Seeing There without Being There: Results of Using the Internet to Assess Appliance Availability in Retail Stores

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ABSTRACT

Assessing the availability of energy-efficient appliances in retail stores is an important component of the evaluation of appliance programs. However, conducting stocking inventories at a large number of retail stores can present a time-consuming and expensive proposition. This paper discusses the results of an approach to assessing retail availability that uses the Internet as a cost-effective alternative for collecting data on a large number of models at stores located in different regions. This analysis should serve as an indicator of the model availability encountered by consumers who visit selected retail stores.

This study assessed the availability of ENERGY STAR and Consortium for Energy Efficiency (CEE) Tier 1, 2, and 3 clothes washers, dishwashers, refrigerators, and room air conditioners during the spring of 2006 at Best Buy and Sears stores located in and near Cambridge, Massachusetts, compared with the availability in and near Sacramento, California, Tampa, Florida, and Rochester, New York. Greater availability of CEE Tier 2 and Tier 3 models in Massachusetts than in other locations would be consistent with the stores' expectations of higher sales of those models. This was in fact the case with clothes washers, suggesting that the Massachusetts ENERGY STAR Appliance program, which began providing $100 incentives in 2006 to customers who purchase Tier 3 models, has been successful in encouraging stores to stock the most energy-efficient clothes washer models. However, the stocking levels of high-efficiency dishwashers, refrigerators, and room air conditioners is similar at the Massachusetts stores compared to the stores located elsewhere.

This type of Internet analysis should provide valuable insight in understanding appliance markets and planning programs.

Introduction

Assessing the availability of energy-efficient appliances in retail stores is an important component of the evaluation of appliance programs. In order to develop programs (in particular establishing incentive levels) that effectively influence the sales of energy efficient appliances, sponsors need to know the retail availability[1] of models that meet various energy-efficient levels.

However, conducting stocking inventories at a large number of retail stores can present a time-consuming and expensive proposition. While the actual time required to collect data for each store location may be similar for both stocking inventories and over the Internet, the Internet approach allows for immediate data entry into an electronic format, which reduces the overall labor costs. In addition, the time and cost of traveling to visit each store location can be substantial, especially for stores located in different regions. Both of these differences suggest that the cost savings of using the Internet to collect model availability data can be substantial.

This paper discusses an approach to assessing retail availability that uses the Internet as a cost-effective alternative for collecting data on a large number of models at stores located in different

[1] Retail prices are also a key component in establishing incentive levels, and can also be collected over the Internet.

regions. This analysis should serve as an indicator of the model availability encountered by consumers who visit retail stores selected for this research.

The objective of this research is to assess the retail availability of ENERGY STAR models at different CEE Tier levels. This study was performed in support of the evaluation of the Massachusetts ENERGY STAR appliance program, assessing the availability of qualifying clothes washers, dishwashers, refrigerators, and room air conditioners during the spring of 2006.

Several of the program sponsors began offering $100 incentives for Tier 3 clothes washer models in 2006. Thus, it was expected that Tier 3 models should be more available at stores in Massachusetts than at stores located in regions without incentives. In addition, the Massachusetts program offered $25 incentives for ENERGY STAR room air conditioners in 2005. While the Massachusetts program has not offered incentives for high efficiency refrigerators and dishwashers, prior research has found a "crossover effect" of clothes washer promotions on sales of other ENERGY STAR appliances (Feldman et al. 2005). Therefore, this research was designed to test whether the availability of Tier 3 clothes washers, and to a lesser extent ENERGY STAR room air conditioners, refrigerators, and dishwashers, was greater in stores located in Massachusetts than elsewhere.

In 2004, four national chains (Sears, Best Buy, Home Depot, and Lowe's) accounted for 66% of clothes washer sales in Massachusetts, 61% of room air conditioner sales, 69% of refrigerator sales, and 64% of dishwasher sales (Nexus Market Research et al. 2005). Sears and Best Buy were selected for this analysis because their websites allow consumers to easily verify the availability of a given model at multiple stores located in or near a zip code entered into their website. Home Depot and Lowe's require the customer to also enter in their name, address, and/or credit card information before displaying information on local availability.[2]

The first step in this research involved recording model information from the Internet web sites of Sears and Best Buy stores for zip codes from four cities located in different regions of the country. Cambridge was selected to represent the state of Massachusetts.[3] Three comparison areas[4] were then selected to represent different degrees of regional appliance program support:

- Sacramento, California, where incentives are available for three out of four appliance types (clothes washers, dishwashers, and room air conditioners).
- Rochester, New York, which has had more limited support than Massachusetts, except for room air conditioners, for which support was greater for a few years.
- Tampa, Florida, which has no local program support and which is located relatively far from distribution centers which might also supply areas with active support.

Entering each zip code produces availability information for three Sears stores and six Best Buy stores located in or near the zip code. The data for clothes washers and dishwashers were gathered during early March of 2006, the data for refrigerators were collected in mid to late March of 2006, and the data for room air conditioners were collected in mid-May of 2006. In addition to collecting the data shown in Table 1, the model number for each model designated as ENERGY STAR qualified was

[2] Since our data collection effort in the spring of 2006, Lowe's added the capability for customers to determine the local availability of specific models on its website without entering this information.

[3] Entering the Cambridge zip code (02140) produces availability information for three Sears stores (Cambridge, Saugus, and Burlington) and six Best Buy stores (Cambridge, Watertown, Boston, Dedham, Saugus, and Braintree). These nine stores likely draw customers from throughout the Boston area and thus should be representative of the greater Boston region, which is the major population center in Massachusetts.

[4] We assume that each store serves a similar number of customers, thus each region should be comparable in terms of the size of the customer base. While the relative incomes of these customers may influence purchases (and thus model availability) in each area, we do not have a reasonable method to determine in which towns customers reside, rendering it impossible to compare incomes between regions.

documented and compared against the list of appliances qualifying for the Consortium for Energy Efficiency's (CEE) Tier specifications. Thus, a model could be categorized as meeting ENERGY STAR or CEE Tier 1, 2, or 3 specifications.

Because Best Buy stores typically carry a relatively small selection of appliances, the vast majority of models require special ordering, and thus were excluded from this analysis. Therefore most records on the Best Buy website were listed as "unavailable," while a relatively small number were "available." In contrast, the Sears website lists a much broader array of models as "available," typically categorized as "in stock pending email confirmation," "in store 3-5 days," "in store 4-6 days," etc., up to "in store 26-28 days." These differences in model availability among regions virtually disappear when the delivery period requested is extended to five days, and completely vanish when the delivery time is extended up to the maximum of 28 days. This probably reflects the responsiveness of the Sears distribution system, and indicates that most models of all efficiency levels are available—eventually—virtually anywhere in the country. Because the intent of this analysis was to examine regional differences in availability, only data on those models available immediately at Sears stores are provided.

Table 1. Data Collected on Appliance Models

Data	Appliance Type Covered
Store Name	All
Zip Code	All
Appliance Type	All
Date of data collection	All
ENERGY STAR	All
CEE Tier*	All
Manufacturer	All
Model Number	All
Model Name	All
Store Availability	All
Delivery Wait	All
Color	Dishwasher, Clothes washer, Refrigerator
Size	Refrigerator, Clothes washer, Room air conditioner
Style	Dishwasher, Clothes washer, Room air conditioner
Door Style	Refrigerator
Door Ice/water	Refrigerator
EER	Room air conditioner

* CEE Tier was not available on the websites, but was assessed after the fact by looking up model numbers on the CEE website.

This analysis of appliance availability is limited in both time and space; it provides information about model availability only at those store locations targeted in the study at the time when the data were gathered (spring of 2006). In addition, while the results should serve as an indicator of the models available to consumers who visit retail stores, there may be discrepancies between the information posted on a store website and models actually available in the store itself (due to delays in updating model availability on the website). However, the Internet appears to provide a reasonable method to assess model availability in selected retail store chains.

Findings

The following tables display the proportion and quantity of all available appliance models that (1) did not meet the ENERGY STAR specification, (2) met the ENERGY STAR level, (3) just met the ENERGY STAR level but did not meet any CEE Tier levels, (4) met CEE Tier 1,[5] (5) met CEE Tier 2, and (6) met CEE Tier 3[6] at the six Best Buy stores and three Sears stores located in or nearest to the selected zip codes in Cambridge, Massachusetts; Sacramento, California; Tampa, Florida; and Rochester, New York.

Clothes Washers

Ninety-one percent of available models at Best Buy stores in or near Cambridge met or exceeded the ENERGY STAR specification, while the proportion in the other three locations ranged from 57% to 65% (Table 2). In addition, Cambridge had the highest proportion of available models meeting the CEE Tier 3 specification (55%), compared to other locales (29% or less). Because the Sacramento and Tampa stores carried more models overall, the number of ENERGY STAR models was higher there than in Cambridge; however, the Cambridge Best Buy stores carried more CEE Tier 3 models than either Sacramento or Tampa (as well as Rochester), despite the smaller number of all models available.

Table 2. Availability of Clothes Washer Models at Best Buy Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	9%	35%	39%	43%
Met some ENERGY STAR level	91%	65%	61%	57%
Met minimum ENERGY STAR level	*36%*	*61%*	*52%*	*29%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 3	*55%*	*4%*	*10%*	*29%*
Number of all models available	11	23	31	7
Number of non-ENERGY STAR models	1	8	12	3
Number of models meeting some ENERGY STAR level	10	15	19	4
Number of models meeting minimum ENERGY STAR level	*4*	*14*	*16*	*2*
Number of models meeting CEE Tier 3	*6*	*1*	*3*	*2*

[5] Except for clothes washers
[6] Clothes washers only

As displayed in Table 3, Sears stores in or near Cambridge had the highest proportion of ENERGY STAR clothes washer models available immediately (62%, compared to 31%-50% elsewhere) as well as Tier 3 models (31% available immediately, compared to 0%-15% elsewhere). There were eight ENERGY STAR models available in Cambridge and Sacramento, compared to four in Tampa and two in Rochester, while there were seven CEE Tier 2 and Tier 3 models available in Cambridge compared to fewer than four such models in the other areas. Hence, for immediate delivery, there were more efficient models, especially CEE Tier 2 and Tier 3 models, available in Cambridge than elsewhere.

Table 3. Availability of Clothes Washer Models at Sears Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	38%	60%	69%	50%
Met some ENERGY STAR level	62%	40%	31%	50%
Met minimum ENERGY STAR level	*8%*	*20%*	*15%*	*25%*
Met CEE Tier 2	*23%*	*5%*	*0%*	*25%*
Met CEE Tier 3	*31%*	*15%*	*15%*	*0%*
Number of all models available	13	20	13	4
Number of non-ENERGY STAR models	5	12	9	2
Number of models meeting some ENERGY STAR level	8	8	4	2
Number of models meeting minimum ENERGY STAR level	*1*	*4*	*2*	*1*
Number of models meeting CEE Tier 2	*3*	*1*	*0*	*1*
Number of models meeting CEE Tier 3	*4*	*3*	*2*	*0*

Dishwashers

While only one dishwasher model was listed as "available" at the Cambridge Best Buy stores, this model did meet the CEE Tier 1 specification (Table 4). In comparison, the stores located in or near other cities stocked between 14 and 15 models, nearly all of which met the ENERGY STAR specification. Between 27% and 47% of these models met the Tier 1 specification, and one model available at the Tampa stores met Tier 2.

However, the sponsors of the Massachusetts ENERGY STAR program did not offer incentives for ENERGY STAR dishwashers. Also, at the time, 93% of dishwasher models qualified for the ENERGY STAR label, so the label was not a differentiating factor (DOE 2005). These results indicate that the availability of ENERGY STAR and CEE models at Best Buy stores near Cambridge, MA was similar to that found elsewhere in the U.S., although these stores stocked fewer models at the time this analysis was performed.

Table 4. Availability of Dishwasher Models at Best Buy Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	0%	0%	13%	0%
Met some ENERGY STAR level	100%	100%	87%	100%
Met minimum ENERGY STAR level	*0%*	*73%*	*33%*	*64%*
Met CEE Tier 1	*100%*	*27%*	*47%*	*36%*
Met CEE Tier 2	*0%*	*0%*	*7%*	*0%*
Number of all models available	1	15	15	14
Number of non-ENERGY STAR models	0	0	2	0
Number of models meeting some ENERGY STAR level	1	15	13	14
Number of models meeting minimum ENERGY STAR level	*0*	*11*	*5*	*9*
Number of models meeting CEE Tier 1	*1*	*4*	*7*	*5*
Number of models meeting CEE Tier 2	*0*	*0*	*1*	*0*

Between one and five dishwasher models were available immediately at Sears stores located in and near the selected cities, with all models just meeting ENERGY STAR specifications (Table 5). Overall, availability of ENERGY STAR and CEE Tier dishwasher models was identical at each of the Sears stores located in the various regions.

Table 5. Availability of Dishwasher Models at Sears Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	0%	0%	0%	0%
Met some ENERGY STAR level	100%	100%	100%	100%
Met minimum ENERGY STAR level	*100%*	*100%*	*100%*	*100%*
Met CEE Tier 1	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Number of all models available	3	2	1	5
Number of non-ENERGY STAR models	0	0	0	0
Number of models meeting some ENERGY STAR level	3	2	1	5
Number of models meeting minimum ENERGY STAR level	*3*	*2*	*1*	*5*
Number of models meeting CEE Tier 1	*0*	*0*	*0*	*0*
Number of models meeting CEE Tier 2	*0*	*0*	*0*	*0*

Refrigerators

The six Best Buy stores located near Cambridge offered fewer refrigerator models than the Sacramento and Tampa stores, and also had a lower proportion of ENERGY STAR models (29%) than the other locations, which varied from 32% to 50% (Table 6). None of the Best Buy stores offered any models qualifying for the Tier 1 or Tier 2 specifications.

Table 6. Availability of Refrigerator Models at Best Buy Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	71%	60%	68%	50%
Met some ENERGY STAR level	29%	40%	32%	50%
Met minimum ENERGY STAR level	*29%*	*40%*	*32%*	*50%*
Met CEE Tier 1	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Number of all models available	7	10	19	6
Number of non-ENERGY STAR models	5	6	13	3
Number of models meeting some ENERGY STAR level	2	4	6	3
Number of models meeting minimum ENERGY STAR level	*2*	*4*	*6*	*3*
Number of models meeting CEE Tier 1	*0*	*0*	*0*	*0*
Number of models meeting CEE Tier 2	*0*	*0*	*0*	*0*

The three Cambridge stores had a total of four refrigerator models in stock, compared to two or fewer at other Sears locations (Table 7). In addition, three of the four Cambridge models were ENERGY STAR qualified compared to one of two models in Sacramento and none elsewhere. None of the models in stock at any of the Sears stores qualified for the Tier 1 or Tier 2 specifications.

Table 7. Availability of Refrigerator Models at Sears Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	25%	50%	100%	0%
Met some ENERGY STAR level	75%	50%	0%	0%
Met minimum ENERGY STAR level	*75%*	*50%*	*0%*	*0%*
Met CEE Tier 1	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Number of all models available	4	2	1	0
Number of non-ENERGY STAR models	1	1	1	0
Number of models meeting some ENERGY STAR level	3	1	0	0
Number of models meeting minimum ENERGY STAR level	*3*	*1*	*0*	*0*
Number of models meeting CEE Tier 1	*0*	*0*	*0*	*0*
Number of models meeting CEE Tier 2	*0*	*0*	*0*	*0*

Room Air Conditioners

The number of available room air conditioner models was exactly the same across the various Best Buy locations, with 20% of models qualifying for ENERGY STAR and none meeting any CEE Tier specifications (Table 8).

Table 8. Availability of Room Air Conditioner Models at Best Buy Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	80%	80%	80%	80%
Met some ENERGY STAR level	20%	20%	20%	20%
Met minimum ENERGY STAR level	*20%*	*20%*	*20%*	*20%*
Met CEE Tier 1	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Number of all models available	60	60	60	60
Number of non-ENERGY STAR models	48	48	48	48
Number of models meeting some ENERGY STAR level	12	12	12	12
Number of models meeting minimum ENERGY STAR level	*12*	*12*	*12*	*12*
Number of models meeting CEE Tier 1	*0*	*0*	*0*	*0*
Number of models meeting CEE Tier 2	*0*	*0*	*0*	*0*

The three Cambridge stores had a total of 42 room air conditioner models in stock, compared to 33 or fewer at other Sears locations (Table 9). Fifty percent of the models at the Cambridge stores were ENERGY STAR qualified, a percentage that was similar to the 45%-61% figure for other Sears locations. Similar to what was found at Best Buy, none of the models in stock at any of the Sears stores met the Tier 1 or Tier 2 specifications.

Table 9. Availability of Room Air Conditioner Models at Sears Stores

Available Models	Cambridge, MA	Sacramento, CA	Tampa, FL	Rochester, NY
Did not meet any ENERGY STAR level	50%	55%	41%	39%
Met some ENERGY STAR level	50%	45%	59%	61%
Met minimum ENERGY STAR level	*50%*	*45%*	*59%*	*61%*
Met CEE Tier 1	*0%*	*0%*	*0%*	*0%*
Met CEE Tier 2	*0%*	*0%*	*0%*	*0%*
Number of all models available	42	33	17	33
Number of non-ENERGY STAR models	21	18	7	13
Number of models meeting some ENERGY STAR level	21	15	10	20
Number of models meeting minimum ENERGY STAR level	*21*	*15*	*10*	*20*
Number of models meeting CEE Tier 1	*0*	*0*	*0*	*0*
Number of models meeting CEE Tier 2	*0*	*0*	*0*	*0*

Summary

The results of this analysis provide information regarding the availability of appliance models qualifying for ENERGY STAR and various CEE tiers at Sears and Best Buy stores located in and near Cambridge, Sacramento, Tampa, and Rochester in the spring of 2006.

Clothes washers. Several of the sponsors of the Massachusetts ENERGY STAR Appliance program began offering $100 incentives for Tier 3 models in 2006. In addition, Sacramento Municipal Utility District (SMUD) provided $75 rebates for Tier 2 and Tier 3a models, and $125 rebates for Tier 3b models; the New York State Energy Research and Development Authority (NYSERDA), whose territory includes Rochester, started an incentive program for retailers to stock efficient clothes washers in 2006, although it may have been too early for the program to have affected stocking patterns. The Internet analysis found greater availability of Tier 3 models in stock at Best Buy and Sears stores in and near Cambridge compared with those in and near Sacramento, Tampa, and Rochester, which would be consistent with the stores' expectations of higher sales of those models in Cambridge than in the other locations. These results suggest that the Massachusetts program has been successful in encouraging stores to stock energy-efficient clothes washer models.

Dishwashers. Sacramento was the only region which had rebates available for dishwashers — SMUD offered rebates of $30 for models meeting CEE Tier 1 specifications and $50 for those meeting CEE Tier 2. However, the results indicate that the availability of ENERGY STAR and CEE dishwasher models at Best Buy stores was similar in all locations, although the Cambridge stores stocked fewer models. In addition, availability of ENERGY STAR and CEE Tiered dishwasher models was virtually identical at the various Sears locations. These results suggest that there was no difference in the

availability of energy-efficient dishwashers in Massachusetts as compared to other regions. As mentioned earlier, though, nearly all dishwasher models available from manufacturers qualified for the ENERGY STAR label, so uniformity of availability in stores might be expected.

Refrigerators. There were no incentives offered for efficient refrigerators in any of the four regions. The analysis found that the six Best Buy stores located in and near Cambridge offered fewer models than the Sacramento and Tampa stores, and also had a lower proportion of ENERGY STAR models (29%) than other locations, which varied from 32% to 50%. However, the Sears stores in and near Cambridge stocked more ENERGY STAR refrigerator models than did those elsewhere. None of the Best Buy and Sears Stores carried any CEE Tiered qualifying models that were available immediately. These results suggest that, overall, stocking patterns for energy-efficient refrigerators in Massachusetts stores were similar to stocking patterns in other regions.

Room Air Conditioners. SMUD offered $50 rebates for ENERGY STAR room air conditioners; NYSERDA offered $75 bounties several years ago (which may still have lingering effects); and the Massachusetts sponsors offered $25 incentives in 2005. However, the number and proportion of available models was exactly the same across the various Best Buy locations, with 20% of models qualifying for ENERGY STAR. At the Sears stores located near Cambridge, 50% of in-stock models qualified for ENERGY STAR, which is similar to the availability found at other stores. In addition, none of the room air conditioner models available at any Best Buy or Sears stores met the CEE Tiered specifications. This consistency of availability is evident despite the fact that room air conditioners are generally more important in the northeastern U.S., as compared to other regions, due to the regional climate and lack of central air-conditioning installed in homes. Also, the seasonal nature of room air conditioner sales may diminish the impact of local incentives on stocking levels.

Overall. The Massachusetts sponsors provided incentives only for clothes washers, and—based on the results described—that seems to have been effective in stimulating the stocking of models with the highest levels of efficiency. However, no "crossover effect" of clothes washer promotions on sales of efficient models of other appliances is reflected in current stocking patterns.

The approach presented in this paper to assessing the retail availability of appliances through the Internet can serve as a cost-effective indicator of the model availability encountered by consumers who visit retail stores. Options for future research include conducting the analysis at several points in time in order to track changes in model availability. In addition, this approach may prove useful in assessing the effects of future revisions to federal standards or ENERGY STAR specifications on the availability of high-efficiency models.

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