

# Joan Robinson, Price theorist

## Introduction

Last week studied Marshall who focused on the determination of prices in markets characterized by freedom of industry and enterprise. In his model he assumed that there are a large number of buyers and sellers of homogenous commodities. While it is true that he also considered monopoly, he was more concerned with pricing under the assumption of freedom. It is also true that markets without the presence of monopolist may afford price setting power to firms.

In the 1930's much attention was given to the grey area of prices in markets which are neither competitive nor monopolistic. Two influential thinkers who pursued this analysis are Pierro Sraffa and Joan Robinson.

## Development of economic analysis

In the US during the 1920's and 30's, big business emerged as a dominant social and economic actor. However, it is debatable whether the institutional environment contributed to the development of price theory. It seems more likely that intellectual developments, particularly an increased interest in mathematical economics, was responsible.

In 1838 Cournot published his theory of monopoly in which he concluded that monopolists maximize profit by equating the first derivatives of total revenue and total cost. Cournot's work remained uninfluential for decades. It was in the 20<sup>th</sup> century that price theory, including under oligopolistic market structures, saw its greatest advancements.

## Contributions to modern price theory

The main substantive contributions in price theory since Cournot have come in the theory of monopoly price discrimination and monopsony. The greatest contributions to monopoly price discrimination came from Arthur Pigou and Joan Robinson.

In 1933 Joan Robinson published *Economics of Imperfect Competition* in which she considers price setting in markets that are not accurately characterize as competitive or monopolistic. Robinson's contributions to price theory and macroeconomics have placed her among the most influential women in the discipline.

Robinson rediscovered Cournot's first derivative of total revenue and named it *marginal revenue*. She is also well known for her elegant, yet simple, geometrical exposition of marginal revenue and marginal costs curves. Another significant contribution of hers was the development of monopsony and contributions to price discrimination.

Other contributions include:

Pigou who considered monopoly pricing in the welfare framework.

Sraffa who published an article in 1926 that challenged Marshallian value theory. In this article Sraffa attacked Marshall's use of external economies to reconcile increasing returns with the assumption of competition.

Edward Chamberlin, starting with his dissertation in 1927 through much of his career at Harvard, focused on monopoly pricing and is recognized as a pioneer in the field alongside Robinson.

Heinrich von Stackleberg 1934 *Market Structures and Equilibrium*.

Robert Triffin 1940 *Monopolistic Competition and General Equilibrium Theory*.

J.R. Hicks generated several works in the 1930's which demonstrated an interest in pricing aspects within the labor market.

Frederich Hayek 1928 *Prices and Production*.

Gunnar Myrdal 1933 *Monetary Equilibrium*.

## Dark spots in neoclassical value theory

### Assumptions concerning firms demand curve

While Marshall's theory of value represented an improvement over earlier works, it is not without flaws. One of the main problems derives from his assumption of free competition. From this assumption, firms are conceived of as price takers with infinitely elastic demand for their products at the market price.

If products are differentiated, there are implications for pricing, implications which Marshall disregarded.

Robinson observed that buyers have distinct preferences. The existence of diverse preferences was considered by Robinson as a source of imperfect competition. Product differentiation, regardless of how it arises, causes the demand curve to be less than perfectly elastic.

the peculiarity of the case of the firm which does not possess an actual monopoly but merely has a particular market is that, in the demand schedule for the goods produced by it, the possible buyers are entered in descending order according to the price which each of them is prepared to pay, not rather than go entirely without, but rather than not buy it from that particular producer instead of elsewhere. -Sraffa

Differentiation also makes the supply and demand curves interdependent: a firm's demand curve depends on the expenditure a firm makes to attract customers.

### Assumptions regarding laws of return

Another problem with Marshall's analysis is his treatment of the long run laws of return and their effect on industry supply curves. He describes three possible cases for returns in the long run: constant, increasing, and decreasing. He rejected the notion that external economies would afford advantage to a single firm, thus destroying competition. Rather he posited that the advantages would be available to all firms in the industry and thus, competition preserved. This part of Marshall's analysis was attacked by Sraffa in 1926.

In the tranquil view which the modern theory of value presents us there is one dark spot which disturbs the harmony of the whole. This is represented by the supply curve, based upon the laws of increasing and diminishing returns. That its foundations are less solid than those of the other portions of the structure is generally recognized. That they are so weak as to be unable to support the weight imposed on them is a doubt which slumbers beneath the consciousness of many, but which most succeed in silently suppressing. -Sraffa

The equilibrium methodology adopted by Marshall requires the principle of negligible indifference such that variations in output or demand in one industry do not affect others. This assumption is suspect in the long run. Long run independence is unlikely, according to Sraffa, in industries with increasing or decreasing returns. Our economic system produces the material well-being through the production of commodities by means of commodities. Changes in the output of the commodity considered is likely to affect the cost of factors that also enter the production of other commodities.

The same reason was used by Sraffa to justify his rejection of Marshall's reliance on external economies to explain increasing returns. As such, Sraffa suggested abandoning the path of free competition and focus on monopoly. Even though pure monopoly is a rare occurrence, it could, Sraffa suggested, facilitate understanding of the price quantity relationship when competition is absent for other reasons.

Enter Robinson. She maintained that the first step was to develop the proper analytical tool, a topic taken up in our reading this week.

## Robinson's chief points.

In considering the determination of price and output, Robinson introduced the concept of marginal revenue. Under free competition, profit is maximized by setting the price equal to marginal cost. And since price is equal to marginal revenue, we have the now standard micro equilibrium condition; marginal revenue equals marginal cost ( $MR=MC$ ). The same condition holds for the monopolists.

Discovering the marginal revenue curve allowed Robinson to more effectively express, both verbally and graphically, the behavior of the profit maximizing firm. So effective was her representation, that it remains the standard today.

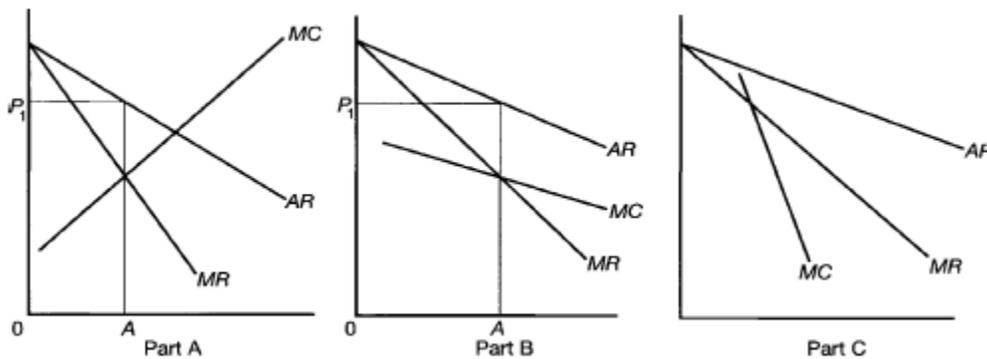
One of Robinson's main concerns and contributions was the difference between the equilibrium of the firm and the equilibrium of the group. Equilibrium of the firm concerns individual sellers in isolation from rivals. Equilibrium of the group examines how the presence of rival sellers affects behavior.

## Equilibrium of the firm

### Conditions of stable equilibrium

Robinson's concern with equilibrium is a direct reflection of Marshall's influence. Robinson's attention on monopolistic market structures follows Sraffa's suggestion. However, Robinson did not concern herself with the case of the pure monopolist; rather, she directed her attention to the case of a firm that is a monopolist of its own product. The price-output decision of the firm will cause a reaction from its competitors. Thus, how to deal with the interdependence is a question that Robinson had to address.

Robinson assumed that only a single firm is not in equilibrium. This assumption allows her to focus on the behavior of the profit maximizing firm as it moves toward its equilibrium. The first order condition of maximizing profit is marginal revenue equals marginal cost. The first order condition does not ensure stability. The second condition does however ensure stability: marginal cost is increasing or, in the very least, decreasing less rapidly than marginal revenue. Graphically, the second condition is that the MC intersects the MR from below and can be seen in part A and B.



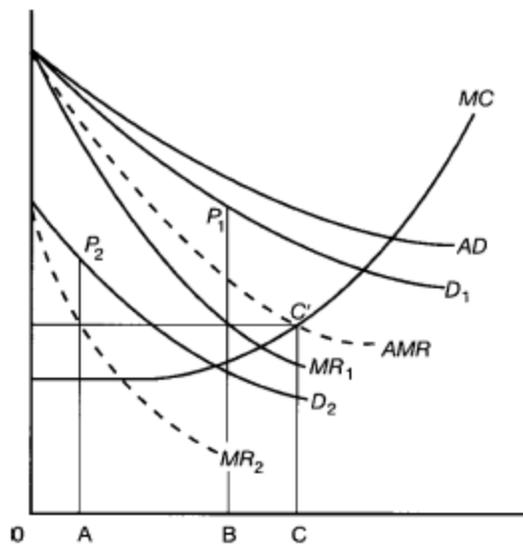
### Equilibrium when monopoly price discrimination is possible

The ultimate technique for maximizing profit is to charge different prices to different buyers. Price discrimination requires not only that the firm be a price maker, but also requires that the firm has knowledge of the buyers demand elasticities. Pigou worked on price problems of the railroads during the 1920's. In his investigation he demonstrated that a discriminatory price structure is enhanced when the commodity is non-transferable, and the market can be segregated: buyers can be divided into groups and the good cannot be resold from low price buyer to a high price buyer.

Robinson formalized this finding, demonstrating that profits will be maximized when, in each submarket, marginal revenue is equal to marginal cost. Total output is determined at the intersection of the marginal cost curve (MC) and the aggregate marginal revenue (AMR) curve. MR1 is the marginal revenue of the market with less elastic demand and MR2 is that of the market with more elastic demand. The marginal revenue curves are derived from their respective demand curves, which when aggregated yield AD.

Total output is OC and consists of OA sold at price P2 to those with more elastic demand and OB sold at P1 to those with less elastic demand.

Traditionally we think of the monopoly market structure as generating a loss in welfare. However, Robinson showed that under conditions of decreasing average costs, monopoly may increase welfare through increased output; this result may not hold if price discrimination exists as output may equal to, less than, or greater than under a single price. Which outcome prevails depends upon the shape of the demand curves.

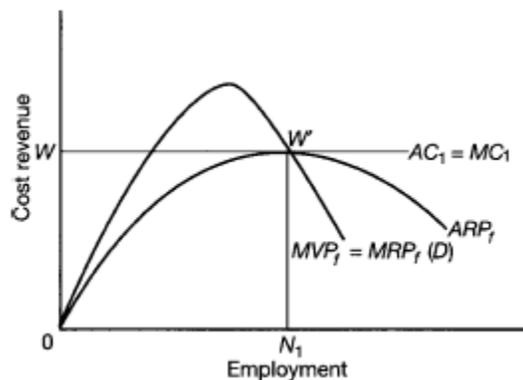


## Imperfect competition and factor rewards

### Factor rewards under competition.

Pigou stated that a factor of production is exploited when the payment it receives is less than its marginal physical product valued at its selling price. Given this definition, Robinson investigated the relationship between factor rewards and marginal productivities under monopsony.

We start by considering the relationship under competition. In the purely competitive market, the labor supply curve is perfectly elastic and is given by  $W=AC=MC$ . The long run equilibrium occurs where the labor supply curve is tangent to the average revenue product curve (ARP) and occurs at its maximum level. The profit maximizing firm will hire labor, the variable factor, up to the point that marginal revenue equals marginal cost. In the image here, the firm hires  $ON_1$  and pays  $OW$ . Under competition, the factor receives payment which is equivalent to its average revenue product and marginal revenue product and receives the full value of its output.



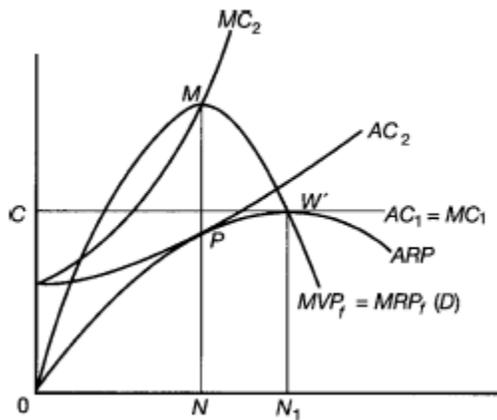
### Monopsony and factor exploitation

When confronting a monopsony buyer, the factor supply curve is no longer infinitely elastic. The monopsonist firm faces upward sloping average and marginal cost curves. Without pure competition,

the firm will employ a smaller quantity of the factor and pay it less than the value of its marginal product.

The purely competitive factor supply curve is included for comparison. Here you can see the upwards sloping curves  $AC_2$  and  $MC_2$  that confront the monopsonist firm. The profit maximizing firm will seek to hire the factor up until its marginal cost equals the factors marginal revenue product. The quantity hired by the monopsonist is  $ON$  which is less than under pure competition. The reward to the factor is given by  $NP$ , the average product. Notice that the average product is less than the marginal product by the amount  $MP$  which is monopsonistic exploitation.

For the case of labor, Robinson asserted that a minimum wage can be used to reduce or even eliminate the factor exploitation. In the diagram here, a minimum wage of  $OC$  would eliminate exploitation and cause the firm to hire labor up to  $N_1$ .



## Concluding remarks

Modern price theory is essentially a refinement of Marshall and Cournot. The static analysis of optimal equilibriums where  $MC=MR$  demonstrates as much. The analytical tool that has developed from the contributions of Marshall and Cournot has been primarily applied to price-output of markets in the grey area between competition and monopoly. While Robinson's term imperfect competition has not stuck, her marginal revenue concept coupled with marginal cost remains the standard analytical tool of modern micro. By the 1950's Robinson had abandoned the neoclassical tradition and established herself as a leading post-Keynesian.