

Title	中山間地域における地域通貨の流通に関するシミュレーション エージェントベースシミュレーションを用いた制度設計支援に向けて
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Agent-based Simulation on Circulation Mechanism of Community Currency in Hilly and Mountainous Area

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As a solution to various problems in hilly and mountainous area, community currency attracts attention for community reproduction or regional economy vitalization. Main objectives of community currency are to establish autonomic growth of the regional economy, to promote a reciprocal exchange based on mutual trust, to revitalize nonmarket service and to enrich and diversify communication among residents. However, many community currencies in Japan were terminated or suspended, because they were not circulating in the areas. The residents in hilly and mountainous area, which is especially suffering from depopulation, have two problems. First, there are few stores where community currency can be used. And the second, the community currency tends to concentrated on specific persons and stores. These problems concern the design of the circulation structure of community currency at the introduction stage.

The purpose of this study is to clarify the mechanism for circulating community currency in hilly and mountainous area using agent-based simulation.

We build a model simulating hilly and mountainous area, specifically, Kawaguchi, Nagaoka-city, Niigata. It is to be noted that we are discussing the institutional design of

community currency, because people are considering to introduce community currency in the near future in Kawaguchi. In order to make the model, we conducted a field survey in Kawaguchi, and we referred to the past survey of consumer behavior in Kawaguchi. From an interview to key persons influential in introducing community currency to Kawaguchi, we found that the customers of the local shopping area put emphasis on distance from their home to shops, while the customers of the outside consider more about price and quality of goods. Moreover, results of our survey and the past survey of consumer behavior showed that suburban stores attract customers of local shopping area. From these surveys, we found trade-off between distance (from home to the shops) and price, and also between distance and convenience, both of which within and beyond Kawaguchi. We built the regional model from these results of the investigation.

To elucidate the circulation mechanism of community currency, we made a resident agent who selects a store from 3 areas. Here, the resident agent selects a store based on the habit of use of community currency, the habit of use of legal currency, community-oriented value, evaluation of the stores, and the balance of community currency. As simulation conditions, we controlled a discount rate of the use of community currency, named premium rate of community currency; the ratio of the community currency to salary; and the availability of the community currency to volunteer. We observed change of the purchase rate of convenience goods, semi-shopping goods, and shopping goods within the area. The reason we paid our attention to the premium rate is that it is said that a high premium rate raises the velocity of circulation of community currency and enlarges the effect of revitalization of economy. The reason why we focus on the rate of the community currency paid as a salary is that it may control stagnation of community currency in the store, and may promote the use of community currency. We focus on the propriety of the volunteer through community currency, since Nishibe et al. (2008) indicated that community currency connected the nodes in a distribution network, which were not connected only by commercial use.

If the rate of a premium is raised, a purchase rate within the area will also go up. The price cost of a regional store declines and the evaluation of a regional store becomes high, because the goods price of a regional store giving a discount according to the rate of a premium. If the rate of the community currency in a salary is raised, a purchase rate of the area will also go up. Suppose the ratio of the community currency in a salary is 20%, the balance of community currency and the probability to choose a regional store increase, and the probability of the habit of use of community currency will also increase. If a salary is paid, the community currency balance will increase, and then a regional store is more likely to be chosen. When there is a volunteer, the purchase rate of goods within the area increase, thus the choice

probability according to the community-oriented value also increases. Since the community-oriented value is maintained at the fixed range, the probability to purchase goods within the area increases, and the probability according to the habit of use of community currency also increases. Moreover, since people get community currency by volunteer work, the balance of community currency increases, thus the chance to choose the area as a purchase place will also increase. Furthermore, the occurrence probability of volunteer increases according to the habit of use of community currency, community-oriented values, and the balance. Also, it is a factor in raising the purchase rate of the area.

The positive feedback between the habit of use of community currency and community-oriented value is essential to increase the probability to purchase goods within the area. To make sure this positive feedback to work, it is suggested that making the rate of the community currency paid as a salary high enough and the volunteer through community currency effective. Moreover, to raise and maintain the community-oriented value, the activity to advertise the significance, the purpose, and the usage of community currency is required. Besides, performing this activity should also take the matching of volunteer into considered. In order to encourage this activity, it is effective to carry out experiment on the design of institutional arrangements by a simulation as shown in this paper.