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## Studies in Fixed Investment Behavior in Japan: A Survey

*by Fumimasa Hamada*

This paper attempts to make a survey on empirical studies in fixed investment behavior in Japan. It includes main empirical results on fixed investment equations by industry (two or three digits classification) and ones as structural equations in macroeconometric models. Criteria for evaluation of them are, in principle, on the specification of investment functions, on the one hand, and characteristics of data used in those studies, on the other hand.

As a conclusion, it was notified that, even for the purpose of prediction of future investment demands, the possibilities of investigation of fixed investment behavior, in terms of a *single equation* type, has almost already been exhausted, so that the next stage will be to study simultaneous equations system, each of which should be estimated directly.

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## Pareto Optimality of Competitive Equilibria in the Presence of Externalities

*by Hiroaki Osana*

The relation of competitive equilibria and Pareto optima is considered for a general equilibrium model with externalities. Assuming all the agents know their own technical possibilities exactly, we show that (1) every competitive equilibrium where no consumer is locally non-satiated is Pareto optimal, provided "total external economies are maximized" or "total external diseconomies are minimized", and that (2) every Pareto optimum where some consumer is non-satiated and relevant convexity conditions are satisfied is a compensated equilibrium, provided "total external economies are minimized" or "total external diseconomies are maximized".

## Economic Development and Social Indicators

*by Kimio Uno*

This is a prototype econometric model aimed at revealing the relation among three mutually related viewpoints on an economy, namely, economic development, social indicators, and possible limits of economic growth. Empirical data is taken from the Japanese experience from 1950 to 1970.

The limits may arise from availability of factors of production. Equally important constraints on continued growth, however, are imposed by the public recognition of other values which have too often been ignored in the past. Recent attempts to deal with "non-economic" variables in addition to "economic" variables resulted in recent attempts to develop welfare indicators or social indicators. At the present time a general economic model capable of integrating what has been considered "non-economic" factors and more conventional economic factors is not available. This dichotomy is not warranted since "non-economic" factors have increasingly exerted their influence on economic factors.

In light of the seriousness of this lack of knowledge, the aim of this paper is to provide a theoretical and empirical framework for study of these problems which explicitly recognizes the interrelationships. The model is developed covering environmental indicators including input of environment to economic activities and output of pollutants; population status indicators including health, accident rates, crime rate, and hours of work; material benefit indicators including the use of the stock of consumer durables, housing capital, and social capital; density indicators, and speed of social transformation indicators. These variables are integrated into a macro-economic model having primary and non-primary sectors, saving and investment functions, consumption functions, price equations, and export and import functions. It is a combination of an economic development model and a system of social indicators.

The model has 74 equations, most of which are specified in log-linear forms. Individual equations are presented and some of the new concepts are explained. Finally, the simulation of the model for the 1950-1970 sample period and projection for 1985 using the derived reduced form coefficients is provided.

The relevance of the study to many of the problems plaguing Japanese society is considerable, since in Japan there is increasing concern over "non-economic" factors brought about by "economic" activity. They include environmental pollution, threatening exhaustion of natural resources, limited availability of land and water, increasing traffic injuries, frustration caused by high

density of economic activity, growing preference for leisure, maintaining technological progress, and rising prices.

The concern can be formulated into a set of rational and consistent policy measures only when the interrelationships of the set of problems are explicitly recognized. The formulation presented in this study is intended to provide theoretical and empirical content to an extended economic system, and is expected to serve as the basis for consistent policy decisions.