

Chapter 1

Introduction

In the opening page of the book *Business Cycles* published in 1927, Wesley Mitchell [163] comments as thus: “As knowledge of business cycles grows, more effort is required to master it.” Ever since, there have been many developments in the field of business cycles. This book describes these new developments.

Historically, the notion of business cycles originated from various types of panics, depressions, and crises experienced by market economies in the 19th and early 20th centuries. According to Karl Marx, one of the most prominent thinkers of the time, “crises” are an endemic feature of capitalist economies. As Mitchell [163] recounts, much effort was devoted to understanding the causes of what many viewed as “abnormal” phenomena. However, other economists observed that the alternating phases of prosperity and depression seemed to follow each other on a regular basis, when one examined the history of commercial cycles for the capitalist economies of the time. In the 1920s, Kondratiev [137] argued that in addition to shorter economic cycles, there were periodic movements or “long waves” in economic variables. Schumpeter [187, 188] sought to explain the existence of such long waves as an outcome of technological innovations. In his framework, both growth and business cycles could be ascribed to the process of innovation. He identified three long waves: 1780–1840, corresponding to the Industrial Revolution; 1840–1890, corresponding to the introduction of steel and steam engines; and 1890–1950, corresponding to the invention of electricity, chemical processing, and motor engines.

While some scholars proposed different theories to explain fluctuations in economic activity, other scholars investigated methods for the systematic

measurement and identification of business cycles. During this time, Burns and Mitchell [50] and researchers at the National Bureau of Economic Research (NBER) began to identify the phenomena of business cycles. According to them, a business cycle is the simultaneous downturns and upturns of a large number of economic series. Their work involved the dating of business cycles and the development of leading indicators for the US economy, and it continues to this day in the business cycle dating methodology employed by the NBER.¹ We discuss the NBER methodology and the stylized facts of business cycles in Chapter 2.

Another important channel which affected the study of business cycles was the development of statistical and time series methods. Writers such as Frisch and Slutsky embedded the notion of business cycles into simple dynamic systems driven by stochastic shocks. Their influence on thinking about business cycles has persisted to this day. The Norwegian economist Ragnar Frisch [95] developed the notions of impulse and propagation mechanisms for describing business cycles, and modeled business cycles as the response of a second-order dynamic system to random shocks. Slutsky [193] argued that the sum of a number of uncorrelated shocks could produce serially correlated or smooth movements in the generated series. Their ideas were formulated in terms of linear time series models, which continue to form the main vehicle for empirically studying business cycles.

The Great Depression and World War II were two major events in the development of business cycle analysis. The period following World War II was an era of high and sustained growth in many countries. Nevertheless, the lessons of the Great Depression were vivid in the minds of many policy-makers. After the early work of Burns and Mitchell, post World War II, the focus shifted to stabilization policy. Keynes' *General Theory* [127] laid the foundations for the analysis of short-run economic fluctuations. Post World War II, the Keynesian framework was interpreted as a model of output determination at a point in time. The oil shocks of the 1970s and the experience of high inflation and high unemployment, or *stagflation* as it is popularly known, led researchers to account for the observations using new mechanisms for the effects of money on output. In their seminal contributions, Phelps [170] and Lucas [148, 149] developed monetary models of the business cycle as a way

¹See also Zarnowitz [211].

of providing a consistent theoretical foundation for describing the impact of changes in money on output. In Phelps' and Lucas' framework, the emphasis was on generating the Phillips-curve type of phenomena between inflation and unemployment based on informational frictions. Despite providing great theoretical advances in the analysis of aggregative phenomena, the specific mechanisms postulated in this literature as leading to business cycles, namely, unanticipated shocks to money, failed to garner sufficient empirical support.

During this period, there was a revival of interest more generally in examining aggregate economic activity as recurrent phenomena characterizing the functioning of economies with optimizing agents. In his article "Understanding Business Cycles", Lucas [151] cataloged the remarkable conformity in a set of economic series and set forth an agenda for explaining these facts using an *equilibrium* approach. Lucas and Rapping [153] argued that observed fluctuations in aggregate labor supply could be modeled as the voluntary response of agents based on intertemporal substitution effects. Long and Plosser [147] developed a simple Robinson Crusoe economy and generated many of the characteristics of modern macroeconomic time series through the mechanisms of substitution and wealth effects in response to technology shocks affecting different sectors of the economy. The literature on real business cycle (RBC) theory owes its existence to Kydland and Prescott [141], who presented a model that featured technology shocks as the main impulse behind cyclical fluctuations and proposed a rich array of propagation mechanisms for these shocks, namely, the durability of leisure, time-to-build in investment, and inventories. They also proposed a methodology for confronting their theory with the data. Widely known as the *calibration* approach, this involves matching a small set of moments implied by the model with those in the data. Though this approach is cited extensively, the merits of this approach have been a topic of debate. We will discuss RBC models further in Chapter 3.

Since this book purports to discuss business cycles, we cannot ignore the calibration approach or, more generally, the debate on the empirical validation of business cycle models. One of the major issues with Kydland and Prescott's contribution, as identified by skeptics, was identifying technology shocks that could generate cyclical fluctuations of magnitudes observed in the data (see Summers [202]). In some sense, this feature of Kydland and Prescott's analysis

was viewed as “fantastical” by many. Other skeptics contested the implications of the RBC approach for the observed behavior of productivity. Productivity, or the Solow residual, is known to be *procyclical*. According to the RBC approach, the observed procyclical movements in productivity should merely be a response to exogenous technology shocks (see Prescott [173]). In a series of papers, Hall [110, 111] argued persuasively that there were most likely endogenous components to the cyclical movement of productivity arising from imperfect competition at the firm level and internal increasing returns to scale in production. A deeper problem lay in modeling the movement of economy-wide averages (possibly fallaciously) in terms of the behavior of a representative or stand-in household.

Subsequent research that evolved from the original Kydland–Prescott exercise has proceeded along several different dimensions. On the one hand, a plethora of papers have presented modifications to the original Kydland–Prescott framework to reconcile the model with many of the actual features of the data. For example, the original Kydland–Prescott model could not explain the relative variability of hours and productivity or real wages. It also failed to account for the correlation between hours and productivity. The model lacked money; hence, it faced the problem of reconciling observations on money–output correlations within a model where the main driving force was real productivity shocks. Many of these issues have taken on the character of “puzzles” in the RBC literature, and they have constituted the topic for much further study. The RBC literature has also generated international business cycle models to replicate findings on current account dynamics, international risk sharing, financial diversification, and international capital flows. More recently, models have been developed that study the role of market completeness/incompleteness on cyclical fluctuations (see, for example, Heathcote and Perri [117]). The original RBC framework has also been extended in recent years to examine the business cycle phenomena in emerging market economies. We will examine a few of these directions in later chapters.

A more general critique to RBC analysis was mounted by the New Keynesian challenge. The New Keynesian viewpoint breaks with the RBC approach by contesting the view that prices adjust frictionlessly to clear markets. Instead, it introduces alternative mechanisms for generating price stickiness such as imperfect competition among firms, markups, endogenous changes in efficiency due to increasing returns to scale, and variable factor

utilization. The New Keynesian challenge has proceeded along theoretical lines (see Rotemberg and Woodford [182]) and empirical considerations (see Gali [96] or Basu, Fernald, and Kimball [32]). This facilitates the analysis of the different effects of government versus technology shocks, or monetary versus technology shocks. We will discuss New Keynesian models in detail in Chapter 5.

The controversy over the calibration approach also resulted in work on alternative methods for empirically analyzing business cycle phenomena. One approach that is popular in the business cycle literature is the method of unobservable index models or dynamic factor analysis developed by Sargent and Sims [185] and others. Following Sims [191], vector autoregression (VAR) and structural VAR (SVAR) have also proven to be popular in empirical macroeconomic research. While both models allow for rich dynamic interrelationships among a set of endogenous variables and an examination of business cycle dynamics based on impulse response functions, SVAR also permits an identification of shocks. More recently, dynamic stochastic general equilibrium (DSGE) models have been developed to identify shocks and propagation mechanisms of business cycles models (see, for example, Smets and Wouters [194, 195]).² We will discuss the issues involved in matching the model with the data in Chapter 7.

²Canova [58] is an excellent reference source on the quantitative and empirical analysis of dynamic stochastic general equilibrium models.