

Appendix A

The data on oil-based fuel consumption are taken from a Ministry of Economy, Trade and Industry (METI) publication ⁶, and those on real GDP and petroleum prices are taken from International Financial Statistics (IFS) ⁷. All data are quarterly data from the first quarter of 1986 to the fourth quarter of 2004, adjusted for seasonality by using the Census X12 method. We consider the natural logarithms of these data in our analysis.

Appendix B

We tried two additional unit root tests, viz. Phillips-Perron test and KPSS (Kwaitkowsky et al. , 1992) test. The results are in Table A1. Judging from the results, each variable is nonstationary, just like in Table 1.

⁶The data on oil-based fuel consumption are taken from “Yearbook of the current survey of oil consumption in commerce, mining and manufacturing” published by the Research and Statistics Department, Minister’s Secretariat, Ministry of International Trade and Industry, and the “Yearbook of the current survey of energy consumption” published by METI.

⁷With regard to data collection, we obtained the data from the database of the Research Institute for Economics and Business Administration of Kobe university

Table A 1: Results of the unit root test

Variable		ADF	PP	KPSS
e	none	2.653(4)	2.893(6)	-
	Intercept	-2.307(4)	-2.327(6)	1.087(6)***
	Intercept & trend	-1.609(4)	-1.776(6)	0.268(6)***
Δe	none	-1.678(11)*	-8.606(6)***	-
	Intercept	-5.376(3)***	-9.328(6)***	0.329(6)
	Intercept & trend	-5.757(3)***	-9.840(6)***	0.050(6)
y	none	5.278(0)	3.683(6)	-
	Intercept	-3.332(0)**	-2.956(6)**	1.081(6)***
	Intercept & trend	-2.337(0)	-2.290(6)	0.236(6)***
Δy	none	-2.355(2)**	-6.046(6)***	-
	Intercept	-3.078(2)**	-7.351(6)***	0.414(6)*
	Intercept & trend	-3.468(2)*	-7.695(6)***	0.108(6)
p	none	0.272(6)	0.066(6)	-
	Intercept	-1.716(6)	-2.090(6)	0.251(6)
	Intercept & trend	-1.861(6)	-2.262(6)	0.219(6)***
Δp	none	-3.093(5)***	-8.668(6)***	-
	Intercept	-3.092(5)**	-8.644(6)***	0.237(6)
	Intercept & trend	-3.773(6)**	-8.641(6)***	0.042(6)

**, **, and * denotes statistically significant at 1%, 5% and 10%. Lag length of ADF test is chosen by AIC (MAXLAG=11). The parenthesis of ADF statistics shows lag length. The parenthesis of PP and KPSS statistics show Newway-West bandwidth.

References

- [1] Engle, R. F. and Granger, C. W. J. (1987), "Co-integration and error correction: Representation, Estimation, and Testing", *Econometrica*. **55**, 251-276.
- [2] Engle, R. F. and Yoo, B. S. (1987), "Forecasting and testing in co-integrated systems", *Journal of Econometrics*. **35**, 143-159.
- [3] Galindo, L. M. (2005), "Short- and long-run demand for energy in Mexico: a cointegration approach", *Energy Policy*. **33**, 1179-1185.