THE RELATIONSHIP BETWEEN THE CONSUMER EXPENDITURE ON SPORT AND THE GDP IN JAPAN

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INTRODUCTION

The proportion of the sport-related expenditure in total economy is not negligible nowadays. Does the increase of the sport-related expenditure cause the growth of GDP? Does the fluctuation in the economic growth rate affect the sport related expenditure? To answer those questions, it is required to analyse the data, taking the lags of the effects into consideration. A structural equation model may be effective in that kind of analysis, but a meaningful structural equation model requires a theoretical formulation and accumulated empirical studies, which have been hardly executed in this field in Japan. Thus we adopted the Granger causality analysis, which is executed in the framework of a multiple time series model, to clarify the relation between the consumer expenditure on sport and the GDP in Japan. According to Judge et. al. (1988), the Granger causality is explained as follows: A variable y_t is Granger-caused by a variable x_t if the information in past and present x_t helps to improve the forecasts of the y_t variable. Granger causality from y_t to x_t is defined analogously. Assuming that (x_t, y_t) is generated by a stationary, normally distributed, bivariate Vector Autoregression process, Granger causality tests are equivalent to block exogeneity tests in Vector Autoregressions (VAR).

METHODS

The quarterly data of consumer expenditure on sport was cited from the *Family Income and Expenditure Survey*. There are four sport-related items in the survey: "Sports equipment," "Sports monthly tuition," "Sports admission," "Sports facility charges." We made a variable by adding them together and named it as SPT. Quarterly estimates of GDP were cited from the web page of the Cabinet Office of Japan. We made an analysis of the data which began at the first quarter of 1994, when the method of estimation of GDP was modified. In VAR, each variable is required to satisfy the conditions of the stationarity. However, both SPT and GDP showed seasonal fluctuations, which violated the stationarity. Thus we calculated the growth rate from the year-before period of each variable, and used them for the dependent variables of VAR.

The analysis has three stages. In the first stage, we checked the stationarity of the data by plotting the actual series, the sample autocorrelation functions (SACFs) and the sample partial autocorrelation functions (SPACFs). In the second, we selected the order of VAR on the criteria AIC and SBC. Finally, Granger causality was tested by using block exogeneity tests executed in VAR procedure. GiveWin (Ver. 2.0) was used to plot the actual series, SACFs and SPACFs. The estimation of parameters of VAR models and the block exogeneity tests were executed by the "VAR" procedure in TSP (Ver. 4.5).

RESULTS

Both series, SPT and GDP, were judged to be stationary because the values of higher-order SACFs and SPACFs were significantly low. As for the order of the model, the VAR (1) model was selected by the criteria AIC and SBC. The parameters of VAR models and the results of block exogeneity tests are showed in table 1. The null hypotheses of block exogneity tests were not rejected.

DISCUSSION

The rejection of the null hypotheses means as follows:

The information in past and present value of the SPT does not help to improve the forecasts of the GDP.

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As for the former, it can be explained that the consumer sport expenditure does not have sufficient amount to effect the GDP in Japan. Is it possible to reach the same conclusion about the latter: The GDP does not effect the consumer sport expenditure in Japan? We should avoid a hasty conclusion because the P-value of the coefficient of GDP(-1) is rather small in the equation for the SPT. To reach a clear conclusion, it is necessary to analyse the yearly data and/or to collect the data in a longer period.

REFERENCES

Judge, G. G. et. al. (1988) Introduction to the Theory and Practice of Econometrics. JOHN WILEY & SONS, New York, pp. 767-770.

Table 1 The results of the parameter estimation and the tests of block exogeneity.

Equation for SPT		Equation for GDP	
Variable	Estimated Coefficient [P-value]	Variable	Estimated Coefficient [P-value]
SPT(-1)	0.339 [0.022]	SPT(-1)	0.011 [0.746]
GDP(-1)	0.584 [0.177]	GDP(-1)	0.776 [0.000]
C	-0.008 [0.300]	C	0.001 [0.482]
Block exogeneity: P=0.177		Block exogeneity: P=0.746	