Chapter 0
Representative-Agent Macroeconomics

Modern macroeconomics is built explicitly on microeconomic foundations. That is, the modern study and analysis of macroeconomics begins by considering how the microeconomic units, namely consumers and firms, in an economy make their decisions and then considers how the choices of these great many individuals interact with each other to yield economy-wide outcomes. This approach sounds quite reasonable because after all it is individuals in a society that ultimately make decisions. However, it may surprise you that macroeconomics was not always studied this way. Indeed, much of the evolution of macroeconomic theory occurred without any reference to its microfoundations. We, however, will consider the microeconomic foundations of macroeconomics – as such, our consideration of macroeconomics will mostly be a "modern" one.

The two most fundamental microeconomic units in any economy are consumers and firms. In introductory microeconomics, you studied how these individual units make their decisions. Under economists' usual assumption of rational behavior, the posited goal of consumers is to maximize their utility and the posited goal of firms is to maximize their economic (as opposed to accounting) profits. Concepts such as marginal utility, marginal revenue, and marginal cost should be familiar to you from your introduction to microeconomics, and they will provide the foundation of our consideration of macroeconomics.

In modern industrialized economies, consumption activity (that is, purchases of goods and services by individuals) constitutes the largest share of all macroeconomic activity. For example, in the United States, consumption accounts for roughly 70% of all economic activity. As such, understanding how consumers make decisions and the factors, especially government policies, that affect these decisions will be of prime importance in our study of macroeconomics. We will thus begin our study of macroeconomics by reviewing the microeconomics of consumer theory in Chapter 1. The tools introduced there will be used repeatedly, so it is important to grasp these ideas fully. Following this review of consumer theory, we will develop the macroeconomic theory of consumption, including the impact of various government policies on consumption behavior. After this, we will introduce firms into our theoretical model of the economy, again considering the impact of various government policies on firms' decisions.

We are potentially faced with one daunting task, however. It is obvious that each consumer is different from every other consumer in his preferences for goods and services, and it is equally obvious that firms are very different from each other, both in the goods and services they produce as well as the technologies that they use in producing those goods and services. In short, there is a great deal of heterogeneity in the economy. This poses a potentially intractable theoretical problem because it should

strike you as impossible to model theoretically the choices of *every single individual* and *every single firm* in the economy. Quite apart from the fact that there is no way we could know the exact choices of every single microeconomic unit, the point of any theoretical model is to be a simplified description of some complicated phenomenon – if we had to try to determine the choices of every single microeconomic unit, we would not achieve any simplification at all!

One approach, then, is to categorize the individual microeconomic units into broad groups: for example, categorize consumers into "upper-class," "middle-class," and "lower-class" and categorize firms into "goods-producing firms" and "service-producing firms." We could then consider how individuals in these different groups make their decisions, and then "sum up" their choices to yield macroeconomic outcomes. This seems an appealing way of proceeding – it turns out, however, that even doing this becomes quite cumbersome theoretically. The details of the theoretical problems associated with this approach are left to more advanced courses in macroeconomics, but, briefly, the main problems have to do with defining the appropriate broad categories and then determining an appropriate way of "summing up" the individuals' choices.

We will instead adopt what is known as the **representative agent** paradigm. In the representative agent approach, we suppose that there are a great many consumers in the economy *each of whom is identical to all other consumers in every way* and that there are a great many firms in the economy *each of which is identical to all other firms in every way.* This is obviously a gross simplification of reality. However, adopting this approach has the virtue that it becomes much simpler to theoretically model macroeconomic outcomes. Of particular interest for our purposes is that it still allows us to consider the general effects of macroeconomic policies, although we will not be able to say which groups are hurt versus which groups benefit from any given policy (because by construction there are no distinct "groups" at all).

A simple example will help illustrate how we will use the representative agent approach. Suppose there are five different consumers in an economy: in a given year, person A spends $50 on consumption, person B spends $75 on consumption, person C spends $100 on consumption, person D spends $125 on consumption, and person E spends $150 on consumption. The total dollar value of consumption in this economy in this year is thus $500. If we wanted to model every microeconomic unit, we would have to describe how each of persons A, B, C, D, and E made his decisions. However, if our main focus is on studying the total consumption of $500, we could equivalently suppose that there are five individuals in the economy *each of whom spent $100 on consumption.* That is, we could suppose that each individual simply spent the economy-wide average on consumption. Then our task, at the microeconomic level, is to model just one individual, this "average consumer," because as soon as we know how he made his decisions we know the economy-wide outcome. This average consumer is exactly who the representative agent is. While seemingly a gross simplification of reality (as it is!), we will see that by modeling only this **representative consumer** in the economy we will be able to describe quite well many macroeconomic outcomes and will also be able to consider the effects of macroeconomic policies.

Similarly, we will also suppose there is an "average firm" in the economy – the **representative firm.** This representative firm produces the average level of goods and services in the economy, guided by to the usual principle of profit-maximization familiar from introductory microeconomics. Once again, the way in which we model this representative firm will allow us to consider how firms respond to various macroeconomic policies.

In all to come, keep the following in mind: our goal is essentially to build a small theoretical model (using the representative agent paradigm) of the entire economy, one that includes consumers, firms, and the government. Putting these components together will allow us to see how they all interact with each other to yield macroeconomic outcomes and allow fairly rich consideration of the effects of macroeconomic policy, both fiscal policy (tax and spending initiatives of Congress) and monetary policy (control of interest rates and the money supply by the Federal Reserve). Throughout, we will be informed by basic microeconomic principles.

Our analysis will be concerned with demand, supply, and equilibrium in the "three macro markets," which are the aggregate goods and services market, the aggregate labor market, and the aggregate financial market depicted in Figure 1. All of the demand and supply relationships are sketched as linear only for illustrative purposes.

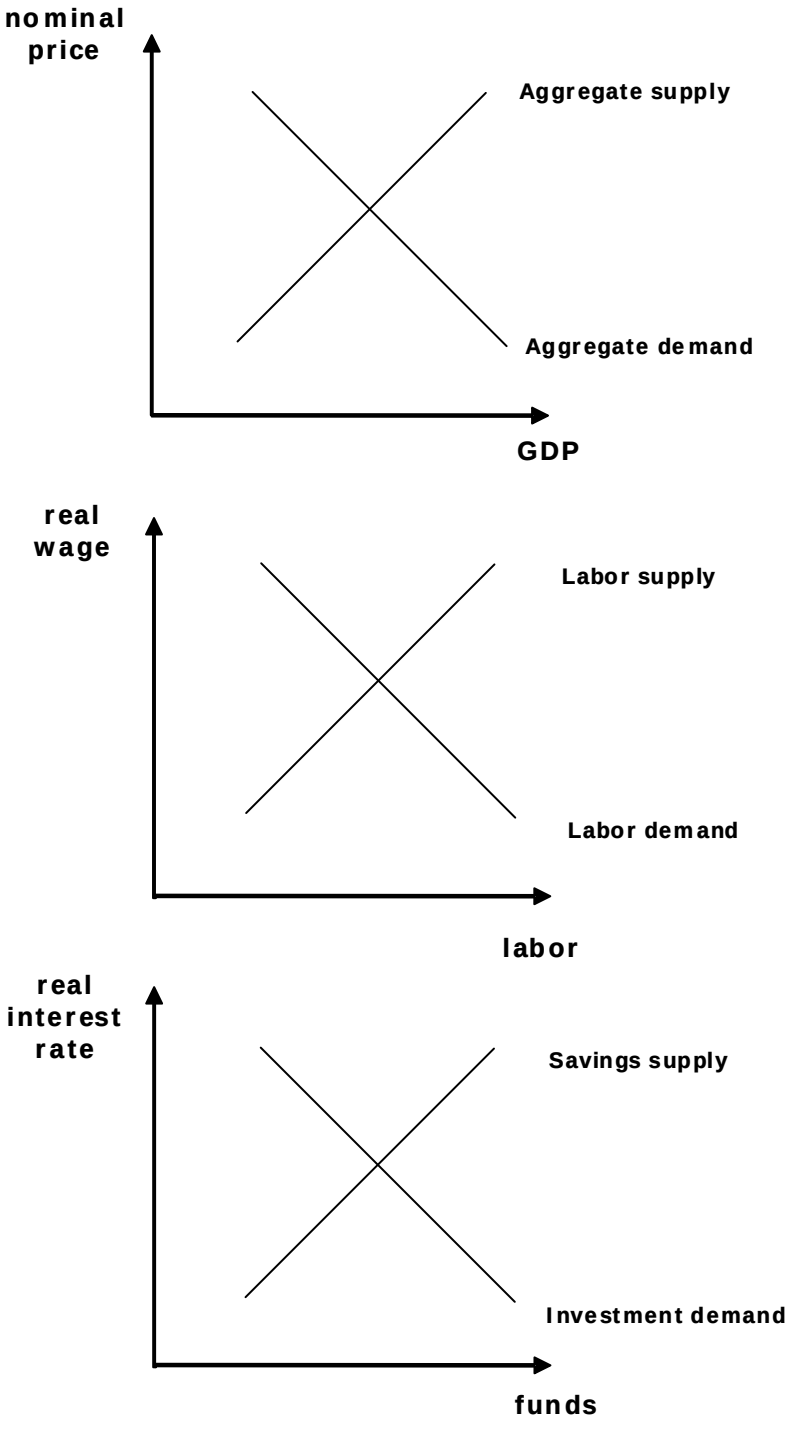

Figure 1. The three macro markets: goods markets, labor markets, and financial markets.