A Theory of Price Control

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Pᴿɪᴄᴇ or rent control is but one of many forms of legislative action which interfere with private contracting in the market place. To delimit the scope of my analysis, I shall use the term "price control" to refer only to any set of regulations which satisfies the following three conditions. First, the control must fix the price (or income)[1] terms of private contracts; this categorically excludes any laws which regulate the distribution of income among the contracting parties on a share or percentage basis.[2] Second, the control must involve no appropriation of proceeds to or from the government; taxation and subsidization are thus excluded. Finally, the fixing of price must not be associated with direct government sales, purchases, or manipulation of resources so as to maintain the regulated price;[3] by this stipulation, price "support" is also excluded. Even on such terms, legal regulations to control price are still many and varied.

To evaluate our understanding of the class of phenomena which we seek to explain it is essential that we discover implications refutable by facts. By this criterion the available body of economic theory pertaining to price control is deficient indeed: the massive literature on the subject offers few such implications.[4] An alternative approach to analyzing the observable effects of price control is presented here.

[1] By income terms of contracts I refer here to the terms of payments designed to stipulate the distribution of income (or wealth) among the contracting parties. We will discuss this further later.

[2] Regulation on a percentage basis may be imposed on commission rates, dividends, or the sharing percentage of a share contract. Because these control a parameter without a dollar dimension, the associated analysis is simpler. See, for example, Steven N. S. Cheung, The Theory of Share Tenancy, chs. 5 & 6 (1969).

[3] For example, we exclude such situations as maintaining a regulated taxicab fare by restricting the number of medallions, or supporting the pegged price of corn by restricting the amount of land devoted to its cultivation.

[4] There are, however, economic studies which deal with the social desirability of price control and others which estimate the effects of price control. These writings may indeed

I. THE NATURE OF THE PROBLEM

Demand and supply schedules are conceptual tools which restrict the maximum quantities of a good individuals are willing to buy or sell at varying prices. With all the underlying qualifications, we are able to arrive at situations where the observed prices and quantities transacted are said to be determined and where these in turn determine income distribution and resource allocation. As a corollary, specified changes in demand and supply conditions will lead to implied changes in the transacted prices and quantities. But as they stand, these conceptual tools are not equipped to handle a situation where the price which they are designed to determine is controlled.

As an illustration, consider a case where the $10 market price of a theater ticket is reduced by law to $6. A "shortage" is then said to exist, and the plausible effects are many. Available tickets might be allocated by a wide variety of methods including waiting in queue, "friendship" with the ticket seller, different forms of rationing, or even physical violence. Alternatively or concurrently, "black" markets of various shades might emerge, the quality of the show might be allowed to deteriorate in a number of ways, or as still another possibility the curtain might go down altogether. Any of these events, or combinations of events, would be consistent with a shortage. But what observation can refute that "shortage" hypothesis? None! If, for example, we observe that queues are not longer or even shorter under the control, the existence of a "shortage" is not necessarily falsified. Nor does the hypothesis contain the weaker, but still useful, type of implication which states that the control will lead to a restricted set of events, since the list of events feasible under a shortage is prohibitively long. A theory potentially consistent with everything explains nothing.

It is frequently said that under price control the market will not clear. A market exists whenever a transaction is made between two or more individuals, and the terms need not be confined to a monetary price. It is true that price control may generate a different criterion, or a combination of criteria, such as allocation by waiting, by seniority, by height, or by strength. Yet given whatever criterion of allocation, and that market transactions continue to exist under the control, the market will necessarily clear in the sense

be of interest in contributing to our knowledge of price controls in general. For a few examples see Seymour E. Harris, Price and Related Controls in the United States (1945); William D. Grampp, Some Effects of Rent Control, 16 So. Econ. J. 425 (1950); D. Gale Johnson, Rent Control and the Distribution of Income, 41 Am. Econ. Rev. No. 2, at 569 (Papers & Proceedings, May 1951); J. L. Carr, Rent Control and Housing Policy, 64 Econ. J. 25 (1954); John Sheahan, Problems and Possibilities of Industrial Price Control: Postwar French Experience, 51 Am. Econ. Rev. 345 (1961); Ira S. Lowry, Joseph S. DeSalvo & Barbara M. Woodfill, 2 Rental Housing in New York City (New York City Rand Institute, 1971).

that the quantity demanded will equal the quantity supplied. The simple mechanism will be illustrated later. It is also true that price control may cause changes in the quality of the good transacted or that transactions which would have occurred in a free market now cease to occur. Again, in any case the market will necessarily clear. Even if we take the extreme case where transactions in a particular good are completely eliminated by the price control, the "clearing" of the market is identical to that of any other in which trading ceases: given the constraints the contracting parties no longer find any transaction of the good worthwhile. In each of these cases, previous theory is incapable of predicting which of the alternatives will occur, but to say that the market "does not clear" is simply to sidestep an unresolved question.

In an analysis where price control is said to result in "disequilibrium," refutable implications are absent. Merely to say that the price of a good or the rental value of a property is by law set above or below the market price is not sufficient to produce any predictable outcome. When additional constraints are specified, however, behavior becomes more restricted. To interpret the effects of price control, as to interpret any economic behavior, the specified constraints must be rigid enough to yield implications refutable by facts.

Some writers on price control, apparently perceiving the futility of treating the problem in terms of "disequilibrium," have met the issue by assuming, implicitly or explicitly, some given constaints sufficient to yield an equilibrium solution.[5] Since they failed to investigate actual constraints, their imaginary restrictions were devoid of empirical content and have produced hypotheses interesting only as intellectual exercises and incapable of explaining real-world phenomena. If certain outcomes are to be attributed to the control, the constraints specified must conform essentially to those in real practice. Given the usual complexity of any effective price control, and that one control usually differs from another, it is highly unlikely that the actual constraints can be guessed correctly. Furthermore, the use of imaginary constraints will easily lead to *ad hoc* theorizing. The imposition of a particular set of constraints, if sufficiently comprehensive, will naturally yield a particular set of implications. But it is always possible to pick and choose among these con-

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[5] For a few examples of such works, see K. E. Boulding, A Note on the Theory of the Black Market, 13 Can. J. Econ. & Pol. Sci. 115 (1947); M. Bronfenbrenner, Price Control Under Imperfect Competition, 37 Am. Econ. Rev. 107 (1947); *id.*, Price Control Under Imperfect Competition: The Joint Production Problem, 15 Can. J. Econ. & Pol. Sci. 210 (1949); Michael Michaely, A Geometrical Analysis of Black Market Behavior, 44 Am. Econ. Rev. 627 (1954); Emre Gonersay, The Theory of Black Market Prices, 33 Economica 219 (n.s. 1966); and J. R. Gould & S. G. B. Henry, The Effects of Price Control on a Related Market, 34 Economica 42 (n.s. 1967).

straints so that, when confronted with adverse evidence, a favorite hypothesis can be salvaged by altering or further specifying the constraints involved.

The central problem in interpreting the effects of price control is therefore the one common to all empirical economic inquiry. On the one hand the specification of constraints requires an investigation of the real-world situation; on the other, the investigation itself must be guided or restricted by some theoretic framework. The latter condition is essential in the inevitable process of sorting out the relevant constraints from the irrelevant, the significant from the insignificant, so that the consequent effects subject to refutation can be restrictively implied. In other words, a theoretic framework which restricts our freedom in choosing and simplifying the constraints is essential to guard against *ad hoc* theorizing, or letting the facts speak for themselves.

The necessity of a theory to govern the investigation and specification of constraints appears to be more imperative in the case of price or rent control than with other forms of government regulations. To fix the price terms of market contracts by law while not setting any standard rules to govern the appropriation of proceeds and allocation of resources leaves a wide-open range of constraints that may be relevant for decision making. Effective price controls vary from time to time and from place to place, they entail immense bodies of regulations and administrative enforcements, and they involve constraints on behavior not limited to legal provisions. Furthermore, as with any empirical inquiry, no study of finite length could possibly incorporate in detail all the relevant constraints. Simplification is necessary, but the greater the simplification, the fewer and less specific will be the derivable implications. While the emphasis and the abstraction of constraints are left to the discretion of the economist, his selection must be consistent with a given theoretic framework.

The theory of price control offered here is, therefore, not intended to explain the effects of any specific control. Rather, it sets forth some general propositions about the way in which the constraints relevant to any price control may be investigated. These propositions, in turn, are restricted by the requirement of conformity to standard economic principles.

II.   Two General Propositions for Price Control Analysis

As noted earlier, price control restricts the income terms of private contracts. The right to contract implies that the resources involved are, at least to some degree, exclusively owned. It is, therefore, pertinent to derive our propositions through an examination of some aspects of property rights and contracting.

An economic good embodies a set of characteristics subject to legally or

customarily defined limits. A good or an asset is "private property" if, and only if, three distinct sets of rights are associated with its ownership. First is the exclusive right to use, or to decide how to use, the good; this may be viewed as the right to exclude other individuals from its use. Second is the exclusive right to receive income generated from the use of the good. Finally, the right to transfer, or freely alienate, its ownership to any individual the owner sees fit includes the right both to enter into contracts with other individuals and to choose the form of such contracts. Within the realm of economic principles, these rights are specifically interrelated. A restriction imposed on the right to receive income, as in the case of price control, will yield predictable changes in behavior in the exercise of the other two sets of rights.

By postulate, each individual will utilize his private property in such a way as to generate the highest real income. He may either employ the good or the resource himself in what he believes to be its most valuable use,[6] or enter into contractual arrangement with another individual to attain this use. Given the distribution of wealth and the portfolios of asset-holdings chosen by individuals, much is to be gained from forming contracts.[7] Thus, the value of a good will decline either if its most valuable use is restricted, or if its transferability, in one way or another, is constrained by law. A free market, by definition, requires not only the absence of legal regulation on contractual terms but also the absence of restriction on the choice of contracts.

In making a contract, the owner of a good forgoes some or all rights to its use in exchange for income. Depending upon the form of contract chosen, the distribution of income may not be stated in terms of a unit price, but price control is applicable to any contract so long as the income receivable by one or more of the contracting parties is regulated to a fixed amount. While every contract necessarily entails an agreement on the distribution of income (or wealth), not all contracts stipulate the use of the resource itself. When a good is transferred outright under *caveat emptor* in return for full and immediate payment, no such restrictions will be present. However, other contracts (such as for wages or rental) involve only a transfer of some of the use rights to a good for a period of time. Containing implicit or explicit use

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[6] No distinction is made here among a good, an asset, a resource, or a factor of production, so long as they satisfy the definition of an economic good.

[7] The gains from contracting are a complicated subject. For our present purpose it is sufficient to recognize that such gains exist. For fuller discussions see R. H. Coase, The Nature of the Firm, 4 Economica 386 (n.s. 1937); *id.*, The Problem of Social Cost, 3 J. Law & Econ. 1 (1960); Steven N. S. Cheung, Transaction Costs, Risk Aversion, and the Choice of Contractual Arrangements, 12 J. Law & Econ. 23 (1969); Armen A. Alchian & Harold Demsetz, Production, Information Costs and Economic Organization, 62 Am. Econ. Rev. 777 (1972).

stipulations that vary with the physical attributes of the good and with the form of contract chosen, such a contract will involve a structure and will exist over a period of time.[8] A price control which regulates a contract of this nature (as in the case of rent control) acts on the *flow* of income. Let us turn to our first proposition.

Proposition 1: *When the right to receive income is partly or fully taken away from a contracting party, the diverted income will tend to dissipate unless the right to it is exclusively assigned to another individual. The dissipation of non-exclusive income will occur either through a change in the form of using or producing the good, resulting in a decline in its value, or through a change in contractual behavior, resulting in a rise in the cost of forming and enforcing contracts, or through a combination of the two.*

Under the postulate of constrained maximization, the loss of exclusive right to receive income from the use of a good will lead to the same sort of behavior as though the right of use were non-exclusive. That is, the individual will not exercise his prerogative because he is denied the right to income from the use. He will have no incentive to contract with others and to stipulate the use of a good or a resource if he cannot derive any exclusive income from that contract. Furthermore, he will have no incentive to use his resource as if it were private property, or to exclude others from its use. For example, if all income—pecuniary or nonpecuniary—derivable from a privately owned fishing ground is effectively reduced to zero, although the use rights remain exclusive, its utilization will be identical to that of another fishing ground lacking exclusive-use rights. By parallel reasoning, a partial attenuation of the exclusive right to receive income will operate in the same way as a partial attenuation of the exclusive right to use.

Before we discuss why price or rent control will generate non-exclusive income, it is helpful to consider the fairly familiar thesis of the dissipation of "rent" for a "common" property resource, frequently exemplified by the case of a fishery.[9] If no one holds exclusive rights to use a resource, the thesis

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[8] That some contractual stipulations are not stated, either orally or in writing, poses another issue which will not be elaborated here. While the presence of contracting costs will lead to omissions of stipulations, common laws or customs will avoid the necessity of setting forth many terms which would otherwise be explicitly stated. For a fuller discussion of a structured contract, see Steven N. S. Cheung, The Structure of a Contract and the Theory of a Non-Exclusive Resource, 13 J. Law & Econ. 49 (1970):

[9] An early major contribution to this thesis is in Frank H. Knight, Some Fallacies in the Interpretation of Social Cost, 38 Q.J. Econ. 582 (1924). The extension of the Pigou-Knight example from that of two roads to that of a fishery is seen in H. Scott Gordon, The Economic Theory of a Common Property Resource: The Fishery, 62 J. Pol. Econ. 124 (1954). The mechanism of the dissipation of rent is discussed in Cheung, *supra* note 8.

tells us, any rent which would have accrued from its exclusive use will be dissipated.

The literature on common property, however, is marred with ambiguities. First, "common property" is a nebulous term. When we speak of non-exclusivity in the use of a good, we mean only that no individual has the *right* to exclude other users so as to derive exclusive income from its use. With respect to contracting, the absence of exclusive-use rights means that no individual has the *right* to contractually stipulate the use of the good or thereby to exclude other non-contracting parties from using it. In any event, we do not refer to the actual number of people using the good or to its degree of utilization. It is generally impossible to tell whether a good is privately owned merely by observing its actual use.[10] In the absence of exclusive-use rights, however, the dissipation of "rent" leads to observable behavior which can be distinguished only in comparison with a situation where the same good has exclusive-use rights.

Second, and more important, "rent" of a non-exclusive resource may be dissipated through more forms than is commonly understood. The familiar "overfishing" in fishery and "overcrowding" in Pigou's superior road have fostered the impression that "rent" will dissipate only through "excessive" exploitation of the resource. That is, the rental value of the fishing ground or the road under non-exclusive use will be absorbed only by a rise in the cost of fishing or of driving as a result of congestion. This impression, however, is misguided. For example, if the use rights to an apple orchard are made non-exclusive, the rental value of the orchard may dissipate through the disappearance of the orchard into pasturage or even wasteland.[11] Furthermore, even if no individual has the right to exclude others from using the resource there are situations where "rent" will not fully dissipate. A user of the good may still obtain some "rent" if there are restrictions on entry, if some candidates have special cost advantages over others in the use of the good, or if some form of discrimination among the users is established.[12] The absence of exclusivity is a matter of degree, and the equilibrium solution requires only that rent be fully dissipated at the relevant margin.

The dissipation of rent (or, more precisely, the dissipation of what I have

[10] For example, a swimming pool within an apartment complex, though privately owned, is open to common use by all the tenants and their friends, the Tiger Balm Garden in Hong Kong, a private property, is open to all tourists free of charge.

[11] An explanation for this is in Steven N. S. Cheung, *supra* note 8. A factual case of foregoing orcharding for cattle raising as a result of "common" ownership of land is seen in Anthony Bottomley, The Effects of Common Ownership of Land upon Resource Allocation in Tripolitania, 39 Land Econ. 91 (1963).

[12] See also Steven N. S. Cheung, *supra* note 8.

chosen to call non-exclusive income) may indeed occur through a variety of changes in behavior associated with the use or allocation of the good. Another general mode of dissipation which has been largely neglected by the literature involves changes in contractual behavior, when the non-exclusive income will be absorbed by a corresponding rise in transaction costs. Such changes in contractual behavior may also take a variety of forms. The presence of a wide spectrum of possibilities points to a third deficiency in the familiar "over-exploitation" proposition. Since that thesis allows no alternative behavior other than "congestion" of use, it offers no theoretic framework to explain various forms of behavior arising from the dissipation of non-exclusive income.[13]

How does price control lead to non-exclusive income? For illustration let us suppose that a tenement's constant monthly market rent of $100 is reduced by law to a controlled rent of $60. Assume for simplicity that this control will last to perpetuity. Who is granted the *exclusive* right to the $40 of rental income taken from the landlord? One may be inclined to think that it is exclusively assigned to the tenant. Perhaps it is; but in general all or part of that portion will have *no* exclusive claimant.

The customary lack of exclusivity in this case may be illustrated as follows. It would be relatively simple—although at some cost—to delineate and assign exclusive-use rights to a portion of the tenement to the tenant. That is, instead of taking $40 from the landlord, part of the physical area of the tenement might be assigned exclusively to the tenant so that the land-lord's remaining portion would yield a monthly market rent of $60. It would also be relatively simple—although again at some cost—to assign exclusively to the tenant that portion of the rent taken from the landlord. This could be done, for example, by issuing stock against the market value of the tenement and giving 40 per cent of the shares to the tenant. Abstracting from the higher arrangement costs that now would be incurred, either of the above situations would result in exclusive assignment of the *entire* rental income of the tenement. The landlord and the tenant would now be joint owners of the tenement, and constrained maximization implies that the tenement would be used as though no control existed. However, when the law governing the control avoids explicitly making the tenant a part-owner of the tenement, the assignment of exclusive rights to the portion of rent diverted from the landlord is no simple matter. Of course, a sufficiently comprehensive set of legal provisions, abstracting from the costs of enforcement, could in principle

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[13] There exists, of course, a set of imaginary constraints which yields "congestion" as the only implied outcome.

endow the tenant with an exclusive claim to that portion of rent. When the actual control falls short of that comprehensive list, competition among contracting parties for the resultant non-exclusive income will tend to dissipate it.

Another example will further clarify the argument. Consider a form of perpetual land lease once practiced in China. The landlord leased the land to a tenant in perpetuity for a fixed money rent. It was also agreed, with due recognition of custom and law, that *all* income derivable from the land belonged to the tenant as long as he paid the money rent. Suppose that after the contract was formed an unanticipated runaway inflation reduced the contractual money rent to only a small fraction of the prevailing real rental income. Would resource allocation, abstracting from inflation and wealth effects, be affected? The answer is, no. The tenant would now be more of a landlord than the landlord himself; both contracting parties would have exclusive and well-defined rights to the entire rental income, and the tenant would use the land in such a way that the highest possible real rental income would be generated. A similar situation would occur if the reduction in rent for the landlord were caused by price (rent) control rather than by inflation, so long as the associated regulations of the control clearly and simply granted to the tenant the exclusive right to the portion of the rent taken from the landlord.

It should be clear that one relevant type of constraint for decision making under price control comprises those legal provisions which define, or fail to define, the exclusive right to obtain real income generated by using or producing the good. Wherever income is non-exclusive, its tendency to dissipate leads to behavior which constitutes the effects of price control. As noted earlier, such dissipation occurs in two general modes, either of which may take a variety of forms. Therefore, any attempted explanation of the observed effects of price control would have to be able to predict the occurrence of a particular form, or a combination of forms, of that dissipation. Further specification of constraints, which requires the dictate of a second proposition, is essential.

Proposition 2: *Given the existence of non-exclusive income and its tendency to dissipate, each and every party involved will seek to minimize the dissipation subject to constraints. This will be done either through seeking alternatives in using or producing the good so that the decline in resource value is the lowest, or through forming alternative contractual arrangements to govern the use or production of the good with the least rise in transaction costs, or through the least costly combination of the two procedures.*

This proposition is based upon the notion that, *to the contracting parties*

involved, the dissipation of non-exclusive income constitutes a waste. The dissipation as discusssed earlier will occur, but the postulate of maximization dictates that whatever dissipation must occur necessarily be a constrained minimum. Thus, instead of viewing the behavior as simply a reaction to the dissipation of non-exclusive income, we now see it as an attempted minimization. The effects are the same, but the change in view directly and restrictively leads us to investigate the constraints subject to which the minimization is achieved. Once these are ascertained and specified, equilibrium analysis further requires either that the specified gains and costs be equated at the margin or that certain corner solutions be reached. The particular forms of behavior through which the dissipation, or rather the minimization of dissipation, will occur become predictable: the effects of price control are thus explained.

For illustration, let us return to our example of a tenement where the constant monthly market rent of $100 is reduced by law to $60, still assuming that the control will last to perpetuity. To exclusively assign the $40 of monthly rent to the tenant without explicitly making him a joint owner of the tenement will require the effective enforcement of a comprehensive program of legal provisions. The simplest such program that I can think of will include the following provisions: the landlord cannot evict the tenant under any circumstances; the obligations of both parties in regard to maintenance and repair of the tenement are clearly defined; the tenant is assigned exclusive-use rights as if he were the landlord, including the right to demolish and reconstruct the dwelling; and the tenant is granted the right to sublet, partly or wholly, to anyone he sees fit. Anything short of such a fully enforced program, or its equivalent, will likely produce non-exclusive income.

Suppose that a comprehensive program of this type exists. But now suppose that the landlord has vacant possession; that is, the tenement he owns is not occupied. With this added condition, *no* prospective tenant has an exclusive claim to the $40 per month. If the tenement is not to remain vacant, the landlord has the options of occupying it himself, selling it, or renting it to another party as he sees fit. In other words, he now has the right to exclude. Let us suppose that, in the absence of control, he would have chosen to lease the property annually at a monthly rent of $100, along with other stipulations. Under the control this form of contract is no longer feasible, for once a tenant occupies the tenement he has the right to pay only $60 per month. Any alternative contractual arrangements would, in general, involve higher transaction costs. In choosing among options, the landlord will weigh the rental value of the tenement for his own occupancy, which in general will be less than $100, against the rental value net of a higher transaction cost that

he could obtain with an alternative contractual arrangement. In either case, some of the rental income will be dissipated.[14]

One might be inclined to think that if the owner considered the rental value of his personal occupancy to be less than $60, he would simply lease the tenement on a first-come-first-served basis at the set monthly rate of $60 and that prospective tenants would then compete for occupancy, spending time and effort trying to get ahead of one another until most of the discounted present value of the non-exclusive $40 per month would be dissipated. It is no doubt true that prospective tenants will compete; but since the landlord has the right to discriminate and exclude, the candidates will seek the least costly arrangement that is legally feasible, so that the rental income for the landlord will dissipate the least. As one solution, they may compete to buy the tenement outright instead of leasing. If this is effectively restricted by law or by a relatively high cost of contracting, they will choose the next least costly arrangements—such as the offering of "key" money for the right to occupy the tenement, in which case competition will generate a lump-sum offer to the landlord which approximates the discounted present value of $40 per month minus a higher cost of contracting. If such an arrangement is again effectively prevented,[15] the landlord may still reduce the dissipation by renting or selling furniture to the tenant at an exorbitant price, by arranging to employ him, or by some other such device.

One might also be inclined to think that the key-money arrangement actually negates the control; on the contrary, it constitutes an effect which would not have occurred in the absence of control. Indeed, as a general class of observation there is no conceptual distinction between the key-money arrangement and the familiar first-come-first-served arrangement. Both are contractual arrangements associated with different costs of transactions. From the key-money arrangement (which involves relatively small resources in the formation of the contract) to the first-come-first-served arrangement (which involves a relatively high cost of waiting, violence, and the like), there is a spectrum of alternative contractual arrangements. The associated costs are transaction costs, for the arrangements will not be present without the rental transaction.

The absence of exclusive claimants among prospective tenants to the $40

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[14] We ignore the possibility that the landlord may occupy part of the tenement himself and lease out the remaining part with an alternative contractual arrangement.

[15] Enforcement against the key-money arrangement would in practice require government agents to pose as prospective tenants to detect the arrangement. See Steven N. S. Cheung, Roofs or Stars: The Legislative Intents and Economic Effects of the Rents Ordinance, Economic Inquiry (forthcoming).

per month implies that the present value of this non-exclusive income tends to dissipate; the effort to establish alternative contractual arrangements is, in effect, an attempt to define more clearly than is provided by law who has the right to some of the $40. While the higher cost of an alternative contract constitutes a dissipation of non-exclusive income, constrained minimization of the dissipation implies that the least costly feasible arrangement will be chosen. In general, the more restrictive is the law on alternative arrangements the higher will be the transaction costs.

Let us consider a variation of the example. Suppose under the aforementioned comprehensive program of rent control, the tenement is now occupied. The resident tenant would have become an exclusive claimant of the rent taken away from the landlord (that is, the $40) except that, as a variation, the control is now imposed on domestic tenements only. The tenant may then be legally evicted if the landlord demonstrates *bona fide* intention to convert the structure to business use. Among a number of alternative uses that satisfy the legal definition of a "business premise," let us suppose that the highest-valued option to the landlord is a warehouse, and that, net of all costs associated with the conversion, the warehouse will yield a monthly rent of $75. Thus, although the $100 market rent of the tenement under domestic use has been legally reduced to $60, the landlord actually has exclusive right to $75 per month from his tenement. Conversion into a warehouse will mean that only $25 per month is being dissipated.

As with the earlier situation, however, both the landlord and the tenant have incentives to minimize the dissipation. Facing possible eviction, the resident tenant will seek to dissuade the landlord from making the conversion. By law the landlord who evicts the resident tenant cannot lease again for domestic use; thus he will be willing to settle for any arrangement which will net him the equivalent of a monthly rent exceeding $75. However, the cost of forming such an arrangement will be higher than that of the key-money arrangement discussed earlier, because the law has created a situation where prospective tenants are not allowed to compete. Neither contracting party is an exclusive claimant to the $25, and while there is room for negotiation so that the conversion to a warehouse may not materialize, each party will also seek a greater share of the amount. The absence of competing offers may raise the cost of settlement so high that conversion of the tenement into a warehouse becomes the only action consistent with the minimization of the dissipation.

Still another variation further illustrates the point while also demonstrating how non-exclusive income may arise from many directions. Suppose, again, that under a comprehensive control program the tenant has an exclusive

right to the $40 diverted from the landlord and is granted all other exclusive rights to use the tenement, except to demolish and reconstruct it. These latter rest with the landlord. It will be recalled that the landlord cannot evict the tenant. Suppose, further, that owing to some identifiable changes in economic conditions a $5,000 net gain will accrue to all parties concerned if the tenement can be demolished and reconstructed immediately. Reconstruction requires eviction of the tenant. If the law allows the landlord to find similar housing accommodation elsewhere for the tenant, then in effect the landlord has been granted an exclusive right to the $5,000 minus the cost of resettling the tenant.

In the absence of such or similar provisions, the control has created a situation where neither the landlord nor the resident tenant is an exclusive claimant to part or all of the gain from reconstruction. As with our earlier situations, both the landlord and the tenant will then seek contractual arrangements to realize the potential gain. Any delay in reconstruction owing to the transaction costs results in foregone interest on the $5,000 and constitutes part of the dissipation of non-exclusive income. Dissipation occurs also in the cost of negotiating for some contractual arrangement for dividing the gains, and agreement is more costly to reach because, as in our earlier variation, no competing offers are available. The situation is complicated further if the tenement is occupied by more than one tenant. The absence of competing offers induces the problem of the "holdout," and the resolution of such a dilemma may require the services of a third party. The court, for example, may make a ruling which reduces transaction costs.

The difficulty of predicting whether some contractual arrangement will be reached in the above variation lies not in any inadequacy of our propositions for price control but, rather, in our present lack of understanding of the nature of transaction costs under certain peculiar situations. In the present state of the art, weaker but still refutable implications can be obtained if only we are able to identify one certain observable situation which entails higher or lower transaction costs, in total and at the margin, than another. Furthermore, it is not necessary that transaction costs under different situations be actually measured. An assertion of the ranking of these costs under different observable situations will often suffice. With an asserted ranking, the test of any implication derived from it will also be a test of the ranking itself, and the validity of the ranking will be enhanced by the presence and confirmation of multiple test implications. Thus we have asserted in regard to contractual arrangements designed to minimize the dissipation of non-exclusive income that the following conclusions hold, other things being equal: the costs of reaching agreement will be higher, the more legal restrictions

are imposed on these arrangements; they will be lower with competing offers than without; they will be higher with a larger number of contractual participants; and so on.

We now summarize the general constraints relevant for the analysis of price control. As noted earlier, one type involves those legal provisions which define, or fail to define, exclusive rights to obtain real income generated by using or producing the good under control. We have illustrated the existence of various directions, or margins, with respect to which non-exclusive income may emerge. Changes in resource use and in contractual arrangements will accordingly be associated with the margin for which the non-exclusive income emerges. In this respect the legal constraints need not be confined to control regulations: common law, for example, often comes into play. Once the existence of non-exclusive income is ascertained, our second proposition suggests that attention should be paid to those control regulations which allow for adjustments in using or producing the good and in the formation of alternative contracts, for through such adjustments any dissipation will be held to a constrained minimum. In predicting these adjustments, or the effects of price control, extra-legal constraints are also pertinent. With respect to adjustments in using or producing the good, the highest-valued feasible options are relevant, and an investigation of these options usually includes an examination of the physical attributes of the resources under control. With respect to changes in contractual behavior, the least costly of the feasible arrangements under different circumstances should be ascertained.

It seems appropriate to conclude this section by reviewing the expansions I have made of the seminal works by Professors F. H. Knight and R. H. Coase in the area of property rights. Like all forms of regulation on market transactions, price control usually has the effect of redistributing wealth. We may well ask: How can the terms of private contracts be regulated in such a way that resource allocation, abstracting from the wealth effects, will *not* be affected? The answer is that resource allocation will not be affected if the following two conditions are met:[14] (1) the rights to all income, however redistributed among the contracting parties, are clearly and exclusively assigned to the parties; (2) no extra costs are involved in forming alternative contracts and in enforcing regulations. These conditions may be compared with those advanced by Coase in his discussion of social cost. In what is now known as the Coase theorem, he proposed (also abstracting from wealth effects) that resource allocation will not be affected regardless of who is liable for any damage if: (1) all use-rights to a good are clearly delineated

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[14] Ignoring here the possible effects of price control on the distribution of risks among the contracting parties, we assume that the control is neither anticipated in advance, nor will it generate expectations of other controls that may follow.

as private; and (2) all costs associated with contracting and enforcing rights are zero.[17]

Expanding to analyze price control, I have introduced the right to receive income as separable from the right to use the good. It is argued, however, that the postulate of maximization implies that the absence of exclusive right to receive income will yield effects similar to those occurring in the absence of exclusive-use rights. Given the presence of non-exclusive income, the thesis of the dissipation of "rent" for a resource not subject to exclusive-use rights, as advanced by Knight,[18] is adopted as a convenient approach to equilibrium solutions. Another expansion here is to point out that the dissipation may occur in a variety of forms, thus requiring prediction of the particular forms that will occur. The specification of constraints for such prediction, it is argued, requires a change in view which regards whatever dissipation occurs as a constrained minimum. While the importance of the costs in forming and enforcing contracts is recognized, our analysis also incorporates a spectrum of contractual arrangements associated with varying transaction costs. With this expansion we are able to classify a general class of observations as contractual behavior, thus allowing the interplay of the three sets of rights which define "private property" within the realm of economic principles.

III. Some Further Aspects Illustrated with a Limiting Case

It is not possible within the confines of this paper to illustrate in much further detail the operational nature of the propositions set forth in the preceding section. However, some aspects of the mechanism of reaching equilibrium have been neglected. To illustrate these aspects, let us return to the example where the market price of a theater ticket is reduced by law from $10 to $6. By adding or removing assumptions, we will vary the example in a highly artificial manner to illustrate the desired aspects.

Let us assume that in a free market the show is produced monopolistically and that at the price of $10 per ticket, determined by competitive bidding among customers, no seat in the theater is left empty. Assume, for convenience, that the monopoly rent per ticket is $4, an amount equal to the price reduction resulting from the control (that is, from $10 to $6). Assume further that the control effectively prohibits the producer from reallocating his resources either to adjust the quality of the show, to produce fewer or shorter shows, or to produce something else. In other words, by assumption we rule out the possibility of any adjustment in resource use to reduce the

[17] See R. H. Coase, The Problem of Social Cost, *supra* note 7.
[18] See Frank H. Knight, *supra* note 9.

dissipation of non-exclusive income; furthermore, the producer will remain in operation without subsidization.

To restrict other options lets us suppose that a customer can obtain a ticket at $6 only by standing in line on an orderly first-come-first-served basis. The producer of the show therefore cannot discriminate in selling the tickets. What was once a monopoly rent from each ticket (that is, $4) now has no exclusive claimant under the control. Note that the ticket itself is a contract which promises a show of a specific kind in a specific setting, and so on. The cost of waiting in line is therefore a cost of contractual arrangement through which the right to see the show is transacted. Suppose further that the purchased ticket is nontransferable and that each customer is restricted to purchasing only one at a time (that is, to buy more tickets, he will have to rejoin the line). Finally, suppose that the waiting time required to acquire a ticket is known in advance, and that all customers have identical waiting costs.

Under the above specified constraints, not only will each customer wait an equal amount of time, but competition among them will lead to a waiting cost of $4 per ticket. Thus the amount of monopoly rent per ticket is dissipated or absorbed by the waiting (transacting) cost. We may consider two variations which result in the same dissipation by supposing that the ticket is transferable and that there is no restriction on how many tickets a customer can buy. (1) If the costs of reselling tickets are zero, then a one-man line will emerge, but under competition the total waiting cost will be the same with one man as with many.[19] (2) Suppose the costs of reselling tickets are positive and the cost functions are identical for all "waiters," each with an identical U-shaped average cost in reselling tickets. In this case, generally, more than one man will be expected to stay in line and each to purchase the same number of tickets for resale.[20] As the costs of reselling tickets increase, the total waiting cost will decline—but the total transaction costs (waiting plus reselling costs) will be the same as in (1). In the above cases, as in a number of others, the monopoly rent will be fully dissipated by different behavior associated with different constraints in each case.

[19] In this variation, and to a lesser degree in variation (2) following, orderly waiting will be more costly to maintain than when the ticket is nontransferable. One reason is that, with an implied increase in waiting time per "waiter," the actual time allowed for the waiting may be insufficiently short. In this case, the enforcement of orderly waiting will lead to competition with other means to obtain the right to wait. A second reason is that, with an implied increase in the cost a "waiter" is now willing to commit, those who achieve a cost advantage by the use of disorderly conduct will be more inclined to violate the enforcement.

[20] Note that in this variation the total number of tickets purchased by each "waiter" may not be the same, since each may choose to keep a different number for himself. Note also that in either variation the waiting cost will in general increase by a larger factor than the increase in waiting time.

Let us return to our earlier set of specifications, except that we now suppose that the waiting costs of the customers are not the same. In this case, the monopoly rent per ticket will be fully dissipated only for the marginal customer. The waiting time will be the same for all customers, but the intramarginal customers, or those with lower waiting costs, will be capturing some of the monopoly rent. This is the general case, and it brings out a point which we did not elaborate in the preceding section. In our discussion of the key-money arrangement, it will be recalled, competition among prospective tenants generates an exclusive payment for the landlord. Yet with other tenements under similar situations, some "rent" will be captured by intramarginal tenants whose costs of transacting the key-money contracts are lower than the marginal contract. Of course, the transaction costs for the marginal contract will be lower with the key money than without.

We may again vary our ticket example to illustrate still another point.[21] Suppose not only that the costs of waiting differ among individuals, but that customers are allowed to hire "waiters" (who have no intention of seeing the show) to obtain the tickets for them, while again each "waiter" is limited to one ticket at a time. In this case, the transaction costs will include the waiting cost plus the cost of the hiring arrangement. Transaction costs for the marginal transaction will equal the monopoly rent of $4. The intramarginal transactions, however, will not only capture some rents but, to the extent that some "waiters" are hired, the total rent captured will in general be larger than in the earlier situation where the hiring practice was not allowed. The reason is that the increased flexibility in contractual arrangements permits the utilization of individuals whose waiting costs are lower for some intramarginal transactions. This is consistent with the discussion in the preceding section: other things being equal, the less restrictive is the law governing contractual arrangements under price control, the less will be the dissipation of non-exclusive income.

The above variations should have amply demonstrated the simplicity of reaching equilibrium solutions under price control once the relevant constraints are known. The mechanism is equally straightforward if (in our ticket example) the show is produced competitively, or whatever other alterations are made in constraints. Equilibrium requires that non-exclusive income be dissipated at the margin (or at corner solution, as when the theater might be converted into a concert hall as a result of the control). Associated with the same margin of dissipation may be a variety of observations (or test implications) each corresponding to a change in constraints. The amount of non-exclusive income dissipated at the margin need not equal the difference be-

[21] For still further discussions of the mechanism and implications of waiting, see Yoram Barzel, A Theory of Rationing by Waiting, 17 J. Law & Econ. 73 (1974).

tween the market price and the controlled price, as we have demonstrated with the example of controlling tenement rent. Demonstrated by way of the tenement example, also, is that non-exclusive income may occur in a number of directions; consequently dissipation stemming from one central control program may emerge at multiple margins.

Assuming such arbitrary constraints as we do with the ticket example makes the equilibrium solution easy. What is difficult and important is to identify and simplify the constraints as they *actually* exist and are *relevant* to the control under investigation. Only by this latter discretionary choice of actual constraints, together with the equilibrium solution they imply, can we hope to predict the specific forms of adjustments in resource use and in contractual arrangements to be expected under price control. To do so, as we have discussed in the preceding section, requires not only the recognition that price control in general will produce incomes which have no exclusive claimants at various margins and that the dissipation of non-exclusive income may take a variety of forms, including a spectrum of alternative contractual arrangements, but also a change in view which regards whatever dissipation does occur as a constrained minimum.

IV. CONCLUSIONS

This paper sets forth a theory for investigating the constraints necessary to derive refutable implications in the analysis of price control. The actual investigation is by no means an easy task. To ascertain the effectiveness of a price control enacted under statutory law, for example, may require the careful examination of an enormous number of court cases. Reliable facts are hard to come by. Fortunately, a theory is also an apparatus to organize information, allowing us to select and omit, to emphasize and simplify. Thus in using broader generalizations and more severe simplifications allowed by the theory, we may make trade-off choices between incurring lower searching costs and obtaining fewer and less specific implications.

Economic theory has seldom stepped beyond the constraints of private property rights. The importance of the costs of transactions in affecting behavior has yet to be popularly recognized. Contractual arrangements as a class of economic phenomena have only recently been subject to intensive tilling. In a paradigm where private property is taken for granted, where transaction costs are assumed away, and where exchange is discussed without reference to contracts, any approach which analyzes behavior through an examination of the constraints of property rights and transaction costs is irrelevant. But my choice here of such an approach is exactly because price control, by interfering with the terms of private contracts, imposes constraints on decision making that differ from those of private property. Thus,

with modifications, the theory offered here may be extended to analyze any other regulations affecting the rights associated with private property.

Throughout this paper, legislative actions on price or rent control are taken as given. But treating the behavior of legislators as exogenous, as we did, is only an attempt to avoid a separate problem. Consider, in particular, the minimization of the dissipation of non-exclusive income. The corresponding behavior may not be confined to adjustments in resource use and in contractual arrangements among private parties; they may also include adjustments through legislative enactments. Indeed, a thorough investigation of various rent controls in Hong Kong for the period 1921-1972 reveals strong evidence that numerous amendments to the controls have the effects of defining more clearly the exclusive rights to rental incomes. However, I have been unable to specify the economic mechanism through which the amendments were adopted, nor could I explain their occurrence nor, for that matter, the occurrence of price or rent control to begin with. The relevant constraints underlying legislative decision making are beyond the scope of this paper.

The lack of a theory to explain legislative actions must be my chief defense for using the term "dissipation," which implies economic waste. Yet in a world where each and every individual is asserted to behave consistently with the postulate of constrained maximization, economic inefficiency presents a contradiction in terms. Even outright mistakes are traceable to constraints of some type. The world is efficient, if the model describing it sufficiently specifies the gains and costs to make it so. Such specification, however, is not always essential for the derivation of refutable implications.

Consider, as discussed earlier, the waiting cost incurred in queuing for the theater ticket under price control. The "rent" thus dissipated constitutes a waste in the sense that valuable resources are allocated to the waiting, which produces nothing of specifiable value. Yet without any price control, we notice that queues also form during rush hours in supermarkets. We do not, however, consider the latter waiting cost a waste if, in our hypothesis intended to explain the waiting behavior, we are able to specify the gains involved: the customers as a whole are not willing to pay higher prices for the products, or to make separate payments, to cover the costs of hiring more cashiers to reduce the waiting time.

Thus the world is inefficient only when the system chosen to analyze it fails to fully specify the gains and costs of every action described. But the specification of constraints sufficient to yield refutable implications may only be a subset of the specification sufficient to yield an efficient solution. Inasmuch as we have ignored the constraints binding legislative decision making, the implied solution in our analysis of price control falls short of satisfying the Pareto condition.