

南海トラフ巨大地震における地震情報に対する主観的信頼度変化による都市土地利用変化

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東日本大震災の発生以降、国内ではハード面、ソフト面ともに様々な地震対策が行われてきた。東日本大震災発生時に防潮堤が津波により倒壊したことなどにより、国や地方自治体は人命を最優先に確保する避難対策としてハザードマップに注目している。地震危険度に関する情報とは、土地の位置と被災時の被害の程度を関連付けたものであり、ハザードマップもその一つである。また東日本大震災により多くの中小企業が人材や設備を失い廃業に追い込まれたことにより、緊急事態に備えるためのBCP（事業継続計画）の策定や運用を行うことで資産を守り、被災時に企業が被る影響を小さくしようという動きもある。このようなソフト面の地震対策はより迅速に行われるべきであり、地震危険度に関する情報提供の効果の測定はその有用性の後押しになるのではないかと考えられる。

地震危険度情報の提供による効果に関する理論的研究は極めて少なく（例えば山口ら^{1) 2)}、その効果を実際の都市に当てはめたシミュレーション分析も極めて少ない。そこで本研究では家計の地震危険度情報に対する主観的な信頼度の変化による家計の立地選択行動を南海トラフ巨大地震により大きな被害を受けると予測されている愛知県豊橋市を事例に考察することを目的とする。

Urban Land Use Change by a Change of Household Subjective Trust in Information for Nankai Trough Huge Earthquake

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Various disaster measures have domestically been done from both hard aspect and soft side since Great East Japan Earthquake occurred. The tide embankments were collapsed by tsunami when Great East Japan Earthquake occurred, and the country and the local government started to pay attention to the hazard map as an evacuation measure that secures the life in top priority. Information on disaster risk relates the location of land and the level of damage when a big earthquake occurs. The hazard map is one of such information sources. Moreover, at Great East Japan Earthquake, a lot of small and medium-sized firms lost human resources and equipment, hence those firms must be closed down. Considering this business operating situation, there is a movement where the earthquake damage on firms is managed to be small by protecting firms' equipment by making and operating a BCP (business continuity planning). The Headquarter of Earthquake Research Promotion in Ministry of Education, Culture, Sports, Science and Technology in Japan estimates the occurrence probability of Nankai (Southern Sea in Japan) Trough Huge Earthquake within 30 years from now as 70%. Thus such a soft side measure for a huge earthquake should immediately be implemented, and the measurement of effects of earthquake information provision is expected to be a backup for soft measures.

The theoretical studies concerning the effects of provision of earthquake information are extremely few (e.g. Yamaguchi et al.), and simulation analyses of those effects on an actual city is also extremely few. Therefore this article aims to investigate the household location choice behavior affected by provision of earthquake damage information taking Toyohashi City in Japan as a study region which is expected to receive a significant damage by Nankai Trough Huge Earthquake.

This study employs an analytic urban economics approach, assuming that Toyohashi City takes a linear shape and there are two districts where the vulnerabilities to an earthquake in the two districts are different. That is, Toyohashi City is divided into two districts, one is safe for an earthquake while another one is risky for an earthquake. And then this study theoretically considers how the land rent and the land use pattern of these two districts will be changed by provision of earthquake damage information and by a change in household subjective trust in earthquake information.

When household subjective trust in earthquake information is taken into account, the bid rent in the risky district decreases while that in the safe district increases as household subjective trust in earthquake information gets higher. Hence the size of residential area in the risky district shrinks while that in the safe district expands. However when any household does not trust the earthquake information at all, the bid rent symmetrically distributes on either side of the CBD. Thus an increase in household trust in earthquake information moves households from the risky district to the safe district prior to the earthquake occurrence resulting in a reduction of damage on household life and asset. This impact hits the peak when the safe and risky districts are symmetrically distributed on either side of the CBD.

From above-mentioned discussions we can conclude that if the risky district spreads across the CBD with a larger size than that of the safe district, the disaster damage prevention effect by provision of earthquake information can be enhanced by improving safeness of the risky district.