ESRI Policy Forum

(Comments on RESET Project)

2025.7.30

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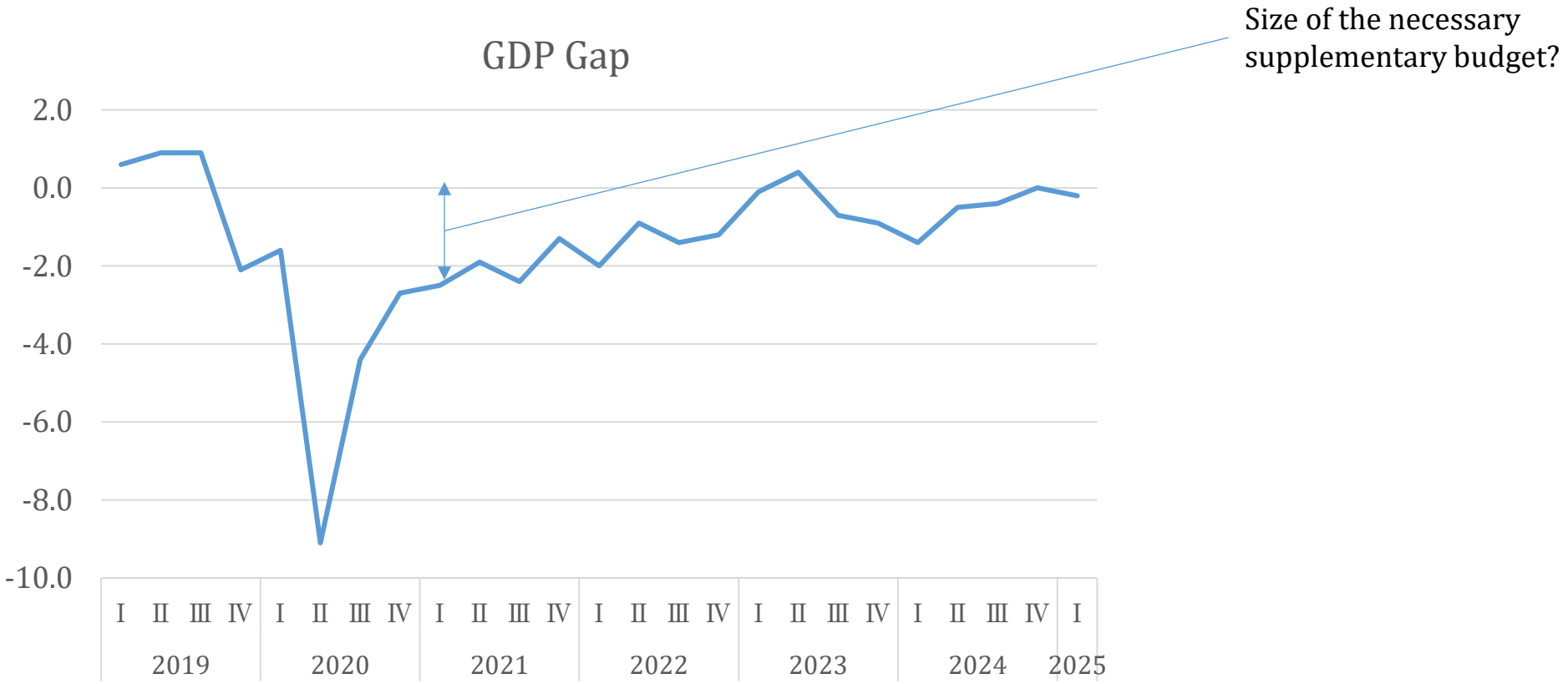
Revision

Serious issues for users; in particular, if the statistics are referred to policymaking.
For example,
CPI: monetary policy, minimum wage or pension levels, etc.
GDP…
Experience during the Covid recession: Estimation of GDP gap



① Difficulty in adjustment of quality change

How can the NSOs deal with the price change caused by the quality change, in particular by the product churn for the construction of price index?

At present, several NSOs have partially introduced Hedonic model (e.g. PCs), while has not used it as a sole basis to construct CPI.

Hedonic models are equipped with practical advantages; how about their robustness?

- ✓ The quality-adjusted price indexes can behave differently, depending on the selection of the variables included in the model (ex. See next slide).
- ✓ Hard to evaluate which variables should be included in the model, as theoretical background is missing,
- ✓ Time-series stability of the estimation results (Revision issues are critical for the NSOs) Rolling window time dummy may not be applicable for the high-turnover items,

- ✓ Multicollinearity, omitted variable biases, interactions b/w characteristics have been pointed out w.r.t. model specification; innovative proposal of this project to apply ML on the Hedonic residuals!

① Difficulty in adjustment of quality change

Advantages of applying ML on Hedonic residuals

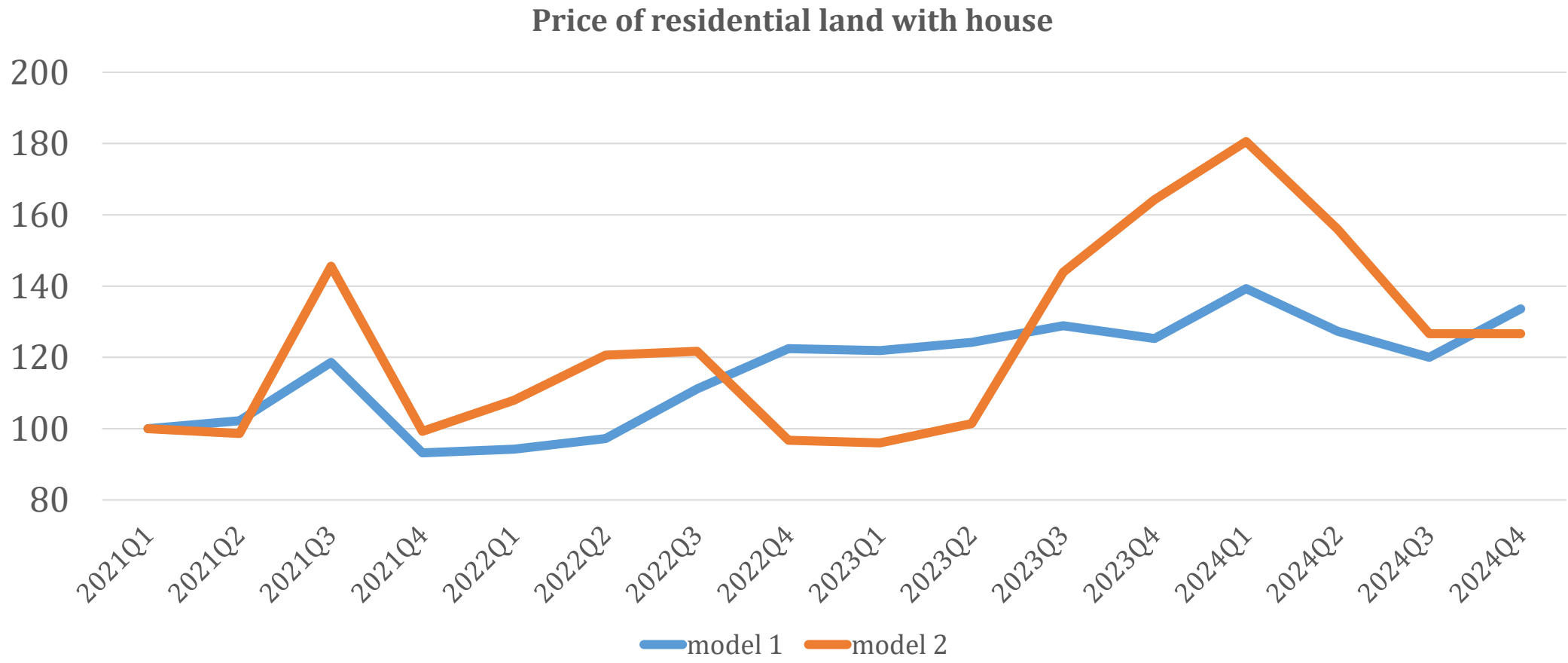
- ✓ Estimation results with high precision,
- ✓ Good-fit particularly in non-linear cases

Possible concerns:

- ✓ Hard to identify the factors behind price movements (NSOs are accountable for the statistics they publish),
- ✓ Practically, they need to take account of clarity (e.g. interpretation of the estimated parameters of log-linearized values), intuitive validity (align with people's perceptions), and simplicity (feasibility for monthly and timely publication).
- ✓ Robustness of the results of CV and overfitting issues

Example of time-dummy hedonic index

$$lnP_{i\tau} = \alpha + \delta^{t} D_{i\tau} + \sum_{k=1}^{K} \beta_k X_{i,k} + \varepsilon_{i\tau}, \tau \in \{t, t-1\}$$



Explanatory variables
Model1: Land area、Building age、Distance to the nearest station、Region
Model2: Model1+Nearest station, Building structure, Direction/Width of front road, Building coverage ratio, Floor area ratio

② Consistency with economic theory etc.

【Level of Substitution】

・Substitution effects can be reflected by using superlative indexes

✓ Theoretically, expenditure weights need to be calculated at the levels closest to actual consumption behavior (i.e. substitution occurs).

→ JAN (Japanese article) code level?

✓ Practically, expenditure weights can be very volatile or even zero at a lower level, leading to unstable indexes. How can NSOs take balance b/w theoretical accuracy and statistical stability?

【Data quality, availability】

・Quality of scanner data may not be very good; it might only include limited information on items' characteristics

→ Improvement in the quality of scanner data itself would be important

③:Issues for further use of scanner data

Which price indexes have been adopted in practice? – Examples from Eurostat manual

1. WLS-TD(WLS-TPD)
   This can be extended as a Hedonic model (product characteristics used as explanatory variables in the model).
   → Practical methodology? Difficulties in selecting an appropriate model

2. GEKS-Tronqvist
   Application examples of scanner data @ several NSOs (e.g. Belgium, Luxemburg, Norway, UK?...) , can be constructed as COLI
   → Vulnerable to the impacts of revision or existence of atypical prices, Cannot deal with effective price increases through new products

3. Hedonic+ML
   Effective for items with high product turnover, potential for practical utilization (but not yet in use)
   → Issues of clarity, accountability as well as stability
   → Links with utility function/production function (not COLI)

③:Issues for further use of scanner data

Although it might be difficult to identify the “best solution,” NSOs

- Need to make ongoing efforts to explore the possibility to use scanner data, web scraping, or Hedonic models,
- Need to explore available data collected for administrative purposes,
- Need to pursue cooperative relationship with international partners.

In this regard I would like to ask the practitioner audience for further inputs based on their most recent efforts (e.g. cooperation w/private firms),

Appreciate suggestions for the Japanese NSOs to improve the qualities of public statistics.