

Study on Information and Knowledge Management for Policymaking of PPP / PFI

Atsuo Miwa and Hiroshi Deguchi

Abstract—The Public-Private Partnership/Private Finance Initiative (PPP/PFI) project is recognized as an important policy-making tool in the “Basic Policy for Economic and Fiscal Management and Reform” as well as the “Japan Revitalization Strategy,” which are guidelines for Japan's macroeconomic policy.

In this study, project and program management (P2M) is used as the framework of knowledge management for a PPP/PFI project. It proposes a data collection and management method necessary for project management and measurement of effectiveness, and examine the analysis and verification method.

Index Terms—Evidence-Based Policy Making (EBPM), PFI, PPP, Project and Program Management (P2M)*.

I. PURPOSE AND BACKGROUND OF THIS RESEARCH

According to the “System of National Accounts 2008(2008 SNA),” an international standard for National Accounts agreed upon by the United Nations, the Public-Private Partnership (PPP), is a long-term contract between two units, whereby, one unit acquires or builds an asset or set of assets, operates it for a period, and then hands the asset over to a second unit. Such arrangements are usually between a private enterprise and government; however, other combinations are possible, with a public corporation as either party. These schemes are distinctively described as the PPP, Private Finance Initiatives (PFI), Build, Own, Operate, Transfer schemes (BOOT), and so on. PFI is a way of financing and managing public sector projects through the private sectors. In the case of Japan, it refers to projects based on the Act on Promotion of Private Finance Initiative (the PFI Act). A PPP/PFI project is recognized as an essential policy tool in the “Basic Policy for Economic and Fiscal Management and Reform” and the “Japan Revitalization Strategy,” which are guidelines for Japan's macroeconomic policy.

However, the data collection and knowledge management methods necessary for everything are not sufficient in measuring the effects of the macroeconomic aspect of the project.

It is difficult to strictly distinguish PPP / PFI from ordinary public and private works concerning the business content. However, PPP/PFI is positioned between regular public works and private works in terms of the implementing entity and contract form (Refer to Fig. 1).

This study uses project and program management (P2M)

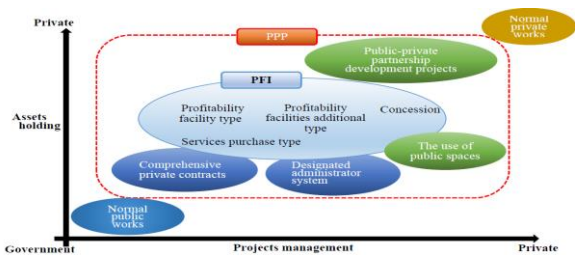
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as the framework of knowledge management for a PPP/PFI project. P2M is a program and project management knowledge system. This program is a business in which a plurality of projects are organically combined to realize a program mission, and it is composed of a plurality of projects.

The study proposes an analysis and verification method based on the available data, and knowledge management. Further, it conducts a study on the administration of macroeconomic policies of the PPP/PFI project.

The data collection and management methods for policy evaluation proposed here were applied in the concrete policy of PPP/PFI in this study; however, they can be used for more general project-based policy evaluation [1]-[6].



Remarks: Based on data from the Cabinet Office PFI Promotion Office
Fig. 1. Concept and features of PPP / PFI projects.

A. Project Management of PPP/PFI

The development of public facilities using PPP/PFI is one of the major policy priorities of the Japanese government. Unlike conventional public initiatives, it is not clear if all related enterprises will be subject to audits. However, for individual projects, the system itself incorporates the publication of information starting from the planning stage along with project management and accounting methods similar to civilian enterprises over a contract period of at least ten years.

The study compares PFI with public facilities development initiatives that are entirely managed on yearly budgets, where calculations of asset values are not necessarily rigorous. PFI is applied to rationalize the relationship between value-added and business resources in profit and loss management, as well as asset management.

Therefore, concerning the operational structure of individual projects, PFI is more suited for rationalizing and enhancing operations compared to traditional initiatives for the development and management of public facilities [2]-[6].

B. PPP/PFI Undergo Insufficient Quantitative Evaluation as Policies

The problem with PFI is that it does not establish a mechanism for evaluating policies in their entirety; rather, it provides a method for evaluating the management of

individual initiatives. Key Performance Indicators (KPIs) are quantitative indicators for measuring and monitoring the degree of achievement in attaining the goals. In many cases, the government's goals involve designating the output of initiatives themselves (factors such as the number of initiatives or initiatives' total amounts) as KPIs. However, when assessing policy success, factors such as the efficiency of PPP/PFI within the country's Policy Programs for macroeconomy must be evaluated in comparison with those of conventional public facilities development initiatives. At present, it appears as if sufficient evaluations based on data in public documents are being carried out. Ideally, policies should be evaluated based on results from assessments that include basic indicators such as an initiative's efficiency [2], [6]-[8].

C. A Proposal in This Study

This study compiled financial information for the individual businesses of PFI. As the definition of business and information disclosure is not sufficient, a method that compares PFI with the Japanese System of National Accounting (JSNA) is proposed. According to the Cabinet Office documents, the JSNA is a key statistic based on the Statistical Law, which complies with the United Nations International Standards (SNA), and aims to systematically record the Japanese economy in an internationally comparable form. It is indicated that the method can be used to verify the quantitative performance of PFI measures, and to establish an evaluation method for policy management as well as a Plan-Do-Check-Act (PDCA) cycle in future [1], [7]-[10].

According to the "Preface" of the "Reference Guide" published by the World Bank in 2017, the scope of Public-Private Partnership (PPP) is very wide.

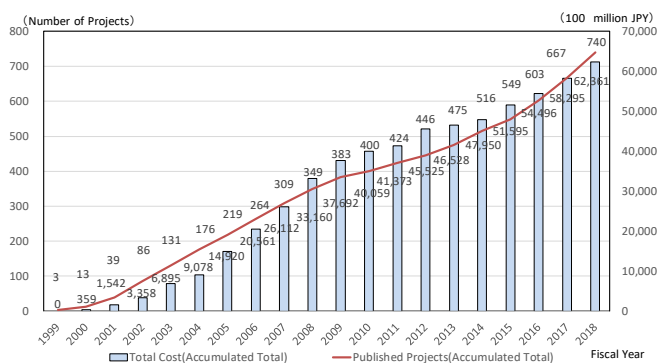
"A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance" [2], [3], [10].

policies, and the scope of business is an aggregation of the initial contract amounts. Therefore, it is worth noting that the business results are not an aggregation of the business expenses that are paid each year [2].

As will be described later, frameworks and tools for management are institutionally prepared for each PFI project, and frameworks are in place to carry out the PDCA cycle. As a result, it is presumed that the disclosure of information regarding the content of the businesses is more advanced compared to that of standard public enterprises [2], [4].

However, the PFI is a program in which all the individual businesses belong, and it is a form of economic and fiscal policy. The total expenditure is calculated regularly (at least once a year), which is the output of each project, and a general breakdown is performed to carry out accurate management based on a logic model. It is difficult to be certain about the existence frameworks to precisely grasp the total investment and aggregate operational costs. These are fundamental pieces of data for the macroeconomic evaluation of the PFI project as a whole. Therefore, it is difficult to claim that sufficient conditions are in effect for an Evidence-Based Policy Making System.

To change this situation and recognize the quantitative condition of the PFI project regularly, the study focuses on the premise that each PFI project must establish a Special Purpose Company (SPC) as a fundamental rule of the policy. The collected financial documents from the SPCs were collected, and the data were evaluated from a statistical perspective. Besides, being the basis for the operation and management of each project the financial documents could also serve as essential data elements for the development of creating indices to optimize the entire business of organizing and operating social capital. The need to evaluate the creation, measurement, and analysis of indices through a project-wide measurement is believed to be important. It may assist in precisely understanding the progress of the PFI project as a program and enabling the assessment of its relationship with outcome indices. Further, the developed index should be appropriately communicated with staff members involved in the policy as well as with stakeholders and third parties so it can be established as a foundation to for the successful implementation of the PDCA cycle regarding the policy.



Source: Modified from the PFI Promotion Office, Cabinet Office, Government of Japan, "On the Current State of PFI"

Fig. 2. The number of PFI projects and contract amount.

As indicated in Fig. 2, according to the Cabinet Office, there have been 740 cases of construction, maintenance, and management of public facilities resulting in 620 million JPY since the establishment of the PFI Act in 1999. However, it is noted that these data demonstrate for the number of businesses for which the government or public corporations, which are placing the orders, have published implementation

II. LOGIC MODEL BASED ON THE PFI ACT

A. Transparency of Procedures Guaranteed by the System

Within the PFI Act, documents will need to be created and published for each of the following business processes. Although all business processes for each business have not been published, there are multiple guidelines; (1) Guidelines for the Process of Implementing the PFI Project, (2) Guidelines for the Division of Risk Regarding the PFI Project, (3) Guidelines for VFM (Value for Money), (4) Guidelines for Contracts: Considerations for Contracts in the Implementation of the PFI Project, (5) Guidelines for Monitoring, and (6) Guidelines for the Rights to Operate Public Facilities and Businesses Operating Public Facilities) that have been created by the Cabinet Office, which is the branch of the government responsible for the act.

For PFI projects, these guidelines clarify the steps of the

project in Fig. 3, the specifics of the project, and the risk-sharing between the government and the private sector.

Usually, it is assumed that the business processes will be carried out based on these guidelines. Not only are the guidelines core principles for the management of each project, but they also assist in establishing an insight when a private enterprise prepares a business plan to participate in the project [2], [4], [5], [8], [10]-[12].

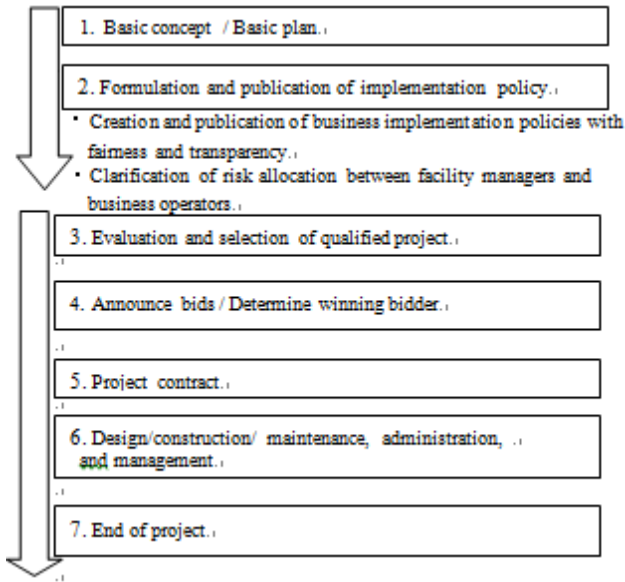


Fig. 3. PFI Business process.

B. Indices Required for the Evaluation of the Logic Model

It is presumed that, in terms of the logic model mentioned in A, regulations have been established in great detail for PFI in their current state regarding processes ranging from planning, operations, management, and conclusion of planned projects.

However, as already stated, while evaluating the outcome indices for the policy, examining PFI as a program is not sufficient to grasp the overall output [2], [5], [10], [13].

This can be observed from the review of “Action Plan to Promote PPP/PFI Promotion” by the government.

Furthermore, we can know the current situation from the fact that the “visualization” of businesses is a goal in the action plan [2].

III. PFI PROGRAM EVALUATION PROPOSAL

Currently, in Japan, there is no legal regulation for the content and scope of PPP projects, unlike PFI projects. It is possible to use the examples in various government documents to infer information about some projects. Nevertheless, it is difficult to comprehensively and specifically regulate the structure or size of the projects and collect data on them.

For that reason, this study investigates PFI projects whose contents and specifics are within the scope of the PFI Act.

The PFI Act does not require the SPCs running PFI projects to create financial statements. Still, as SPCs are usually operated as businesses, the creation of these documents is mandated by the Companies Act and other laws [2], [4], [13].

Furthermore, for PFI projects, the document that specifically references the projects’ financial reporting is the “Guidelines Regarding Monitoring” (established September 2013), created by the Cabinet Office to manage/monitor the policies practiced by PFI projects. These guidelines foster the understanding of a company’s financial situation through balance sheets, profit and loss statements, and cash flow statements [2], [6], [8], [14].

Compared to regular public enterprises, individual PFI projects are required by law to publish more details about the processes involved from the beginning to the end of the project. Besides, regarding the facility maintenance and operations process as well as interim reports, in some cases, the financial statements of SPCs are created and published in the same way as those of listed companies, so the transparency of these projects is higher than it was in the past [2], [6], [14].

A. Transparency and Objective Evaluation of Project Management

As noted above, financial statements are used to monitor PFI projects. However, it is necessary to go beyond management accounting for project management and to pay attention to functions for information provided to third parties who are not directly involved in business management. In the end, due to the public nature of the business of social capital development and management, the author avoids the bearing of excessive risk burden by the government or public enterprise that order projects, considering this important in the sense of making these accountable to the public and local residents. Therefore, mandating the disclosure of financial statements, etc., by operating bodies is also considered advisable.

In general, compared to regular public works, PFI projects are required by law to disclose details about the process from the beginning to the end of the project. As shown in Fig. 4, the scale of public works is calculated from the financial statements of the government, which is macroeconomic information based on the financial statements of individual economic entities (private business companies) [2], [4], [10].

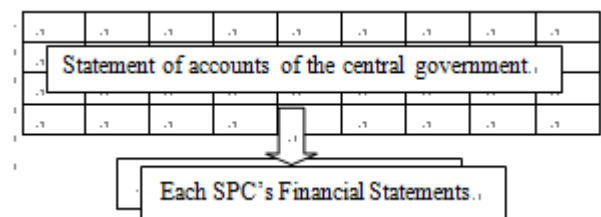


Fig. 4. From financial statements of budget items to financial statements of each project.

Under the PFI Act, the scope of improvement of public facilities, targeted for PFI projects is limited. However, PPP, which includes a wider range of projects, can often be considered in the form of expanding the scope targeted by the PFI Act, from the viewpoint of proper management of public facilities.

The Study focuses on the project structures incorporating project management that embeds project transparency, planning, and medium- to long-term risk management.

It further focuses on the systemization of the possibility of conventional effective functioning and initiatives to make effective use of creative devices for private funding.

The survey forms necessary for input of data, and forms for output of survey data can be identified in advance or applied to work in the specific corporations such as independent administrative corporations [2], [4], [6], [8], [10], [13], [14].

B. Objective Evaluation when Handling PFI as a Collection of Projects

In the previous section, it was noted that the scale of expenditures, for projects involving improvement of public facilities, carried out by local governments is recorded through statements of accounts, and that the state of individual projects is not visible. It was also noted that, through the proliferation and expansion of PFI projects, improvements are being made in the financial statements, of individual companies, and tools are being prepared for disclosing the form of individual projects to third parties.

While it is not valid for all cases, an increasing number of examples have disclosed individual financial statements concerning these SPCs.

This makes it possible to provide indices that handle individual (industry-specific) areas of economic activity and units of economic actors in groups, causing the central government and regional improvement to function as programs for the management and operation of projects.

By incorporating P2M elements into systems themselves, along with designing and modifying systems through an accumulation of evaluations of individual projects, there is increasing potential for quantitatively and finely assessing effectiveness [2], [8], [10].

C. Integration into the Macro Account (JSNA) Structure and the Benefits Thereof

In section A, the measures to be used as indices of individual companies are described.

A comprehensive extraction and integration of the data from the SPCs' and other financial statements' for each specified subject are performed. Subsequently, it is compared with the Japanese System of National Accounts (JSNA). The JSNA is comprised of the basic statistics of Japan as well as the national accounting system (macro accounting). The comparison for macroeconomic and fiscal policy verification and planning. Moreover, comparison with economic entities at the level of prefectures and government-designated cities becomes possible through clarification of correspondence relationships with the Japanese Prefectural Accounts (JPA), which are Japanese regional accounts created in conformance with JSNA [1], [9].

However, at present, as shown in Table 1, it is difficult to assess at a glance how PPP/PFI projects are reflected in the account structure by examining JSNA from its emblematic items. The same holds for the JPA, the regional account structures created in conformance with the JSNA. In this case, as the JSNA does not explicitly categorize and handle PFI projects at present, it is believed they will be treated as a kind of satellite account [9].

On the other hand, improvement-related projects for public facilities are considered.

As the entire project cost has been included in the government statements of accounts, with the increase in PPP/PFI and other forms, it becomes more difficult to examine the overall picture of project costs.

In the past, for the total amount related to social capital improvements, the total amount of expenditures for single fiscal-year project expenses could be understood relatively clearly by examining the statements of accounts. However, in the case of concessions and other self-supporting PPP/PFI projects, it can be stated that there is a need to understand the content of the financial statements of each project.

The advantage of recording in the JSNA is that, unlike budget books and statements of accounts, economic cycles at the macroeconomic level, from flow accounting through double-entry bookkeeping to stock accounting, can be expressed in a consistent account structure.

Moreover, within this account structure, output amounts, intermediate input amounts, added value amounts, fixed capital formation, and fixed capital stock for each project are captured quantitatively. In a chronological order, and within the basic statistics that are the foundation for national economic and fiscal policy, it will be possible to make macro-level comparisons with existing public enterprises and public works under the direct control of the government. As a result, the comparison with other macro indices will be carried out consistently, and the accuracy of data-based consistent planning/drafting and verification will be improved.

Further, regarding Japan's Prefectural Accounts, as no stock account is prepared at present, comparisons with fixed capital stock are not possible.

D. Challenges for Integration into the Macro Accounting System (JSNA)

According to the current JSNA estimates, the supply and demand of goods and services for each item are aggregated based on the commodity flow method shown in Fig. 5. The output amounts corresponding to companies' sales and the intermediate input amounts corresponding to production costs are estimated by considering transportation costs and the distribution margin at all stages for each item,

In this manner, the business surplus that corresponds to profit in the promotion of companies in a micro-like way, such as private companies, is not created by aggregation of data by subtracting intermediate inputs, from the output amount of each field of economic activity (industry category).

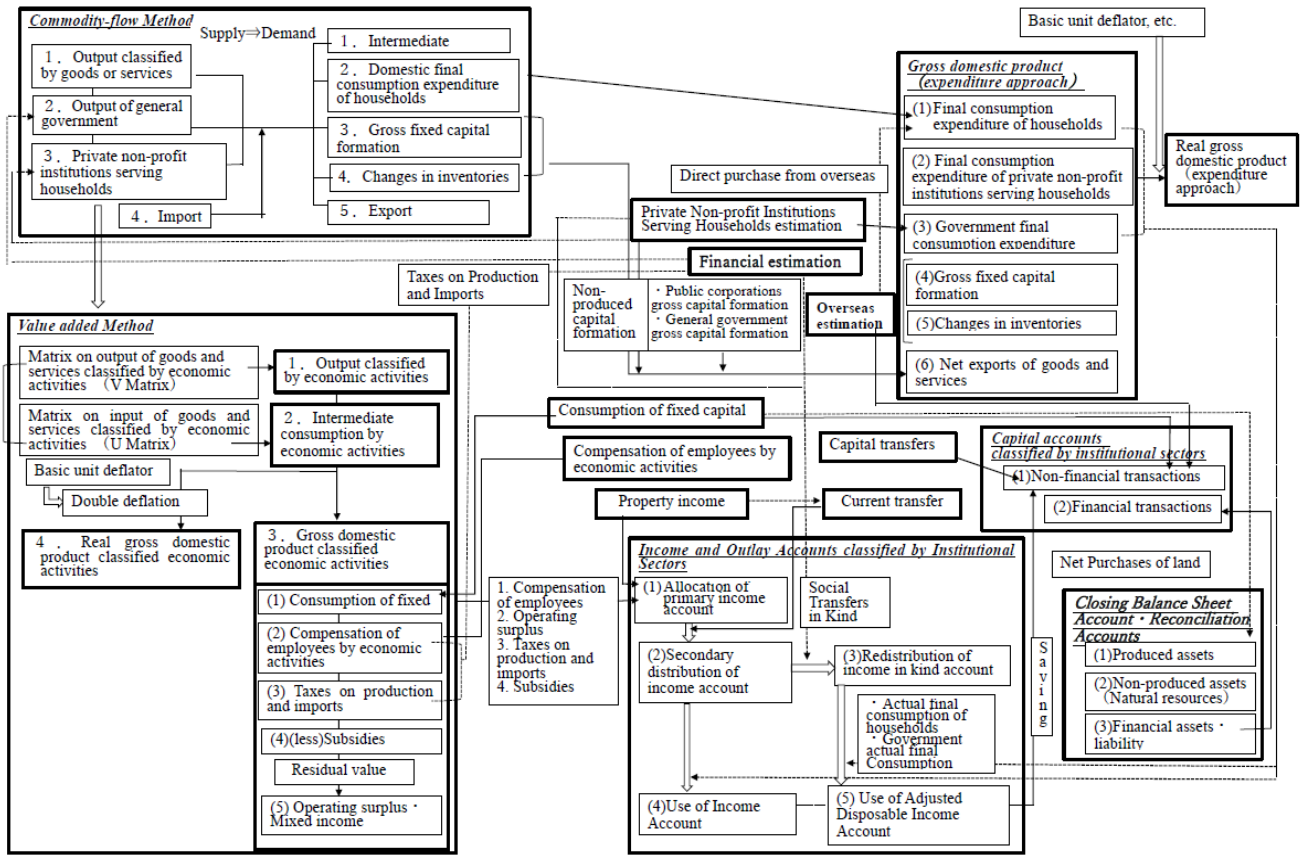
However, in the JSNA, for public companies, and so forth, estimation is also conducted through the aggregation of the financial statements noted in section B, and this is not necessarily a contradiction with the JSNA's estimation method. In this case, the definitions and content do not necessarily match the JSNA's accounting items and the accounting items on the financial statements of public companies, even if the names are similar.

Thus, it is necessary to obtain companies' financial statements and particulars, to make corrections for discrepancies in the content of items. While performing this task, it is essential to accurately understand the concepts and estimation methods of the JSNA and making the adjustment methods clear.

E. How to Use SPCs' Financial Statements

As described in section D, a conceptual adjustment will be required between the financial statements of SPCs and JSNA accounts (Refer to Fig. 6). A simple comparison with the

JSNA macroeconomic indicator will be possible through compiling SPCs' financial statement data by using the method of Nakamura (1999).



Remarks: Based on data from the Cabinet Office Economic and Social Research Institute
Fig. 5. Flow chart of the JSNA estimation method.

| SPCs Balans Sheets Items | JSNA Balans Sheets Items | SPCs Statements of Income Items | JSNA Flow Items |
|------------------------------|--|--|--|
| Assets | 1. Non-financial assets | 1 Revenues | "Gross Output(at. Producers' prices" (wholesale and retail trade margin only) |
| Current assets | (1) Produced assets | 2 Operating expenses | Intermediate input, Taxes on production and imports less subsidies (→ Indirect tax), Consumption of fixed capital), Compensation of employees (Manufacturing sector only) |
| Cash and cash equivalents | a. Fixed assets | Gross profit | No corresponding item |
| Inventories | (a) Dwellings | 3 Selling, general and administrative expenses | Intermediate input, Taxes on production and imports less subsidies (→ Indirect tax), Consumption of fixed capital), Compensation of employees (sales management sector only) |
| Fixed assets | (b) Other buildings and structures | Operating income | Operating surplus plus inventory valuation adjustments |
| Tangible fixed assets | (c) Machinery and equipment | 4 Non-operating income | Receivable property income, Non-life insurance claims |
| Buildings, Structures | (d) Defense equipment | 5 Non-operating expenses | Payable property income, Non-life insurance fee (net), Fines, Other current transfers (net) excluding payment dividends |
| Machinery, equipment | (e) Cultivated biological resources | Ordinary income | Calculated from the above items, or "Entrepreneurial income (after dividends received)" with simplified method, plus dividend paid and inventory valuation adjustment |
| Tools, furniture, fixtures | (f) Intellectual property products | 6 Extraordinary income | Difficult to explain exact correspondence |
| Land | (2) Non-produced assets (Natural resources) | 7 Extraordinary loss | Difficult to explain exact correspondence |
| Construction in progress | (a) Land | Net income | Difficult to explain exact correspondence |
| Intangible assets | (b) Mineral and energy resources | | |
| Right of using facilities | (c) Non-cultivated biological resources | | |
| Software | 2. Financial assets | | |
| Other intangible assets | (1) Monetary gold and SDRs, etc. | | |
| Investments and Other assets | (2) Currency and deposits | | |
| Deferred assets | (3) Loans | | |
| Liabilities | (4) Debt securities | | |
| Current liabilities | (5) Equity and investment fund shares Of which shares | | |
| trade payables | (6) Insurance, pension, and standardized guarantee schemes | | |
| Short-term borrowings | (7) Financial derivatives and employee stock options | | |
| Fixed liabilities | (8) Other financial assets | | |
| Bonds payable | 3. Liabilities | | |
| Long-term debt | (1) Monetary gold and SDRs, etc. | | |
| reserve for special repairs | (2) Currency and deposits | | |
| Equity | (3) Loans | | |
| Shareholder's equity | (4) Debt securities | | |
| Capital stock | (5) Equity and investment fund shares Of which shares | | |
| Capital surplus | (6) Insurance, pension, and standardized guarantee schemes | | |
| Retained earnings | (7) Financial derivatives and employee stock options | | |
| | (8) Other financial assets | | |
| | 4. Net worth | | |
| | (ef) Historic monuments | | |

Remarks: Based on data from the Cabinet Office Economic and Social Research Institute, and Nakamura (1999)
Fig. 6. Correspondence between corporate accounting (SPCs' financial statements) and JSNA account items.

According to the Cabinet Office's estimation methodology informative guide, public companies' financial statements are being used as basic data in the JSNA's actual estimates as well [1], [7], [13], [15].

In the absence of governmental statistical research that serves as the basis for PPP/PFI policy verification, SPCs' financial statements are collected to extract data and information. Comparison and verification with the

JSNA-based data became possible by rearranging the aggregated data into the JSNA-based data.

For example, comparison with industrial sectors and economic entities in the macroeconomy will be possible in the form of general management indicators such as Return on Assets and Return on Equity. These can be obtained from the aggregated PFI business data as well as the JSNA-based data [7], [9].

TABLE I: CORRESPONDENCE BETWEEN THE JSNA TABULAR REPRESENTATIONS

| Classification of economic activities | Gross output (at producers' prices) | Intermediate input | Gross domestic product (at producers' prices) | Consumption of fixed capital | Net domestic product (at producers' prices) | Taxes on production and imports less subsidies | Domestic factor income | Compensation of employee | Operating surplus and mixed income |
|---|-------------------------------------|--------------------|---|------------------------------|---|--|------------------------|--------------------------|------------------------------------|
| | ① | ② | ③ = ① - ② | ④ | ⑤ = ③ - ④ | ⑥ | ⑦ = ⑤ - ⑥ | ⑧ | ⑨ = ⑦ - ⑧ |
| 1. Agriculture, forestry, and fishing | | | | | | | | | |
| 2. Mining | | | | | | | | | |
| 3. Manufacturing | | | | | | | | | |
| (1) Food products and beverages | | | | | | | | | |
| (2) Textile products | | | | | | | | | |
| (3) Pulp, paper, and paper products | | | | | | | | | |
| (4) Chemicals | | | | | | | | | |
| (5) Petroleum and coal products | | | | | | | | | |
| (6) Non-metallic mineral products | | | | | | | | | |
| (7) Basic metal | | | | | | | | | |
| (8) Fabricated metal products | | | | | | | | | |
| (9) General-purpose, production, and business-oriented machinery | | | | | | | | | |
| (10) Electronic components and devices | | | | | | | | | |
| (11) Electrical machinery, equipment, and supplies | | | | | | | | | |
| (12) Information and communication electronics equipment | | | | | | | | | |
| (13) Transport equipment | | | | | | | | | |
| (14) Other manufacturing | | | | | | | | | |
| 4. Electricity, gas, and water supply, waste management service | | | | | | | | | |
| 5. Construction | | | | | | | | | |
| 6. Wholesale and retail trade | | | | | | | | | |
| 7. Transport and postal services | | | | | | | | | |
| 8. Accommodation and food service activities | | | | | | | | | |
| 9. Information and communications | | | | | | | | | |
| 10. Finance and insurance | | | | | | | | | |
| 11. Real estate | | | | | | | | | |
| 12. Professional, scientific, and technical activities | | | | | | | | | |
| 13. Public administration | | | | | | | | | |
| 14. Education | | | | | | | | | |
| 15. Human health and social work activities | | | | | | | | | |
| 16. Other service activities | | | | | | | | | |
| (regrouped) Market producer General government Non-profit institutions serving households Total | | | | | | | | | |

Remarks: Based on data from the Cabinet Office Economic and Social Research Institute.

IV. CONCLUSION

Based on the PFI Act, the scope of public facilities covered by PFI projects is limited. PFI and PPP are often considered from an asset management perspective. Whereas, business structures that incorporate project management techniques that in turn incorporate business transparency, planning, and medium- to long-term risk management are expected to work effectively with a wide range of traditional government procurement.

However, it is essential to collect data from financial statements, if systems or mechanisms that effectively use ingenuity, such as private funds or PFI, are introduced into a wide range of government procurement. Currently, as shown in part III, the scope of items is often different, even if the name is the same in the core statistics and company accounts such as the JSNA. To quantitatively validate policies, prepared a system that uses common forms and items needs to be prepared, collecting as much data as possible using a common form survey sheet for each target field.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Atsuo Miwa conducted the research and wrote the paper; Hiroshi Deguchi received comments and corrections regarding the concept and content of this paper; both authors have approved the final version.

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