

CHAPTER 2

Problems of Model Estimation of Long-Term Economic Oscillations

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This chapter is divided into two parts. The first part deals with the results of the spectral analysis of long-term statistical data from the USA, and in the second part some approaches to the use of macroeconometric models for investigating long-term economic oscillations are discussed.

Theoretically, there may be five types of long-term oscillations around a trend (see *Figure 2.1*). Type I oscillations are described by a sinusoidal curve with constant period (T) and amplitude (A). Types II and III have different T and A , respectively. Type IV is an "in-step" line, where different development types substitute one for another. Finally, Type V reflects the influence of some short-term disturbances that occur periodically in an economy. In reality, all five types of oscillations may take place and period and amplitude instability of oscillations are more probable. Traditional methods of spectral analysis enable oscillations to be effectively identified only in cases of A and T stability, and the last condition is more important.

Long-term statistical series for the US economy have been analyzed in order to identify long-term harmonics within a long sample period and for sub-periods within it. Estimates of US industrial production (see *Table 2.1*) were made for 65 observations (N) between 1920 and 1984 by varying investigated frequencies (M) from 24 up to 40. Our results showed the existence of short-term (four years), medium-term or cyclical (seven years), and long-term (16 years) harmonics. Using Kondratieff's methodology, the original time series was modified with a seven-year moving average to exclude short- and medium-term harmonics. As a result only one harmonic with an 18–22-year oscillation was identified, whose spectral power (SP) was three times greater than the maximum in the original series estimation.

The same experiments were made for producer price time series for 94 observations from 1891 to 1984 (see *Table 2.2*), and in the original series three

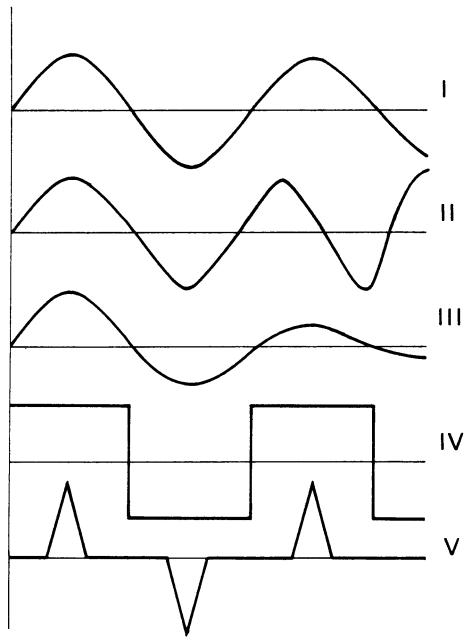


Figure 2.1. Types of long-term economic oscillations.

Table 2.1. Industrial production (IP), 1919–1984, $N = 65$.

M	T	SP
24	16	2.3
	7	3.7
	4	3.3
28	16	2.5
	7	3.8
	4	3.6
32	16	2.7
	7	4.0
	4	4.1
36	16	2.7
	7	4.0
	4	4.1
40	16	2.7
	7	4.1
	4	4.3
Moving average – seven years		
28	18–22	12.8
	4	0.3