# Charitable Giving, Tax Reform, and Political Trust

Hiroki Kato[1]    Tsuyoshi Goto[2]    Yong-Rok Kim[3]

[1]Osaka University

[2]Chiba University

[3]Kobe University

2021/01/26

Introduction

# Background of South Korea Tax Reform

To investigate the price effect, we use the 2014 tax reform in the South Korea.

▶ Before 2014, tax deduction was adopted to subsidize charitable donation behavior.

▶ After 2014, tax credit have been adopted.

The main difference is that tax credits reduce taxes directly, while tax deductions indirectly lower the tax burden by decreasing the taxpayer's marginal tax rate, which increases with gross income

Data

# National Survey of Tax and Benefit (NaSTaB)

▶ The Korea Institute of Taxation and Finance implements the financial panel survey to study the tax burden of households and the benefits that households receive from goverment.

▶ The subjects of this survey are general household and household members living in 15 cities and provinces nationwide.

▶ This survey is based on a face-to-face interview. If it is difficult for investigators to meet subjects, another family member answers on behalf of him.

▶ Survey items: Annual taxable income (last year), charitable donations (last year), trust for politicians (5-Likert scale), and other covariates (age, education, gender etc.).

▶ Survey period: 2008 ~ 2019
  ▶ We use survey data after 2013 to focus on tax policy change in 2014.
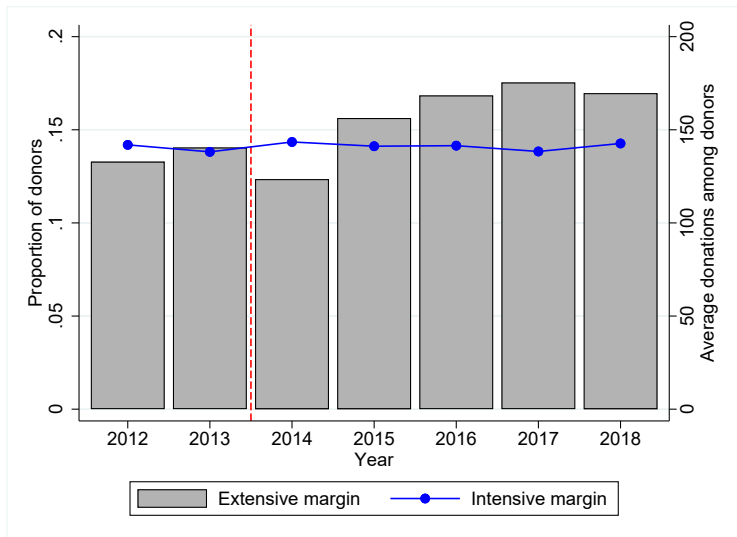
# Time Series of Chariable Giving



Figure 1: Proportion of Donors and Average Donations among Donors

# Summary Statistics of Covariates

Table 1: Summary Statistics of Covariates

|                       | 2012    | 2013    | 2014    | 2015    |
|-----------------------|---------|---------|---------|---------|
| Female                | 0.51    | 0.51    | 0.52    | 0.52    |
| Age                   | 38.39   | 39.10   | 39.67   | 40.51   |
| Annual taxable income | 1699.86 | 1764.04 | 1838.76 | 1872.54 |
| University graduate   | 0.28    | 0.28    | 0.29    | 0.30    |
| High school graduate  | 0.30    | 0.30    | 0.31    | 0.31    |
| #.Respondents         | 14138   | 13984   | 13787   | 13524   |
| #.Households          | 4756    | 4807    | 4819    | 4832    |

# Summary Statistics of Covariates (Cont'd)

Table 2: Summary Statistics of Covariates (Continued)

|                       | 2016    | 2017    | 2018    |
|-----------------------|---------|---------|---------|
| Female                | 0.52    | 0.52    | 0.52    |
| Age                   | 41.07   | 41.89   | 42.55   |
| Annual taxable income | 1906.91 | 1951.55 | 2039.47 |
| University graduate   | 0.31    | 0.33    | 0.34    |
| High school graduate  | 0.31    | 0.31    | 0.31    |
| #.Respondents         | 13238   | 12963   | 12795   |
| #.Households          | 4790    | 4770    | 4765    |

# What is Giving Price?

Consider allocation between private consumptions ($x_i$) and charitable giving ($g_i$). Let $y_i$ be pre-tax total income. Then, the budget constraint is

$$x_i + g_i = y_i - T_i(y_i, g_i),$$

where $T_i$ is tax amount depending on the pre-tax income and charitable giving.

# Determination of Tax Amount

Tax deduction reduces taxable income by giving, that is,

$$T_i = \tau(y_i - g_i) \cdot (y_i - g_i),$$

where $\tau(\cdot)$ is the marginal income tax rate which is determined by $y_i - g_i$.

Tax credit reduces tax amount directly, that is,

$$T_i = \tau(y_i) \cdot y_i - mg_i,$$

where $m \in [0, 1]$ is the tax credit rate.

## Derive Giving Price

Under the tax deduction system, the budget constraint is

$$x_i + [1 - \tau(y_i - g_i)]g_i = [1 - \tau(y_i - g_i)]y_i.$$

Thus, the giving price of tax deduction system is
$p_i^d = 1 - \tau(y_i - g_i).$

Under the tax credit system, the budget constraint is

$$x_i + (1 - m)g_i = [1 - \tau(y_i)]y_i.$$

Thus, the giving price of tax credit system is $p_i^c = 1 - m.$

# Construct Giving Price

In the South Korea, the tax policy about charitable giving drastically changed in 2014.

▶ tax deduction (before 2014): $\text{Price}_i = 1 - \tau(y_i - g_i)$
  ▶ the giving price is endogenous because people can manipulate $\tau(y_i - g_i)$ using the charitable giving $g_i$. Since this problem is caused by *last* donations, we use the giving price applying to the *first* donations (**first price**). The first price is calculate by $\tau(y_i)$ where $y_i$ is the annual taxable income reported in the NaSTaB.

▶ tax credit (after 2014): $\text{Price}_i = 1 - m$
  ▶ In the South Korea, the tax credit rate determines exogeneity, $m = 0.15$.
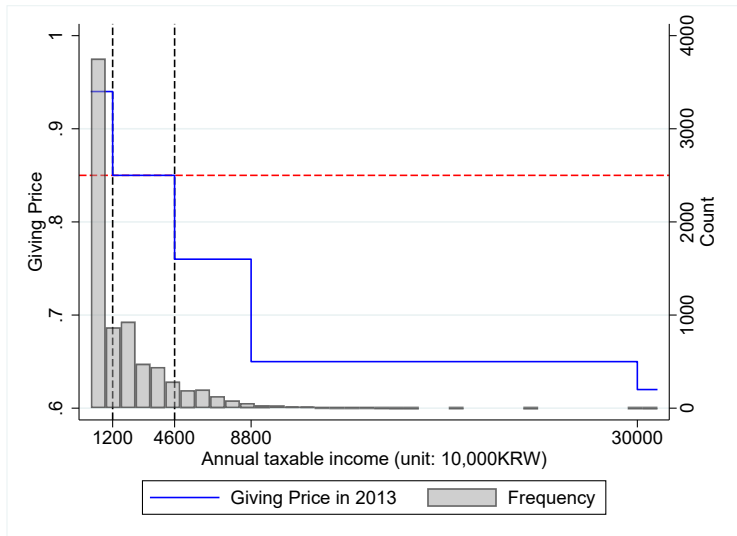
# Income Distribution and Giving Price



Figure 2: Income Distribution and Giving Price in 2013

Price Elasticity

# Baseline Regressions

Our baseline regression equation is

$$\log(\text{Giving}_{ijt}) = \alpha_i + \beta_1 \log(\text{Price}_{ijt}) + \delta X_{ijt} + \lambda_t + \epsilon_{ijt}.$$

- ▶ $\log(\text{Giving}_{ijt})$ is logarithm of individual $i$'s charitable giving in year $t$.
- ▶ $\log(\text{Price}_{ijt})$ is logarithm of individual $i$'s giving price in year $t$.
- ▶ $\beta_1$ represents the price elasticity of giving.
- ▶ $\alpha_i$ and $\lambda_t$ are individual and time fixed effect, respectively.

## Result of Baseline Regressions

We found the **price effect** of giving (1% price increase leads to about 1.1% giving decrease)

Table 3: Baseline Regressions

|                 | (1)         | (2)         | (3)         | (4)         | (5)         |
|-----------------|-------------|-------------|-------------|-------------|-------------|
| ln(giving price)| -1.071***   | -1.071***   | -1.229***   | -1.059***   | -1.062***   |
|                 | (0.201)     | (0.201)     | (0.227)     | (0.226)     | (0.226)     |
| Logged Income   | Y           | Y           | Y           | Y           | Y           |
| Age             | N           | Y           | Y           | Y           | Y           |
| Year X Educ     | N           | N           | Y           | Y           | Y           |
| Year X Gender   | N           | N           | N           | Y           | Y           |
| Resident Area   | N           | N           | N           | N           | Y           |
| N               | 54213       | 54213       | 54211       | 54211       | 54211       |

# Robustness Check

We addressed the following two potential concerns:

1. Income and donations are determined simultaneously
   - ▶ This causes both a change of giving price and a change of an amount of donations
   - ▶ Gruber and Saez (2002) provided that we should use $\log(\text{Price}_{ijt}/\text{Price}_{ij(t-k)})$ as an insturment.
   - ▶ Following Alumina et al. (2020), we estimated the model (5) in the previous slide, using the panel IV model for $k = 1, 2, 3, 4$.
2. The effect of presidential transition on donations
   - ▶ The presidential transition is one of our major ommited factor to affect both political trust and charitable giving.
   - ▶ To shed light on this concern, we used data in 2013 and 2014 (President was Park Geun-hye in both years), and estimated the model (5) in the previous slide, using the fixed effect model and the panel IV model for $k = 1, 2, 3, 4$.

# Result of Robustness Check 1

We obtained similar value of price elasticity to baseline results (1% price increase leads to about 1.1% giving decrease)

Table 4: Panel IV Regressions

|  | k = 1 | k = 2 | k = 3 | k = 4 |
|---|---|---|---|---|
| ln(giving price) | -1.279*** | -1.155*** | -1.150*** | -0.962*** |
|  | (0.478) | (0.414) | (0.369) | (0.340) |
| F-stat of IV | 10315.94 | 11506.64 | 11569.61 | 9651.75 |
| N | 51548 | 49217 | 46399 | 43301 |

# Result of Robustness Check 2

We obtained **stonger** price effect than baseline (1% price increase leads to about $1.2 \sim 1.6\%$ giving decrease)

Table 5: Results with data in 2013 and 2014

|  | FE | Panel IV with FE | | | |
|---|---|---|---|---|---|
|  |  | k = 1 | k = 2 | k = 3 | k = 4 |
| ln(giving price) | -1.466*** | -1.535*** | -1.683*** | -1.151*** | -1.259*** |
|  | (0.327) | (0.360) | (0.378) | (0.385) | (0.400) |
| F-stat of IV |  | 7420.10 | 4490.74 | 5034.58 | 4990.94 |
| N | 15134 | 13727 | 12902 | 12420 | 11676 |

Political Trust and Price Elasticity

# Estimation of Trust Index

The trust for politicans is time-varying variable because it depends on governments' policies. We make time-invarying trust index using the fixed effect model.

$$\text{Trust}_{ijt} = \text{Trustid}_{ij} + c_j \cdot \lambda_t + \lambda_t + \epsilon_{ijt}.$$

▶ $\text{Trust}_{ijt}$: trust for politicians (5-Likert scale)
▶ $\text{Trustid}_i$: individual fixed effect (**Trust index**)
▶ $c_j \cdot \lambda_t$ captures local governments' policies effect
▶ $\lambda_t$ captures the central government policies effect
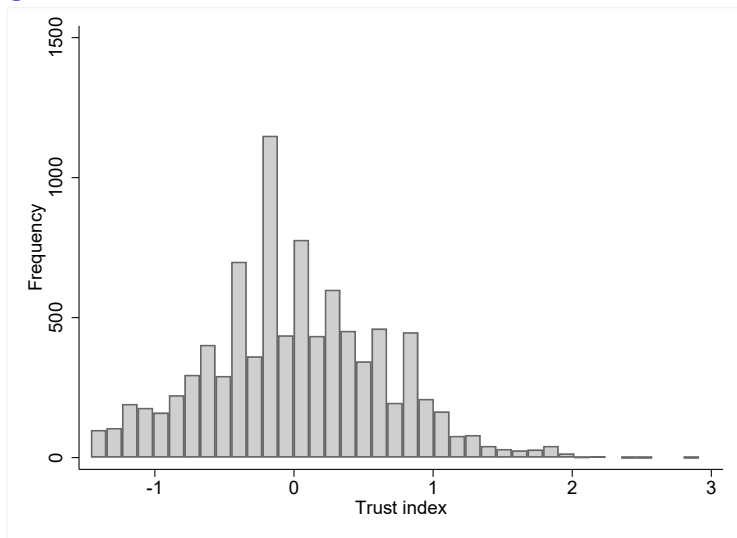
# Histrogram of Trust Index



Figure 3: Histogram of Trust Index

# Relationship with Donations and Covariates

▶ We made a scatter plot b/w individual average donations and trust index
  ▶ No linear relationship
▶ We tested difference in mean of individual average donations b/w among those whose trust index above and below threshold
  ▶ The difference in mean is statistically siginificant at 5% level if threshold is $\{0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4\}$.
▶ We regressed trust index on covariates, using data in 2018
  ▶ trust among females $<$ trust among males
  ▶ the positive correlation between income and trust index
  ▶ trust index is concave in age
  ▶ Those having extreme political views have a distrust of politicians rather than those having moderate political views.
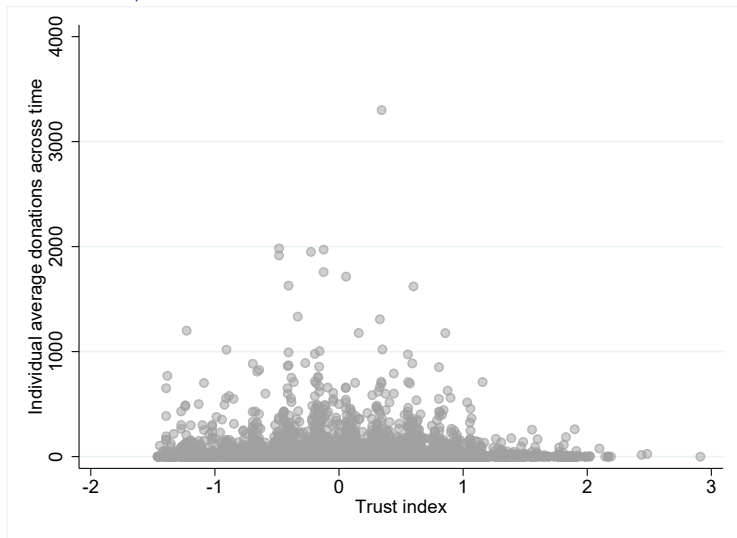
# Relationship b/w Donations and Trust Index



Figure 4: Scatter Plot between Donations and Trust Index
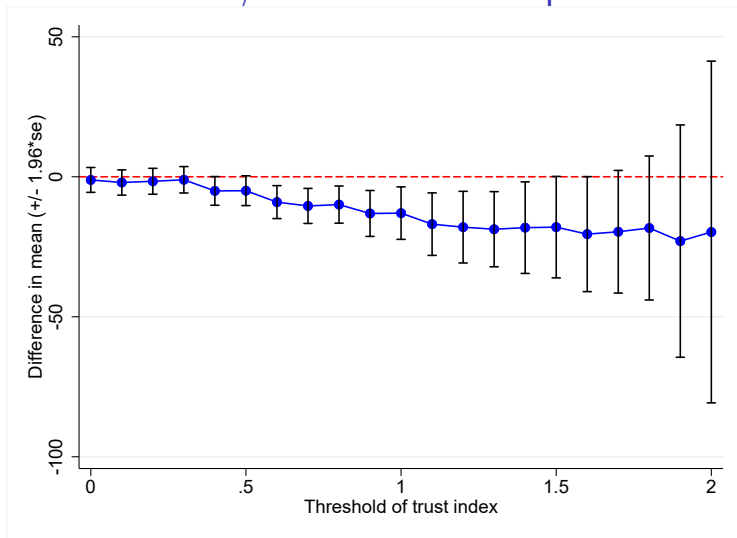
# Difference in Mean b/w Two Trust Groups



Figure 5: Difference in Mean between Trust Group above and below Threshold

# Regression of Trust Index on Covariates

Table 6: Regression of Standarized Trust Index (Year = 2018)

| Variables | Coefficients | S.E. |
|---|---|---|
| Female | 0.036** | (0.015) |
| Logarithm of income | 0.529* | (0.281) |
| Age | -0.014*** | (0.003) |
| Squared age/100 | 0.014*** | (0.002) |
| High school graduate | 0.018 | (0.023) |
| University graduate | 0.006 | (0.024) |
| Extreme right wing | -0.143*** | (0.054) |
| Right wing | -0.023 | (0.018) |
| Left wing | -0.050*** | (0.018) |
| Extreme left wing | -0.424*** | (0.029) |
| N | 7697 | |

# Subgroup Regressions

To see the heterogenous price elasticity by political trust, We estimated the baseline regression model (5) (see Table 3), using sample grouped by the trust index.

- ▶ Lowest: $0 \sim 20\%$ quantile of trust index
- ▶ Lower: $20 \sim 40\%$ quantile of trust index
- ▶ Neutral: $40 \sim 60\%$ quantile of trust index
- ▶ Higher: $60 \sim 80\%$ quantile of trust index
- ▶ Highest: $80 \sim 100\%$ quantile of trust index

Covariates are the logarithm of income, age, interactions b/w year and education, interactions b/w year and gender, and living are dummy into covariates.

# Results of Subgroup Regressions

We cound **NOT** find the price effect for respondents whose trust is very low.

Table 7: Subgroup Regressions

|                  | Lowest  | Lower   | Neutral    | Higher    | Highest   |
|------------------|---------|---------|------------|-----------|-----------|
| ln(giving price) | -0.673  | -0.452  | -1.707***  | -1.130**  | -1.397**  |
|                  | (0.557) | (0.462) | (0.479)    | (0.524)   | (0.563)   |
| N                | 10250   | 10532   | 10286      | 10558     | 9680      |

## Regression on Interaction Term

To check whether price elasticity is statistically siginificant different among five trust groups, we estimated the baseline regression model (5) including interation term between five trust groups and giving price.

$$
\begin{aligned}
\log(\mathsf{Giving}_{ijt}) = & \alpha_i + \beta_1 \log(\mathsf{Price}_{ijt}) \\
& + \sum_g \beta_g \log(\mathsf{Price}_{ijt}) \cdot \mathsf{TrustGroup}_{ijg} \\
& + \delta X_{ijt} + \lambda_t + \epsilon_{ijt}.
\end{aligned}
$$

▶ $\mathsf{TrustGroup}_{ijg}$: taking 1 if individual $i$ living in $j$ belongs to the trust group $g$.
▶ $g \in \{\mathsf{Lowest}, \mathsf{Lower}, \mathsf{Higher}, \mathsf{Highest}\}$.

# Regression Result on Interation Term

There is statistically siginificant difference on price elasticity between the lowest group and the nuetral group.

Table 8: Heterogenous Price Elasticity

|                   | Coefficients | S.E.    |
|-------------------|-------------|---------|
| ln(giving price)  | -1.702***   | (0.388) |
| X Lowest          | 1.345**     | (0.527) |
| X Lower           | 0.917*      | (0.513) |
| X Higher          | 0.403       | (0.533) |
| X Highest         | 0.350       | (0.534) |
| N                 | 51306       |         |

# Potential Concerns of Heterogenous Price Elasticity

▶ There is one potential concern that the presidential transition affects both donation behavior and political trust.

  ▶ In May 2017, South Korean president changed from Park Geun-hye to Moon Jae-in. This presidential transition was due to the impeachment charge against Park Geun-hye. People became distrustful of Park Geun-hye due to the shinking of MV Sewol (April 2014).

▶ To rule out this confounder, we constructed president-specific trust indexs using either in 2015 and 2016 (Park's Trust index) or data in 2017 and 2018 (Moon's Trust index).

  ▶ We discussed how to use these indexs later.

# Relationship b/w President-specific Trust Indexes

▶ We made a scatter plot between Park's trust index and Moon's trust index.
  ▶ Large variation of Moon's trust index among those who have same value of the Park's trust index.
▶ We tested whether the average individual difference b/w president-specific trust indexes is statistically different from zero.
  ▶ We cannot reject the null hypothesis.
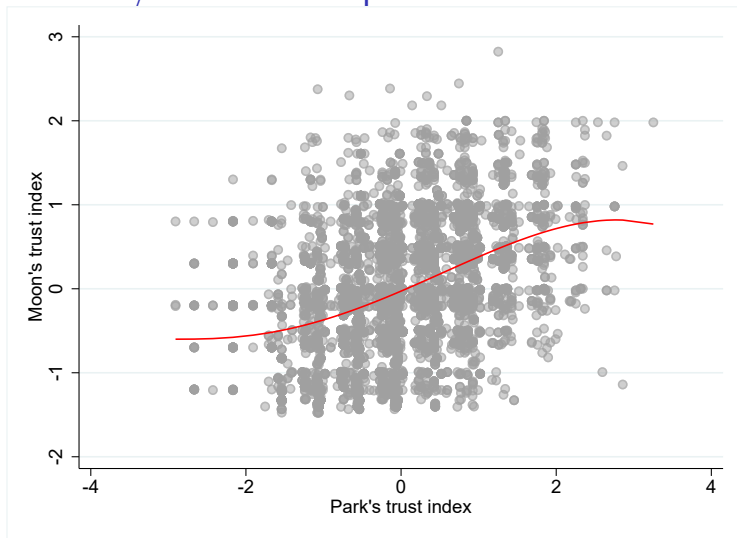
# Scatter Plot b/w President-specific Trust Indexes



Figure 6: Scatter Plot between Trust Index under Park Geun-hye and Moon Jae-in

# Result of Pair-wise t-test

Table 9: Pair-wise T-test

|         | Moon's trust | Park's trust | Difference |
|---------|--------------|--------------|------------|
| Average | -0.009       | -0.001       | -0.008     |
|         | (0.716)      | (0.827)      | [0.446]    |

# Relationship among Three Trust Indexes

▶ We made a scatter plot between difference of president-specific trust indexes and the original trust index.
  ▶ there is large variation of difference of president-specific trust indexes, and there is large variation of the original trust index among those who have similar value of two president-specific trust indexes.

▶ We regressed the original trust index on difference of president-specific trust indexes. We restrict units whose aboslute value of president-specific trust index difference is less than 2 (Abs < 2), 1 (Abs < 1), and 0.5 (Abs < 0.5).
  ▶ the positive correlations between difference of president-specific trust indexes and the original one. However, this positive correlation is statistically insignigicant if we use units whose president-specific trust indexes have similar values.

# Scatter Plot b/w Difference of Separated Trust Indexs and Original One
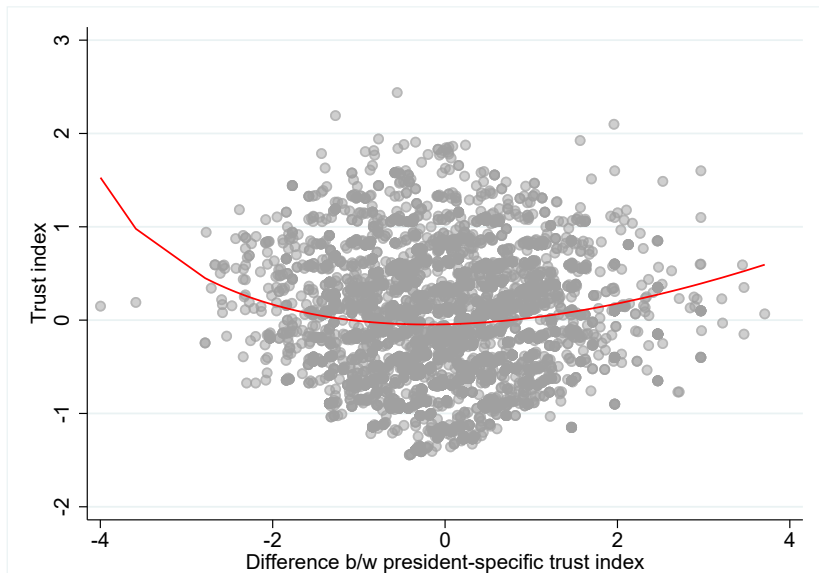
# Result of Regressions on Difference b/w President-specific Trust

Table 10: Regressions of Trust Index on President-specific Trust Index

|                            | Full     | Abs < 2   | Abs < 1  | Abs < 0.5 |
|----------------------------|----------|-----------|----------|-----------|
| Moon's trust - Park's trust | 0.020**  | 0.024***  | 0.033**  | 0.066*    |
|                            | (0.008)  | (0.009)   | (0.016)  | (0.038)   |
| Adjusted R-sq              | 0.001    | 0.001     | 0.001    | 0.001     |
| N                          | 7314     | 7128      | 5687     | 3467      |

# Robustness Check of Heterogenous Price Elasticity

1. Using data in 2013 and 2014, we estimated the interaction model again
   - ▶ The president was Park Geun-hye in both 2013 and 2014. Thus, we can exclude the effect of presidential transition on donation behavior.
2. Using the park's trust index instead, we estimated the interaction model with data in 2013 and 2014.
   - ▶ Since the trust index represents the trust for politicians under the president Park (but scandalous period), we can rule out the effect of presidential transition on both donations and trust.

# Result of Robustness Check

Table 11: Robustness Check of Heterogenous Price Elasticity

| Year | 2013 and 2014 | |
|---|---|---|
| Trust index | Original | Park |
| | (1) | (2) |
| ln(giving price) | -2.724*** | -1.702*** |
| | (0.580) | (0.548) |
| X Lowest Trust | 1.689** | 0.458 |
| | (0.784) | (0.771) |
| X Lower Trust | 1.081 | 0.445 |
| | (0.728) | (0.707) |
| X Higher Trust | 1.787** | 0.050 |
| | (0.735) | (0.741) |
| X Highest Trust | 1.533* | -0.188 |
| | (0.813) | (0.779) |
| N | 13788 | 13440 |

Conclusions

# Conclusions