



Toward New Construction Deflators “quasi-model price approach”

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1. Methodology and issues of current construction deflators

① Current Methodology on Construction sector deflator in Japan

- Adopting “input costs method,” instead of market-oriented type price indices.
- Weighted average of appropriate price indices for intermediate inputs (by goods and services) and labour inputs = approximately covering 90% of output.
 - ⇒ The deflator for remaining value-added portions is assumed to be equally to the above due to the lack of appropriate price data.

② Issues

- The remaining value-added portions, such as operating surpluses and taxes imposed on production and imports, are not covered.
- *Price data on labor inputs (per-capita wages in the construction industry by the Monthly Labour Survey) do not cover changes in the quality of labor, such as attributes including age, employment status, and educational background.*

2. Prior studies on alternative methods in Japan

Alternatives	Methodology	Issues
Stratification Method	The micro-data from MLIT's "Statistics on Building Starts" is stratified (subdivided) by major attributes. Price indices are created from the average unit price per construction area calculated by each of the subdivided strata.	<ul style="list-style-type: none"> • Only applicable to building construction (not applicable to civil engineering works). • Resource consuming. • Information available from the source data is not necessarily sufficient to account for the quality change. (e.g. the parameters in hedonic model are sometimes statistically and economically insignificant)
Hedonic Method	Hedonic functions are estimated from the average unit price per construction area and quality attributes, obtained from the micro-data of "Statistics on Building Starts". Price indices are created by using the parameter of time dummy.	
Model Price Method	Price indices are created from hypothetical winning bids (construction cost + general and administrative expenses, etc.) by model construction, using input surveys for IO-Tables and bidding information, etc. The figures for projects directly controlled by the national government are estimated from detailed bidding information, etc.	<ul style="list-style-type: none"> • Only applicable to public civil engineering works. • Resource consuming • More detailed information is necessary to find how general and administrative expenses, etc. are determined by local governments and Independent agencies.

The inflation rates of construction service (building, civil engineering works) estimated by the above three alternative methodologies are higher than the current estimate (i.e. input cost approach)

*All three methods above mentioned don't resolve the quality control of the labor force.

3. Quasi-model price approach

A. Methodology

The mark-up ratio incorporating construction revenue is calculated from the MLIT's "Construction Work Statistics" and then multiplied by input cost deflator.

$$\text{Quasi-model price based Construction Deflator} \\ = \text{input cost deflator} \times \underbrace{(\text{value added} / \text{input cost} + 1)}_{\text{mark-up ratio}}$$

value added = operating surpluses+ depreciation and amortization + taxes and public dues

input cost = cost of completed construction + SG&A expenses

- depreciation and amortization - taxes and public dues

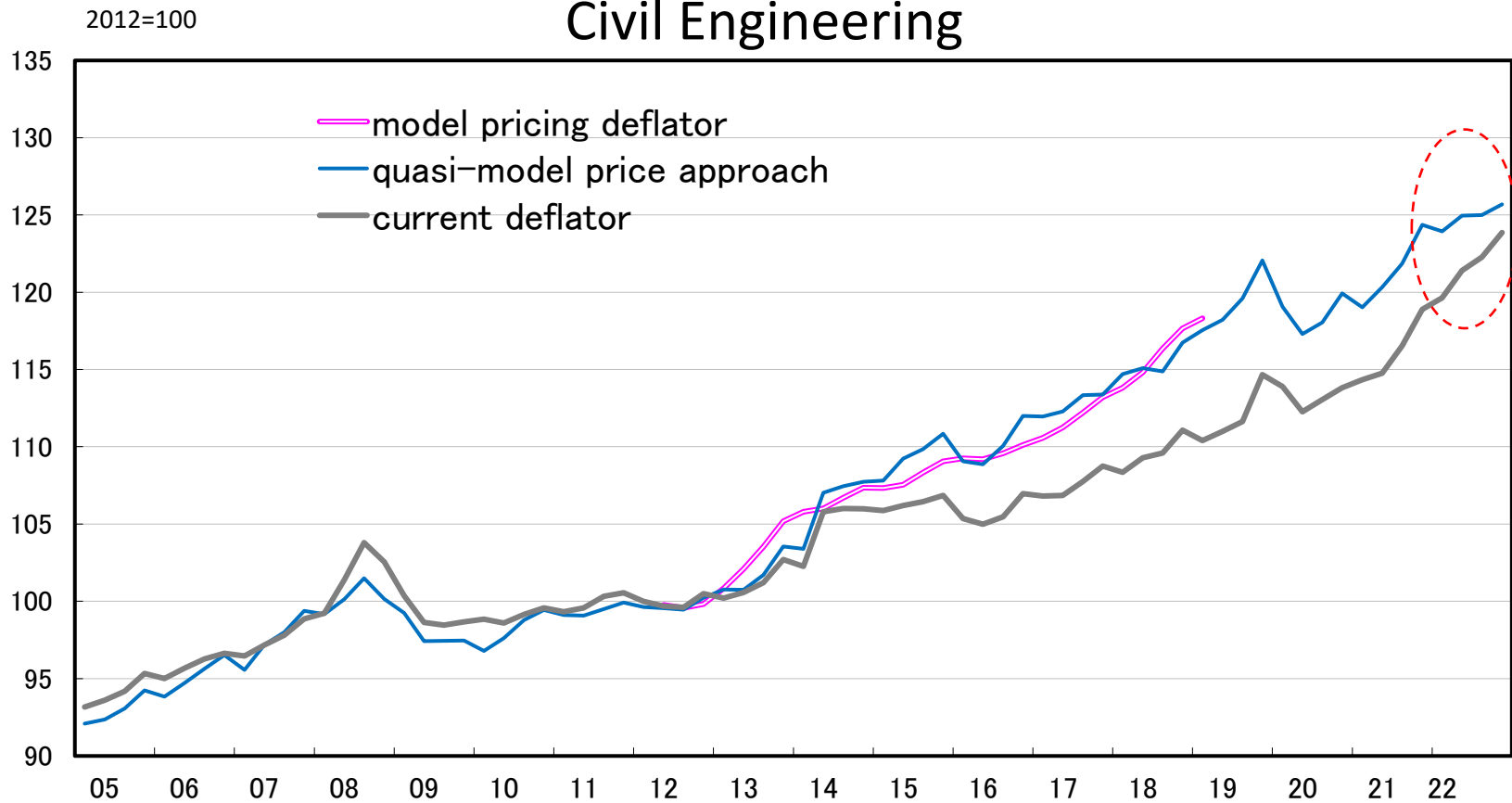
(Note) Information from "Quarterly survey of Corporations" is used for the quarterly calculations. Since the quarterly mark-up ratio fluctuates widely (extremely large in the January-March period), the backward 4-quarter moving average is used here.

B. Estimated Results

The results are almost the same or slightly weaker than prior studies, reasonably strong compared to the current input cost deflator.

3. comparison of results-1 (Civil Engineering)

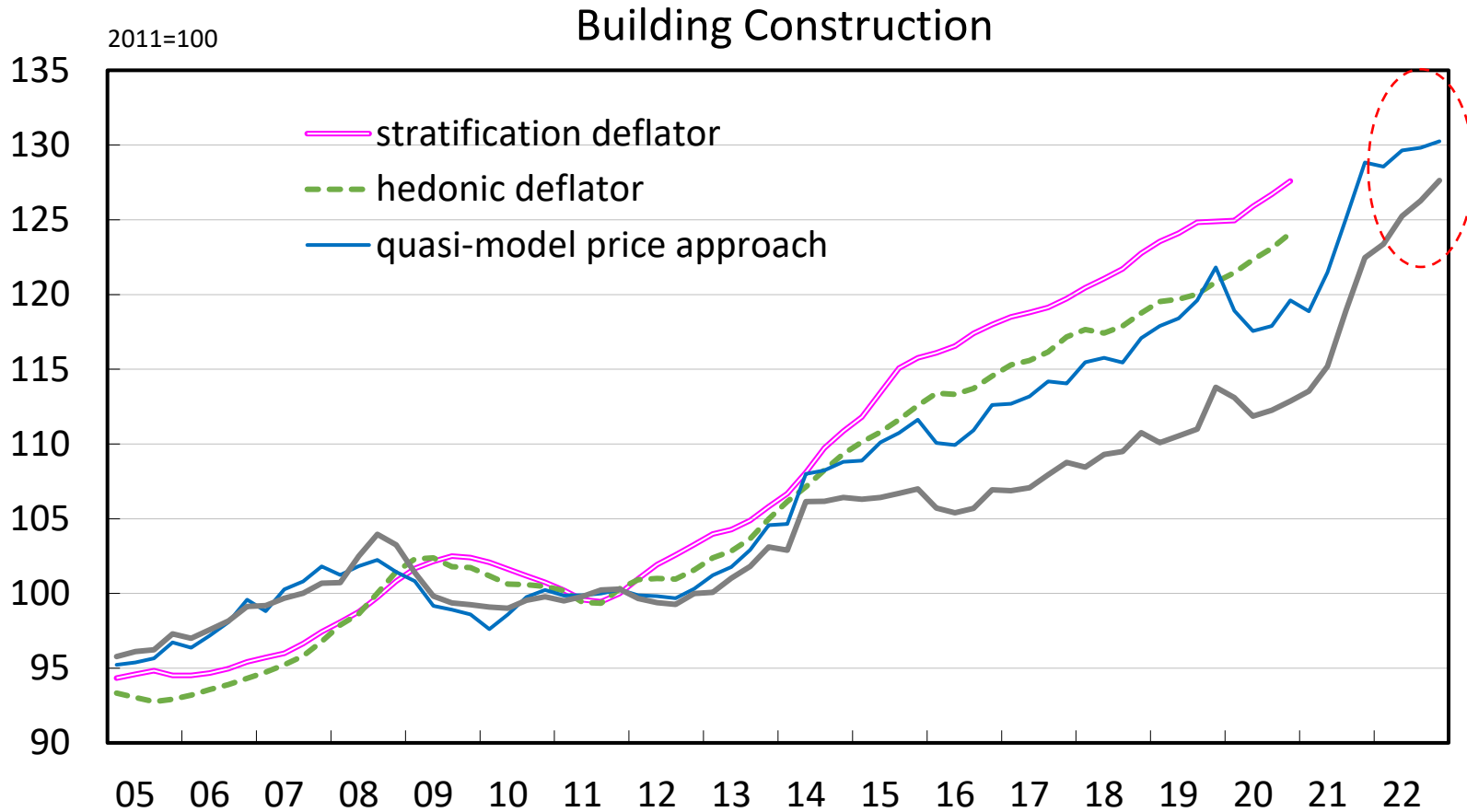
- ✓ For civil engineering, quasi-model price approach moves closer to the model price.



(Note) The "model pricing deflator" for civil engineering is a combination of five different deflators that are subcategories.

3. Comparison of results-2 (Building Construction)

- ✓ For construction, quasi-model price approach is relatively closer to the hedonic method in construction, although it is weaker than the stratification method.



- ✓ For both civil engineering and construction, quasi-model price approach reflects the behavior of construction sector, suppressing deflator increase among the rapid price increase of intermediate goods and services.

4. Results and future actions

Compared with the prior studies, quasi-model price approach is judged to be suitable for implementation.

- ✓ As the tentative estimation result show, the new method, similar to the results based on the prior studies, is considered to reflect the actual situation better than the current input cost type deflator.
- ✓ Theoretically, it is superior to other methods in terms of quality adjustment (the price index applied to intermediate inputs can adjust quality changes fairly well).
- ✓ The new method can be estimated with relatively low workload. In addition, the development of deflator can be decomposed into material price factors, labor cost factors, and mark-up factors, helping the compilers analyze the details.
- ✓ The approach can be applied to all forms of construction, including building construction, civil engineering and construction repair.

4. Results and future actions

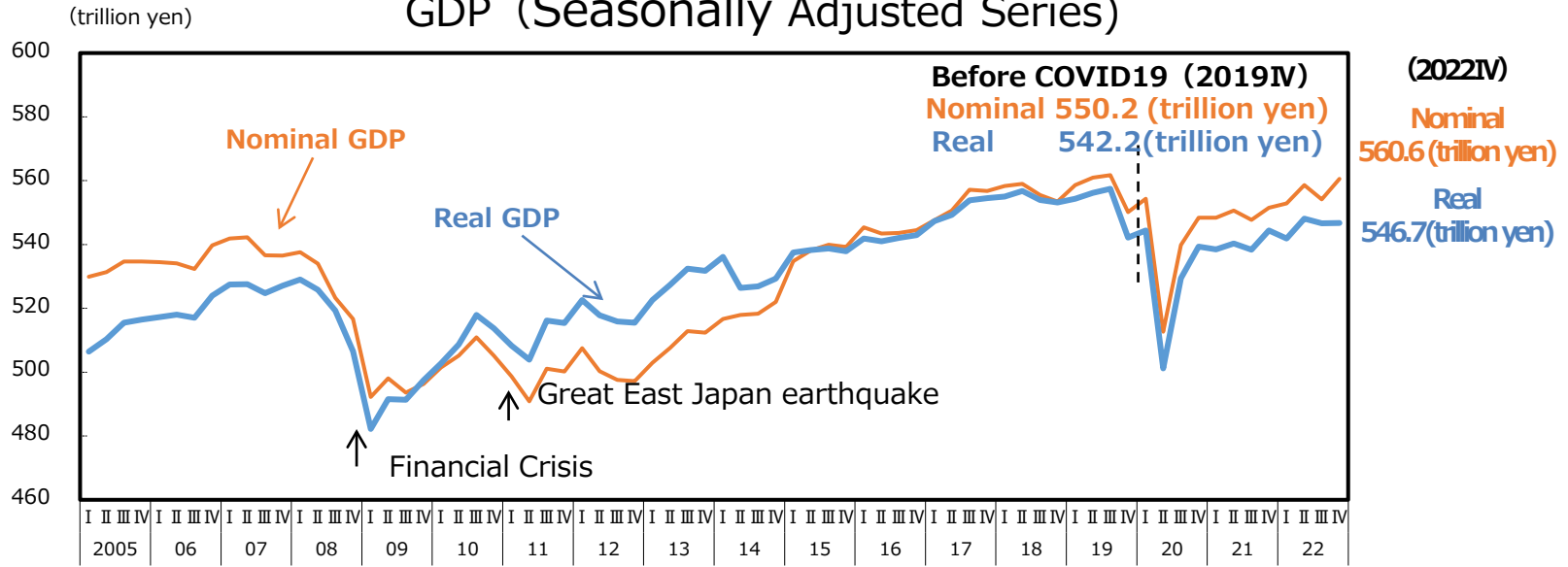
Remaining issues include...

- ✓ Whether different mark-up rates can be estimated and applied to different construction type (currently, a common mark-up rate covering whole construction types is used).
- ✓ How to estimate the quarterly mark-up rates, which are subject to large fluctuations.
- ✓ Whether it is possible to adjust quality change in labour costs.

After studying above issues and establishing an appropriate estimation method, we aim to implement the new method in the next benchmark revision of National Accounts in Japan scheduled in 2025.

Supplementary Materials

GDP (Seasonally Adjusted Series)



(Quarter-to-Quarter percent change in GDP)

