<Research Notes>

Present Situation of the Disaster Area's Economy from the Point of View of Investment–Savings Balance and Role of Second-Tier Cities

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ABSTRACT
Seven years have passed since the Great East Japan Earthquake. The purpose of this research is to propose specific measures for regional revitalisation on the basis of trends witnessed in the disaster area’s economy. We quantitatively measure structural changes and grasp the actual state of the afflicted area’s economy. In doing so, the investment–savings (I–S) balance is used to evaluate the autonomy of afflicted regional economies. It is also necessary to encourage the resilience of the urban system itself within the disaster area. To that end, we decided to pay closer attention to the second-tier city group.

KEYWORDS: Great East Japan Earthquake, Investment-Saving Balance, Second-Tier Cities

JEL CLASSIFICATION: O20

1. INTRODUCTION

1.1 Study Background

Seven years have passed since the Great East Japan Earthquake. In the coastal areas of Iwate, Miyagi and Fukushima—three prefectures that witnessed great damage—movement towards full-scale recovery is obvious, except for some cities in Fukushima Prefecture that experienced nuclear damage. The area’s change during this time has been severe. Indeed, from 2010 to 2015, the population has decreased in twenty-three of the twenty-seven municipalities in the coastal areas of both the Iwate and Miyagi prefectures. In six municipalities, the decline has exceeded 15%. Furthermore, the urban population increased only in Sendai City, Rifu Town, Natori City and Iwanuma City in the area. Just what concrete measures for real economic recovery from the disaster-caused difficulties may be expected?

1.2 Purpose of the Study

The purpose of this research is to propose specific measures for regional revitalisation on the basis of trends witnessed in the disaster area’s economy. To do so, we quantitatively measure structural changes in that economy and population movements from the afflicted cities, and thus grasp the actual state of the afflicted area’s economy (Andoh and Nakamura, 2008). In doing so, the

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investment–savings (I–S) balance is used to evaluate the autonomy of afflicted regional economies. The reason for adopting it is to capture the change in the disaster area economy, considering the prefecture’s account.

The I–S balance to capture the regional balance is as follows (Doi, 2005). In terms of economic statistics, GRP (Y) is expressed by following equation.

\[ GRP^* (Y) = Private \, Consumption \, Expenditure \, (C) + Private \, Investment \, Expenditure + Government \, Expenditure \, (G) + Export \, (EX) - Import \, (IX) \]

*GRP = Gross Prefectural Domestic Product

This relationship leads to following equation.

Balance of Investment and Saving (Private Savings (S) - Private Investment (I)) + Fiscal Balance Surplus (Tax (T) - Government Expenditure (G))

= ITB (Interregional Trade Balance) Surplus (Export (EX) - Import (IM))

\[ (2) \]

In the expression derived from equation (2), it can be seen that excess savings (deficiency) in the private sector and excessive government revenues (insufficiency) are equal to the regional balance surplus (deficit) in external sector transactions. However, because these are identities, their relationship is not one-sided; they are related to each other. Equation (2) shows that the population transition in each of the aforementioned regions is thought to be reflected in each region’s balance through consumption and savings trends.

In this research, we first clarify the transition of regional balances in the three prefectures of Fukushima, Iwate and Miyagi from the viewpoint of I–S balance theory. Then, we analyse the population transition quantitatively from the viewpoint of urban systems (i.e. a second-tier city approach) located in the disaster area for both the Iwate and Miyagi prefectures. On the basis of the results, we propose an urban policy for disaster area recovery.

2. ESTIMATION METHOD

Owing to constraints on available basic materials, we used “prefectural accounts”, which were estimated and classified by prefecture. In such prefectural accounts, a standards revision was undertaken according to the 2011 benchmark that conforms to the annual estimate of national economic accounts in 2015. Hence, the figures since 2006 have been retroactively revised. Therefore, the data period runs from 2006 to 2015, and the Great East Japan Earthquake occurred during this period. In addition, as target areas, we have subsumed the Iwate, Miyagi and Fukushima prefectures, along with Sendai City.

Using these data, we estimated each term of the foregoing equation (2) as follows. First, we calculated private investment as the sum of private residential investment, private non-residential investment and change in private inventories. Next, government expenditure was calculated as the sum of government consumption, public investment and change in public inventories. We calculated private savings by subtracting private consumption and government consumption from the prefectures’ disposable revenues. The balance of investment and saving was calculated by deducting private investment from the aforementioned private savings. Finally, the fiscal balance surplus was calculated by deducting the balance of investment and saving from the regional balance surplus. The ITB surplus includes a ‘statistical discrepancy’.

2.1 Estimated Results of the I–S Balance

Figures 1–4 show the secular change of the I–S balance. Their charts are shown by the percentage of gross prefectural domestic product. The ITB of Iwate Prefecture had been stable in its deficit since the Great East Japan Earthquake (see Figure 1). In the disaster year itself, this deficit expanded...
significantly, but has been shrinking ever since. However, the ITB has not returned to pre-disaster levels. In addition, the fiscal balance shrank significantly during the year of the disaster, similar to the transition of the ITB, and the deficit continued to shrink. Because the balance of investment and saving has been almost zero, deficits in the ITB are compensated by a deficit in the fiscal balance.

**Figure 1:** Balance of Investment and Saving in Iwate Prefecture (as a Percentage of Gross Prefectural Domestic Product)

The ITB of Miyagi Prefecture has tended to be in deficit since the earthquake (see Figure 2). In the year of the disaster, this deficit widened significantly. After that, the deficit has shrunk, and it is about to return to pre-earthquake levels.

**Figure 2:** Balance of Investment and Saving in Miyagi Prefecture (as a Percentage of Gross Prefectural Domestic Product)

However, it has yet to return to pre-earthquake levels. Compared with Iwate Prefecture, the deficit has been short-lived. In addition, although the fiscal balance has shown a stable surplus, it turned into a deficit in the year of the disaster. Since then, the deficit has shrunk, and the fiscal balance has returned to black ink in fiscal 2014. In fiscal 2015, it was almost zero. The fact that the balance of investment and saving remained in deficit meant that private investment was active. The trends for ITB in Sendai City, which account for about half of the total expenditures in Miyagi Prefecture, are almost the same as those in the prefecture (Figure 3).
From this fact, the transition of the ITB in Miyagi Prefecture is considered to be greatly affected by the transition of Sendai City. The regional balance in Miyagi Prefecture is better than that of Iwate Prefecture, because Sendai is a major city.

Fukushima Prefecture contrasts with the Iwate and Miyagi prefectures (Figure 4). Before the earthquake, the ITB of Fukushima Prefecture had been contracting but maintained a surplus.

In the year of the disaster, this deficit had expanded significantly and, later, the deficit gradually expanded. Thus, in contrast to the Iwate and Miyagi prefectures, the ITB in Fukushima Prefecture has apparently yet to have reached a recovery trend.

Given the current financial situation of Japan, it is impossible to improve the ITB by an across-the-board income redistribution scheme in the future. Therefore, we need a regional policy based on ‘selection and concentration’. Therefore, where should a policy be concentrated? In spite of the acceleration of the growth of the Sendai metropolitan area, other areas are on the decline. To deal with this reality, it is important to encourage the revitalisation of the entirety of the affected area. It is also necessary to encourage the resilience of the urban system itself within the disaster area. To that end, we decided to pay closer attention to the second-tier city group.

The theory of second-tier cities, advocated by Ann Markusen et al., is related to the restructuring of city groups and its policy task. I would like to make a proposal for the restoration of the affected city groups using this way of thinking (Markusen, 1999).

3. ROLE OF THE SECOND-TIER CITY GROUP

The aforementioned second-tier city group is a cluster of cities located in the next hierarchy from the
top, in terms of population, etc., just below the first-tier cities (e.g. the Sendai metropolitan area) that are at the core of the disaster area. Until now, in the country, second-tier cities have been defined as cities below the capital of Japan, and the functions of these cities and their influence on the national economy have been noted. We decided to pay attention to these second-tier cities that affect the economic raising of the afflicted area as a whole and the robustness of economic revitalisation (Camagni et al.,2015).

Here, we attempted to find the second-tier city cluster in the Iwate and Miyagi prefectures. We took Fukushima Prefecture out of the scope, which expanded the deficits of the ITB. Fukushima Prefecture requires a more detailed analysis than this study can provide. We defined the urban areas on the basis of the individual urban areas affected (i.e. second-tier cities) by the percentage of the population and labour force whose place of work or schooling is in other cities, to the total population and labour force of those whose place of residence is in such cities. The proportion by which the first-tier city (central city) exceeds 3% (2015 census) is the definition used, and it is consistent with the definition of government-designated cities by the census. We found that the second-tier cities in the hierarchical structure of the affected urban areas centred on this first-tier city.

Table 1 shows the urban areas covering the afflicted municipalities in Iwate Prefecture. Because there is no government-designated city in Iwate Prefecture, a first-tier city does not exist. We extracted the hierarchy between the central areas and extracted Miyako City, Kuji City, Kamaishi City and Ofunato City as the second-tier city group.

Table 1 shows the arrangement by urban centre size of the metropolitan area covering the afflicted municipalities in Miyagi Prefecture. On the basis of the above setting criteria, the first layer city group is Sendai City. Then, from the hierarchical nature between the central areas, the second-tier cities are Ishinomaki City, Natori City, Tagaya City and Kesennuma City. However, both Natori City and Tagaya City show that enrolment and the enrolment rate in Sendai City are 42.8% and 42.3%, respectively, indicating that they are heavily influenced by Sendai City. For this reason, the second-tier city group included Ishinomaki City and Kesennuma City.
Table 2: Metropolitan Areas of Miyagi Prefecture

| Central Cities | Surrounding Area |
|---------------|------------------|
| Sendai City   |                  |
| Rihu Town     | 546,121          |
| Tagazyo City  | 43.97            |
| Siogama City  | 37.2             |
| Iwanuma City  | 34.01            |
| Natori City   | 26.55            |
| Watari Town   | 20.89            |
| Yamamoto Town | 13.35            |
| Sitigahama Town | 26.45          |
| Matusima Town | 26.55            |
| Iwanuma City  | 26.45            |
| Yamamoto Town | 13.35            |
| Isinomaki City | 7.9             |
| Higasi Matusima City | 3.59 |

Tagazyo City

| Central Cities | Surrounding Area |
|---------------|------------------|
| Rihu Town     | 32,833           |
| Siogama City  | 15.39            |
| Matusima Town | 8.68             |
| Tagazyo City  | 5.5              |

Sioigama City

| Central Cities | Surrounding Area |
|---------------|------------------|
| Rihu Town     | 27,094           |
| Matusima Town | 12.76            |
| Tagazyo City  | 8.88             |
| Sioigama City | 8.64             |

Isinomaki City

| Central Cities | Surrounding Area |
|---------------|------------------|
| Rihu Town     | 73,736           |
| Higasi Matusima City | 33.36 |
| Onagawa Town  | 19.53            |
| Matusima Town | 3.43             |

Iwanuma City

| Central Cities | Surrounding Area |
|---------------|------------------|
| Watariki Town | 23,364           |
| Natori City   | 10.28            |
| Yamamoto Town | 7.02             |
| Iwanuma City  | 6.14             |

Yamamoto Town

| Central Cities | Surrounding Area |
|---------------|------------------|
| Watariki Town | 17,778           |
| Yamamoto Town | 9.28             |
| Iwanuma City  | 4.23             |

Higasi Matusima City

| Central Cities | Surrounding Area |
|---------------|------------------|
| Kesennuma City | 51,607           |
| Minami Sanriku Town | 7.14   |

Note: The population in the central city is the total persons employed there and students aged 15 years or more who are permanent residents. The percentage of the surrounding city is the ratio (%) of workers and schoolchildren who are over 15 years and working and studying in the central city as permanent residents of each city.

Sources: the 2015 Census

The population of Sendai City and its surrounding cities, which make up the first-tier city group of Miyagi Prefecture, is increasing. In addition to the above, the following points are clarified. In the second-tier city group in both the Miyagi and Iwate prefectures, despite the declining population, the decrease is smaller than in the other affected municipalities. This suggests that the ranking of affected municipalities in the metropolitan hierarchy is related to a transition of the population after the disaster.

4. SECOND-TIER CITIES AND URBAN POLICY FOR THE RESTORATION OF DISASTER AREAS

The population decline in second-tier cities in the disaster area has continued. However, the rate of decrease is moderate compared with the whole disaster area’s average, and the potential for population recovery is expected to be large. This situation in the second-tier city group, linked with the declining birth rate and overall ageing of Japan, needs to be mitigated or recovery needs to be led by some specific policy intervention. The rise and fall of the second-tier city group is directly linked to the revitalisation of the disaster area. Therefore, what kind of urban policy is effective for recovery of the disaster area? To date, several bold policies have been attempted in the affected areas. In the present study, the existing measures for revitalisation are positioned from the following three frameworks in the second-tier city approach, and we would like to hypothetically indicate the direction of their development.

(1) Discover and utilise resources unique to each local government

The regeneration of afflicted areas will proceed by reorganising the socioeconomic resources unique to the area, thereby exerting a competitive advantage and stimulating the vitality of the local industry. Even outside the afflicted area, there is a development of measures from these perspectives. However, here stimulation of regional resources by non-traditional, skilled methods has been attempted. Indeed, new relationships between businesses that have not benefited from cooperation so far are also being formed. Precisely which factors of regional agglomeration are important have appeared through networking. New relationships between individual enterprises have begun to form. New products have been created through the ‘sixth industrialisation’ in agriculture and fisheries that
were closed in the past (Miyako City, Kesennuma City). Further, efforts to share, which is another important factor of agglomeration, have been remarkable. Kamaishi City is promoting new businesses that rent private homes and rooms (minpaku) in collaboration with Airbnb, the world’s largest provider of matching services for private accommodations. A guidebook, Explore Kamaishi, introducing the charm of Airbnb and Kamaishi in English has been created by local high school students. The guidebook introduces places, shops, etc. that serve as guides and includes an effort that involves local resources. There is also a matching movement that is a third factor of economic agglomeration. To promote a cohesive attitude among high school students with their home town, a career-building programme has been created to facilitate opportunities for them to meet local ‘cool adults’. This project is sponsored by the UBS AG group, a financial enterprise in Switzerland. As a measure to promote the transfer of young people into Kamaishi City, ‘Cooperation Volunteers for Regional Revitalisation’ was established. This project attempts to adopt entrepreneurial talent in the Tokyo metropolitan area, and requires them to establish a new business in one to three years (Kamaishi City). Fostering the learning, sharing and matching in the affected area creates the ‘nucleus’ of a new industrial cluster. In future, the further evolution and deepening of region-specific attempts will be essential (Duranton et al., 2004).

(2) Deepening the special-zone policy for second-tier cities
The special-zone policy was positioned as the trump card for disaster area revitalisation (Katoh, 2018b). In fact, there is a case where a large-scale shop was opened using the special-zone policy in an exclusive industrial district, where shops may not be located under the city planning law (Kamaishi City). To flexibly manage and operate special zones, we needed a special organisation such as an ‘affected area redevelopment cooperative’. Regarding the special-zone policy, issues pertaining to institutional design have been pointed out, but this will be delivered under separate cover (Katoh, 2018b).

(3) Evolution of wide-area cooperation among affected cities and towns
It is necessary for the activation of the second-tier cities to be linked to the economic revitalisation of the disaster area as a whole. For this purpose, wide-area cooperation among cities within the disaster area is essential. In particular, cooperation between the second-tier cities and the third- and fourth-tier ones connected to them is necessary. Kamaishi City has concluded an agreement with Otsuchi Town, and the two are now beginning to take on various initiatives together.

In this paper, we derived the assumption that policy intervention into disaster-affected, second-tier cities is effective and efficient for the revitalisation of affected areas as a whole. How will the revitalisation of second-tier cities affect the overall affected area? I would like to undertake that topic in another study.

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