Bunching Evidence of Cognitive Bias Caused by Eco-Labeling – The Case of Japan's Top Runner Program

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- We extend Bunching analysis (Saez[2010], Ito and Sallee[2018]) by searching cause from the bunching effects
- Bunching occurs if and only if any discrete causal factors that change the attribute discretely.
- Discrete standard is decided within the regulation.
- We apply this conjecture to Top Runner Program where bunching occurs and found that color of Eco-label changes at the bunching point discretely that cause the bunching.

1. Top Runner Program in Japan(1)

In order to improve energy efficiency of various durable goods such as TV, car air-conditioner, refrigerator, METI(Ministry of Economy and Trade and Industry Japan) introduced the Top Runner Program for manufacturers.

1. In the Top Runner Program, METI tries to force the manufacturers to produce and sell more efficient durable goods.

2. This Top Runner Program uses, as a base value, the value of the product with the highest energy consumption efficiency of the product at the previous period(or base period). That is, efficiency of the product such as air-conditioner, refrigerator, automobile on the market at the time when the standard was established.

3. For achievement evaluation, manufacturers can exceed target values by weighted average values using shipment volume. That is, not all the durable goods the manufacturer produces must exceed the standard.
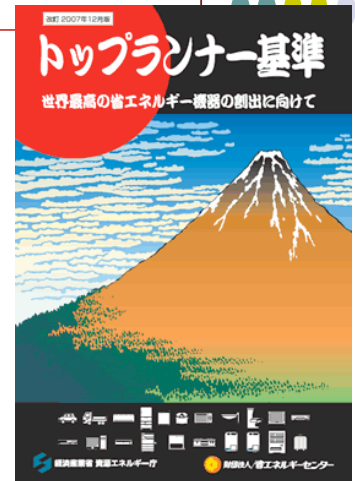
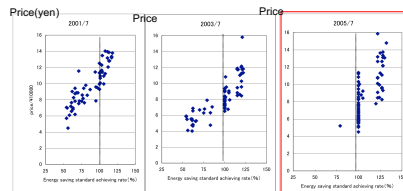## 2. Results of the program(1)

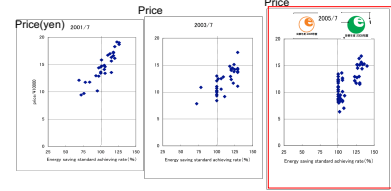**small air-conditioner(less than2.2KW)**
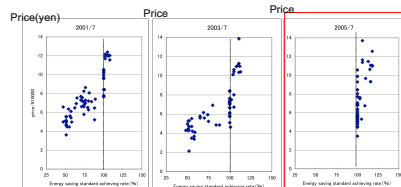
At the target year(2005), all the models exceed the standard,

(2) medium air-conditioner(2.8KW)

At the target year(2005), all the models except one exceed the standard.

(3) large air-conditioner(4.0KW)

At the target year(2005), all the models exceed the standard.

3.Proposal of inverse of bunching analysis.

- Why all the model (except one) exceed the Top Runner Standard? Although target values need to exceed only by weighted average values.
  It is natural to consider that bunching occurs if and only if any factors that change the attribute discretely, because discrete standard is decided soley based on the regulation.
- We infer the factor causing bunching, by inverse inference of bunching analysis (Saez[2010], Ito and Sallee[2018])

4. Factor of Bunching (1)Eco-labeling

There is only two factor that change discretely.
One is energy label used in the program discriminate attainable and not, by the symbols.

- And the difference of color of eco-label make consumers cognitive bias and requires the manufacturer produce all the goods that exceed the top runner standard.
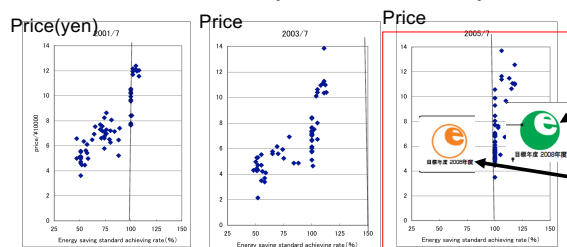
small air-conditioner(less than2.2KW)

Figure 11. Example of Energy Saving Label

Energy-saving symbol — Green symbol is given to products meeting Energy Conservation Standard. Orange symbol is for products failing to meet the standard.

Energy Saving Standard achievement rate — Percentage shows how much a given product achieves Energy Conservation Standard (target standard value). Target standard values are provided for in Energy Conservation Law for each product category. Higher the percentage, the better energy-saving performance is. As for computers and magnetic disk units, products achieving the standard will have "A", "AA" or "AAA".

省エネ基準達成率　年間消費電力量
117% 246kWh/年
目標年度 2008年度

Target fiscal year — Targeted timing to achieve Energy Saving Standard. Target fiscal year is provided for in Energy Conservation Law for each product category.

Energy consumption efficiency — An index (e.g. annual energy consumption) shows how much energy a given product consumes, and which is obtained by using a measuring method provided for each product category.

省エネ基準達成率　年間消費電力量
90% 320kWh/年

For a product failing to meet the standard, orange symbol is given.

4. The other candidate of factors :Spillover effects.

When standard was decided, Ministry revealed rough spec of the model briefly and all the manufacturer is easier to achieve the standard. However, There is a cost to adjust existing model to new technology. Thus, it is not the only factor of bunching.

5. Concluding remark

We find cognitive bias based on eco-labeling that causes the bunching of energy standard by inverse of banching.