

A Financial Analysis on Municipal Water Enterprise: the Case of Wajima City, Japan

日本の地方水道事業の財務分析: 石川県輪島市の水道事業を例に

Keywords: municipal water enterprises, water works, financial analysis

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Expected Time of Graduation: Sep. 2014

1. Introduction

Japan's water service, which has earned an international reputation on effective operations, is nevertheless standing on a critical juncture to review its management structure. Japanese public water enterprises are facing several difficulties. Public water enterprises are observing reduction in their financial revenues. Since the population of the Japanese society in general is decreasing and some proportion of population has started to drink bottled water, the structure of revenue is changing. Water businesses in general are getting fragile (Hattori, 2010, 41). While the sources of revenue are being gradually undermined, the huge capital is still required. The water infrastructures now being maintained are mostly constructed between 1970 and 1990; therefore, financially sustainable periods are going to end in the near future. It is predicted that necessary investment would be massive since huge amounts of infrastructures need to be renewed (Hattori, 2010, 45). Accordingly, it is anticipated that the public water enterprises will experience critical scenes.

2. Objective and Research Question

Understanding the circumstance over the public water enterprises in Japan, the current study's objective is to discover solutions to make the enterprises' management financially sound. In order to achieve this, firstly, the recognition of when a certain water enterprise will experience management crisis is needed. Secondly, some possible solutions will be discussed.

The research questions for this study are:

1. *When does a public water enterprise reach the management crisis?*
2. *What is the suitable solution that could be adopted when the public water enterprise reaches the management crisis?*

3. Literature Review

Some solutions to overcome the issues public water enterprises are facing (or will face in near future) have been discussed between policy makers and researchers. Ministry of Health, Labor and Welfare (MHLW) have proposed solutions such as widening of water supply area, partnerships with private sector, and optimization of water tariff (MHLW, 2013).

The solutions proposed by the government were

discussed and reexamined based on the literature. It is true that partnership between private companies brings some cost reduction effects (Ministry of Economy, Trade and Industry, 2012). Still, there remains a concern that small water enterprise cannot expect enough cost reduction (Watanabe, 2004). Expansion of the water supply areas is believed to be rewarding for the water enterprises from the viewpoint of scale merit. However, some reviews on this measurement take issue on whether the expanded water supply area is always populated enough (Nakamura, 2013). In addition to those solutions proposed by the governmental reports, the subsidies issue has been reviewed as well, identifying a number of authors who challenge its effectiveness (Urakami, 2004).

While various solutions have been proposed and reexamined, there is a need for exploring complexity specific to each case. This study has therefore chosen the case study methodology and focused on a single water enterprise in a rural middle-sized city.

3. Methodology

Conducting an analysis on nearly 13 hundred public water enterprises from the aspect of management, Wajima City of Ishikawa Prefecture seemed one of those needing precautions in Japan. Therefore, the current study examines Wajima City Water Enterprise (WCWE) as a case. In order to have a plausible prediction on the future of WCWE, some data were needed. Financial Accounts and Fixed Asset Ledger (information on infrastructures the enterprise possesses) being provided from the WCWE, the projection has been made mainly based on those two data. In order to make a consolidated future projection, firstly, the data of past WCWE has been reviewed. Gaining a general understanding on businesses of WCWE, the future projection has then been constructed.

4. Results

4.1 Preliminary Analysis

An analysis on the past data provided some meaningful results to make the future projection. The water supply population of WCWE is decreasing. Concluding that the water supply population is crucial for the business, a population projection was made in two patterns: the extrapolation method and the method using the data from national research institute. Apart

from the forecast of water supply population, a regression analysis between the revenue from water service and the water supply population proved that the relation between them is significant. Another result is that the relation between the amount of water used by customers of WCWE has a significant correlation with the number of water supply population. Based on these correlations, the revenue and cost of future WCWE has been attributed.

The key information related to the WCWE's capital investment was found as well. The public water enterprises procure finance from issuing a bond. Recently, foreseeing the critical situation of the water enterprises, MIC has made a study that proposes stricter restrictions on financial procurement (MIC, 2013). According to the study of MIC, the enterprises that are restricting themselves from issuing a bond at the level not exceeding more than 50% of redemption are found to be free from excessive deficit. In some cases the enterprise were issuing bonds that amounts to 90% to the capital expenditure it needed. Taking these finding into account, future financial procurement could take two forms: restricted and loose. Overall, a financial projection will be made in four patterns since two patterns on population and two patterns on financial procurement are each adopted.

Table 1. Patterns of Financial Projection

Population/Finance	Restricted	Loose
Extrapolation	Pattern #1	Pattern #3
National Institute	Pattern #2	Pattern #4

4.2 Financial Projection

The financial projection based on the data and findings from the preliminary analysis has revealed that WCWE will fall into deficit in the new future. In the pattern #1 and #2, where financial procurement is restricted, the deficit will be posted in 2020 and 2019. The pattern #3 and #4 under looser restrictions both posted deficit in 2019. It was also discovered that in pattern #1 and #2, the finance stored inside WCWE will run out in 2031 and 2028, respectively. In other words, the WCWE will confront management crisis where they cannot invest for its future any longer. In the cases of looser conditions on financial procurement, it was discovered that the finance inside the WCWE will not be exhausted. However, the debt held inside the WCWE will become so huge that exceeds the amount it can return, i.e. WCWE will confront a financial crisis. WCWE is most likely to confront a critical scene in less than 20 years. There is a need to examine possible solutions to avoid confronting such scenes.

5. Discussion and Conclusion

Discussion is made on the main results of the analysis. It was revealed that WCWE's businesses will be damaged from huge costs inflation, such as depreciation cost, interest, human resource expenses, power expenses and so forth. The cost reduction is suggested to WCWE in order to avoid the critical situation. Another suggestion is to raise the water tariff. The table below shows the extent of how much water tariff per 1m³ should be raised just before the year WCWE goes into deficit. Another possible solution is to implement partnership with private companies, so that it can expect cost reduction effects. However, the doubt over whether cost reduction effects of partnership is significant for a small-size water enterprise remains. Therefore, the partnership is recommended when other cost reduction measures can be implemented only inside WCWE. Except from the solutions that WCWE can themselves adopt, three policy measures were suggested: facilitation of a water tariff rise, introduction of the competition principle, and subsidy. In conclusion, both the effort and policy support is needed to avoid the critical scene of public water enterprises.

Table 2. The Extent of Water Tariff Hike

Patterns	Price [yen] (Fiscal Year)
#1	92.67 (2019)
#2	89.40 (2018)
#3	84.97 (2018)
#4	92.64 (2018)

6. References

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