【Grant-in-Aid for Scientific Research (S)】

Dynamics Prices of Goods, Services and Real Estate Japan: Understanding and Reconstructing Statistics Using Big Data

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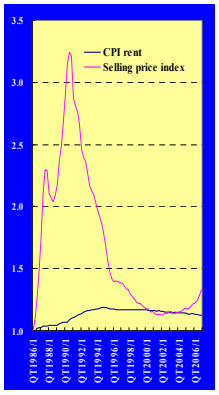
Project Information	Project Number : 24H00012　Project Period (FY) : 2024-2028 Keywords : Economic Measurement, Price Index, Property Price Index, Urban Agglomeration, Economic Measurement.

Purpose and Background of the Research

●Outline of the Research

Official statistics on aggregated price indices and productivity play a crucial role in guiding decision-making within economic activity. During Japan's property bubble period in the second half of the 20th century, a pivotal moment in the postwar Japanese economy, prices remained relatively stable despite significant fluctuations in property prices. The absence of official statistics on property prices hindered accurate comprehension of the extent and timing of property price increases during the bubble period and subsequent reversals. Recent studies have highlighted that the lack of movement in the CPI, a representative statistic on good and service prices, led to delayed policy responses to the property bubble, contributing to the prolonged stagnation of the Japanese economy. It is hypothesized that Official Statistics on price indexes may not have accurately reflected real societal conditions during this period. Our research aims to address this issue from three perspectives: a) Constructing a new model capable of explaining prices of goods, services and properties, b) Generating new data resources using large-scale microdata from public and private sectors, incorporating techniques such as machine learning to fit the constructed model, c) Developing and disseminating new price indexes and property price indexes to the wider society.



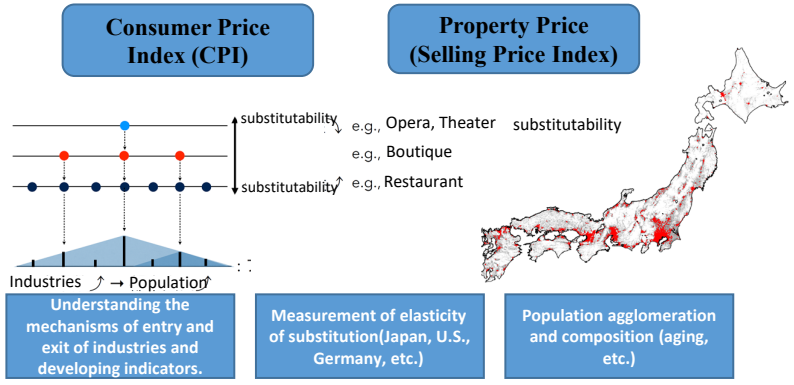


Figure1 Construction of price indexes on Good, Services and Property that take into account the diversity of industrial structure and population composition.

●Significance of the Study

Efforts to measure prices have been ongoing since ancient times, but systematic research on the construction of "price indexes" based on index formulas traces back to the 17th century. The Laspeyres or Paasche methods, widely utilized in many countries today, were established in the 19th century.

As services diversify and digital goods such as TVs and PCs become prevalent, the demand for new estimation technologies appeared. In the property market, as shown in Figure 1, after the burst of the property bubble, there were phenomena such as office buildings being converted to residential properties. Moreover, properties exhibit uniqueness, with new designs and features constantly emerging. This diversity in the market, where prices vary based on various characteristics, is not exclusive to the digital goods market but also prevalent in the property market. To calculate price indexes for such a diverse array of goods, “quality adjustment” is essential. Addressing the challenges of goods metabolism or product churn, and quality adjustment lies at the core of this study.

Figure2 Office→Condominium

Expected Research Achievements

●Measuring "prices" in consideration of the diversity of the market

Current price indexes are typically measured and calculated under the assumption of standard households and fixed preferences among individuals. However, in highly mature societies, it's more realistic to acknowledge that preferences vary across regions, income brackets, and even age groups within a country or nation.

Therefore, we will utilize micro-level big data measured at the household level to understand the mechanisms of household consumption behavior. Subsequently, we will develop a measurement method for price indices that considers household characteristics.

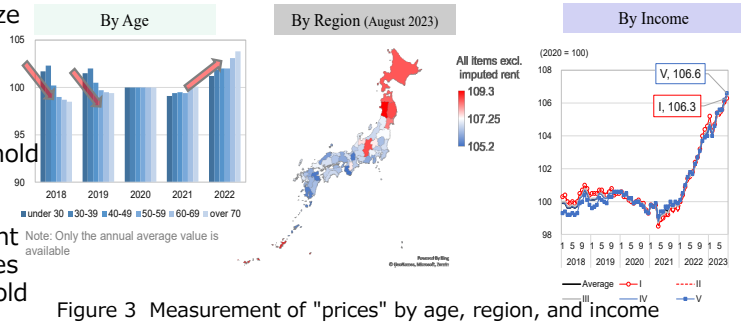


Figure 3 Measurement of "prices" by age, region, and income

●Measuring “property prices" in consideration of the diversity of the market

We will utilize micro-level big data measured at the household level to understand the mechanisms of household consumption behavior. Subsequently, we will develop a measurement method for price indices that considers household characteristics.

The mechanism behind the emergence of such contrasting markets will be clarified based on over 20 years of big data recording movable property transactions. Building upon this research, our aim is to develop a new method for measuring property prices tailored to the nature of the market and publish it as a statistical indicator.

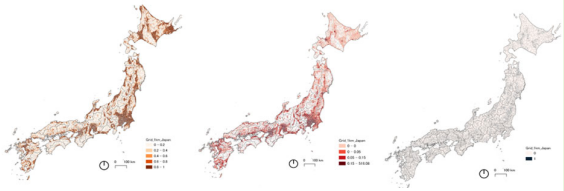


Figure 4 Disappearance of the property market

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