Consumer Behaviors and Appliance-Specific Electricity Feedback

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Overview

Using appliance-specific feedback technology:

- We treat consumers’ installation behavior as revealed preferences for information and monitoring.
- We look at energy conservation behaviors at the appliance level.
The Technology: The Plugwise System

- Appliance-specific devices
- Devices communicate via a home area network
- Hourly resolution
- Devices can be controlled: **automation of appliances**
- Web and/or portable device interface
The Technology: The Plugwise System
Data

- Data from 521 European households (mostly Dutch)
- Collected over a two-year period
- Appliance-specific electricity consumption observed
- Location is observed for a subset of the sample
## Summary Statistics

<table>
<thead>
<tr>
<th>Sample Characteristics</th>
<th>Nb of Households</th>
<th>Nb of Households with Postal Code Information</th>
<th>Nb of Days of Observation per Household ($\bar{X}$, M, sd)</th>
<th>% of Households with &lt; 6 Months of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>521</td>
<td>247</td>
<td>308 268 177</td>
<td>28.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Devices &amp; Appliances Monitored</th>
<th>Nb of Monitoring Devices per Household ($\bar{X}$, M, sd)</th>
<th>% of Households with &lt; 5 devices</th>
<th>% of Households with ≥ 5 and &lt;10 devices</th>
<th>% of Households with ≥ 10 and &lt;15 devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.7 9 5.8</td>
<td>19.6</td>
<td>45.1</td>
<td>15.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nb of Appliances Monitored per Household ($\bar{X}$, M, sd)</th>
<th>10.2 9 6.4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Purchase Decision</th>
<th>Nb of Households that Purchased New Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
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</table>

<table>
<thead>
<tr>
<th>Experimentation</th>
<th>Nb of Households that Experimented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>104</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experimentation Score ($\bar{X}$, sd)</th>
<th>0.53 1.5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Experimentation Score if Purchase ($\bar{X}$, sd)</th>
<th>1.2 1.6</th>
</tr>
</thead>
</table>
Proportion of Household that Monitored the Appliance Type

- Computer Desktop 1
- TV 1
- Washing Machine 1
- Refrigerator 1
- Lamp 1
- Dishwasher 1
- Dryer 1
- Heater Central 1
- Computer Desktop 2
- Coffee Maker 1
- Freezer 1
- Lamp 2
- Oven Microwave 1
- Router 1
- Solar Panel 1
- Printer 1
- TV 2
- Water Heater 1
- Home Theater 1
- Computer Desktop 3
- Lamp 3
- Lighting 1
- Water Cooker 1
After 3 Months
Take Aways

• Evidences that curiosity, automation and convenience drive installation behaviors
• Significant reductions were achieved where automation may have played a role
• Overall reductions within the range of 1.5 to 2 kwh/day after 3 months