

Chapter 1 Introduction

With microeconomics, macroeconomics is one of the two pillars of economics. Macroeconomics studies the performance, structure, behavior, and policy-making of an economy as a whole. The fact that macroeconomics studies the economy as a whole has an important implication: it is often more reasonable to take a behavioral approach in thinking about macroeconomic problems. Even when everybody in the economy behaves rationally, collectively they may exhibit irrationality in a big way.

In macroeconomics, we try to understand causes and consequences of “business cycles”, and to understand why some countries achieve long-term economic growth while others do not. Better understanding may lead to better policy making on the part of the government, whether the objective is to promote growth and employment or to smooth business cycles. On the part of market participants, better understanding of macroeconomics helps to form better expectations on the future evolutions of the economy and the government policies. Finally, on the part of general citizens, better understanding of macroeconomics leads to more productive discussions and debates on government policy making.

Macroeconomics is important not only for the economy per se. A stably growing economy leads not only to a better living for millions of people, but also to a better society. As the Chinese saying goes, 仓廩实而知礼节. In contrast, recent world history teaches us that economic depressions often breed political radicalism, extremism, and wars, which invariably trample liberty and make human lives cheap. In poverty and misery, human morality and dignity are bound to decay, overwhelmed by more basic and urgent human desires such as survival.

In the rest of this chapter, we first describe how different types of economies work to solve basic economic problems. Then we describe how, in general terms, economists use models to understand the economy. In the end, we briefly survey the history of macroeconomic thoughts.

1.1 How Economies Work?

The economy is a complex organization that solves three fundamental problems: (1) What and how many goods and services should be produced? (2) How should resources, which are scarce and have alternative uses, be used in producing these goods and services? (3) For whom are they to be produced?

There are some conceptual forms of economy, each of which solves the above problems in distinct ways. The most primitive is the *economy of instinct*, in which bees and ants, for example, solve the above problems by instinct. Early human societies, according to Karl Marx and Friedrich Engels, may solve the above problems

in the form of the *primitive communism*, which is based on common ownership and egalitarian relationships. As human societies grow and become more complex, the *market economy* emerges to solve the above problems using the “invisible hand” of the market. Finally in the last century, a group of countries (including China) experimented the *planned economy*, which relied on commands to solve the above problems.

Note that these are very stylized conceptual forms of economy. Perhaps except the economy of instinct, they only exist on people’s mind. Reality is much more complex. In the following, we describe in more details the market economy and the planned economy. The understanding of these two stylized economy would help us to understand the mixed economy, which is arguably closer to reality.

The Market Economy

A market economy relies on the market to solve the three fundamental problems any economy has to solve. As demand for some goods and services increases, consumers bid up their prices, which induce suppliers to produce more. To produce more of the demanded goods and services, suppliers bid up prices of required inputs (labor, capital, land, energy, metals, etc.). The increased prices then lead to re-allocation of these resources for production. Workers receive their compensation for the supply of labor; owners of capital get paid for the supply of capital; and owners of the firms claim the residual profit. Capable workers or those with sought-for skills receive more; shrewd or/and lucky capitalists and entrepreneurs survive and become rich. All of them are consumers of goods and services in the economy.

In a market economy, price plays a crucial role. For the first problem an economy must solve, prices signal the supply and demand condition in the market of consumer goods and services. For the second problem, prices signal the relative scarcity of resources and the reward for being used. Invisibly and without any coercion, prices direct resources to be used in producing millions of goods and services demanded by millions of consumers with different tastes and preferences.

However, there are limitations of the market economy. The market alone would under-supply public goods and over-supply public bads (e.g., pollution). Monopolies may lead to under-supply of goods and services with distortionary prices. Without proper regulation of the financial industry, the market may experience violent boom-bust cycles. Distribution of income and wealth in a pure market economy may be dangerously unequal. (Recommended reading: *Capital in the 21st Century*, by T. Piketty)

In addition, there are also some moral limits of the market. There are things money should not buy (e.g., human being, political rights). Market value of labor can be unfair. For example, salary of “super-managers” of big corporations can be hundreds

times of what can be earned by nurses. Similarly, professors of finance typically earn much more than professors of mathematics. Such differences in pay arguably cannot be justified by differences in contributions to the society. (Recommend reading: What Money Can't Buy: The Moral Limits of Markets, by M.J. Sandel.)

Planned Economy

From 1953 to 1978, China experimented the planned economy similar with the former Soviet Union. The planned economy relies on the government to determine what and how much goods and services to be produced, how resources are used in production, and how final goods and services are distributed among peasants, workers and cadres in every rank. Without markets and prices, the economic planning turned out to be a disaster resulting in huge waste in the use of labor and capital, extreme scarcity of consumer goods, stagnation of living standards. Since 1978, under the leadership of Deng Xiaoping, China started economic reform that let market play more and more important roles. As a result, we now have a China Miracle that has transformed a stagnant poor country into a dynamic middle-income country. As the Chinese economy becomes one of the largest in the world, hundreds of millions of ordinary people have been lifted out of poverty.

Mixed Economy

The current economic model of China can be more precisely described as a mixed economy, where both the market and the government play important roles in solving the fundamental economic problems. It is worth noting that even in the advanced western economies, governments also play important roles. It is in the author's opinion that the Chinese economy and the western capitalist economies differ only in degree, not in category.

In a mixed economy, the government typically plays the following roles. First, provide public goods like national defense and public security, and quasi-public goods like infrastructure and education. The private sector tends to under-supply public goods because the private cost of supplying public goods exceeds the total benefit to the public.

Second, since the private sector tends to over-supply "public bads" (e.g., pollution), the government is responsible for imposing penalties and costs on the provision of public bads and protecting public interests. A typical example is the protection of environment. The government is responsible for maintaining environmental standards for farming and manufacturing, ensuring a sustainable development.

Third, to alleviate income inequality, or as social insurance, the government may make transfer payments to the disadvantaged groups such as the old, the unemployed, and so on. To balance regional differences in public good provision, the central

government may make transfer payments to less developed provinces.

Fourth, the government is responsible for regulating financial institutions (e.g., banks, securities, and insurances), fighting against financial crime, and protecting retail investors from misinformation and fraud.

Fifth, the government also implements macro-prudential measures to reduce “systemic risk” in the financial system. Unchecked “animal spirits” in the financial industry may easily lead to excessive leverage, bubbles, and ultimately, financial crisis. In a modern economy, a healthy financial industry is indispensable for the provision of financing and risk-sharing products for firms and households. Financial crises, with widespread failure of financial institutions, almost always lead to economic crises.

Sixth, the government is responsible for conducting monetary policy, with the aim to smoothen economic cycles.

Finally, in some countries like China, the government also directly owns and manages state-owned enterprises.

1.2 Macroeconomic Modeling

We “know” the economy, in an objective way, through macroeconomic variables (e.g., GDP, inflation, etc.), which are measurements of the economy from different perspectives. We “understand” the economy using models involving macroeconomic variables. Key macroeconomic variables include GDP, (un)employment, inflation, interest rates, exchange rates, and so on.

Professional economists approach economic problems by scientific modeling. From data we summarize some empirical facts (phenomenon) to be explained. These empirical facts are usually some statistics of some *endogenous variables*. For example, the average growth rate of real income. To explain, we conjecture a model (that is, a toy economy) that involves both endogenous variables and exogenous variables.

Definition: Endogenous and Exogenous Variables. *In a mathematical model, an endogenous variable is a variable whose value is determined by the solution of the model. It may also be called a dependent variable. In contrast, an exogenous variable is one whose value is given. It may also be called an independent variable.*

A successful model explains the empirical facts about the endogenous variable using the exogenous variables involved. A model successful in explaining one phenomenon may fail to explain some new facts. Or speaking differently, the model may be refuted by some new facts. Then a new model (theory) is proposed to accommodate the new facts. This dynamic process goes on.

Case Study: To Explain the Rise in Government Bond Price in 2016

At the end of 2016, the government bond price in China tumbled. How do we explain that?

In this question, the government bond price (or equivalently, the risk-free interest rate) is the endogenous variable. The empirical fact is that the price for a standard 5-year government bond declined in the last two months of 2016.

An obvious model is the model of supply and demand in the bond market, with exogenous variables shifting the supply and demand curves. The exogenous variables that may explain the bond price decline may include:

1. On the demand side: the expectation of rate hike by the US FED, the rise of domestic inflation expectation due to supply-side restrictions, etc.
2. On the supply side: a sudden rise in bond issuance.

Macroeconomic modeling is useful not only for explaining what has happened, but also predicting what would happen. In the above example, if a smart investor witnesses a huge rally in commodity prices, he/she may predict that, everything being equal, the government bond price would decline, compensating the rise in inflation expectation.

Macroeconomic modeling helps us to better understand the interactions between the economy and various exogenous events, including government policies. This understanding would enable economists to come up with policy recommendations for dealing with various problems, such as poverty and unemployment. Economists may also employ models to evaluate policy recommendations before they are actually implemented.

In conclusion, the macroeconomic models are useful in: (i) explaining macroeconomic phenomena; (ii) making forecasts on the trends in the economy and the financial markets; (iii) policy prescription and evaluation.

Concept: Structural Model v.s. Reduced Model

In the previous example, the simple model of supply and demand is an example of structural model. We are essentially explaining the variation in endogenous variable (government bond price) using the variation in the exogenous variables via the working of a model.

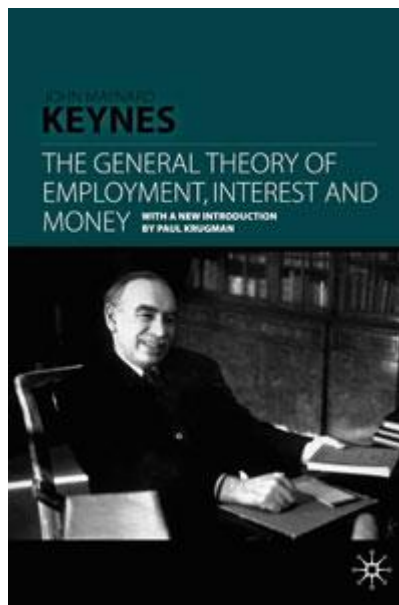
Without a structural model, we may still make forecasts based on the correlations between variables, endogenous and exogenous. A set of correlations constitutes a reduced model.

A reduced model is nothing but a collection of statistical associations, which do not explain anything causal. As time goes by, the reduced statistical model may change and become useless for forecasting. This point is known as the “Lucas Critique”, which was raised by Robert Lucas, the winner of 1995 Nobel Prize in economics.

1.3 A Skeleton History of Macroeconomic Thoughts

Macroeconomics was born in the ruins of the Great Depression, at a time when classical economics failed to recommend any policy responses to the widespread misery even in the advanced countries. John Maynard Keynes, in his magnum opus “General Theory of Employment, Interest and Money”, offered a theory that explained why the Great Depression could occur and what governments could do. Keynes challenged many classical assumptions, such as flexibility of price and rationality of individuals. He introduced many important macroeconomic concepts such as the consumption function, the multiplier, and so on.

John Maynard Keynes (5 June 1883 – 21 April 1946)



Before Keynes, there were already discussions on problems that we call macroeconomic problems. For example, there were many versions of the “Quantity Theory of Money”, including Irving Fisher’s (1867-1947) formulation,

$$M \cdot V = P \cdot Y,$$

where M is supply, V is velocity of money, P is price, and Y is real value of aggregate transactions (real GDP). In classical thinking, prices (and wages) are

assumed to be flexible and both V and Y are assumed to be constant. So an increase in money supply (M) would bring a proportional increase in the price level (P). It is in this sense that money was regarded as a “veil” over the real economy: money is exogenously given and does not have any impact on real activities.

For another example, the business cycles were well-studied by the Austrian school. The Austrian theory of business cycle regards bank credit as the key to understanding economic fluctuations. They argue that the prevailing interest rates are too slow, for which the central bank is to blame. The low interest rate encourages businesses to take loans and over-invest in capital goods, resulting in booms and busts.

The Austrian School

The Austrian School is a school of economic thought that is based on the concept of methodological individualism – that social phenomena result from the motivations and actions of individuals (from Wikipedia). The first-generation Austrian economists include Carl Menger (1840-1921), Eugen Böhm von Bawerk (1851-1914), Friedrich von Wieser (1851-1926), among others. The second-wave Austrian economists include Ludwig von Mises (1881-1973), Joseph Schumpeter (1883-1950), Friedrich Hayek (1899-1992), among others.

The Austrian school made great contributions to the economics discipline. Notions such as opportunity cost, marginal utility, marginal cost, etc., were invented by Austrian economists. The Austrian school also fiercely attacked the viability of planned economy. According to Austrian economists, the lack of individual incentives and price-discovery mechanism makes the government unable to make optimal decisions for all people. In the end, the planned economy would have been implemented by coercion.

The neo-Keynesians, notably Paul Samuelson (1915-2009), combined Keynes's macroeconomics with neoclassical microeconomics (general equilibrium analysis). Samuelson established a new pattern for economic teaching and research: economic theories expressed in formal, mathematical models.

At the same time, large-scale econometric models were developed for macroeconomic forecasts and policy evaluations. These models may employ hundreds of regression equations. An important one of these would be the Phillips-curve equation, which postulated an inverse relationship between inflation and unemployment. The Phillips curve gave support to policies that combat unemployment by creating inflation using fiscal and monetary policies.

This doctrine was then challenged by Monetarism, which was championed by Milton Friedman. Friedman (and Phelps) argued that there would no long-run trade-off between inflation and unemployment, because people would expect inflation following stimulus measures. In contradiction to his contemporary Keynesians, Friedman argued that monetary policy mattered and that fiscal policy might fail. During the great inflation era of 1970s, Monetarism was successful in explaining why inflation happened and how to deal with it. A famous doctrine of Monetarism was “inflation is always and everywhere a monetary phenomenon”.

New classical economists, notably Robert Lucas, further challenged the Keynesians. The new classical macroeconomics assumes rational expectation of individuals, instead of adaptive expectation. Large-scale econometric models were discredited, since the empirical relationship (reduced model) may break down when the underlying structural model changes (the Lucas's critique). More extremely, Edward C. Prescott and Finn E. Kydland proposed the real business cycle (RBC) theory, which argued that business cycles might be efficient responses to exogenous shocks. Monetarism, new classical, and RBC all shared the same view that the market economy was inherently stable and that government interventions (aggregate demand management) were at least unnecessary, if not harmful. Keynesianism, in contrast, held that the market economy was inherently unstable and that aggregate demand management would help to stabilize the unstable economy.

Despite the attacks waged by Monetarists, new classicals, and RBC theorists, Keynesianism is still alive today. On the one hand, some new Keynesians investigate how market imperfections occur, e.g., sticky price, asymmetric information, and so on. These imperfections lay the “microeconomic foundation” that makes the economy unstable. On the other hand, the Global Financial Crisis has dealt a deadly blow to the notion of self-correcting market forces. After the GFC, in fact, post Keynesian economists such as Hyman Minsky has received widespread recognition on their analysis of crises. The GFC has ushered in a new era of instability. It would also be the beginning of a new age for macroeconomics.

1.4 Concluding Remarks

Macroeconomics is the study of the economy as a whole. The Chinese economy can be characterized as a mixed economy, where both market and government play important roles. To explain macroeconomic phenomenon, professional economists rely on models that contain both endogenous variables and exogenous variables.

A model is in a sense always wrong, since it is necessarily an abstraction from the reality. It is valuable as long as it sheds light on one or two questions. As we can see in Section 1.3, there are many schools of thoughts in the evolution of macroeconomics. Different schools differ in the modeling assumptions, sometimes

not easily verifiable, about the world. What school should we believe in? The obvious answer should be none. We may have a prior opinion, but we should not religiously believe in any “ism”. We should confront theory with facts and tests and even when we settle on a seemingly satisfactory model, we should use it cautiously. In macroeconomics as in other sciences, there is no absolute unchanging truth, but tentative and temporary understanding. Research improves such understanding in a dynamic and evolutionary manner.