

Panel (b) shows the equilibrium in the market for capital. In contrast to the supply curve for land, the supply curve for capital is relatively elastic. That's because the supply of capital is relatively responsive to price: capital comes from the savings of investors, and the amount of savings that investors make available is relatively responsive to the rental rate for capital. The equilibrium rental rate for capital,  $R^*_{\text{Capital}}$ , and the equilibrium quantity of capital employed in production,  $Q^*_{\text{Capital}}$ , are given by the intersection of the two curves.

One small aside—you may have noted that producers frequently purchase land or capital rather than rent it over time. Does this fact mean that our model no longer works? No—it just means that we have to make an adjustment. We have to take into account that a parcel of land or a piece of machinery that has been purchased by a producer generates future revenue as well as current revenue. Using the present value method, which we learned in Chapter 9, we can convert the value of the marginal product stream that the parcel of land or machine generates today and in the future into its present value. Thus, a producer will purchase parcels of land or pieces of machinery up to the point at which the present value of its current and future stream of the value of the marginal product is equal to its factor price. If you examine our analysis of present value in Chapter 9, you'll see that, other things equal, present value increases when the interest rate falls. This leads to an important observation about how markets interact: other things equal, a fall in the interest rate (the real interest rate, which is the interest rate adjusted for changes in the purchasing power of money) leads to a rightward shift of the demand curves for land and for capital, with higher equilibrium prices and quantities transacted.

According to the **marginal productivity theory of income distribution**, every factor of production is paid its equilibrium value of the marginal product.

## The Marginal Productivity Theory of Income Distribution

So we have learned that when the markets for goods and services and the factor markets are perfectly competitive, a factor of production will be employed up to the point at which its value of the marginal product is equal to its market equilibrium price. That is, it will be paid its equilibrium value of the marginal product. What does this say about the factor distribution of income? It leads us to the **marginal productivity theory of income distribution**, which says that each factor is paid the value of the output generated by the last unit of that factor employed in the factor market as a whole—its equilibrium value of the marginal product.

To understand why the marginal productivity theory of income distribution is important, look back at Figure 20-1, which shows the factor distribution of income in the United States, and ask yourself this question: who or what decided that labor would get 70.4% of total U.S. income? Why not 90% or 50%?

The answer, according to the marginal productivity theory of income distribution, is that the division of income among the economy's factors of production isn't arbitrary: it is determined by each factor's marginal productivity at the economy's equilibrium. The wage rate earned by all workers in the economy is equal to the increase in the value of output generated by the last worker employed in the economy-wide labor market.

Here we have assumed that all workers are of the same ability. (Similarly, we've assumed that all units of land and capital are equally productive.) But in reality workers differ considerably in ability. Rather than thinking of one labor market for all workers in the economy, we can instead think of different markets for different types of workers, where workers are of equivalent ability within each market. For example, the market for computer programmers is different from the market for pastry chefs. And in the market for computer programmers, all participants are assumed to have equal ability; likewise for the market for pastry chefs. In this scenario, the marginal productivity theory of income distribution still holds. That is, when the labor market for computer programmers is in equilibrium, the wage rate earned by all computer programmers is equal to the market's equilibrium value of the marginal product—the value of the marginal product of the last computer programmer hired in that market.

### PITFALLS

#### GETTING MARGINAL PRODUCTIVITY THEORY RIGHT

It's important to be careful about what the marginal productivity theory of income distribution says: it says that all units of a factor get paid the factor's equilibrium value of the marginal product—the additional value produced by the last unit of the factor employed.

The most common source of error is to forget that the relevant value of the marginal product is the equilibrium value, not the value of the marginal products you calculate on the way to equilibrium. In looking at Table 20-2, you might be tempted to think that because the first worker has a value of the marginal product of \$380, that worker is paid \$380 in equilibrium. Not so: if the equilibrium value of the marginal product in the labor market is equal to \$200, then all workers receive \$200.