants receiving EA payments. The aggregated data show similar results to the previous comparison except in Figure 9 the mid-summer effect is erased while the winter benefits are more pronounced. During the winter months, when WHEAP+WAP participants were able to keep their post-program arrearage levels reduced, the difference in arrearage levels is striking. Following the receipt of the EA payments, the WHEAP+WAP participants were able to keep their 6-month mean average significantly lower than before the EA payments, indicating that the WHEAP+WAP group are helped by the EA payment and this help greatly reduced the winter-induced arrears. However, the same data also indicates that this advantage is erased by the time the late spring, summer and early fall months approach. The arrearage levels then again fall to, on average, a positive balance after the EA payments are credited to their account. This graphic includes everyone in the database who had an arrearage and who received an EA credit on their account for each of the observed months included in the graphic. If the customer had an arrearage, but did not receive an EA payment for that month, their data is not included in these graphics. The effects seen in this and the previous graphics are the effects on participants receiving an EA payment.

Figure 9. Aggregated 2-Year Mean Arrearage of WHEAP+WAP Participants Six Months Before and After an EA Payment, by Month

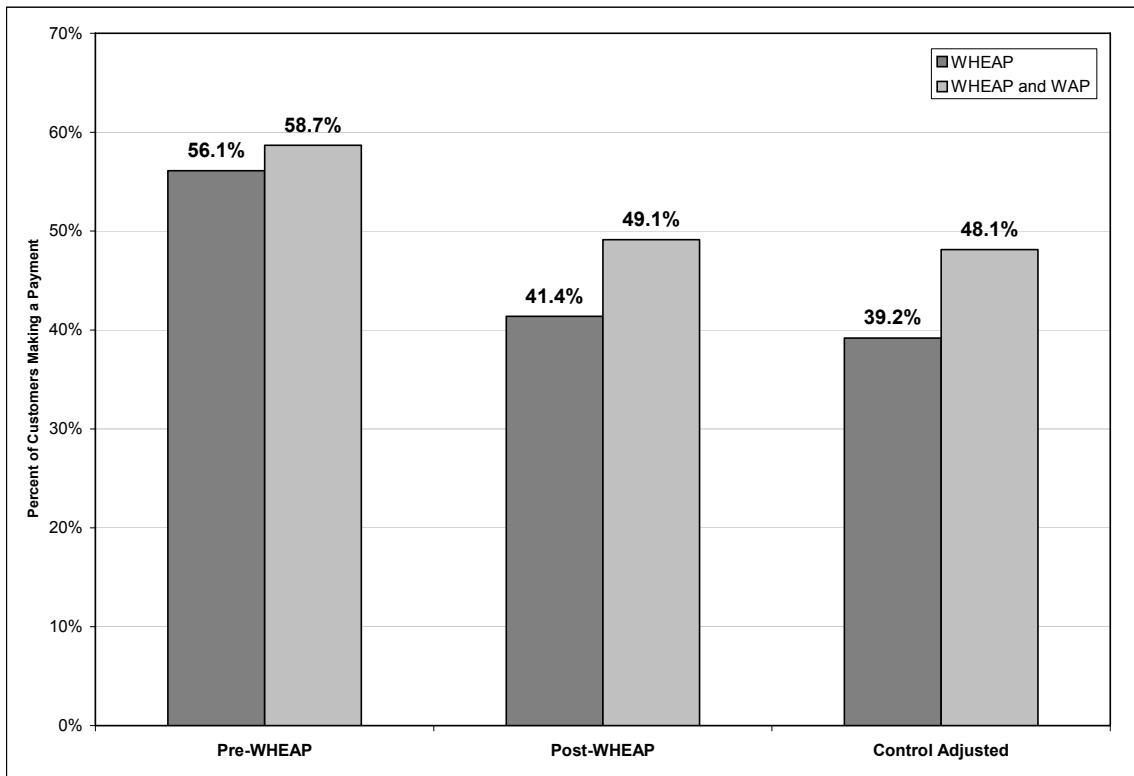


Percent of Bill Paid

The percentage of WHEAP-only and WHEAP+WAP customers making a payment (of any amount) in any month increased slightly as a result of the program.

The percent of the bill paid by people who carry an arrearage decreased after EA payments were made for both WHEAP-only and WHEAP+WAP participants. WHEAP-only participants moved from an average of paying 84 percent of their bill to 81 percent after receiving an EA payment. WHEAP+WAP participants paid 95 percent of their bill before the EA payment and 88 percent of their bill after the payments. Adjusting these changes to account for the control group did not change the percent of the bill paid by WHEAP-only participants, but lowered the percent of the bill paid by WHEAP+WAP participants from an average of 95 percent of the bill paid on average over the six months prior to the EA payment to 77.5 percent over the six months following the payment.

Figure 10. Mean Percent of the Participants Making a Payment



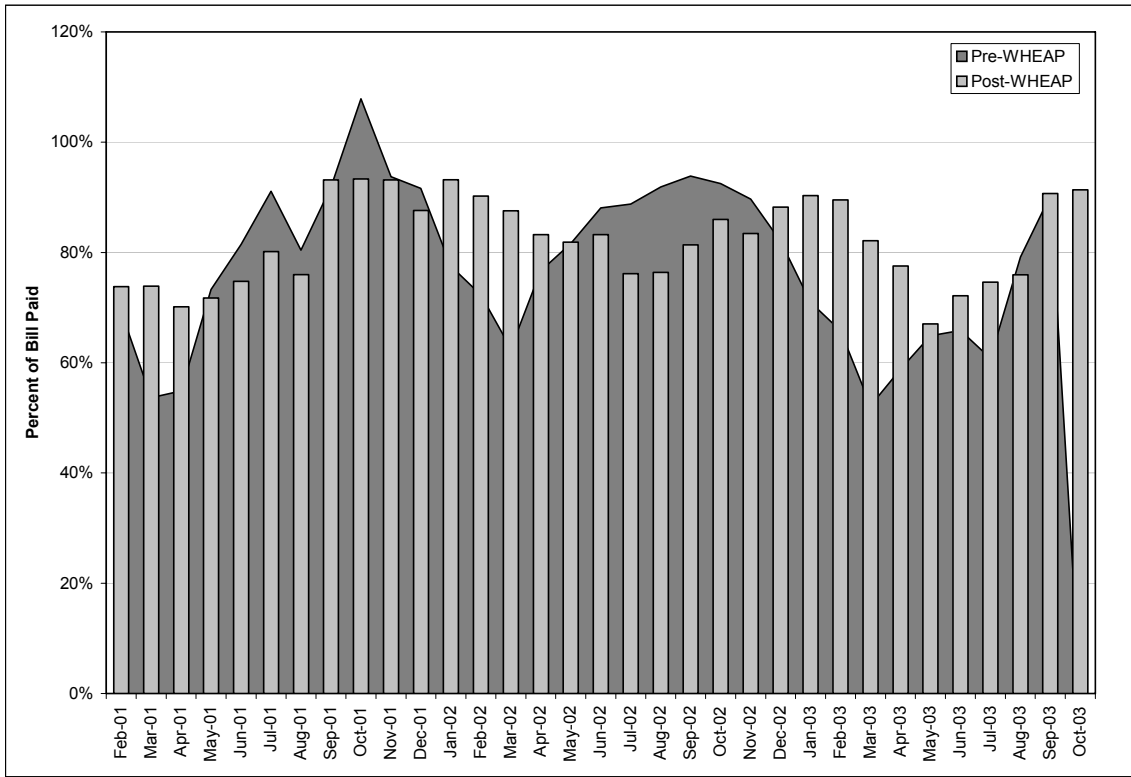
The average days to pay the utility bill for those with arrearages remained constant between the pre-EA payment and post-EA payment periods.

Other Findings

Here we present the findings from the assessment of the participant characteristics and demographics. The following demographic and sample characteristic findings apply to all participants in the sampled population regardless of whether their account was in arrears.

- The mean poverty level for WHEAP-only and WHEAP+WAP participants has decreased (they have become poorer) each year of the analysis period. Participants are poorer in 2003 than they were in 2001. Participants living in cities of over 50,000 are significantly poorer than participants in more rural areas of the state.
- Energy burdens for WHEAP-only and WHEAP+WAP participants have increased between 2001 and 2003 with rural participants having an average energy burden of about 17 percent of their total household income. Urban participants are worse off with energy burdens approaching 20 percent of their income.
- About 76 percent of WHEAP-only and WHEAP+WAP participants carry an arrearage, with urban and near urban populations (greater than 10,000) having the highest percent of customers with arrearages; about 80 percent of these customers have a continuing debt to the utility at some point in both 2002 and 2003.

Figure 11. Mean Percent of Bill Paid by WHEAP-only Participants Over Time, Before and After an EA Payment



Conclusions

This study was conducted during a period in which the economy was in a decline, creating increasing levels of arrearage among the low-income populations as a whole, yet arrearage levels declined for participants in the months just after an EA payment as a direct result of the EA payment, while the participant was able to hold a reduced arrearage level for a 9-month period following the EA payment.

The debt reduction provided by the EA payment allows participants to pay a lower percent of their newly acquired debt built-up in their current bills, which acts to slowly grow their arrearage levels to their pre-existing condition within 9 months. If their bill is less, they tend to pay less, leaving their limited incomes for other expenses. In addition, Wisconsin WHEAP participants are poor and are getting poorer, with mean poverty levels getting worse each year of the analysis, but especially for urban participants. Over this same period of time the energy burden for participants is increasing, meaning participants are paying more for their energy as a percent of their total household income (we expect that the rapidly increasing energy costs of 2005-2006 are compounding this condition). As a result, almost 80 percent of these participants carry an arrearage on their accounts during the typical year. The EA payments are helping these customers deal with rising energy costs and deteriorating ability to pay and these payments are having an impact on their level of utility debt that helps them maintain less debt than they would otherwise carry.