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Reforms and crises in government statistics: The case of Japan

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ADB Working Paper Series

REFORMS AND CRISES IN GOVERNMENT STATISTICS: THE CASE OF JAPAN

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and Yukie Sakuragawa

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Abstract

This paper describes the statistics reforms in Japan, especially in regard to gross domestic product and related statistics, that were meant to identify and then rectify the problems in Japanese government statistics. The paper then explains the recent revelation of serious errors in vital wage statistics caused by deplorable mismanagement in the Ministry of Health, Labour and Welfare; this statistical crisis led to a crisis in public relations, as well as to potentially jeopardizing the functioning of the system of government statistics.

Keywords: government statistics, statistic reform, errors on wage statistics in Japan

JEL Classification: C80, E01

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1. INTRODUCTION

Government data and statistics have become increasingly important in the political economy of many countries. There are two notable developments in policy and the economy that are at the root of this change: increasingly data-dependent policy making and the advent of the data-driven economy.

In macroeconomic policy, especially monetary policy, transparency is regarded as important, and some would say paramount. Government in general has promoted evidence-based policy making, requiring data-dependent policy making. This produces an ever-increasing demand for up-to-date information, and at the same time it stirs frustration among policy makers and analysts about the volatility caused by statistical revisions.

Another development is the advent of the data-driven economy. Because of the development of information and communication technology (ICT), the Internet of Things, artificial intelligence, etc., the scope of data and economic activities has greatly expanded. Granular (individual, personal) data are collectable by those technologies, and demand for such data is almost bursting. However, personal (and industrial) data are assets for private persons and society. Due to increased awareness about privacy and trade secrets, how to gather and treat personal and business data has become a serious problem.

In these circumstances, government statistics, especially gross domestic product (GDP) and related statistics, must be reformed so that economic activities can be gauged accurately and in timely fashion. The issue is methodology and coverage. Government statistics have been traditionally tailored to capture activities (once agricultural and now manufacturing), and they are not well suited for services, with respect to either quantity (coverage) or price (quality adjustment). This becomes problematic, especially for new, internet-related services (physical quantity versus non-physical utility).

Another problem for government statistics in some countries is a mismatch between the established institutional framework and current reality. Governmental institutions are often said to be prone to institutional rigidity; in statistics, the old ideal is cemented in so-called “statistical continuity,” making change difficult. In addition, the budget for statistics has been restricted in many countries, and thus resources, including human resources, are decreasing. This may cause a deterioration of the organizational knowledge base and individual skill sets. Consequently, it may pose further challenges in the future.

Japan has acute challenges regarding statistics reform, and the situation might be described as in a crisis stage. However, past economic development reveals that Japan is not an exception but rather a precursor of other countries, including Asian ones, which are increasingly facing economic and demographic conditions similar to Japan.

Japan experienced very rapid change in its industrial structure and demographic composition after World War II and for the three-quarters of a century that followed. Manufacturing success was notable, and economic performance was remarkable until 1990. This was also a period of favorable demography, with an increasing ratio of working age to non-working age population, meaning that the number of young working people supporting children in comparison with the number of old non-working people was increasing. However, an economic “bubble,” led by the financial and services sectors, started in the late 1980s and burst in the early 1990s. Almost simultaneously, favorable demographic conditions reached their plateau, and the aging of the population took effect. After 2000, Japan was losing its manufacturing base and failed to adjust to

the ICT-driven service economy. This trend might be affected by the population's progressively acute aging—the decreasing ratio of working age to non-working age population. The change Japan experienced was extraordinary and rapid, and it posed a serious challenge for government statistics to catch up and at the same time to face dwindling resources in government statistics departments.

Because of the difficulty in catching up, Japanese government statistics have been plagued by fragmentation, institutional rigidity, and a legacy of the past. After World War II, acute knowledge of the failure of government statistics in guiding pre-war policy led to a series of novel initiatives (including computerization) to rectify this information gap. Unfortunately, however, the fragmented system of government statistics of the pre-war period was retained, in which each ministry had its statistics division. Moreover, post-WWII policy had mostly been led by political considerations—based not on objective numbers (statistics) but on subjective episodes (including non-statistical opinion surveys). This might be different from the United States (where population and labour statistics are politically important) and Europe (where allocation of resources among EU countries is based on statistics). In Japan, resources were increasingly taken away from statistics and assigned to other purposes. The legacy of past efforts still worked well for some time. Statistics are slow to deteriorate, most likely outliving the political terms of politicians. So politics continued to ignore the problem.

The aim of this paper is to describe the statistics reforms in Japan, especially in regard to GDP and related statistics, that were meant to identify and then rectify the problems in Japanese government statistics. The paper then will explain the recent revelation of serious errors in vital wage statistics caused by deplorable mismanagement in the Ministry of Health, Labour and Welfare; this statistical crisis led to a crisis in public relations, as well as to potentially jeopardizing the functioning of the system of government statistics.

1.1 Reforms and Crises

Nascent statistics reform started in 2014 after Nishimura (one of the authors) became chair of the Statistics Commission in Japan. Scrutiny began about the government's "fundamental statistics," which had not been examined by the Commission for a long time because they were not requested by ministries.^{1,2}

Increasing dissatisfaction of policy makers culminated in harsh comments by Vice Premier Taro Aso in October 2015 and a reform paper by nongovernmental members in November 2015 at the Council on Economy and Fiscal Policy. They led to the Establishment of Statistics Reform Promotion Council in December 2016, and after the Council's half-year deliberations, the second revision of the Statistics Act was enacted in 2018, increasing the authority of the Statistics Commission as a guiding body overseeing government statistics, though it still retains the decentralized (and fragmented) status quo.

Meanwhile, under the leadership of the Statistics Commission, preparation for sweeping changes in GDP statistics began in early 2017, and preparation for related changes in

¹ The government "fundamental statistics" are important statistics domestically and/or internationally specified by the Statistics Act.

² The Statistics Act had been interpreted such that the Commission could examine ministries' statistics only when requested by the respective ministers, who contemplated changing existing statistics surveys and starting new surveys.

primary statistics followed. The year 2018 saw substantial progress in this preparation.

Then, in December 2018, inappropriate procedures for sampling and data compilation in monthly wage statistics was detected by the Statistics Commission, and subsequently more inappropriate procedures were uncovered in other wage statistics. This was the start of the statistical crises.

This paper is organized as follows. In the next section, we explain and summarize the statistics reforms underway, especially those related to GDP. In Section 3, we explain the serious errors and mismanagement in wage statistics that were revealed at the end of 2018, and we discuss statistical forensics. Section 4 contains remarks about possible lessons from this Japanese experience.

2. REFORMS OF INFORMATION ABOUT GDP AND RELATED PRIMARY STATISTICS

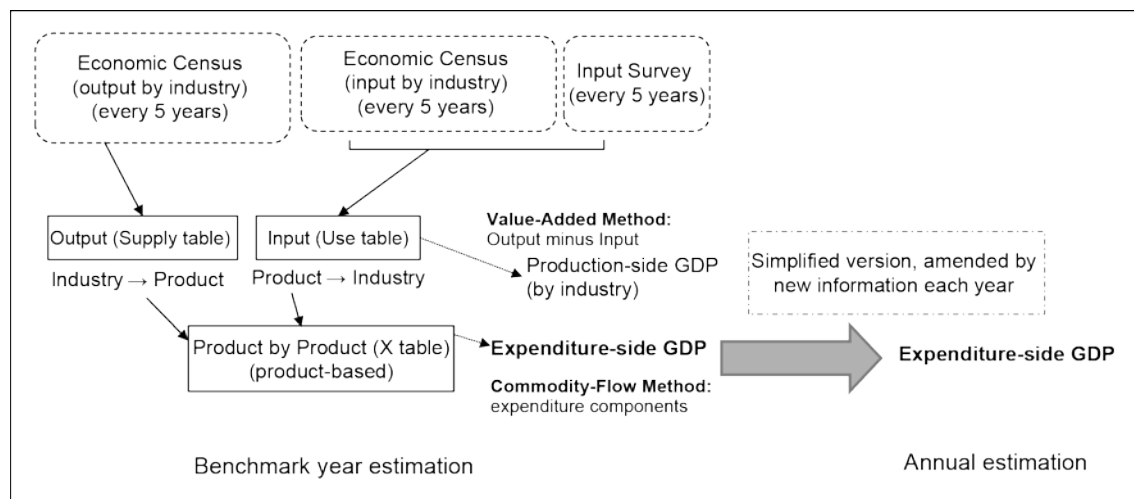
Statistics reforms in Japan focus on GDP statistics and primary statistics on which computation of the GDP is based. The reforms are comprehensive in scope and consist of various intertwined measures for improvement. We categorize those reforms into four fields: methodology, coverage, ICT and new services, and quality-adjusted price indexes or deflators (quality-adjusted measures of outputs).

2.1 Methodology: Departing from the Old Paradigm to Face Current Reality

The Old Ideal

In Japan, GDP estimation is based on detailed input and output (IO) tables. Figure 1 shows the procedure to estimate the benchmark year GDP and annual GDP. As shown, the benchmark year GDP is estimated from the IO tables (product-based) every five years. The IO tables are estimated from the economic census (activity) and input surveys, all of which are surveyed every five years (in principle). Annual GDP is estimated from the simplified version of IO tables, amended by new information each year.

One of the problems of annual GDP estimation is that detailed IO tables are heavily based on input surveys every five years. Reliable and detailed input surveys are increasingly difficult to conduct. For example, the Input Survey of the Mining and Manufacturing Industry is conducted by the Ministry of Economy, Trade and Industry and used for the estimation of the input structures of 187 manufacturing sectors (products). Establishments covering 70% of shipment value are surveyed by product, in order, from highest to lowest value. Table 1 shows a summary of this survey in 2011 and 2015. Although measures are taken to reduce the burden of survey completion, such as preprinting direct material costs, etc., the burden for respondents is still high, and the response rate remains at only around 50%. When compared to other statistical surveys, the response rate for this survey is particularly low, and it is even lower for surveys of non-manufacturing industries such as services. Due to the impact of overseas transfer and the increasing oligopolization in the manufacturing industry, the number of establishments subjected to survey is decreasing significantly, making it difficult to secure a sufficient number of samples. The same can be said for the survey environment of non-manufacturing industries. Further examination is needed to improve the precision of input structures.

Figure 1: The Old Paradigm Based on Detailed IO Tables (Product-based)

Source: Authors' Preparation.

Table 1: Summary of the Input Survey of Mining and Manufacturing Industries

Year of Survey	2011	2015
Number of establishments surveyed	14,934 establishments	10,996 establishments
Response rate	55.3%	50.5%
Number of establishments responded	8,259 establishments	5,553 establishments
Average number of establishments by sector	44 establishments	30 establishments

Note that this survey is conducted by the Ministry of Economy, Trade and Industry.

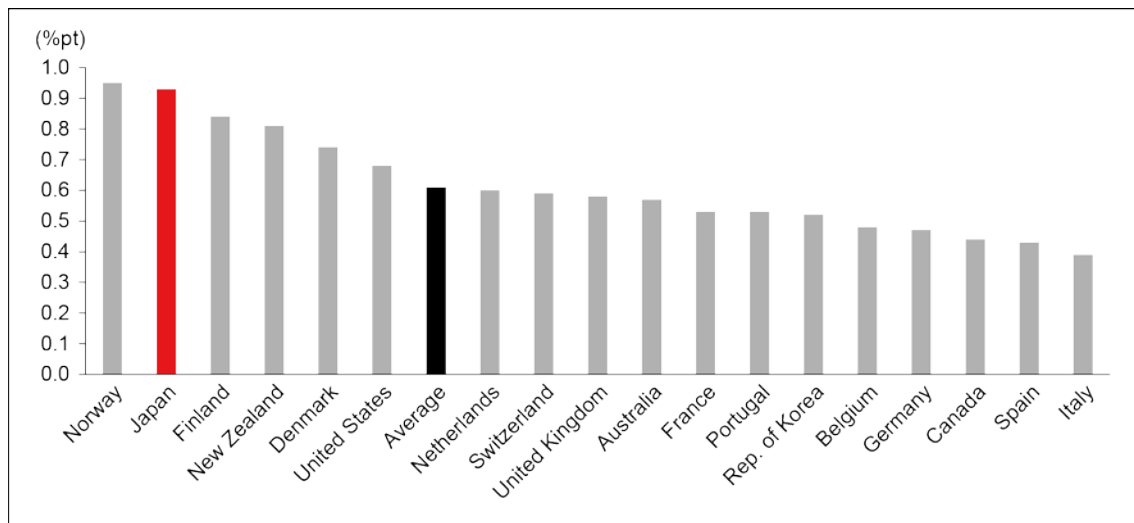
Source: Ministry of Internal affairs and Communication (2017). http://www.soumu.go.jp/main_content/000497012.pdf.

Another problem is that IO tables are extended to get annual GDP estimates with newly available annual data. Thus, traditional GDP measurement was crucially based on an old data structure (more than five years old and possibly older than seven years).

In addition, the old methodological paradigm was based on the idea of using all possibly relevant statistics in quarterly estimates (QEs). Thus, Japanese QEs are constructed from a hybrid of demand-side information and supply-side information. QEs are sometimes revised substantially after the annual GDP is estimated. Figure 2, from Zwijnenburg (2015), shows a comparison of revisions to QEs after the initial release in OECD countries. The revision made to Japan's quarterly real GDP growth rate (year-on-year) from the initial release until three years later is sizable, and second largest among OECD member countries. This large volatility in revision is sometimes hard to explain. According to an analysis by one Statistics Commission member, overreliance on demand-side estimates in Japan may be a culprit of this volatility.³ Specifically, reliance on household surveys is questioned for GDP estimation.

³ See the following documents by a member of the Statistics Commission http://www.soumu.go.jp/main_sosiki/singi/toukei/sna/kaigi/000125449_001.html.
http://www.soumu.go.jp/main_sosiki/singi/toukei/sna/kaigi/000125449_002.html.

Figure 2: QE Revision (International Comparison)
Mean Absolute Revision (1994 Q4–2013 Q4)
[First Estimation versus Three Year Later Estimation]



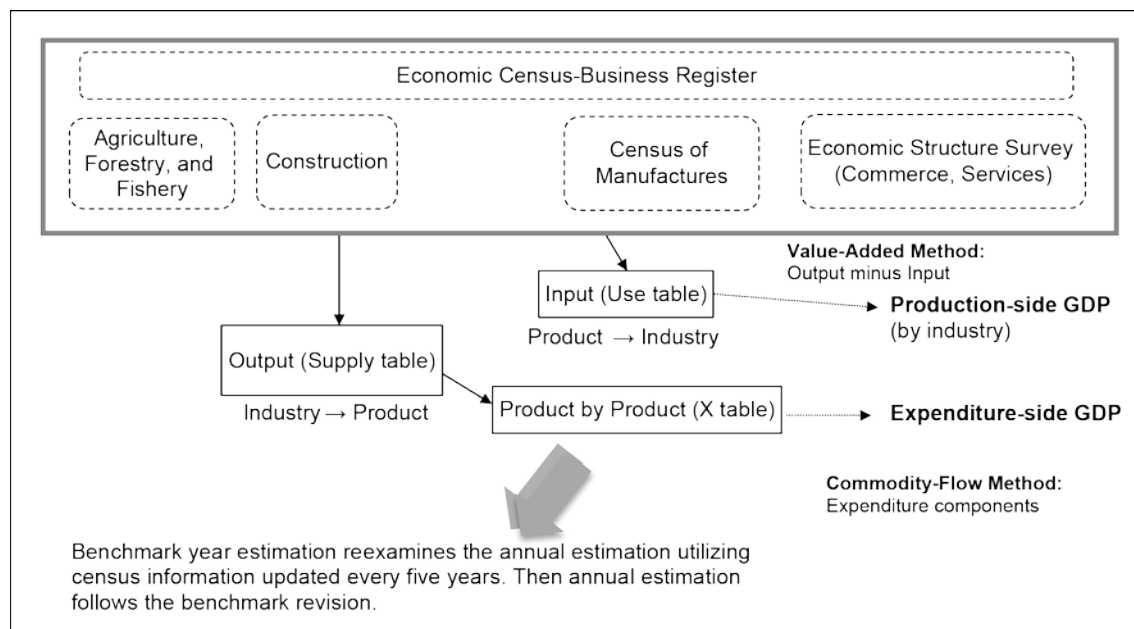
Source: Zwiijnenburg (2015), Table 2.

Newly Reformed Methodology

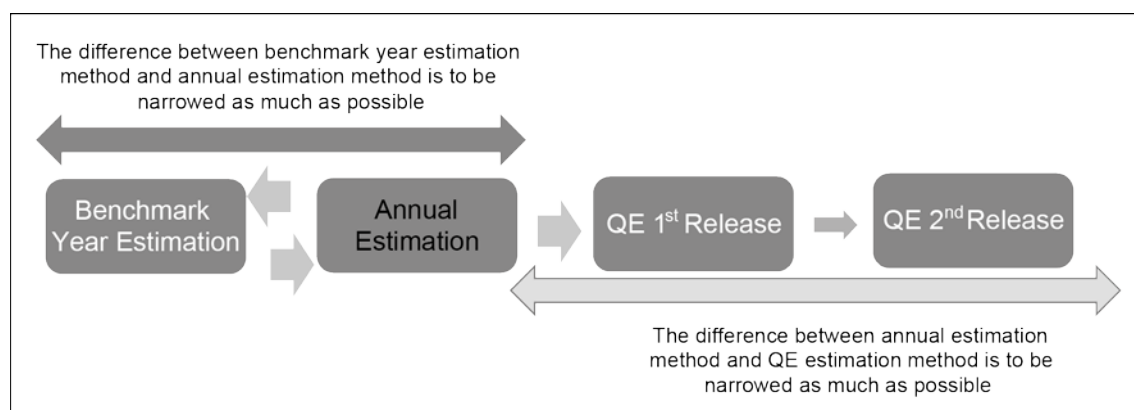
In the new methodology, which will take decades to complete, the starting point is to implement improvements in the timely and accurate collection of data. With the aim of achieving a more accurate IO structure, supply-use tables (industry-based) (hereafter, SUTs) instead of IO tables (product-based) will form the core of GDP measurement.⁴ SUTs are based on relatively easy to collect, reliable, industry-wide information, and thus it is hoped that there will be less resistance from increasingly complex and in some cases noncooperative companies. To resolve the problem that the annual GDP is based on the old data structure, the construction of a business survey framework is planned. Figure 3 shows the outline of this framework. It consists of several surveys, done annually, which broadly cover the industrial field. Though the idea is still in a preparation stage, we hope we are able to construct an annual IO structure based on the business survey framework to estimate annual GDP in the next ten years. Additionally, these numbers will be revised and corrected retrospectively in five-year benchmark revisions.

We think that IO tables (SUTs), annual estimates, and QEs should be compiled in a consistent manner. We call this methodology “Seamless Estimation” (see Figure 4). It aims to narrow the differences among the benchmark year estimation method, the annual estimation method, and the QE method. To reduce volatility in the QE revision, a planned Japanese QE methodology will shift from the hybrid of demand-side and supply-side information to solely supply (production)-based information for its base. In addition, we will change the QEs’ product classification to be finer and closer to the annual estimate’s classification. Furthermore, new methods of data collection and estimation of inventory investments will be considered and examined.

⁴ In fact, Japanese IO tables are based on “activities”, in which the production of a product is further subdivided into multiple production activities.

Figure 3: New Methodology Based on Business Survey Framework (Annual)

Source: Authors' Preparation.

Figure 4: Seamless Estimation

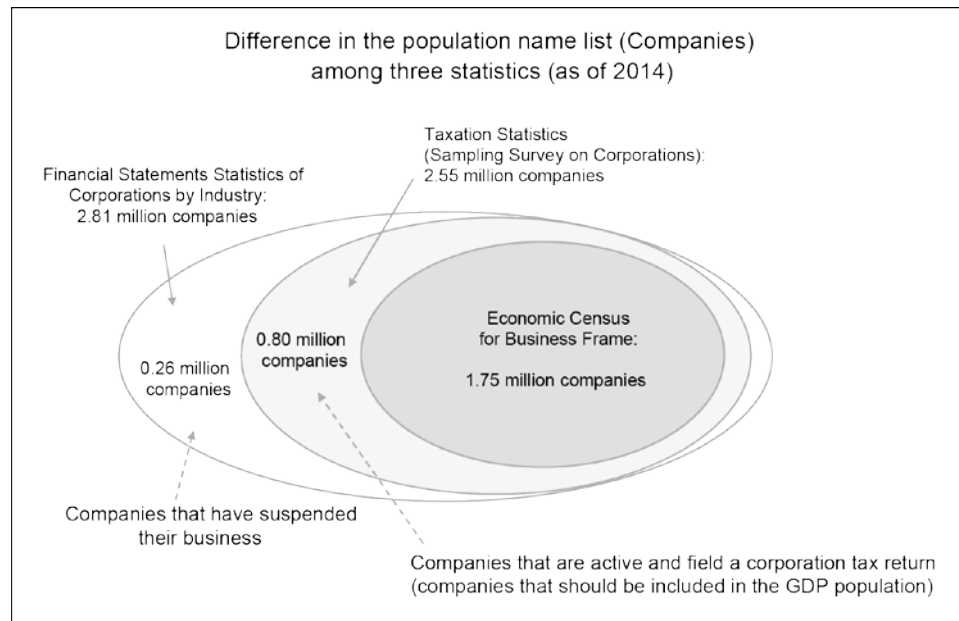
Source: Authors' Preparation.

2.2 Coverage

As explained earlier, we are challenged to extend the coverage. The number of companies covered by the most basic economic census (Economic Census for Business Frame) is 1.75 million as of 2014, as shown in Figure 5. However, the number of companies that filed a corporate tax return (sampling survey on corporations) is 2.55 million. Thus, approximately 0.80 million companies have not been identified and thus are not included in the estimation of GDP. Which companies are omitted from the economic census? Table 2 provides additional information. According to Office of the Statistics Commission (2017), companies not captured are mostly small and medium-sized enterprises that reside in office buildings in metropolitan areas. By industry, many of these companies belong to the construction, real estate, information and communications, and services industries. On a value-added basis, there is an indication

that up to 10–20 trillion yen is not captured. To rectify the problem, the construction of a new establishment frame database is underway, though this effort will take years.

Figure 5: Coverage: Population Base



Source: Office of the Statistics Commission of the Ministry of Internal Affairs and Communication (2017).

Table 2: Coverage by Economic Census and by Taxation Statistics (2014)

Panel A: by scale

	All Scale	0.1 Billion Yen or More	Less than 0.1 Billion Yen
Economic census (A)	1.750 million companies	0.030 million companies	1.720 million companies
Taxation statistics (B)	2.550 million companies	0.031 million companies	2.519 million companies
Capture rate (A/B)	69%	97%	<u>68%</u>

Panel B: by industry

	Manufacturing	Construction	Real Estate	Wholesale/ Retail Trade	Information and communications/ services
Economic census (A)	0.271 million companies	0.304 million companies	0.160 million companies	0.448 million companies	0.466 million companies
Taxation statistics (B)	0.340 million companies	0.416 million companies	0.291 million companies	0.575 million companies	0.757 million companies
Capture rate (A/B)	80%	73%	55%	78%	62%

Source: Office of the Statistics Commission of the Ministry of Internal Affairs and Communication (2017).

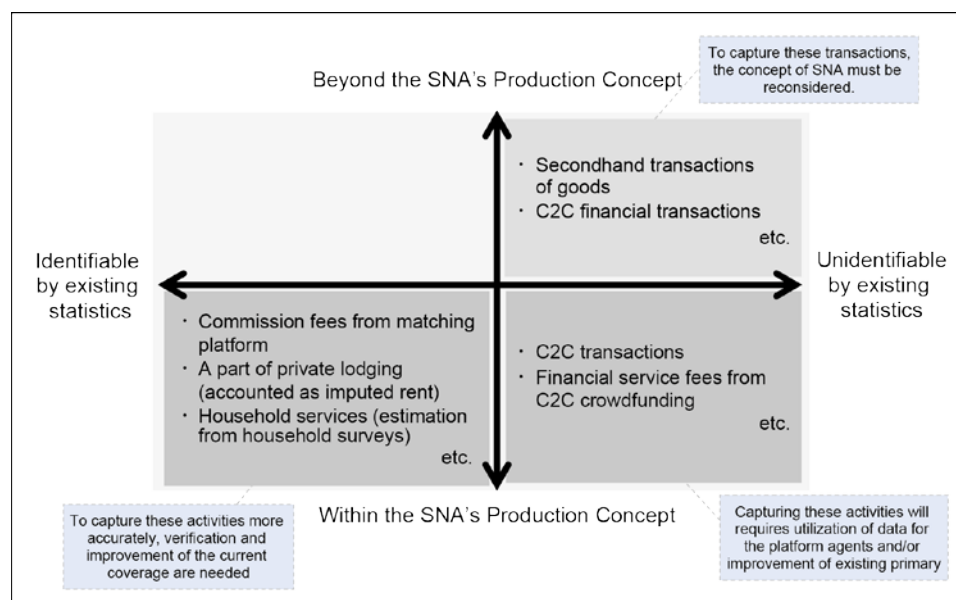
2.3 ICT and New Services (Sharing Economy)

New services in the “sharing economy” are potentially important to capture the precise GDP. Right now, its importance is small in Japan, though this may change. However, these services are substitutes for once-established products. New services may capture

only a part of the old products. Practical problems include how to measure output—as physical quantity or utility? Government statistics are based on observed quantity, not utility. Another problem is how to measure the quality-adjusted prices of these services. The problems of new services in the sharing economy are still in the recognition stage.

The Mitsubishi Research Institute (2018) categorized the economic activities arising from the sharing economy under two dimensions: beyond the Systems of National Accounts (SNA)'s production concept or within, and identifiable by existing statistics or unidentifiable, as shown in Figure 6. Secondhand transactions of goods, financial transactions between consumers (consumers to consumers; C2C), and so on are placed in the category beyond the SNA's production concept and unidentifiable by existing statistics. To capture such transactions, the concept of SNA must be reconsidered. C2C transactions, financial services fees from C2C crowdfunding, and so on are placed in the category within the SNA's production concept but unidentifiable by existing statistics. Capturing these activities will require utilization of data for the platform agents and/or improvement of existing primary data. Commission fees from matching platforms, a part of private lodging (accounted as imputed rent), household services estimations from household surveys, and so on are placed in the category within the SNA's production concept and identifiable by existing statistics. To capture these activities more accurately, verification and improvements of the current coverage are needed.

Figure 6: Sharing Economy – Conceptual Categorization



Source: Mitsubishi Research Institute (2018).

The Mitsubishi Research Institute (2018) also calculated the market size of the sharing economy in 2016, although the amounts were calculated under various assumptions (see Table 3).

Table 3: Market Size of Activities in Sharing Economy (2016)

Category	(1) Beyond the SNA's Production Concept	(2) Within the SNA's Production Concept but Unidentifiable by Existing Statistics	(3) Within the SNA's Production Concept and Identifiable by Existing Statistics	Sum
	Secondhand Transactions of Goods, C2C Financial Transactions, etc.	C2C Transactions, etc.	Commission Fees from Matching Platform, A Part of Private Lodging (Accounted as Imputed Rent), etc.	
Space	–	70–100 B yen	70–80 B yen	140–180 B yen
Goods	270–275 B yen	15 B yen	10–15 B yen	300 B yen
Skill, time	–	10–20 B yen	5 B yen	15–25 B yen
Money	–	–	15–20 B yen	15–20 B yen
	(financial transactions: 55–60 B yen)			(+ financial transactions: 55–60 B yen)
Sum	270–275 B yen (+financial transactions: 55–60 B yen)	95–135 B yen	100–120 B yen	470–525 B yen (+ financial transactions: 55–60 B yen)

Source: Mitsubishi Research Institute (2018).

2.4 Quality-adjusted Deflators (Quality-adjusted Measure of Outputs)

Precision in the measurement of nominal GDP and deflators (price statistics) is absolutely necessary to accurately obtain the real GDP. To improve the precision of deflators, it is important to capture the actual price correctly and to measure the quality of goods and services appropriately.

An example of failure to capture the actual price may be construction deflators. These are calculated as cost-based, not output-based, which means that they do not include the profits of construction companies. The profit of construction companies has increased recently, so the revision to the construction deflator based on cost might be underestimated, and then real GDP might be overestimated. Research is underway in the Statistics Commission to improve construction deflators methodologically, but the incorporation of this methodology in government statistics is still distant.

Quality is difficult to measure for some services, especially medical care and educational services. This is still in a burgeoning research stage at the Economic and Research Institute of the Cabinet Office.

2.5 Summing Up: Where Are We Now? Or Where Were We When the Statistics Crises Broke Out?

The methodology and procedures for measuring GDP have improved substantially, except for medical and education services. Table 4 shows a selected list of improvements.

Table 4: Selected List of Achievements to Date

Category	Item	
Methodology	Shift to the SUT system	Institutional decision has been made about its basic constitution
“Seamless” estimation aimed at reducing volatility	QE comprehensive revision	Use of more supply-side data
	Improvement of economic census	2021 survey aimed at subsidiary business, based on enterprise
	Economic structure survey	Annual survey complementing economic census. From June 2019.
	Improvement of primary statistics	Monthly Labour statistics (introduction sampling), integrated statistics on construction works (survey of progress rate), current survey of production
Coverage (quantity)	Establishment frame database	Use of administrative record information is underway
	Product classification	Service product classification is completed
	Improvement of primary statistics	Corporate statistics (addition of R&D investment)
	Related research	Sharing economy measurement, granular real-estate database
Quality adjusted prices	Improvement in price indexes	Wholesale service price indexes, quality-controlled housing rent indexes incorporating depreciation
	Related research	Medical care, education, and construction

Source: Authors' Preparation.

The level of nominal GDP (and possibly its rate of change) is likely to increase in the coming years as the methodological improvement is taking effect. We have recently observed large upward revisions of nominal GDP (annually) for the past two years, and particularly in 2015, as captured by high growth rates. Table 5 shows the revision sizes. However, how much of the revision size stems from improved measurement is an open question.

Table 5: Recent Corrections of Nominal GDP by Annual Estimates

Time of Revision	GDP (2014)	GDP (2015)	GDP (2016)
End of 2016	(2) +4.4	(1) +7.3	–
End of 2017	(3) +0.2	(2) +1.5	(1) +1.2

Note: The annual estimate corrections at the end of 2016 exclude the effect of introducing 2008SNA. The marks of (1), (2), and (3) represent the first, second, and third annual estimate, respectively.

Source: Economic and Social Research Institute, Cabinet Office.

Table 6: Perspective—Period When GDP Reflects the Accuracy Improvements of Primary, Basic Statistics

Period	Improvement of Accuracy of Basic Statistics	GDP
End of 2020 (the next standard revision of SNA)	Account for the reform and renewal of buildings as investment	↑
	Extend the coverage of real estate transaction	↑
	Economic census: Improve the treatment of consumption tax and the complement for missing values	↑
Annual estimate at the end of 2022	Extend the coverage of establishment frame database	↑

Source: Authors' Preparation.

Many improvements will have been achieved by the time of the next benchmark revision of SNA (the end of the 2020 calendar year) (see the upper part of Table 6). The coverage of the establishment frame database is planned to be extended at the end of the 2022 calendar year. Thus, reforms for the nominal GDP are planned to be concentrated over the next five years (see the lower part of Table 6).

In contrast, methodological improvement in deflators is still far from satisfactory (except for construction deflators and wholesale deflators), though it is quite likely that current deflators are overestimating price changes (improvement is likely to be counted as price increases in general).

3. CRISES IN STATISTICS: ERRORS AND MISMANAGEMENT IN WAGE STATISTICS AND THE STATISTICS COMMISSION'S STATISTICAL FORENSICS

In this section, we explain serious errors and deplorable mismanagement in procedures involving wage statistics. First, we explain the turmoil at the Ministry of Health, Labour and Welfare (hereafter, the Labour Ministry) about vital wage statistics (the Monthly Labour Survey). Second, we explain the political fallout from the resulting underpayments of various government compensations. Third, we show the macroeconomic impacts; they are quantitatively small but bring severe distortion in wage inflation data. Finally, we explain the statistical forensics used by the Statistics Commission to rectify the problem.

3.1 Turmoil at the Labour Ministry About Vital Wage Statistics

We start to briefly explain the timeline of events of the statistical crises. On 13 December 2018, the chair of the Statistics Commission of Japan detected inappropriate procedures (a violation of the Statistics Act) involving vital wage statistics. When asked by the chair about the reasons for statistical irregularity in large establishments' wages in Tokyo, a middle-management official from the Labour Ministry confessed that the ministry had conducted a sampling survey, not a comprehensive survey as approved by the statistical authority of the government. This practice had started secretly as early as 2004 and continues to date. The official even proposed extending the sampling from Tokyo to other areas. The chair and individuals from the government statistical authority who attended the meeting were stunned.

On 21 December 2018, rudimentary errors in compiling were revealed to the Commission, comprising failure to multiply the sum of samples by the reciprocal of the sampling rate in order to get the estimate of the total. At the briefing, a high-ranking Labour Ministry official admitted to the chair that the ministry failed to apply the necessary multiplication procedure to get the estimate of the total wage payment. This failure was later revealed to apply to the 2004–2017 period. Worse, the ministry corrected the error secretly from January 2018 without reporting it to the Commission. There was no public announcement of this fact until 2019 January 2019.

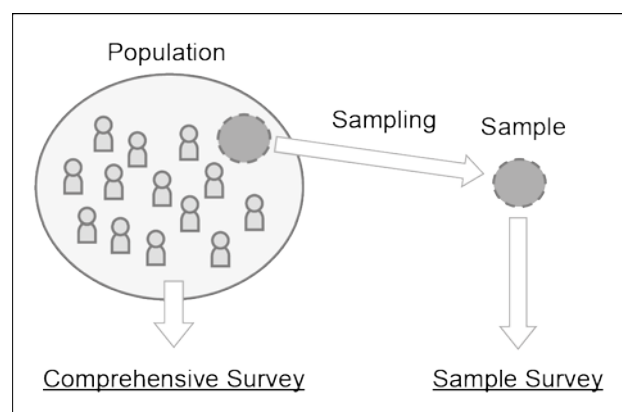
On 17 January 2019, the Labour Ministry reported to the Commission that it had already discarded some original data dating from before 2011, which were necessary for making corrections. The ministry claimed that because of this it was unable to correct wage data and to recalculate correct wage series between 2004 and 2011. For this reason, the ministry published the recalculated wage series only after 2012.

We describe the errors and mismanagement in wage statistics from three aspects: inappropriate sampling for large establishments in Tokyo, inappropriate compiling procedures, and the discarding of vital data for correction.

Inappropriate Sampling for Large Establishments in Tokyo

Large establishments are quite heterogeneous, not distributed normally, with large variance. So the statistical authority has required surveying of all establishments (comprehensive survey) with 500 and more regular employees. The Labour Ministry, however, conducted a sample survey arbitrarily without any notification to the authority and thus violated the Statistics Act. In contrast, the ministry complied with the law with respect to 46 prefectures other than Tokyo, and it regularly surveyed all establishments with 500 and more employees in those prefectures as approved by the authority. Figure 7 explains the comprehensive and sample surveys, and Table 7 shows the sampling method the Labour Ministry planned and approved. The number of establishments with 500 and more employees in Tokyo was 1,464, but the actual number of surveyed establishments was only 491.

Figure 7: Schematic Explanation of Comprehensive Survey and Sample Survey



Source: Authors' Preparation.

Table 7: Survey Method Approved by the Statistical Authority

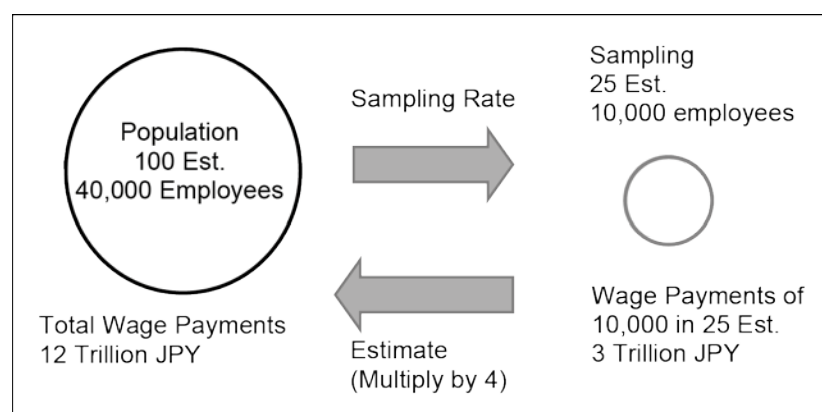
Establishment Size (Regular Employees)	Sampling	Survey Method
500 and more	Comprehensive	Mail, Online
30–499	Sample	Mail, Online
5–29	Sample	Examiner, Online

Source: Ministry of Health, Labour and Welfare.

This inappropriate sampling for large establishments in Tokyo causes a possible problem involving large errors. The changes due to large sampling errors might be erroneously interpreted as true changes. This has possibly sizable effects on the change in the macroeconomic average wage. Exactly such an effect seems to have taken place in January 2019.

Inappropriate Compiling Procedure: Estimation Failure

The Labour Ministry treated the sample survey's wage payments for Tokyo's large establishments as if they were those of comprehensive surveys and failed to multiply them to estimate the total wage payments for these establishments. Figure 8 shows a schematic example of the correct estimation (multiplying) procedure. We assume that there are 100 establishments with a total of 40,000 employees and that the sampling rate is 0.25. In this case, the sample numbers total 25 establishments and 10,000 employees. The wage payments of 10,000 employees in 25 surveyed establishments are assumed to be 3 trillion yen. To obtain the total wage payment of 40,000 employees, that is 12 trillion yen (population), the sample wage payment (3 trillion yen) should be multiplied by the inverse of the sampling rate (i.e., four). The Labour Ministry failed to perform this multiplication. The ministry claimed that this was a mistake in adjusting the computer program, and that it was undetected for a number of years.

Figure 8: Estimation (Multiplying) Procedure – A Schematic Example

Source: Authors' Preparation.

This failure causes a serious problem: the average wage at the national level had been underestimated since 2004, because the wage level in Tokyo is much higher than that in other areas. Since many government-sponsored insurance and other benefits are indexed to these wage statistics, the cumulative effects of underpayment are sizable and politically sensitive.

The Labour Ministry corrected the values of wages between 2012 and 2018 by multiplying the inverse of the sampling rate in Tokyo and announced these as a “recalculation” of values. Table 8 shows the size of underestimation of the reference wage of government-managed benefits; the average wage is underestimated by approximately 2,000 yen (0.5%–0.6%) per month in total cash earnings.

Table 8: Total Cash Earnings per Month (yen)

Calendar Year	New Correct Series	Old Incorrect Series	Difference
2012	315,334	314,126	1,208
2013	316,023	314,048	1,975
2014	319,175	316,572	2,603
2015	315,856	313,799	2,057
2016	317,862	315,581	2,281
2017	319,453	316,978	2,475
2018	323,546	322,131	1,415

Source: Ministry of Health, Labour and Welfare.

Discarding of Data Vital for Correction

In order to calculate the average wage series and total wage payment, the number of employees and the industry and regional classification of establishments are necessary. The Labour Ministry, however, discarded the following crucial data: individual establishments’ wage data of old samples at the time of sample replacement in January 2007; information about industry classification of establishments of new samples in the January 2009 sample replacement, corresponding to the 2010 industry classification change; and pre-2012 employment insurance data that are used to estimate the number of employees between census years. Because everyone who is involved in analyzing and forecasting macroeconomic data needs the data that the ministry claims they are unable to reconstruct, the Statistics Commission has an obligation to conduct statistical forensics about this issue.

3.2 Immediate Microeconomic Impacts and Political Fallout

To (partly) compensate for the underpayment of employment insurance and other benefits, the cabinet had to revise its plan for the general account budget for fiscal year 2019 on 19 January, even before making its presentation to the Diet, which was truly exceptional. The revision added 650 million yen to the budget (government contribution part).⁵ This is mainly financed by the issuance of deficit-covering government bonds.

However, most of the cost will be incurred by employees and employers. The government official estimates that the total cost caused by the underestimation amounts to 79.5 billion yen, including expenses for updating computer software (see Table 9).⁶ The bulk of this amount will be paid out from the Labour Insurance Special Account (contributions of employers and employees).

⁵ The general budget for fiscal year 2019 is 101 trillion yen, and GDP is 550 trillion yen, for comparison.

⁶ The Ministry of Health, Labour and Welfare (2019).

Table 9: Total Cost Caused by Underestimation
(Approximate Amount, yen)

	Employment Insurance	Worker's Accident Compensation Insurance	Sailors Insurance	Grants for Employers	Sum
Sum	47.2 B	26.4 B	1.8 B	4.1 B	79.5 B
Additional benefits	27.6 B	24.1 B	1.6 B	3.1 B	56.4 B
Amount added	2.0 B	1.4 B	100 M	200 M	3.7 B
Office expenses (budget for FY 2019)	17.7 B (8.5 B)	0.9 B (0.6 B)	30 M	900 M	19.5 B
Number of people targeted or cases	19.42 million people	<ul style="list-style-type: none"> • Pension benefits: 270,000 people • Temporary absence from work: 450,000 people 	10,000 people	300,000 cases	<ul style="list-style-type: none"> • Insurance benefit: 20.15 million people • Subsidies: 300,000 cases

Source: Ministry of Health, Labour and Welfare (2019). <https://www.mhlw.go.jp/content/10301000/000469901.pdf>.

This development caused political uproar in the Diet. Issues included these: Who is responsible for the inappropriate procedures in 2004 and the subsequent cover-up of the problem? Was the secret correction of 2018 without reporting to the Commission, making a sharp increase in wages, politically motivated to praise “Abe-nomics”?

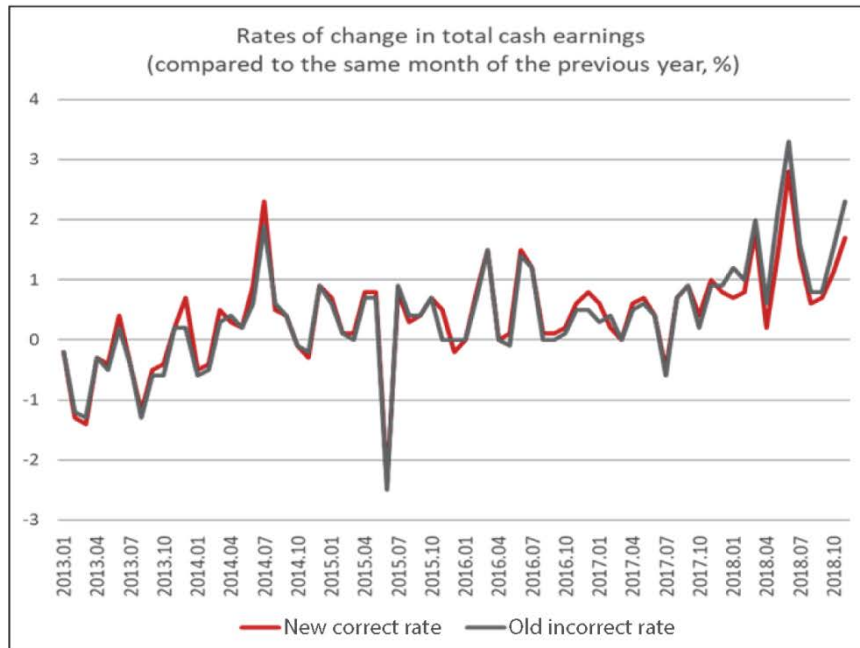
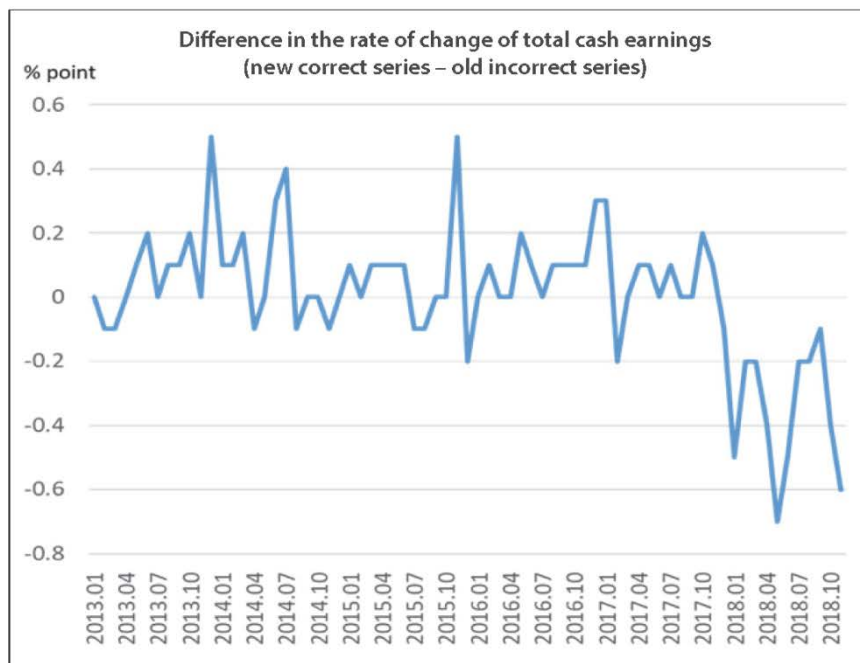
Meanwhile, statistical errors spread beyond the Monthly Labour Survey. Inappropriate procedures violating the Statistical Act have been uncovered in another set of wage statistics, guardian the Basic Survey on Wage Structure, though the violation is to a lesser degree.⁷ Moreover, the Labour Ministry's poor handling of these violations aggravated the problems. The ministry failed to provide sufficient and timely information, apparently trying to minimize the damage by not revealing too much to the Statistics Commission. This strategy clearly backfired, and it poses a serious problem for the Commission, which tries to maintain its integrity as of government statistics.

3.3 Macroeconomic Impacts

On the other hand, the impacts on macroeconomic data are small, at least after 2012, for which the recalculated correct data are available. Figure 9 shows the impacts on total cash earnings.⁸ Panel A shows the rates of change in total cash earnings calculated by the correct compiling procedure and by the incorrect one, and Panel B shows the difference. As shown in this figure, the rates of change in total cash earnings were mostly underestimated by 0.2 percentage points until December 2017. The impacts on SNA employment compensation are also small. Table 10 shows the impacts on the compensation of employees and the household saving rate caused by the revision of the wage statistics. The household saving rates in fiscal years 2016 and 2017 were revised upward by 0.2%.

⁷ Though to a more modest extent, inappropriate procedures have also been found in other ministries' statistics.

⁸ Total cash earnings are the total for contractual cash earnings and special cash earnings. Contractual cash earnings are earnings paid according to the method and conditions previously determined by labor contracts, collective agreements, or wage regulations of establishments.

Figure 9: Impacts on Total Cash Earnings**Panel A****Panel B**

Source: Ministry of Health, Labour and Welfare.

Table 10: Macroeconomic Impacts by Revisions**Panel A: Compensation of employees**

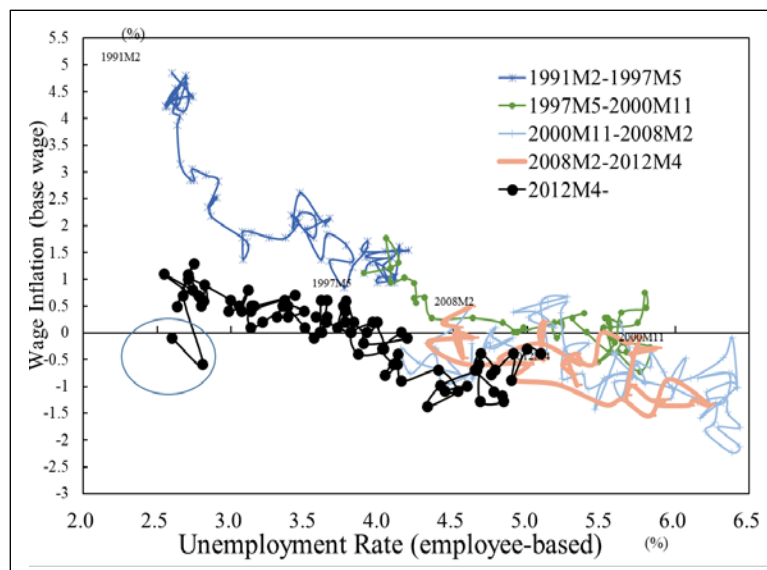
	(1) Revised Estimates (25 January 2019 Release)		(2) Initial Estimates (10 December 2018 Release)		Extent of Revision (1)–(2)	
	Level (Trillion Yen)	Annual Growth Rate (%)	Level (Trillion Yen)	Annual Growth Rate (%)	Level (Trillion Yen)	Annual Growth Rate (%)
FY2016	271.2	–	270.5	2.4	0.7	–
FY2017	276.3	1.9	275.6	1.9	0.7	0.0

Panel B: Household saving rate

	(1) Revised Estimates (25 January 2019 Release)		(2) Initial Estimates (10 December 2018 Release)		Extent of Revision (1)–(2)	
	(%)		(%)		(%)	
FY2016	2.8		2.5		0.2	
FY2017	2.5		2.3		0.2	

Source: Economic and Social Research Institute, Cabinet Office (2019). https://www.esri.cao.go.jp/en/sna/data/kakuhou/files/2017/pdf/announce_en_20190125.pdf.

However, impacts on macroeconomic wage-inflation data are severe. Figure 10 depicts the wage Phillips curve (constructed by one of the authors) from February 1991 to February 2019. The wage Phillips curve drawn for the 1991–2011 period (colored dotted line) is drawn from the old data available in December 2018. Because the Labour Ministry deleted data files because of the problem, we cannot redraw the wage Phillips curve for the period. Moreover, the January–February 2019 data (circled part), showing a sudden large downward shift of the curve, making wage inflation negative, seems unreliable because of a large error in the wage series due to inappropriate sampling, although such errors did not show up (fortunately or unfortunately) until January 2019.

Figure 10: Wage Phillips Curve

Source: Nishimura (2019).

3.4 Statistical Forensics: How to “Uncover” the Culprit of the Problems

Two problems about the wage data of the Monthly Labour Survey remain: the discarding of vital data to (allegedly) prevent 2004–2011 wage data from being reconstructed and the strange behavior of (average) wage inflation after January 2019.

The Statistics Commission is delving into data collection and compilation procedures of the Labour Ministry, which in the past was a “black box” not open even to the Commission, and then will identify possible causes of the problem and make recommendations to rectify the problems. This procedure can be described as statistical forensics.

“Discarded Data” Problem

The Labour Ministry claimed that it cannot recalculate correct data for 2004–2012 because critical data were discarded. The Statistics Commission uncovered the fact that we do not need all discarded data, and only some industry data are absolutely necessary. The Statistics Commission examined data still available in Tokyo and found a possible feasible alternative method for reconstruction of the missing nationwide wage statistics.

Concerning individual establishments’ wage data of old samples at the time of sample replacement in January 2007, necessary industry data can be recalculated for 41 out of 45 industries from Tokyo data, which are available online from the Tokyo Metropolitan Government. An estimation method is proposed for the remaining four industries. Concerning information about industry classification of establishments for new samples in the January 2009 sample replacement, corresponding to the 2010 industry classification change, the Statistics Commission shows that this information can be calculated from existing individual sample data and possibly from other governmental statistics. Finally, concerning pre-2012 employment insurance data that are used to estimate the number of employees between census years, the Statistics Commission shows that necessary information can be recovered from the existing “incorrect” data. So there is no need to get pre-2012 data.

The Labour Ministry confirms that the Statistics Commission’s recommendation is feasible and sensible. The ministry is now in the process of reconstructing missing wage data between 2002 and 2017.

Strange Behavior of Wage Inflation in January 2019

Sample replacement for large establishments in Tokyo has greatly contributed to the downward shift of the wage Phillips curve, from the positive to the negative domain, as shown in Figure 10. Table 11 shows an analysis of the gap caused by sample replacement. The new samples have 0.6% lower base wages than the old samples. Of this difference, 0.4% is the contribution of large establishments. This shows that the failure to conduct comprehensive surveys for large establishments in Tokyo produces substantial noise in wage inflation in January 2019, and the resulting negative wage growth is misleading.

Anticipating this, the Statistics Commission required the Labour Ministry to conduct comprehensive surveys for large establishments in Tokyo. The Ministry is scheduled to conduct these surveys in mid-year.

Table 11: Gap Caused by Sample Replacement**Results of January 2019 Survey**

Establishment Size	Contractual Cash Earnings (yen)			Degree of Contribution (%)
	New Sample (After Sample Replacement)	Old Sample (Before Sample Replacement)	Difference (New - Old)	
5 and more	259,482	261,058	-1,576 (-0.6%)	-0.6
500 and more	360,600	367,996	-7,396 (-2.0%)	-0.4
100-499	295,156	296,088	-932 (0.3%)	-0.1
30-99	252,324	254,736	-2,412 (0.9%)	-0.2
5-29	214,264	214,260	+4 (+0.0%)	+0.0
Change of composition				+0.1

Source: Ministry of Health, Labour and Wealth (2019). http://www.soumu.go.jp/main_content/000615313.pdf.

4. CONCLUDING REMARKS

This paper explains the situation with recent statistics reform in Japan. Existing GDP and related statistics are in a stage of major overhaul. Primary statistics used for GDP measurement will also change accordingly to accommodate changes in GDP measurement. Furthermore, we explain the serious errors and mismanagement of wage statistics of the Ministry of Health, Labour and Welfare, which in fact were revealed in the course of the statistical reform that the Statistics Commission is leading. The Statistics Commission is now conducting statistical forensics to rectify the problem.

There are a number of implications for economic research that stem from the Japanese experience.

First, existing GDP and related statistics are changing in many countries, including Japan, as statisticians try to incorporate new activities and quality adjustment. And the means of data collection is also changing. The immediate and profound implications for economic research are that researchers should know what data they are using. Knowledge of the data collection and compilation method is very important to avoid misinterpretation of research results.

Second, some analysts have become suspicious that unnoticed problems may remain in other statistics. This supports the view that a swift move of statistics authority is absolutely necessary to maintain the integrity of statistics. Moreover, active involvement of economic researchers in government statistics is highly recommended. The ultimate watchdogs of statistics are active users of these statistics, who have an important stake in statistical accuracy. Academics are those who have an important stake in the statistics.

Finally, a lingering question arises: Is Japan unique? Are these statistical problems solely Japanese ones? We doubt it, and we think these problems are the consequences of rapid change in the data environment and dwindling resources for statistics. These issues are common to all economies, though the severity differs from economy to economy. Japan has the most acute problem, but other economies, especially rapidly aging Asian economies and already aged European economies, will follow Japan.

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