

氏名(本籍)	やざわ のりひこ 矢澤 則彦	(東京都)
学位の種類	博士(情報科学)	
学位記番号	情 第 17 号	
学位授与年月日	平成 12 年 4 月 13 日	
学位授与の要件	学位規則第 4 条第 2 項該当	
最終学歴	平成 3 年 3 月 筑波大学大学院博士課程社会工学研究科修士課程	
論文題目	A Macroeconomic Analysis of Land Use for Agricultural Liberalization (農産物自由化と土地利用に関するマクロ経済分析)	
査 委 員	(主 査)	
	東北大学教授 佐々木 公 明	東北大学教授 鈴木 篤
	東北大学教授 森 杉 壽 芳	東北大学教授 長谷部 正 (農学研究科)
	東北大学助教授 安 藤 朝 夫	

論 文 内 容 要 旨

Abstract

From my review of past research described in Chapter 1, I found that not so many studies have tried to incorporate an explanation of the relationship between land use and the macroeconomic balance within the frame of two (or more) countries. It is therefore the *raison d'être* of this thesis is to call attention to a number of points which previous research has overlooked. Among others, the intrinsic role of land, i.e., factors of production, and real assets, have rarely been incorporated simultaneously in a macroeconomic model. Holding assets generally causes people to change their schedule of consumption and investment in broader perspective. *Agricultural land in UPA (Urbanization Promotion Area)* is sensitive to influence from the global economic condition and reflects the

worldwide balance of supply and demand of food. For example; those who are confronted with free-trade of agricultural products might be expected to part with their paddy fields because of land depreciation, and in turn, gains from the sale of land might be transferred to consumption. Moreover, land in some countries would be converted from agricultural use to other types of uses. These phenomena, however, may not emerge because the induced demand produced by specific policies possibly compensates for that conversion or wipe out the effect. All we can do is to pay closer attention to the intrinsic roles of both factors of production and real assets from a macroeconomic point of view.

Being supported by such a grasped background showed in Chapter 1, Chapter 2 presented a theoretical and numerical analysis of the effects of agricultural liberalization and rationalization policies on nation-wide land use and the nation's welfare. This analysis was developed by generalizing the Sachs and Boone (1988) model such that migration between urban and outer areas was incorporated and different land use was allowed. The main conclusion of this chapter is that liberalization and rationalization could produce a reverse effect on welfare. If the degree of progress by rationalization is in the lower level, liberalization has a positive effect on utility, whereas, in the state of higher rationalization, produces a negative effect. Also, it was demonstrated that social problems such as aging do not always weaken the welfare effect of liberalization under certain conditions.

Chapter 2, in nature, was exposed to several limitations to investigate the real agricultural environment especially in the asymmetric assumptions, which boiled down to the inconsistent framework between intertemporal decision for household and temporal decision for firms. To make this model more complete or realistic, Chapter 3 examined the possibility of incorporating more flexible models of free migration and a

regional-urban framework into a CIGE (**computable intertemporal general equilibrium**) model, and pursued "an operational model of national formation", in which I aimed to show the configuration of regional-urban land use affected by the forthcoming liberalized macroeconomic circumstances i.e., the step-by-step reduction of tariff on imported goods. From the difficulty of treating simultaneous equations in the model presented here, however, nonetheless I consequently was able to show *the intertemporal equivalent of three aspects*, still which is very important nature to hold the consistency for the macroeconomic models. It is impossible for us to evaluate recent Japanese macroeconomic trends until we devise a model introducing the intertemporal system as a kind of import substitution policy such that a target year of its balanced trade account is considered.

In Chapter 4, I tried to explain the operational model as clearly as possible because I was not able to completely simulate the full aspects of liberalization in the previous chapters. The purpose of this chapter was to construct a model by using the computable aspects of frameworks from previous chapters, considering the aging problem, reducing acreage policy, and import tariff. The main conclusions obtained are: 1) Among both (urban and outer) areas, as aging proceeds, it becomes more and more difficult to reduce the burden of the rate of savings to earnings which need to be taken over by the next generation; 2) In cases where the share of housing expenditure is small, I observed that the tapering-off situation in the agricultural sector was curbed; 3) The achievement of liberalization at an earlier stage is a desirable scenario in the meaning that the welfare (utility) is kept holding.

Through all the chapters, my interest was mainly put in replying to the question of whether or not I should continue liberalization in Japan

given that the population is quickly aging. Furthermore, I am looking at the question of whether the mandatory rationalization policy associated with liberalization could cause exhaust the economy. In this context, "the exhaustion degree" was *identically* (the expression "*reversely*" should be correct from a stand point of model interpretation) evaluated by the decrease of welfare or utility. Though the historic rationalization process was not explicitly modeled in my paper, I was able to show, in chapter 2, the difficult nature of rationalization peculiar to Japan. This was in accordance with the intuitive conjecture inferred in chapter 1, which can be interpreted to mean that the rationalization in the form of saving labor input leads to a decrease in welfare. It is conceivable that such an extreme conclusion was derived, however, mainly because I only included the rationalization of labor input in my model and not rationalization by mechanization. Unfortunately, this point had to be carried over to Chapter 3 and 4. To rectify this problem, a more realistic analysis should be conducted by introducing the aspects of substitutability between labor and capital into the model.

Furthermore, regretfully, I have not always treated all aspects of the multi-functional roles of agriculture. Amongst them, *food security* has especially been recognized as a most important function from the point of view of administration. As seen in the annual report by MAFF (i.e., Japanese authority of Agriculture), the Japanese government will continue to insist on the importance of food security also in the forthcoming negotiations of the WTO (World Trade Organization). Speaking from the perspective of a social scientist, when thinking of the future society, however, the most important thing is not to maintain the present state, but to analyze how the future will be transformed by extrapolating from the present state of affairs.

Although models presented in this thesis leave room for improvements, I believe that the results of this research have brought the problems of a real agricultural market into sharp relief. The atmosphere of crisis created by pushing liberalization and rationalization simultaneously is an important matter of concern to people presently engaged in agriculture.

Lastly if we turn my eyes to the historic aspects of the problem, it is difficult to introduce such aspects into the model, especially based on the fact that the so-called "agricultural administrative sense" has not been grown up since the Edo era mainly because the tenant farmers in Japan have unwillingly been tied in their rented land. In Western Europe and Oceania, for the people engaged in agriculture, it was a common phenomenon that the discord between the opinions of the management policy and the feudal lord drove them to transmigrate to the territories of other feudal lords. The reason why the tenant farmer in Japan was tied to the land is that they needed to build levees for the many river with rapid currents and also had to control common land by collaborating in work that was difficult to do alone. For example, in New Zealand which has a similar climate to Japan and has the same geographical territory, there was no room for non-rationality to occur, because the dairy and pasturage, which are inherently movable, are the center of their agriculture work. It is probable that, as a result of these differences, the mood of organization has been shaped by forces that are not challenged by the pressure of liberalization. Groping for the future direction of the agriculture in Japan can not be illuminated merely by using several models of economics, so it is necessary for us to make continual efforts to understand this complicated theme.

I have learned through this research that both liberalization

accompanied with rationalization policy and the aging problem leads to an undesirable future. I am sure that the research presented here leaves much to be desired, but at the same time it offers us immense opportunities to make meaningful proposals for solving urgent problems which otherwise would be postponed to future generations.

論文審査の結果の要旨

従来のほとんどのマクロ経済モデルは国内の土地利用とその変化を明示的に扱っていない。本論文は、都市部と農村部の土地利用を陽表的に導入し、特に、農産物の輸入自由化と農業生産の合理化という農業政策が土地利用の変化を通してマクロ経済と国民厚生におよぼす影響を分析したものである。論文は全編5章から成る。

第1章では研究の背景が述べられているが、日本の農業政策の変遷とそれに伴う国内土地利用およびマクロ経済指標の時系列的变化に関して詳細な検討が加えられている。そして、その諸変動を適切に説明するためのモデル構築について議論がなされている。

第2章は、都市部と農村部の2地域一般均衡モデルによって、農産物輸入自由化と農業生産の合理化が一国の土地利用と国民厚生におよぼす影響を理論的に、および数値解析の手法によって分析を行っている。主要な結論の一つは、生産の合理化が高い水準にあるとき、農産物の輸入自由化が推進されるならば国民の厚生はかえって低下する可能性があることである。特に、当該国が非農産物を輸出（輸入）して、その価格が低下（上昇）している状況でそのような自由化の負の影響が生じ得ることが示されている。これは、新しい知見である。

第3章は、土地利用の変化と地域間人口移動を考慮したより一般的なCIGE(Computable Intertemporal General Equilibrium)モデルを構築し、それに基づいて農産物の輸入関税を漸進的に引き下げる自由化政策の影響をシミュレートするためのシステムの解法を提案している。現実の政策を的確に評価するためのシステムを構築したことは、政策科学上大きな貢献である。

第4章は、3章で構築されたモデルの一部を用い、高齢化社会のもとでの農産物輸入関税引き下げの効果を実際にシミュレートし、その結果に基づいた政策提言を行っている。最も興味ある結論は、高齢化が進む下では関税撤廃による自由化をより早いステージで行うことが国民厚生の観点から望ましいということである。これは農業政策を立案する上で有用な知見である。

第5章では結論と今後の展望が述べられている。

以上、要するに本論文は土地利用を陽表的に導入したマクロ経済モデルを構築し、それを用いて種々の農業政策がマクロ経済と国民厚生に及ぼす影響を理論的に分析し、有用な政策提案を行っているものであり、情報科学の発展に寄与するところが少なくない。よって、本論文は博士（情報科学）の学位論文として合格と認める。