

***THE ECONOMICS  
OF CONTROL***

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THE ECONOMICS  
OF CONTROL

*Principles of Welfare Economics*

BY ABBA P. LERNER

*Associate Professor, the Graduate Faculty  
of the New School for Social Research*

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*To Alice,  
Lionel and Marion*

## PREFACE

This study was started about twelve years ago while I was a student at the London School of Economics. During this time it has changed in scope and in direction. Originally it was to be a development of the theory of the price mechanism of a socialist society. The socialist society was conceived of as completely or almost completely collectivist. In the course of the development of my ideas on the subject, while the work was continually being interrupted by other tasks, it gradually became clear to me that the maintenance and further development of the democratic way of life, as it grew under capitalism and was extended by the labor movement within the capitalist society, not only formed a far more essential part of the socialist ideal than the negative "abolition of private property in the instruments of production" but was in much greater need of careful tending. So much is now clear from the history of Russia and Germany. If socialism is to be identified with the belief that the abolition of private property would automatically establish the brotherhood of man—and many socialists did, while some apparently still do, believe this—then socialism must be counted out as false. State control or ownership of the instruments of production where the state itself is not thoroughly democratic is not socialism and is much further removed from socialism than socialism's "opposite," capitalism.

The title *Economics of Control* was proposed in 1932, with the idea that the principles of the price mechanism would also be applicable to nonsocialist but autocratic collectivist societies. The name is perhaps even more appropriate for the present form of the book, now that the stress is taken from collectivism and applied to the idea of conscious recognition of the problems of social organization and the exercise of conscious control over the

economic system: I do not think I ever was guilty of raising collectivism from a *means* of bringing about the socialist ideals to an *end* in itself, but, like many socialists, I tended to overemphasize its importance. The economics of *control* is still contrasted with the economics of *laissez faire*, but control does not necessarily mean collectivism. It suggests the deliberate application of whatever policy will best serve the social interest, without prejudging the issue between collective ownership and administration or some form of private enterprise.

In my original plan I had intended to provide a theoretical solution for each economic problem of a completely collectivized economy and then see to what extent, if at all, and by what means the problem is in fact solved in a capitalist society. But the abandonment of the dogmatically, and therefore completely, collectivist economy as identical with the ideal of a society organized in the social interest still permits a similar procedure to be followed with slight modifications, as described in Chapter 1:

It is almost impossible for me to say now exactly in what respects this work shows true originality. Most of it doubtless was absorbed from my teachers at the London School of Economics. To Professor Lionel C. Robbins, Professor Frederick A. Hayek, Professor J. R. Hicks, and Professor D. H. Robertson I am indebted for my original training in handling the tools of economic analysis. To Professor Arnold Plant and to Professor William C. Hutt of the University of South Africa I owe much for their special insistence, long resisted by me, on the possibility of approaching social problems understandingly from the free-enterprise starting point. Professor Harold J. Laski and Professor Maurice H. Dobb are responsible for helping to direct my interests to the topic on which I have written. Mr. J. M. Keynes's influence is of course seen throughout, as in practically all modern writings. I owe a special debt to Mr. R. F. Kahn and Mrs. Joan Robinson for the great pains they took in getting me to overcome my prejudices against Mr. Keynes's great advancement of economic understanding. Not least is my debt to Dr. M. Kalecki and Professor Oscar Lange, not only for their keen criticisms of my thoughts and theories, but for their incessant and valuable reminders to me of



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the larger problems of social organization into which the purely economic issues have to be fitted. In the long interval since I started on this work I have had the privilege of meeting economists all over England and the United States as well as in Canada, and no doubt many have left their mark on me. I regret that it is impossible to mention them all.

Thanks are due to the publishers of the following articles of mine for permission to make use of some of the materials in them.

"The Diagrammatical Representation of Elasticity of Demand," *Review of Economic Studies*, October, 1933.

"The Diagrammatical Representation of Elasticity of Substitution," *Review of Economic Studies*, October, 1933.

"Capital Investment and Interest," *Group Meetings 1936-37*, Manchester Statistical Society.

"Some Swedish Stepping Stones in Economic Theory," *Canadian Journal of Economics and Political and Social Science*, November, 1940, University of Toronto Press.

"From Vulgar Political Economy to Vulgar Marxism," *Journal of Political Economy*, August 1939, University of Chicago Press.

I am grateful to Professors Carl T. Devine of Johns Hopkins University and George J. Stigler of the University of Minnesota for reading the manuscript and correcting a number of errors. An earlier draft of the manuscript was accepted by the University of London as a thesis in partial fulfilment of the requirements for the Ph. D. (Econ.) London.

*Abba P. Lerner*

NEW YORK

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The fundamental aim of socialism is not the abolition of private property but the extension of democracy. This is obscured by dogmas of the right and of the left. The benefits of both the capitalist economy and the collectivist economy can be reaped in the controlled economy. The three principal problems to be faced in a controlled economy are employment, monopoly, and the distribution of income. Control must be distinguished from regulation. Liberalism and socialism can be reconciled in welfare economics.

### Chapter 2. THE OPTIMUM DISTRIBUTION OF GOODS 7

The quantitative problem in distribution is how much shall go to each individual. The qualitative problem is how the different kinds of goods shall be allocated among the different individuals. Certain assumptions have to be made about human satisfactions or welfare, including the *principle of diminishing marginal substitutability* between goods. The optimum allocation of goods involves the equalization of marginal substitutability ( $M$ ). This is automatically reached by free exchange, but is upset if there is any monopolistic exploitation. The inconveniences of barter exchange can be avoided by the use of money. The prices of goods can be made to reflect their  $M$ . In some circumstances the government may interfere with the optimum allocation of goods.

### Chapter 3. THE OPTIMUM DIVISION OF INCOME 23

Money income can be used to represent real income even if prices change. To obtain a criterion for the optimum division of money income we must assume that different people enjoy similar satisfactions and that the *principle of diminishing marginal utility of income* holds generally. The maximization of total satisfaction by equalizing the marginal utility of income is impossible, but the maximization of *probable* total satisfaction is attained by an *equal* division of income. Complications arising from complementarity and irrationality do not affect the general conclusion. The acquisition through experience of capacity to enjoy income may be an argument for equalizing income gradually rather than suddenly. Where acquisitiveness indicates greater capacity to enjoy income, an unequal division would be the optimum, but concessions that have to be made for other reasons meet this point too. To reject the conclusion that the optimum division of income is an equal one is not more impartial or scientific than to accept the assumptions on which it is based.

*Chapter 4. DIVISION OF INCOME AND ALLOCATION OF GOODS IN THE UNCONTROLLED ECONOMY* 41

Great inequalities of income create wants, and this has the same bad effect on welfare as the destruction of means for satisfying wants. Ignorance, certain forms of advertising, and monopoly distort the allocation of goods. Monopoly destroys the equality between relative prices and marginal opportunity cost so that  $M$  is not equalized among different consumers. Government crop restriction plans and the two-price stamp plan interfere with the optimum allocation of goods for the sake of helping farmers and others. Direct help would be better for everybody because it would not interfere with the optimum allocation of goods. Rationing also sacrifices the optimum allocation of goods in a roundabout attempt to prevent the rich from outbidding the poor. All the benefits can be obtained without this loss by *general rationing* of purchasing power. Monopolistic interference with the best use of goods can be met by *counterspeculation*.

*Chapter 5. SIMPLE PRODUCTION I (IN A COLLECTIVIST ECONOMY)* 57

The study of production with only one factor is unrealistic, but it is a useful exercise. Factors that are not *scarce* may be ignored. The fundamental economic problem is the problem of *choice*. The optimum division of a factor among different uses implies that the value of its marginal product is not less than the value of any alternative marginal product. To bring this about in any real society involves an infinitely complex problem. It can be solved with the help of the price mechanism and a simple *Rule* that must be followed by the managers of every production unit. The Rule equalizes the value of the marginal product of each factor in each of its uses. The private marginal opportunity cost and the social marginal opportunity cost are equalized by free consumer purchases on the market. In this way each individual is induced, while seeking his own interest, to do that which is in the social interest. The Rule also works if there are many stages in production. Where there is only one (*scarce*) factor and no indivisibilities there must be constant returns to the scale of production. Productive speculation, as distinct from aggressive Speculation (with a capital S), is a socially most useful activity.

*Chapter 6. SIMPLE PRODUCTION II (UNDER PERFECT COMPETITION) THE WELFARE EQUATIONS* 72

Under certain conditions free enterprise leads to the optimum use of resources without any Rule expressly designed to bring it about. If there is *perfect competition in buying* the price of the factor is equal to the marginal cost to the buyer. If there is *perfect competition in selling* the price received for the product is equal to the marginal revenue. If there is perfect competition throughout the economy individual enterprisers seeking to maximize their profits behave just as if they were following the Rule. This is illustrated by the *welfare equations* which must be satisfied if the optimum is to be reached. A chart shows how the optimum use of resources can be achieved in a capitalist as well as in a collectivist economy.

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### Chapter 7. SIMPLE PRODUCTION III (IN THE CAPITALIST AND IN THE CONTROLLED ECONOMY)

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The conditions under which the welfare equations would be satisfied in a capitalist economy are very stringent and unlikely to be fulfilled. The infrequency of perfect competition is shown by the importance of salesmanship. The optimum application of resources in any particular use is only *relative* to what is happening elsewhere in the economic system, so that perfect competition must be *universal* if the optimum is to be reached. Even when reached, perfect competition is unstable. It can be shown, with the help of the *average-marginal relationship*, that there may be no direct gain in the firms' expanding, but there is always an indirect gain from their becoming large enough to establish a monopoly. Perfect competition has advantages over the attainment of the optimum by the Rule: the incentive to the managers is of the ideal intensity, and alternatives to government employment are a safeguard of the freedom of the individual. Perfect competition can sometimes be artificially maintained by government counterspeculation. This provides an *objective guide* in any instance whether the production unit should be operated privately or collectively. Complete freedom for *public enterprise* and *private enterprise* on equal and fair terms may be called *free enterprise*.

### Chapter 8. COMPETITIVE SPECULATION

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The social utility of competitive speculation is more certain than that of simple production. It is beneficial to the rest of society even if the speculator is mistaken and incurs a loss, and even when he sells short. Hostility to speculation is mistaken and arises in part from identifying productive or competitive speculators with aggressive or monopolistic Speculators. The profits from speculation are best eliminated by increasing the amount of speculation.

### Chapter 9. AN ALTERNATIVE FORMULATION OF THE WELFARE EQUATIONS. EQUALITY AND PROPORTIONALITY

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Adjustment of production so as to reach the optimum may be considered in terms of the factor or in terms of the product. There are two corresponding formulations of the Rule and of the welfare equations. The Rule may be expressed in terms of the marginal cost instead of the marginal quantity of factor. This is misleading until it is pointed out that marginal cost really stands for the value of the marginal quantity of factor. Making the price *proportional* instead of equal to marginal cost was believed to be enough, but proportionality cannot be universal unless it is really equality. This is illustrated in the allocation of labor power between labor and leisure.

### Chapter 10. COMPLEX PRODUCTION I (FIXED PROPORTIONS BETWEEN FACTORS AND PRODUCTS)

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Where proportions are fixed by the technique of production, the same Rule applies as for simple production. While the marginal product of each factor is indeterminate, the Rule can be applied to the *combination* as if it were a single

factor. Alternatively the Rule can be applied with identical results to the marginal *net* product of the individual factors. The factor prices are determined by the *differences* in the proportions in which factors are combined for different purposes. One factor can *indirectly* be substituted for another through the substitution of products using more of it for products using less of it. Even if the proportions are not different in different uses, the factor prices can be determined by their conditions of supply. Where the supplies of factors are fixed and in the same proportions as in all production uses, the individual factor prices are indeterminate, but they are then not needed. Product and factor play symmetrical parts in production. Corresponding to *net vmp* (value of the marginal product) is *net vmf* (value of the marginal quantity of factor), and corresponding to *F*, the composite factor, is *P*, the composite product.

**Chapter 11. COMPLEX PRODUCTION II (VARIABLE PROPORTIONS BETWEEN FACTORS AND PRODUCTS, NO SIGNIFICANT INDIVISIBILITY)**

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The distinction between the *division* of resources among different products and the *allocation* of the separate factors to their various productive combinations is parallel to the distinction between the division of income among different individuals and the allocation of the different goods to their various consumption combinations. Either problem is too complex to be achieved without using the price mechanism. The same Rule brings about both the optimum division of resources and the optimum allocation of the factors. The optimum division of resources among products involves equating the *technical marginal substitutability* between products to their marginal substitutability in consumption. Products sacrificed to permit the production of alternatives can be treated as factors, and factors set free can be treated as products. The difference between factor and product is only one of sign. There are three kinds of transformation: factor into product, product into alternative product, and factor into displaced factor. All three are properly adjusted by the simple application of the Rule to the transformation of factor into product. The economic problem is seen more clearly in terms of input of factors than in terms of the output of products. The approach from the point of view of output leads to the formulation of *two rules*. The two rules correspond to the distinction between the division of resources and the allocation of the factors. This formulation is not so satisfactory and arises from a weakness of economists for assuming perfect competition. The dangers to perfect competition are of the same nature as in simple production. With factors and products variable, imperfect competition can interfere with the optimum allocation of the factors as well as with the optimum division of resources among different products.

**Chapter 12. DIMINISHING MARGINAL TRANSFORMABILITY**

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The principle of diminishing *M* (marginal substitutability) is also applicable to production. The technical *M* between two factors is given by the ratio between their marginal products. It depends on the *proportion* in which the factors are

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combined. Possible ranges of constant or increasing  $M$  are economically irrelevant. The optimum proportion between factors, as well as between products, is that which makes the  $M$ 's proportional to the prices. The general *principle of diminishing transformability* shows itself as diminishing  $mp$ , increasing  $mf$ , diminishing  $M$  of factors, and increasing  $M$  of products. Constant returns to scale are not inconsistent with diminishing returns to increases in the proportion of one factor to the others. Substitution always involves at least *three* items. The relationships discussed in this chapter are considered only as within the production unit.

### Chapter 13. THE ELASTICITY OF SUBSTITUTION AND THE LAW OF DIMINISHING RETURNS

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The elasticity of substitution measures the rate at which substitutability diminishes. It can be generalized to apply to all forms of transformation, measuring the rate at which substitutability *increases* in products. Zero elasticity of substitution signifies fixed proportions, and infinite elasticity of substitution indicates economically indistinguishable factors or products, the proportion between which can be varied indefinitely. All elasticities are measured in terms of *proportional* changes. Constant or increasing  $mp$  is eliminated by the Rule or by perfect competition, but may persist under monopoly. The principle of diminishing  $mp$  is therefore not so strong as the law of diminishing returns (which means diminishing average product of any factor increased in relation to the other factors). Diminishing returns follow from the necessity that every cooperating employed factor has a *positive* marginal product. There is a middle range of factor proportions where no factor is in *absolute* excess and where the diminishing returns are universal. The popular argument for diminishing returns is inadequate for several reasons. Wise production does not avoid diminishing returns, it avoids *increasing* returns. The corresponding law for products is the law of diminishing  $af$  (average quantity of factor per unit of product).

### Chapter 14. COST OF PRODUCTION

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Cost and returns are not the simple inverse of each other. Cost refers to the unit of product, and returns refer to the unit of factor. The sum of the marginal products exhausts the whole product. On our present assumptions we would have constant cost and diminishing returns throughout the economy. But from the point of view of the industry there will be increasing cost. Increased output of the industry makes some of the factors more scarce and raises their prices. The effect of this on cost is mitigated by substitution of relatively cheaper factors for those whose prices rise. The rise in the price of factors in response to an increase in the amount bought is measured by the elasticity of supply. The influences on the elasticity of supply are extremely complex. Increasing cost from the point of view of an industry must be distinguished from increasing cost from the point of view of society. Elasticity of supply will be less from the point of view of an industry than from the point of view of society because the former reflects psychological in addition to technical resistances. The concept of elasticity of substitution is applicable to the indirect technical substitution of one product for another in reallocating society's resources.

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Indivisibility may be found in the factor, in the product, or in the method of production. It can upset the law of diminishing returns by limiting the adjustability of factor proportions. With increasing returns it will always pay the firm (in perfect competition) either to expand or to close down. Indivisibility is significant when it is large enough to destroy perfect competition through the expansion of the firm. With significant indivisibility, perfect competition, or the application of the Rule, must result in the firm's running at a loss, so that the optimum use of resources is possible only in a collectivist or subsidized agency. Increasing returns is only an extreme case of this where the individual factor is in excess not merely *in relation to its price* but *absolutely* in the sense that it is excessive at any price greater than zero. Counterspeculation is not effective by itself against monopoly established by indivisibility. Small indivisibilities, which can be large in relation to the market involved, may be more important than large ones. Where recognized, indivisibility shows itself in the problem of the public utility, where unintelligent compromise leads to unending regulation. In the absence of indivisibility, perfect competition would be *possible* everywhere. Freedom of entry, like government regulation, can prevent excessive profits but cannot prevent the waste of resources. These wastes because of *imperfection* of competition are frequently called the wastefulness of competition by ingenuous planners. The economies of standardization are also based on indivisibilities and are adequately encouraged by the Rule.

## Chapter 16. INDIVISIBILITIES II ("VIRTUAL MP," LARGE DECISIONS)

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What is meant by the marginal product of an indivisible factor. The Rule must be applied to the indivisible block. The seeming elimination of all possible cases of decreasing cost is merely the reflection of the incompatibility of perfect competition with indivisibility. The values of net *vmp* and *pf* depend on whether the indivisible unit is applied or not, so that they cease to be adequate measures of marginal social benefit (*msb*) and marginal social cost (*msc*). Estimates of the range within which *msb* and *msc* lie can be narrowed by considering the possibilities of monopolistic discrimination. Discrimination is made possible by differences in the relative efficiency of units of factors in different uses. Production may be socially desirable even if monopolistic discrimination is unable to cover costs. Direct estimates may be made of *msc* and *msb* by considering the area under sections of the demand curves. The same analysis is applicable to all *large* decision whether to produce or not. The necessity of making unreliable estimates is in the nature of the problem and not in the method of solving it. The uneasiness of accepting a permanent loss is often due to identifying irrelevant aspects of perfect competition with the optimum use of resources.

## Chapter 17. FIXED FACTORS (EQUILIBRIUM OF THE FIRM, LONG AND SHORT PERIODS)

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There may be *too little* of an indivisible factor. This will result in increasing cost, and, in perfect competition, either the firm will be making a profit or it will pay

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the firm to contract output. Perfect competition thus appears to be secure, but this is true only over a limited range. As the firm grows larger the significance of the indivisibility diminishes. Factors and costs that are fixed in the short period are variable in the long period. The average cost plays no part in determining the *output* of a firm that tries to maximize its profits. But in the long run the adjustment of the *number* of firms tends to make the price equal to the minimum average cost. This is because in the long run there are no fixed factors and the optimum proportion between the factors can be reached. Consequently the stability of competition which results from fixed factors disappears too in the long run. Legal maxima to the size of firms could maintain perfect competition, but would interfere with efficiency. Counterspeculation is therefore preferable, as where there is no indivisibility. Diminishing returns to entrepreneurship, which is unaugmentable, can stabilize perfect competition, but recent developments in business organization have made this less important.

### Chapter 18. LONG AND SHORT PERIOD. RENT AND NEGATIVE RENT

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Periods are long or short *relative* to the time it takes to make an adjustment, and the distinction between fixed and variable factors is correspondingly relative. Short period *mc* need not be less than long period *mc*. The appropriate *mc* to use in connection with the Rule is that which refers to the date of the output considered. A minimum adjustment period may be convenient. The average cost is adjusted to the marginal cost by the derived price of the fixed factors. Rent (and quasi-rent in the short period) may be defined as *unnecessary payment* or *surplus*. This may be large or small. What payment is "necessary" depends on the demarcated area which constitutes the point of view taken. From the point of view of one firm there is no surplus. The wider the point of view the greater is the part of the payment that appears as surplus. A redistribution of surplus does not affect the optimum use of resources. The rent of land is a limiting case. From the point of view of society some surplus is to be found in nearly all payments. Increasing cost to an industry (which may be arbitrarily defined as a collection of firms) results in rent from the point of view of the industry if it is due to the movement of relatively less productive factors from other industries, but not if it is due to a higher price of the diminished alternative product. The excess of *mc* over *ac* is absorbed in rent. An excess of *ac* over *mc*, as when an indivisible factor is in excess, would call for a *negative* rent. This is what makes perfect competition impossible in such cases. The same analysis is applicable to temporal points of view. The short period corresponds more to a wide than to a narrow point of view and would be better called the "shortsighted" point of view.

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Surplus also applies to the purchaser, and in this case it depends on the demarcation of the area *from* which he buys. All taxation falls on surplus. A tax greater than the surplus from the transaction on which it is based will prevent the transaction and destroy the surplus, bringing about a social loss. The land taxers are fundamentally right in stressing the "surplus" nature of land rent. But in assuming that the government *needs* the revenue they are reduced to the weak negative



argument that the land tax would do a minimum of harm. Land is not the most important source of surplus. Where taxation is necessary the personal income tax seems the least harmful. The marginal income tax should not be greater than one hundred per cent. Income tax does not fall entirely on surplus in connection with saving ("the double taxation of saving"), leisure, and risky investments.

### Chapter 20. PRODUCTION AND TIME

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Technical marginal transformability refers to transformability over time as well as to any other form of transformation. The Rule calls for the equalization of the present and future values of goods, making allowance for the cost of transformation over time by storage or otherwise. More important than storage is the indirect transformation of present goods into future goods by shifting resources from producing present goods to producing future goods. Improvement of equipment permits future output to be increased by *more* than the present sacrifice. Future goods must therefore be cheaper than present goods. Even in a stationary society the *opportunity* of improving equipment must make future goods cheaper than present goods. To keep the same relative values, all goods must fall in value at the same rate over time. The opportunity of transforming present into future goods is equalized for all goods by the possibility of *indirect* transformation through the good that gives the greatest yield of future over present product. Factor prices would also have to be lower in the future than in the present. The inconveniences of falling prices can be avoided by *a positive rate of interest on money*. The rate of interest raises the marginal *value* yield from postponing output or anticipating input. Making use of the general relationships which must hold between the marginal physical yield (from postponing output or anticipating input), the rate of change of prices, and the rate of interest, an interest policy can adjust the movement of the price level so as to minimize the price changes, resistance to which would interfere with the optimum use of resources. With relative prices variable the same principles hold as in a stationary society, but instead of all prices it is only some arbitrarily chosen index number that can be stabilized. Different goods depreciating at different rates offer alternative measurements of the same general marginal yield from the postponement of output. Technical progress tends to make product prices fall relatively to factor prices so that it is impossible to stabilize both. A positive rate of net investment, by increasing the quantity of equipment, also increases the marginal product of factors other than capital goods and tends to make their prices rise relative to the prices of the products.

### Chapter 21. INTEREST, INVESTMENT, AND EMPLOYMENT I

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Price policy, which comes before interest policy, should be framed so as to conflict least with price rigidities. Prices might be expected to be less rigid in a collectivist economy. The rate of interest is related not to the price level but to *the rate of change* in the price level. The marginal yield from the postponement of output depends on the degree to which output is being postponed. The *marginal efficiency of investment* is a function of the rate of investment. In applying the Rule, *pf* and *vmp* must be discounted to the same point of time. The determination

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of the rate of investment is unavoidably political. Private saving could be used as an index in making the political decision about the rate of investment. The government must arrange for changes in consumption to offset changes in investment, and it must offset accidental changes in investment or consumption so as to prevent inflation or unemployment. The payment of a *social dividend*, which enables this to be done, must be independent of the amount of work done by the recipient. The social dividend might be negative, that is, a *tax*. The adjustment can be made automatic but there are many complications. The rate of interest also affects the amount of money people want to hold.

### Chapter 22. INTEREST, INVESTMENT, AND EMPLOYMENT II

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Full employment may be achieved automatically in a capitalist economy. The level of employment depends on the money demand for goods and services. Net income is equal to net expenditure because each dollar of expenditure creates a dollar of income. Investment, defined as expenditure other than on consumption, together with expenditure on consumption constitutes total expenditure and so total income. If there were no investment, income would be stabilized at a very low level. For every level of investment there is a corresponding level of income which is reached when the investment just fills the gap between income and *equilibrium consumption*. The propensity to consume is determined primarily by the distribution of income. Employment is determined by investment, which is determined by the rate of interest, which is determined by liquidity preference and the supply of money. Surplus cash is likely to be loaned out and thus to lower the rate of interest. There are eight stages in the mechanism whereby unemployment is automatically eliminated and inflation automatically checked.

### Chapter 23. UNEMPLOYMENT AND THE TRADE CYCLE 285

At each step in the automatic elimination of unemployment and inflation the machinery is likely to stall. Wages may refuse to fall. If wages do fall this will not immediately eliminate unemployment. The prices of other factors may not follow wages. Product prices may be held up by monopolists. The need for cash may not fall because *falling* wages and prices can offset the effects of *lower* wages and prices. The amount of money in existence may decrease more than the need for it decreases. The fall in the rate of interest may be negligible because of elasticity of liquidity preference. There may even be a lower limit to the rate of interest. Investment may be unresponsive to the rate of interest. The effect of falling income on investment may start a spiral of deflation which would be accentuated by a cumulative increase in liquidity preference. All these considerations apply in reverse for an inflation. With several rigid prices relative unemployment depends on relative prices. The fundamental cause of the business cycle is the inadequacy of demand because of the very unequal distribution of income. The study of business cycles is the study of what happens to employment when nothing is done to keep demand where it should be. It is natural for government activity to aggravate the business cycle. But in very severe depressions the government is usually forced to relieve the situation.

Chapter 24. INTEREST, INVESTMENT, AND EMPLOYMENT III (FUNCTIONAL FINANCE)

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There are effective instruments in the hands of the government for maintaining full employment and preventing inflation, but their use is hindered by strong prejudices. The instruments are not available until it is recognized that the size of the national debt is relatively unimportant, that the interest on the debt is not a burden on the nation, and that the nation cannot be made "bankrupt" by internally held debt. Every debt has a corresponding credit. Only external debt is like individual debt and impoverishes the nation. The purpose of taxation is never to raise money but to leave less in the hands of the taxpayer. The purpose of borrowing is not to raise money but to make the public hold more bonds and less money. The purpose of war bonds is only to make the public spend less. Borrowing and taxing can also be applied in reverse. The effects of taxing and borrowing overlap. Taxing and spending, borrowing and lending, and buying and selling constitute the six fiscal instruments of the government. Printing money and destroying or hoarding money are subsidiary to these in the task of adjusting investment and consumption to give full employment. Spending may have to take the form of public works. The government should try to equalize the *msb* of public and private spending, counting also the indirect *msb* from increased employment. All items of public and private spending and taxing should be so adjusted that the *msb's* from the spending and the *msc's* of the taxes are all equal. Though there is no room for the *principle* of balancing the budget, there is a long run *tendency* for the budget to balance itself. It is possible to maintain full employment while balancing the budget if demand is maintained by redistributing income. Businessmen's prejudices against functional finance are best met by a determined maintenance of adequate demand. There are also some devices for making functional finance look more like traditional finance. The objection that functional finance interferes with free choice between saving and spending is extraordinarily empty.

Chapter 25. CAPITAL, INVESTMENT, AND INTEREST 323

Investments are not usually consumed after one year. All replacements are really devoted to future output. Equipment can be considered as "imprisoned" factor services. The relation between the quantity of capital and the flow of services corresponds to the average *time* the services are "imprisoned." The postponement of consumption for a year may be regarded as a temporary lengthening of the average period production. Alternatively all investments can be treated as if they were permanent. A better "atom" is the postponement of one dollar for one year. In a stationary economy the *marginal productivity of capital* is equal to the marginal efficiency of investment. Only individuals (or small parts of the economy) are free by borrowing to adjust the quantity of their real capital to make its marginal productivity equal to the rate of interest. Society can adjust its capital only by investing or disinvesting, and this takes time. The marginal productivity of capital is the marginal efficiency of investment when the rate of net investment is zero. This can be illustrated on a three-dimensional diagram, and the effects of unemployment can be brought in. The capital concept is essentially static. Practical problems are never concerned with capital but only with

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investment. The rate of interest differs with risk, liquidity, and the period considered. Competition equalizes the *sum* of the money and liquidity yields from holding different assets. This permits the theory of the rate of interest to be generalized to explain all kinds of differential interest rates. The creation of liquidity should be reserved to the monetary authority, for it permits other creators of liquidity to use the proceeds to subsidize less productive investments and thus to depart from the optimum use of resources.

### Chapter 26. FOREIGN TRADE I

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The same Rule applies to foreign as to domestic trade. Because of the tendency for an equilibrium to be reached between the supply and demand for foreign currency, the foreign currency can be used to represent *msc* and *msb*. The Rule unites the whole world in one system for the best use of resources. One factor or product may move in substitution for the movement of others. This reduces interregional price differences to the cost of the cheapest substitute movement. A higher *mei* (marginal efficiency of investment) in one country than another must be accompanied by a correspondingly higher rate of interest or a (relatively) falling price level or a correspondingly depreciating currency (or a combination of these). The concentration of investment so as to equalize *mei* leads to international indebtedness. The Rule provides an objective principle for the collaboration of different nations as of the individuals within the state. Specific international trade problems arise only from artificial barriers to the movement of goods, of money capital, and of people.

### Chapter 27. FOREIGN TRADE II

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There are rational as well as irrational temptations for a nation to discriminate between domestic and foreign goods, capital, and people. An appropriate restriction of imports and exports (below what would be indicated by the Rule) can benefit a country (while imposing a loss on the foreigner greater than this gain). This invites retaliation which would make everybody lose. Earlier inhabitants, as a whole, cannot lose by the immigration of workers who are paid no more than their marginal product. Foreign lending might well be limited for the sake of preventing ill feeling unless some scheme is adopted for equalizing the wealth of nations.

### Chapter 28. FOREIGN TRADE III (IN A CAPITALIST ECONOMY)

368

Particular interests are able to harm the economy as a whole by insistence on protective devices in lieu of harmless but unpopular compensation. Even "taxing the foreigner" is not carried out scientifically. The conveniences of the gold standard are insufficient to make up for the hindrances it imposes on a policy for full employment. Fear of losing gold is met least objectionably by raising interest rates. This may lead to the maintenance of the gold standard only at the cost of severe unemployment, which gives rise to pressure for imports duties. Export subsidies violate the spirit of the gold standard. Capital movements can cause the same difficulties. The prerequisite for a single currency (or gold standard)

area is effective freedom of movement of goods, people, and capital. Stable exchange rates are a result of this—a symptom that cannot safely be established by decree. Where demands are inelastic the automatic mechanism for adjusting the international balance works the wrong way. The critical point is where the *sum* of the elasticity of demand for exports *plus* the elasticity of demand for imports is equal to unity. The tendency to assume that elasticities are high shows undue optimism.

*Chapter 29. (FOREIGN TRADE IV (IN THE CONTROLLED ECONOMY))*

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There is no need to give up the benefits from foreign trade for the sake of insulation from disturbances. It is better to be overgenerous in compensating particular sacrifices in the general interest than to forego the general benefit. There is a simple formula for the optimum tax on imports and exports, in perfect and imperfect competition, if it is desired to exploit the foreigner. Similarly monopolies can be taxed and bribed into buying and selling the quantities that best serve the interest of the country or of the world economy. Foreign exchange values should be subservient to the maintenance of full employment. Wage and cost reduction are just as competitive with other countries for employment as the reduction of exchange values. But unlike the case of tariffs there remains a net benefit all round instead of a net loss if all countries expand domestic demand without worrying whether this might make their exchange rates fall. Stable exchanges will then be the result, and the establishment of *fixed* exchange rates will be a reasonable if not very important issue.

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*THE ECONOMICS OF CONTROL*

## *Abbreviations*

<i>ac</i>	average cost	<i>mf</i>	marginal quantity of factor
<i>af</i>	average quantity of factor	<i>mp</i>	marginal product
<i>afc</i>	average fixed cost	<i>m<sub>p</sub>c</i>	marginal private cost
<i>ap</i>	average product	<i>m<sub>p</sub>r</i>	marginal private revenue
<i>apc</i>	average private cost	<i>mr</i>	marginal revenue
<i>ap<sub>r</sub></i>	average private revenue	<i>msb</i>	marginal social benefit
<i>ar</i>	average revenue	<i>msc</i>	marginal social cost
<i>avc</i>	average variable cost	<i>P</i>	composite product
<i>e<sub>d</sub></i>	elasticity of demand	<i>p</i>	price (of the product)
<i>e<sub>s</sub></i>	elasticity of supply	<i>p<sub>f</sub></i>	price of the factor
<i>F</i>	composite factor	<i>vap</i>	value of the average product
<i>M</i>	marginal substitutibility	<i>vmf</i>	value of the marginal quantity of factor
<i>mc</i>	marginal cost	<i>vmp</i>	value of the marginal product
<i>mei</i>	marginal efficiency of investment	<i>σ</i>	elasticity of substitution

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