An empirical analysis of economic fluctuations in Japan: 1885–1940

Shigeyuki Hamori[a,*], Naoko Hamori[b]

[a]*Faculty of Economics, Kobe University, 2-1, Rokkodai, Nada-Ku, Kobe 657-8501, Japan*
[b]*Faculty of Information Science, University of Marketing and Distribution Sciences, 3-1,*
Gakuen-Nishi-Machi, Nishi-Ku, Kobe 657-2188, Japan

Abstract

This paper analyzes economic fluctuations in Japan's economy before World War II using the vector error correction model. It is found that causality from the real sector to the monetary sector can be observed but not vice versa in those years of Japanese economy. © 2000 Elsevier Science B.V. All rights reserved.

1. Introduction

This paper is intended to empirically analyze business fluctuations in Japan using data from a period during the Meiji era until just before the outbreak of World War II. Japan was dramatically transformed following the Meiji Restoration in 1868, and succeeded in modernizing its entire society. Since the Restoration, Japan has introduced many Western influences to rapidly develop its own economy. The early 20th century was a transition period for the Japanese economy. Chenery et al. (1962) pointed out that the year 1914 was a turning point, marking the change from growth balanced between agriculture and industry to an industry-driven economy. One characteristic of Japan's economy at that time was fierce competition throughout the entire economy. Bankruptcies occurred frequently in every industry, including the banking sector, and price levels often dropped. This is

---

[*] Corresponding author. Tel./fax: +8166338-1255.
E-mail address: hamori@kobe-u.ac.jp (S. Hamori).

distinctly in contrast to the current economy, where even price mechanisms are not working satisfactorily, as criticized by other countries.

Unfortunately, analysis using recent econometric techniques has not been made of the business fluctuations of the period[1]. This may be attributed to the fact that people have been interested only in the current challenges facing Japan's economy. However, it must be remembered that although Japan's modern economic growth started after World War II, the economy itself had been successful since the Meiji era by taking advantage of accumulations in every industry. Therefore, it would be meaningful to analyze the economy of Japan for the Meiji period.

There are several approaches that can be taken in analyzing economic fluctuations. One is the calibration approach, which is often used in the real business cycle model (see Kydland and Prescott, 1982; Backus et al., 1992, for examples). This approach has the advantage that one can construct an economic model based on dynamic optimization behavior. However, it also has some weaknesses. For example, it is not easy to solve stochastic nonlinear equations quantitatively, in addition to which the results obtained by this method depend significantly upon the approximation method used in the analysis (Taylor and Uhlig, 1990). The other is the application of time series analysis.

Time series analysis itself consists of alternative approaches. One is the extension of the standard vector auto-regression (VAR) developed by Sims (1980). This approach excludes ad hoc restrictions on structural parameters and tries to obtain important information (e.g. exogeneity or causality) from statistical data. Another is the extension of structural VAR developed by Blanchard and Quah (1989) and Giannini (1992). This extension imposes long run or short-run restrictions on structural parameters and analyzes the performance of the model. As Hatanaka (1996, p. 124) pointed out, there is no unequivocal choice between standard VAR and the simultaneous equations model.

One way to test economic theory is to identify the model using constraints derived from a portion of the theory and then to test the validity of the remainder of the theory against the observations. In contrast to the standard VAR, this structural VAR model achieves identification of its parameters through economic theories, and thus is subject to Sims' criticism about the validity of economic theories. This paper adopts the standard VAR approach and analyzes what can be found about the economic fluctuations from the data, with special focus on the relationship between the real and the monetary sectors. The relationships among major macro variables suggest that there is a cointegrating relation among the real GNP, interest rate, money supply and the price level. It is also found that causality from the real sector to the monetary sector can be observed but not vice versa in those years of Japanese economy.

2. Characteristics of data

The present study analyzes annual data from 1885 to 1940 using four variables: real GNP, prices, money supply and interest rates. The GNP deflator is used for prices and M1 is used for the money supply. Interest rates are represented by loan-on-deed rates in Tokyo.

---

[1] Hamori and Kitasaka (1997) analyzed the business cycles of Japan for the post-war period.