



# Report Cards: Assessing the Impacts of the Public Disclosure of Antibiotic Prescribing Rate for Acute Upper Respiratory Tract Infection



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## Problem

- Current Antibiotic Use in Korea
  - National average: 23.0 DDD/1,000/day, for children under 7: 45.6 DDD/1,000/day in 2003 (KFDA, 2003)
  - 90.6% of Korean children received antibiotics to treat acute upper respiratory tract infection (AURI) (Park and Moon, 1998)
- Antibiotic Resistance: Erythromycin resistance rate: more than 70% and continuously increasing (Lee, 2009)

## Policy Intervention

- After the People's Solidarity for Participatory Democracy submitted administrative litigation for the public disclosure of high antibiotic-prescribing health care facilities in 2005, the High Court of Justice ruled that the government was obligated to release the information.
- Since February 9, 2006, the Health Insurance Review & Assessment service (HIRA) has released the AURI antibiotic prescribing rate of health care facilities that have more than 100 patients on a quarterly basis on HIRA's website.

## Outcome Variable

- Antibiotic prescribing rate (APR) for AURI is defined by HIRA
 
$$= \frac{\text{total number of antibiotic prescriptions for patients diagnosed with AURI}}{\text{total number of patients diagnosed with AURI and received a prescription}}$$
- Acute Upper Respiratory tract Infection (AURI) covers 7 diagnoses according to Korean Classification of Disease
  - J00 (Acute nasopharyngitis, common cold), J01 (Acute sinusitis)
  - J02 (Acute pharyngitis), J03 (Acute tonsillitis), J04 (Acute laryngitis and tracheitis)
  - J05 (Acute obstructive laryngitis and epiglottitis), J06 (Acute upper respiratory infections of multiple and unspecified sites)
- APR data available for all health care facilities with > 100 patients diagnosed with AURI over a three-month period

## Methods

- Interrupted time series analysis

$$APR_{ict} = \beta_0 + \beta_1 Time_t + \beta_2 Policy_t + \beta_3 (Policy_t \times Time_t) + \alpha P_i + \gamma D_c + H_{ct} + A_c + B_t + \varepsilon_{ict}$$

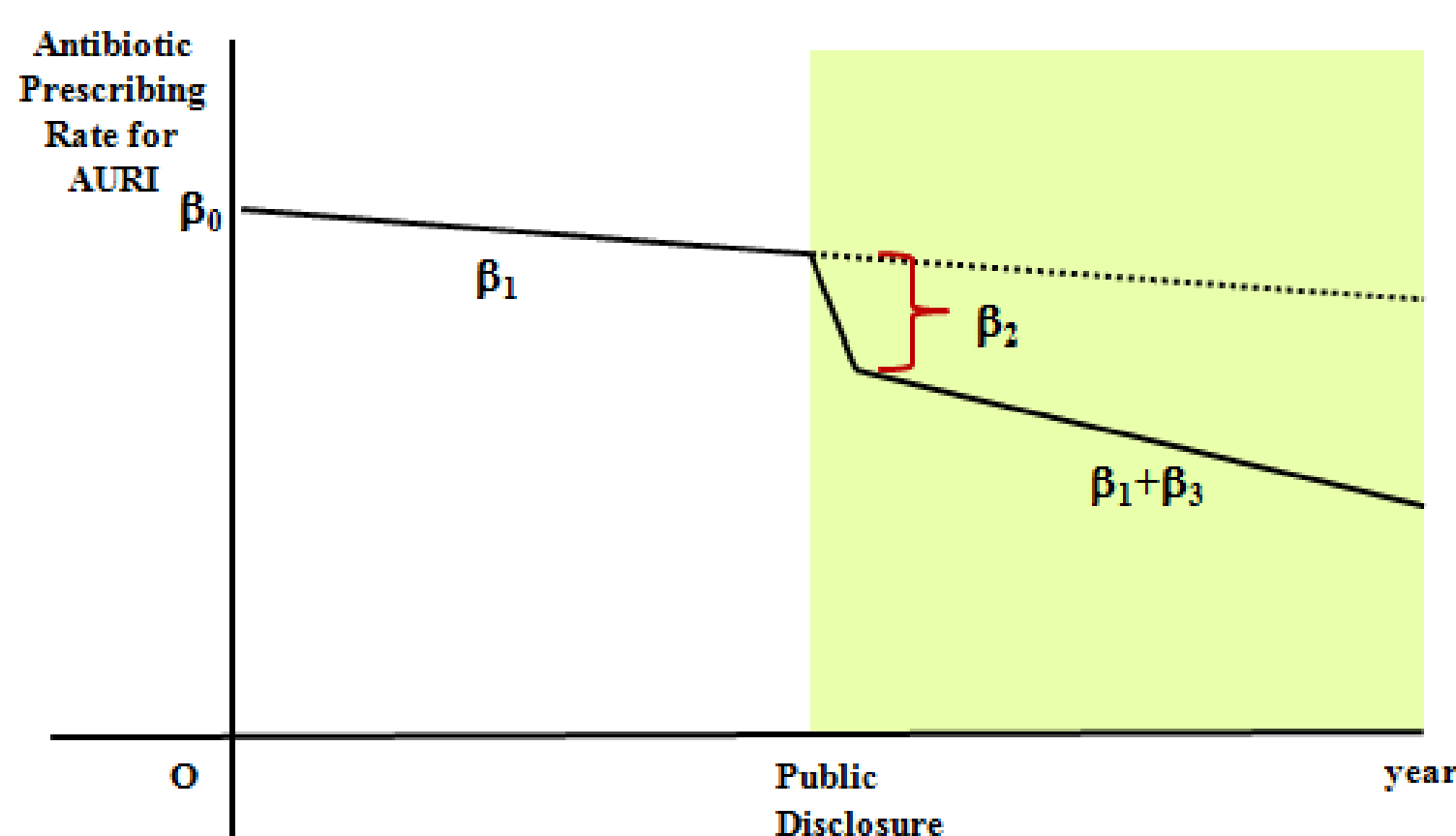


Figure 1. Modeling of interrupted time series analysis

- Quantile regression analysis: allows researchers to estimate the heterogeneous impact on the distributional outcomes by estimating quantile treatment effects (QTE) across the outcome variable distribution.

## Data

- Publicly released APR datasets between Q1 2004 and Q4 2008 based on National Health Insurance claim data
- Dataset of health care facilities in 2005
- 2005 Census: gender, age structure, occupation, education (Korea National Statistical Office)
- 254,432 observations, 15,669 health care facilities at 249 districts and 16 metropolitan areas or states between Q1 2004 and Q4 2008

## Results

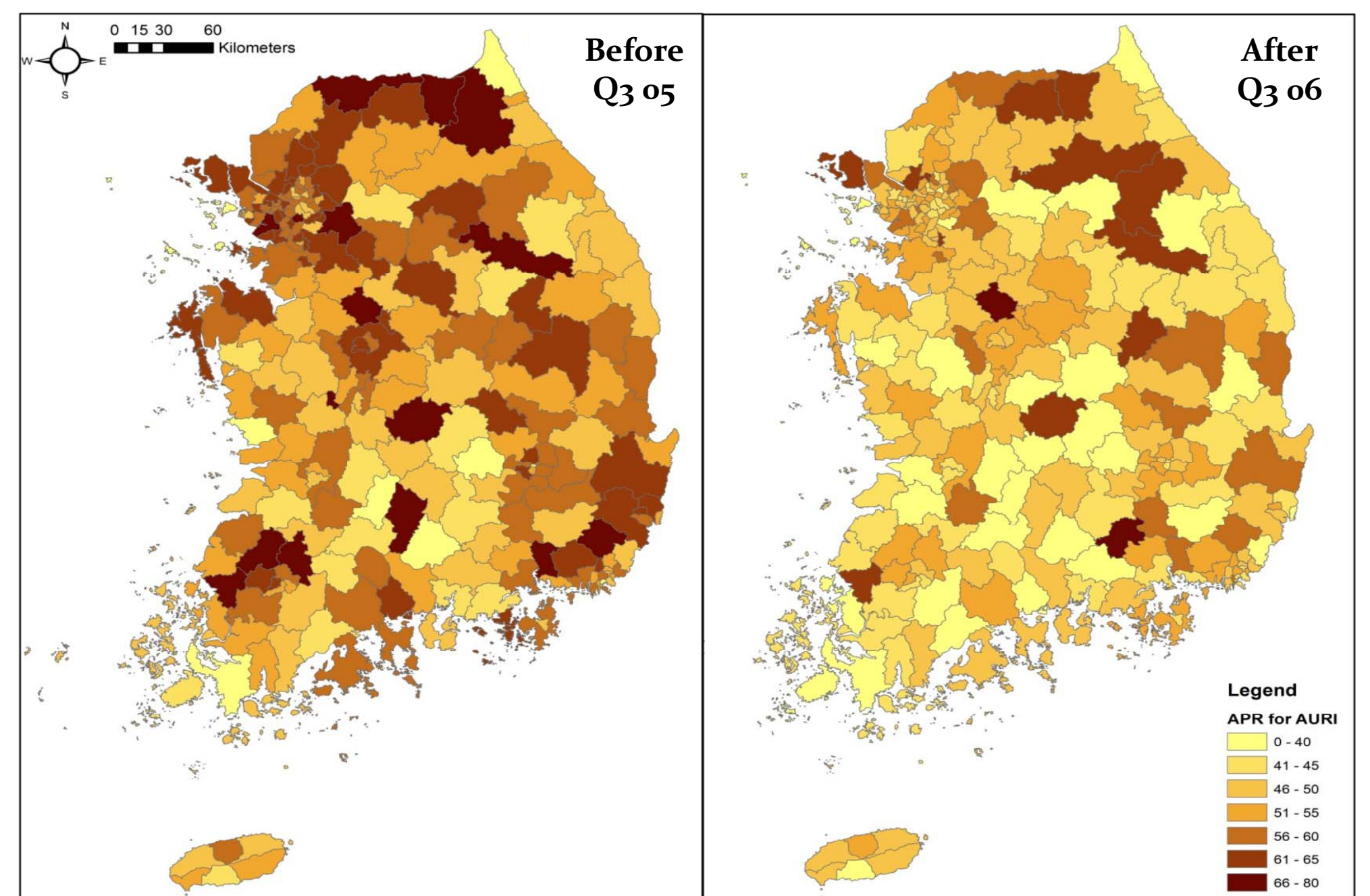


Figure 2. APR for AURI distribution before and after public disclosure

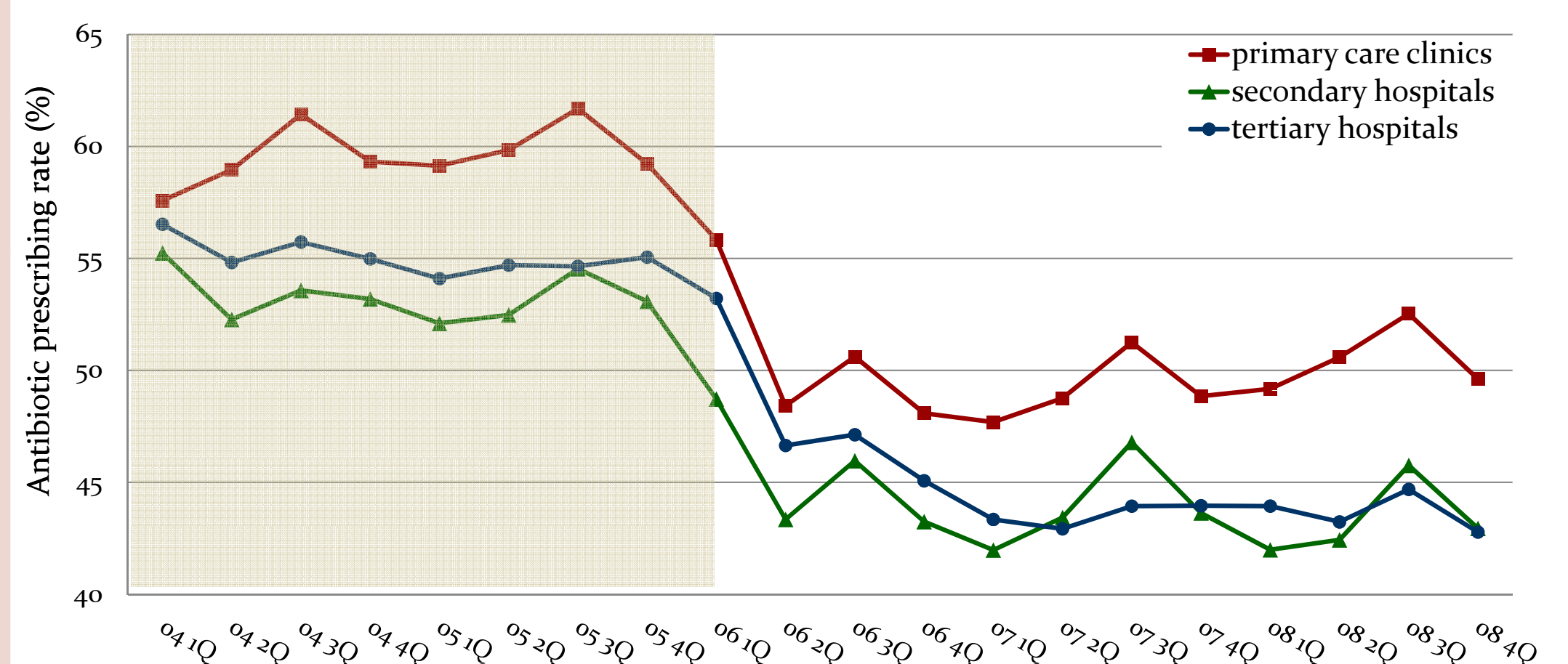


Figure 3. APR trends for AURI by type of health care facility

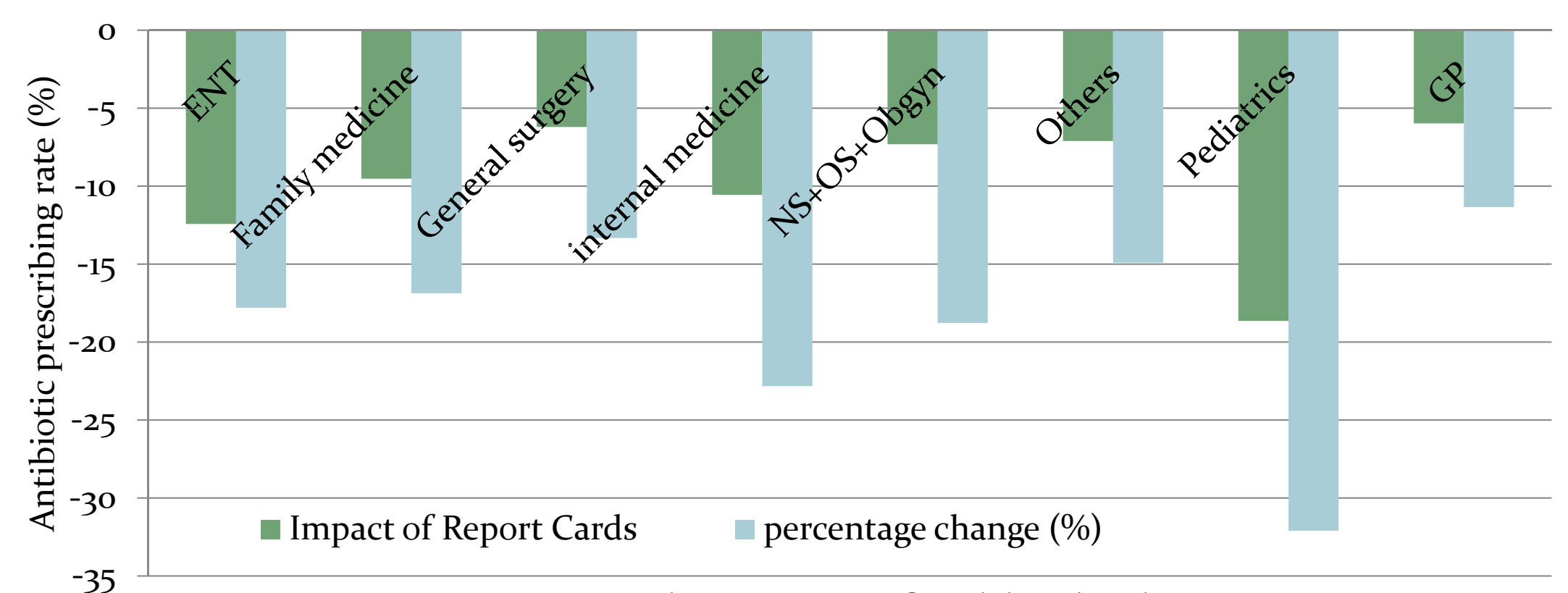


Figure 4. Variation in the impact of public disclosure on APR by specialty among primary care clinics

Note. The coefficient estimates were statistically significant at 1% significant level except general surgery, NS+OS+Obgyn, and other specialties. The regression model includes the number of beds, dummy for solo practice, dummy for private ownership, female education at district level, population clinic ratio, number of medical appliance, district fixed effect, and quarter fixed effect. The standard error are clustered at individual healthcare facility level.

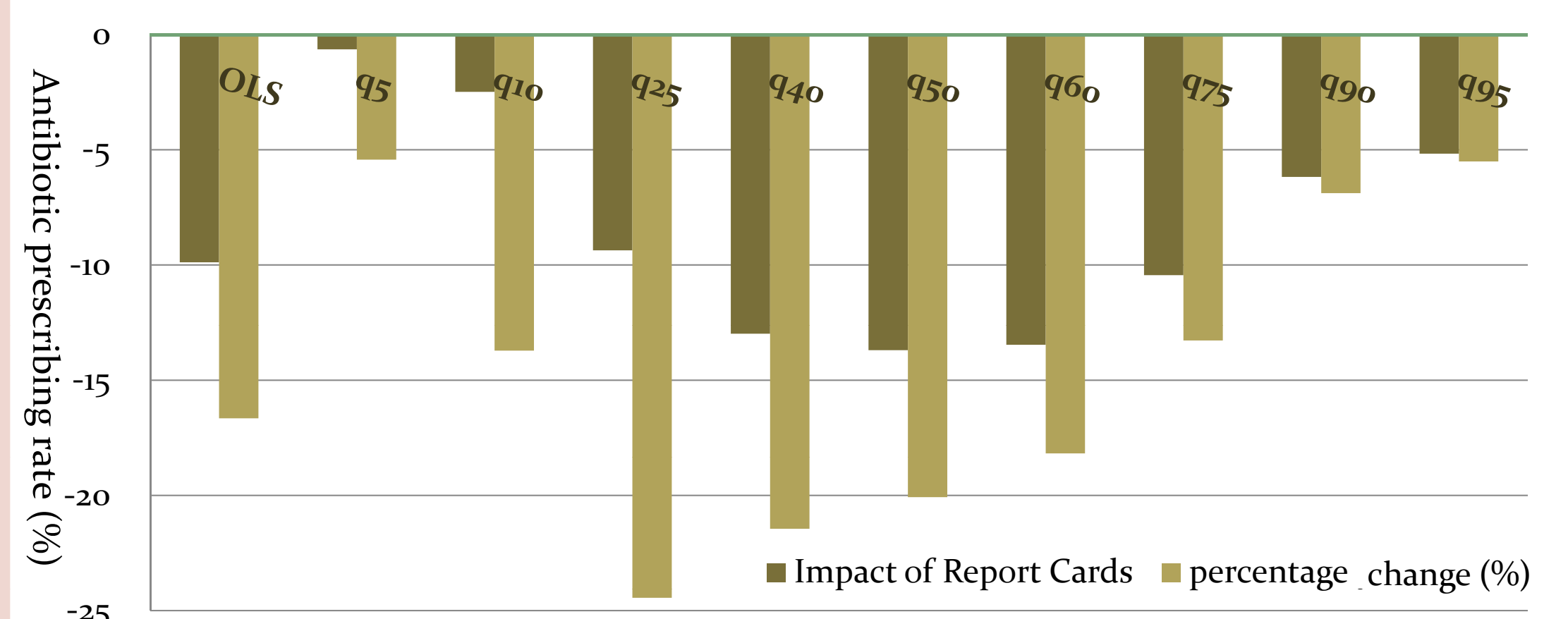


Figure 5. Quantile regression analysis for primary care clinics

Note. Except q5, all of the coefficient estimates of the impact of Report Cards are statistically significant at 1% significant level. The regression model includes the number of beds, dummy for solo practice, dummy for private ownership, number of medical appliance, female education at district level, population clinic ratio, district fixed effect, and quarter fixed effect. The standard error are clustered at individual healthcare facility level.

## Discussion

- The Internet-based report cards of APR for AURI is an effective policy intervention to reduce antibiotic prescription in Korea.
- Heterogeneous impact of report cards by type of health care facility, specialty, the level of antibiotic prescribing rate.
- Unintended consequences of the public disclosure: diagnosis code shift