Is There a Price Premium for Energy Efficiency Labels? Evidence from the Introduction of a Label in Korea

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Introduction

- Energy labeling is a benchmark for the end-consumer to see how economical, environmentally friendly and/or energy saving the product is.
- The first to look at the effect of new adoption of energy label on televisions.
- Attempts to address endogeneity problem by using difference-in-difference method and fixed-effects estimation, which are novel approaches for the literature.

Literature

Study	Label, Product & Country	Method	Is there a price premium?
Blend and van Ravenswaay (1999)	eco-labeled apples in the US	survey	40% would buy with $.40 premium
Ward et al. (2011)	refrigerators with Energy Star in the US	online survey	WTP estimate ranges from $249.82 to $349.30
Bjorner et al. (2004)	toilet paper, paper towels, detergents with Nordic Swan in Denmark	data on actual purchases	WTP ranges from 13% to 18% of the price.
Srinivasan and Blomquist (2009)	eco-labeled paper towels in the US	hedonic regression	69.9% price premium
Fuerst and McAllister (2011)	Energy Star- and LEED- certified buildings in the US	hedonic regression	3 to 4% rent premium, 28% sales price premium
Wallander (2008)	washing machines with Energy Star in the US	hedonic regression based on regression discontinuity design	Price premium does not exist.

Estimation and Results

- **Basic Hedonic Regression**

$$lnprice_i = \alpha + \beta energylabel_i + \gamma ecolabel_i + \delta' Z_i + v_i + \varepsilon_i$$

Basic Hedonic Regression				
Energy Label	.529*** (.148)	169*** (.053)	.371** (.143)	.191*** (.048)
Eco-label	.006 (.109)	-.082** (.039)	.077 (.118)	-.063 (.052)
TV controls	No	Yes	No	Yes
Brand effects	No	No	Yes	Yes
Observations	129	129	129	129
R^2	.0648	.8984	.2693	.9020

Notes: Standard errors are robust and are in parenthesis. Significance at 0.10, 0.05, and 0.01 levels are indicated by *, **, and ***, respectively.

- Price premium seems to exist for products with the energy label.
- However, potential unobserved heterogeneity is a concern.

- **Difference-in-difference**

$$lnprice_{ij}$$
$$= \alpha_i + \beta_1 energylabel_i + \beta_2 time_j + \beta_3 energylabel_i * time_j + \delta' Z_i + v_i + \varepsilon_{ij}$$

- $energylabel_i$ captures permanent differences between the models with and without the label that is not captured in Z_i.
- $time_j$ controls for a time trend that may have influenced both labeled and unlabeled groups.
- β_3 is the coefficient of interest; it is the "treatment" effect of the Energy Efficiency Grade Label.

- **Fixed-effects**

$$\Delta lnprice_{it} = \Delta\alpha_i + \Delta\theta_t + \beta\Delta energylabel_{it} + \delta'\Delta Z_{it} + \Delta v_{it} + \Delta\varepsilon_{it}$$

- Δ denotes the change from June to August.
- Using repeated observations over two time periods, first-differencing the data will absorb the unobserved permanent model effects α_i and non-time-varying Z_{it} and v_{it}.

Variables	Difference-in-difference		Fixed-effects	
Energy Label*Time	-.008 (.013)	-.008 (.009)		
Energy Label	.167** (.054)	.219*** (.047)	-.008 (.009)	-.010 (.009)
Time	-.013* (.007)	-.013* (.007)		
TV controls	Yes	Yes	No	Yes
Brand effects	No	Yes	No	Yes
Observations	258	258	129	129
R^2	.9003	.9080	.0022	.2326

Notes: Standard errors are robust, clustered and are in parenthesis. Significance at 0.10, 0.05, and 0.01 levels are indicated by *, **, and ***, respectively.

- While basic hedonic regression suggests an apparent price premium on the energy label, that link disappears in difference-in-difference and fixed-effects estimation.
- It seems that certified models have higher prices in general, but the observed price difference arises because of permanent differences between the labeled and unlabeled groups.

Conclusion

- Using difference-in-difference and first-difference estimation to reduce omitted variable bias, the study finds that the observed price premium is caused by existing product differences instead of the energy efficiency label.
- Introducing more rigorous standard for the energy label may reduce information asymmetry problem and enhance credibility of the label.

References

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