Confidence and the Real Economy:
The Japanese Case

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Abstract

This paper empirically analyzes whether consumer confidence has an effect on the real economy in Japan. We use vector autoregressions including variables which represent consumer confidence. We show that in the cases of quarterly and monthly data, consumer confidence has a significant effect on GNP fluctuations, whereas in the case of semiannual data, it has no effect. In other words, consumer confidence has an effect on only very short-term economic fluctuations.

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1. Introduction

In this paper, we empirically analyze whether consumer confidence has an effect on the Japanese economy.

It is often said that macroeconomic performance depends on confidence.[1] The change of confidence, however, may precede business fluctuations because economic agents accurately forecast future economic conditions. Matsusaka and Sbordone (1995) showed empirically the relation between consumer confidence and GNP in the U.S. economy. To exclude the possibility that consumers simply forecast the future growth rate, they use vector autoregressions including such control variables as the Index of Leading Indicators, which are useful for predicting future economic conditions.[2] In this method, the effect of pure confidence on GNP can be investigated. They confirm that in the U.S. economy, consumer confidence itself has a significant effect on GNP fluctuations.

By using quarterly data, Matsusaka and Sbordone investigate the relation between consumer confidence and GNP. In our paper, so as to investigate the more strict relation between confidence and the real economy, we use not only quarterly data but

[1] In standard neo-classical economics, under the ordinary assumptions on production function and utility function, a unique equilibrium is determined. Therefore, confidence has no effect on the real economy. But, for instance, in an economy where a sunspot equilibrium exists, the stochastic natural event which has nothing to do with the economic fundamentals, can cause economic fluctuations. In this case, confidence can affect the real economy. Azariadis (1981) and Cass and Shell (1983) analyze the existence of a sunspot equilibrium in the overlapping generations model with money. They show that in an ordinary exchange economy, a sunspot equilibrium occurs only if the degree of relative risk aversion is sufficiently large. But, Fukuda (1998) and Utaka (2000), for instance, analyze the models in which a sunspot equilibrium can occur under the assumption that the degree of relative risk aversion is small.

[2] In addition to the Index of Leading Indicators, such indexes as government spending and "default risk" are considered control variables in Matsusaka and Sbordone (1995). They show that in cases where such indexes are added, the results are almost the same as those in cases where only the Index of Leading Indicators is considered.

also monthly and semiannual data, and analyze the effect of confidence on GNP fluctuations in Japan.

2. Empirical Analysis

In this section, we empirically analyze the relation between consumer confidence and business fluctuations in Japan. First, we investigate the quarterly case to confirm whether the results of Matsusaka and Sbordone are applicable to the Japanese economy. The Consumer Confidence Index (CCI), which has been formulated by the Economic Planning Agency (EPA), is supposed to represent consumer confidence.[3] We investigate whether CCI has an effect on GNP. We utilize vector autoregressions including GNP and CCI, and investigate whether CCI has a significant effect on GNP fluctuations. We estimate the following equations:

$$\begin{pmatrix} GNP_t \\ CCI_t \end{pmatrix} = \begin{pmatrix} a_{11}(L) & a_{12}(L) \\ a_{21}(L) & a_{22}(L) \end{pmatrix} \begin{pmatrix} GNP_t \\ CCI_t \end{pmatrix} + \begin{pmatrix} u_{GNP_t} \\ u_{CCI_t} \end{pmatrix}, \tag{1}$$

where $a(L)$ denotes polynominal in the lag operator L, and u is an error term.

The results are summarized in the following table.

[3] CCI consists of such elements as the expectations of overall livelihood, income growth, and willingness to buy durable goods.

Table 1
Vector Autoregressions with GNP and CCI

Lag=2, Quarterly data			
		Dependent variables	
		GNP	CCI
GNP	F-test: p-value	0.526	0.000
	Sum of coefficients	-0.049	182.2**
	Standard error	0.205	38.58
CCI	F-test: p-value	0.001	0.000
	Sum of coefficients	0.16E-02**	0.499**
	Standard error	0.53E-03	0.099

This table indicates the p-value of F-test for the hypothesis that the block of coefficients is jointly equal to zero. In addition, the sum of the block of coefficients and its standard error are presented. ** denotes significant rejection of the hypothesis that the sum of the block of coefficients is equal to zero at 1 percent.

In this paper, the lag length is chosen by minimizing AIC (Akaike Information Criterion). The sample period covers the second quarter of 1983 to the third quarter of 1998. The number of observations is 62. GNP is expressed in terms of log differences. CCI is expressed in levels. Each column is a regression and the dependent variable is shown at the top of each column. In this table, we first report the p-value of F-test for the hypothesis that the block of coefficients is jointly equal to zero. In addition, we present the sum of the block of coefficients and its standard error.[4] ** denotes significant rejection of the hypothesis that the sum of the block of coefficients is equal to zero at 1 percent.

[4] All equations in our estimation include a constant term.

We are specifically interested in the effect of CCI on GNP. In the GNP equation, the hypothesis that the block of CCI coefficients is jointly equal to zero is rejected at almost the zero percent level. In other words, there exists Granger Causality from consumer confidence to GNP. Moreover, the sum of CCI coefficients is positive and the hypothesis that it is equal to zero is rejected at the smaller than 1 percent level.

Table 1 also presents the results of the CCI equation. It is shown that GNP has a significant effect on CCI.

Next, to investigate whether confidence itself has an effect on GNP, we use vector autoregressions with GNP, CCI, and the control variable which is useful for forecasting future economic conditions, as indicated by Matsusaka and Sbordone (1995). For this variable, we consider the Index of Business Conditions: Composite Index of Leading Index (IBCL), which is also formulated by the EPA.[5]

We estimate the following equations:

$$\begin{pmatrix} GNP_t \\ IBCL_t \\ CCI_t \end{pmatrix} = \begin{pmatrix} a_{11}(L) & a_{12}(L) & a_{13}(L) \\ a_{21}(L) & a_{22}(L) & a_{23}(L) \\ a_{31}(L) & a_{32}(L) & a_{33}(L) \end{pmatrix} \begin{pmatrix} GNP_t \\ IBCL_t \\ CCI_t \end{pmatrix} + \begin{pmatrix} u_{GNP_t} \\ u_{IBCL_t} \\ u_{CCI_t} \end{pmatrix}. \quad (2)$$

The results of this estimation are denoted in the following table.

[5] IBCL is calculated based on eleven statistical data such as money supply (M2+CD) and new orders for machinery, whose movements tend to precede those in business conditions.

Table 2
Vector Autoregressions with GNP, IBCL, and CCI

Lag=2, Quarterly data				
		Dependent variables		
		GNP	IBCL	CCI
GNP	F-test: p-value	0.182	0.416	0.001
	Sum of coefficients	-0.231	0.508	160.8**
	Standard error	0.207	0.381	41.95
IBCL	F-test: p-value	0.007	0.000	0.426
	Sum of coefficients	0.105*	0.716**	12.05
	Standard error	0.045	0.083	9.16
CCI	F-test: p-value	0.000	0.053	0.000
	Sum of coefficients	0.21E-02**	-0.23E-02*	0.525**
	Standard error	0.51E-03	0.94E-03	0.104

This table indicates the p-value of F-test for the hypothesis that the block of coefficients is jointly equal to zero. In addition, the sum of the block of coefficients and its standard error are presented. * and ** denote significant rejection of the hypothesis that the sum of the block of coefficients is equal to zero at 5 percent and 1 percent, respectively.

This estimation also covers the second quarter of 1983 to the third quarter of 1998, and the number of observations is 62. We express IBCL in terms of log differences. * and ** denote significant rejection at 5 percent and 1 percent, respectively. From the GNP equation, it is shown that even after adding IBCL to the system, there exists Granger Causality from CCI to GNP.[6] The sum of CCI coefficients is positive and the hypothesis that it is equal to zero is rejected at the smaller than 1 percent level. In

[6] From the GNP equation, it is also shown that IBCL precedes GNP, namely, IBCL is useful for predicting GNP movements.

addition, the CCI equation indicates that GNP has a significant effect on CCI.[7]

Next, let us investigate the quantitative effect of consumer confidence on GNP by using the forecast variance decomposition.

Table 3
Forecast Variance Decompositions of GNP and CCI

	Dependent variable: GNP				Dependent variable: CCI		
Quarter	GNP	IBCL	CCI	Quarter	GNP	IBCL	CCI
1	100.00	0.00	0.00	1	1.33	2.24	96.43
4	74.18	15.98	9.83	4	29.33	15.16	55.52
8	70.52	20.19	9.29	8	30.34	28.61	41.05
Quarter	IBCL	CCI	GNP	Quarter	IBCL	CCI	GNP
1	1.23	0.98	97.79	1	2.61	97.39	0.00
4	17.14	10.44	72.42	4	19.50	60.12	20.38
8	22.01	9.97	68.02	8	34.47	44.94	20.60
Quarter	GNP	CCI	IBCL	Quarter	GNP	CCI	IBCL
1	100.00	0.00	0.00	1	1.33	98.67	0.00
4	74.18	13.56	12.26	4	29.33	60.20	10.48
8	70.52	13.13	16.35	8	30.34	46.09	23.57
Quarter	CCI	GNP	IBCL	Quarter	CCI	GNP	IBCL
1	1.33	98.67	0.00	1	100.00	0.00	0.00
4	14.72	73.02	12.26	4	66.57	22.95	10.48
8	14.50	69.15	16.35	8	51.92	24.51	23.57

This table reports the percentage of forecast variance of dependent variables (especially GNP and CCI) which can be explained by GNP, IBCL, and CCI from one to

[7] As Matsusaka and Sbordone (1995), we also investigated the block exogeneity of GNP and IBCL with respect to CCI by using c^2 statistic. The hypothesis that GNP and IBCL are block exogenous is rejected at almost the zero percent level.

eight quarters ahead. It is known that percentage contributions are affected by the ordering of variables, so we investigate the variance decomposition in the four ways of ordering.

From GNP decompositions, it is shown that CCI explains about 10 percent to 15 percent of the forecast variance of GNP eight quarters ahead. Matsusaka and Sbordone (1995) show that in the U.S. economy, the variance of CCI explains 13 percent to 26 percent of forecast variance of GNP eight quarters ahead. Therefore, it is shown that in Japan, the quantitative effect of consumer confidence on GNP fluctuations is smaller than that in the U.S. economy. CCI decompositions show that CCI explains about 41 percent to 52 percent of its own innovation variance eight quarters ahead. CCI can be said to be exogenous to this system.

Next, we investigate the more short-term effect of confidence on the real economy by using monthly data. In this case, we substitute the Index of Industrial Production (IIP) for GNP.[8] As the index which shows consumer confidence, we construct an original diffusion index (DI) from the survey on economic conditions carried out by Jiji Press in the *Public Opinion Poll Monthly* compiled by the Prime Minister's Office.[9] In this case, too, we use vector autoregressions not only with IIP and DI, but also with IBCL. The results are presented in the following table.

[8] IIP is a component of Coincident Index in the Index of Business Conditions.

[9] The answer is chosen from among: (**i**) economic conditions have surely improved; (**ii**) they have slightly improved; (**iii**) they are unchanged; (**iv**) they have slightly worsened; and (**v**) they have surely worsened. We define DI as the difference between the percentage share of the respondents choosing (**i**) or (**ii**) minus those choosing (**iv**) or (**v**).

Table 4
Vector Autoregressions with IIP and DI

Lag=3, Monthly data			
		Dependent variables	
		IIP	DI
IIP	F-test: p-value	0.000	0.079
	Sum of coefficients	-0.434*	199.3*
	Standard error	0.184	78.27
DI	F-test: p-value	0.001	0.000
	Sum of coefficients	0.19E-03**	0.905**
	Standard error	0.68E-04	0.029

This table indicates the p-value of F-test for the hypothesis that the block of coefficients is jointly equal to zero. In addition, the sum of the block of coefficients and its standard error are presented. * and ** denote significant rejection of the hypothesis that the sum of the block of coefficients is equal to zero at 5 percent and 1 percent, respectively.

Table 5
Vector Autoregressions with IIP, IBCL, and DI

Lag=4, Monthly data				
		Dependent variables		
		IIP	IBCL	DI
IIP	F-test: p-value	0.000	0.226	0.863
	Sum of coefficients	-0.992**	-0.097	119.0
	Standard error	0.254	0.088	124.5
IBCL	F-test: p-value	0.000	0.000	0.337
	Sum of coefficients	0.889**	0.933**	123.8+
	Standard error	0.143	0.050	70.18
DI	F-test: p-value	0.000	0.046	0.000
	Sum of coefficients	0.31E-03**	-0.48E-04+	0.914**
	Standard error	0.70E-04	0.24E-04	0.034

This table indicates the p-value of F-test for the hypothesis that the block of coefficients is jointly equal to zero. In addition, the sum of the block of coefficients and its standard error are presented. +, *, and ** denote significant rejection of the hypothesis that the sum of the block of coefficients is equal to zero at 10 percent, 5 percent, and 1 percent, respectively.

IIP and IBCL are expressed in terms of log difference and DI in terms of levels. The sample period is from April 1983 to September 1998, which is the same as that in the quarterly case. The number of observations is 186. +, *, and ** denote significant rejection at 10 percent, 5 percent, and 1 percent, respectively.

In both models, it is shown that in the IIP equation, there exists Granger Causality from DI to IIP. Moreover, the sum of DI coefficients is positive and has a significant effect on GNP. It is shown that also in the monthly case, confidence itself has a significant effect on the real economy.

Next, let us investigate the forecast variance decomposition. Table 6 reports the percentage of IIP and DI forecast variance which can be explained by IIP, IBCL, and DI from one to twenty-four months ahead (in other words, eight quarters ahead). We report the results of the variance decomposition in four ways of ordering.

From IIP decompositions, it is shown that DI explains about 4 percent to 5 percent of IIP variance twenty-four months ahead. In the monthly case, its quantitative effect is considerably less than that in the quarterly case. DI decompositions show that DI explains about 60 percent to 65 percent of its own innovation variance twenty four months ahead, in other words, DI is to a large extent exogenous to this system.

Table 6
Forecast Variance Decompositions of IIP and DI

	Dependent variable: IIP				Dependent variable: DI		
Month	IIP	IBCL	DI	Month	IIP	IBCL	DI
1	100.00	0.00	0.00	1	0.29	0.27	99.43
6	83.68	12.55	3.77	6	0.94	8.78	90.28
12	81.86	14.27	3.87	12	0.70	22.17	77.13
18	81.17	14.61	4.22	18	1.06	30.05	68.90
24	80.72	14.54	4.74	24	1.45	31.26	67.29
Month	IBCL	DI	IIP	Month	IBCL	DI	IIP
1	1.37	0.35	98.27	1	0.21	99.79	0.00
6	17.57	4.21	78.22	6	8.08	91.33	0.59
12	19.27	4.28	76.45	12	21.57	77.98	0.45
18	19.60	4.64	75.76	18	29.87	69.64	0.49
24	19.51	5.18	75.32	24	31.31	68.06	0.63
Month	IIP	DI	IBCL	Month	IIP	DI	IBCL
1	100.00	0.00	0.00	1	0.29	99.71	0.00
6	83.68	3.58	12.75	6	0.94	92.56	6.50
12	81.86	3.69	14.44	12	0.70	80.34	18.96
18	81.17	4.01	14.82	18	1.06	71.97	26.98
24	80.72	4.53	14.75	24	1.45	70.01	28.54
Month	DI	IIP	IBCL	Month	DI	IIP	IBCL
1	0.29	99.71	0.00	1	100.00	0.00	0.00
6	3.90	83.36	12.75	6	93.25	0.26	6.50
12	3.98	81.57	14.44	12	80.72	0.31	18.96
18	4.31	80.87	14.82	18	72.26	0.76	26.98
24	4.85	80.40	14.75	24	70.37	1.09	28.54

Finally, we investigate the effect of consumer confidence on GNP by using semiannual data. We construct the semiannual data by averaging quarterly data. The results of the estimation are presented as follows.

Table 7
Vector Autoregressions with GNP and CCI

Lag=1, Semiannual data			
		Dependent variables	
		GNP	CCI
GNP	Coefficient	0.463+	94.39+
	Standard error	0.257	49.24
CCI	Coefficient	0.13E-02	0.408+
	Standard error	0.11E-02	0.212

This table indicates the coefficient and its standard error. + denotes significant rejection of the hypothesis that the coefficient is equal to zero at 10 percent. In this estimation, since the number of lag is one, the p-value of F-test is identical to the p-value of the significance of the respective coefficients.

The sample period covers the latter half of 1983 to the first half of 1998. The number of observations is 30. + denotes significant rejection at 10 percent. In this estimation, since the number of lag is one, the p-value of F-test is identical to the p-value of the significance of the respective coefficients.

In the GNP equation, it is shown that the CCI coefficient is positive, but has no significant effect on GNP. On the other hand, also in this case, GNP has an effect on CCI.

3. Conclusion

We have empirically analyzed whether consumer confidence has an effect on business fluctuations in Japan. It is shown that in the cases of quarterly and monthly data, consumer confidence has a significant effect on economic fluctuations, whereas in the case of semiannual data, it has no effect. Namely, confidence itself has an effect on very short-term economic fluctuations, but in the long term, it does not affect the real economy, as maintained by standard neo-classical economics.

The estimation process of our paper, however, cannot completely exclude the possibility that there exists a certain variable that makes movements in confidence precede those in the real economy, as previously is referred to by Matsusaka and Sbordone (1995). Therefore, by grasping the purer confidence, we may be able to investigate the more precise effect of consumer confidence on the real economy.

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