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5

INSURANCE, RISK AND RESOURCE ALLOCATION

Insurance is an item of considerable importance in the economies of advanced nations, yet it is fair to say that economic theorists have had little to say about it, and insurance theory has developed with virtually no reference to the basic economic concepts of utility and productivity. Insurance is not a material good; although it is usually classified as a service, its value to the buyer is clearly different in kind from the satisfaction of consumers' desires for medical treatment or transportation. Indeed, unlike goods and services, transactions involving insurance are an exchange of money for money, not money for something which directly meets needs. The closest analog in ordinary economic theory to an insurance policy is a bond or note, an exchange of money now for money later. But an insurance is a more subtle kind of contract; it is an exchange of money now for money payable contingent on the occurrence of certain events.

I wish to explore, in a tentative way, the lessons that economic theory on the one hand and insurance theory and practice on the other can bring to each other. It will be seen that the shifting of risks, the very essence of insurance, occurs in many forms in the economic system, but always with some limits. The economic system is hobbled by these limits; it is desirable to extend the scope of risk-shifting, and indeed from time to time new economic institutions arise with precisely this aim in view. But an examination of insurance itself shows that there are strong reasons for its being limited to such a relatively narrow field. By understanding the restrictions on insurability of risks, we can understand better the reasons why the economic system in general is so limited in its

risk-bearing ability and therefore we will be in a better position to expand that ability.

Although our economics textbooks have remarkably little to say about the matter, nothing is more obvious than the universality of risks in the economic system. Machines break down from time to time; the coordination of complex production processes can never be perfect; despite the decreasing importance of agriculture, the uncertainties of the elements still play an important role; the search for mineral deposits is notoriously chancy; the demand for a product may change unpredictably in relatively short time spans, due to changing tastes or the development of substitutes; in a capitalist society, the success of new businesses and the movements of the stock market cannot be foreseen; and above all, technological progress and the development of new knowledge are by their very nature leaps into the unknown.

In any economic system, capitalist or socialist, there is a responsible agent on whom the burden of any given risk falls in the first instance. In a capitalist world, with which I shall be mostly concerned, the owner of a business typically is supposed to assume all the risks of uncertainty, paying out the unexpected losses and enjoying the unexpected gains. But society has long recognized the need for permitting him to shed some of the risks. A man's capacity for running a business well need not be accompanied by a desire or ability for bearing the accompanying risks, and a series of institutions for shifting risks has evolved.

Insurance itself is an early and important example of such an institution. The risks of business losses due to maritime disaster or fire were at an early stage shifted from the business firm to specialized insurance companies. But other institutions for risk-shifting have emerged. The most important is the market for common stocks. By this means, the owner of a business could divest himself of some of the risks, permitting others to share in the benefits and losses. Since each individual could now own a diversified portfolio of common stocks, each with a different set of risks attached, he could derive the benefits of a reduced aggregate risk through pooling; thus, the stock market permits a reduction in the social amount of risk-bearing.

To my knowledge, there are no other major institutions in which the shifting of risks through a market appears in such an explicit form as in insurance and common stocks. Nevertheless, the universal presence of risk is necessarily felt, even though only implicitly, in any contracts requiring performance in the future. A case in which the risk elements still show fairly clearly is contracting for military procurement. If the government were to purchase in accordance with the usual procedure of the market, it would settle, by bargaining or bidding, on a fixed price which would be paid to the producer for each unit delivered. Indeed, this procedure is followed for products of a routine nature, such as clothing or office supplies or even arms and ammunition of types that have been in production for a long time. But in purchasing very large and expensive items which have not been produced in large quantities previously, most especially airplanes, the contract used is of the so-called cost-plus variety. The government agrees beforehand to reimburse the producer for all his costs, whatever they may be, plus a fixed agreed profit.

The reason for this alternative mode of payment is, of course, that the producer finds himself very uncertain about costs and is unwilling to bear the risks. One can, for analytic purposes, regard a cost-plus contract as being made up of two contracts, one a fixed-price contract of the usual commercial type, and one an insurance contract by which the government agrees to reimburse the manufacturer for his unexpected costs. Thus the change from one contract to another can be regarded as a shifting of cost uncertainties from its normal locus in the producing firm to the purchaser, in this case, the government. We notice that private purchasers do not offer similar contracts to their suppliers, even in analogous cases; for example, airlines do not offer cost-plus contracts to aircraft manufacturing companies. The explanation for the range of use of cost-plus contracts is the same as that for the existence of insurance companies; it is profitable for all concerned that risks be shifted to the agency best able to bear them through its wealth and its ability to pool risks. The government, above all other economic agencies, fits this description.

Risks enter necessarily into all contracts into the future, but only as one element among others. Any bond has, after all, the risk of default, and the rate of interest is in fact greater on bonds judged risky by the market than for government bonds; the interest rate differential is in effect a premium paid by the borrower for insurance against default, the lender being at the same time the insurer. Futures contracts in commodities and in foreign exchange are well known to supply insurance against price movements among their other social functions.

At this point, it might be useful to ask more specifically what is the social usefulness of markets for shifting risks? Of course, there is always the simple justification for any contract freely arrived at between two individuals; if both of them choose to enter the contract, then both of them must be better off. Society after all is just a convenient label for the totality of individuals, and if the two contracting parties are better off, then so is society, unless other individuals are injured in some way. If I dislike an uncertainty and if I can find someone else or some organization to whom the cost of bearing the uncertainty is less than it is to me, then there will be some trade possible, by which the other party assumes the risk, I pay a fixed premium, and both of us are better off.

But the mere trading of risks, taken as given, is only part of the story and in many respects the less interesting part. The possibility of shifting risks, of insurance in the broadest sense, permits individuals to engage in risky activities which they would not otherwise undertake. I may well hesitate to erect a building out of my own resources if I have to stand the risk of its burning down; but I would build if the building can be insured against fire. The shifting of risks through the stock market permits an adventurous industrialist to engage in productive activities, even though he is individually unable to bear the accompanying risks of failure. Of course, under these circumstances, some projects will be undertaken which will turn out to be mistakes; that is what is meant by risk. But at any moment society is faced with a set of possible new projects which are on the average profitable though one cannot know for sure which particular projects will succeed and which

will fail. If risks cannot be shifted, then very possibly none of the projects will be undertaken; if they can be, then each individual investor, by diversification, can be fairly sure of a positive outcome, and society will be better off by the increased production.

A particularly important class of projects that society may consider are research activities. By definition, research is a venture into the unknown, such as geographical exploration was in the time of Columbus. The outcome of any research project is necessarily uncertain, and the most important results are likely to come from projects whose degree of uncertainty to begin with was greatest. The shifting of risks is thus most needed for what is very likely the most profitable of activities from society's point of view.

Suppose that we could introduce into the economic system any institutions we wish for shifting risks instead of being confined to those developed historically. In view of the preceding discussion, it is not hard to see what an ideal arrangement would consist of. We would want to find a market in which we can insure freely against any economically relevant event. That is, an individual should be able to bet, at fixed odds, any amount he wishes on the occurrence of any event which will affect his welfare in any way. The odds, or, in a different and more respectable language, the premium on the insurance, should be determined, as any other price, so that supply and demand are equal.

Under such a system, productive activity and risk-bearing can be divorced, each being carried out by the one or ones best qualified. It must be pointed out, though, that the range of insurance policies required by this ideal system is indeed very wide. An entrepreneur would wish to be insured against shifts in demand for his product as well as against unexpected difficulties in production. He or the investor in his enterprises might even wish to insure against his failure to make an appropriate judgment in some future situation.

The devices actually available for risk-shifting, common stocks and forward contracts, are far from meeting the ideal standards suggested above. The entrepreneur can shift his risks through

floating common stocks but only in an undiscriminating way. Suppose he is quite certain about the production costs of a new product but uncertain about the market. He would like insurance only about sales, but the issue of common shares means that he has to share the fruits of his special knowledge of production methods, about which he is not uncertain, in order to be protected against selling risks. He may therefore be motivated not to enter into production at all.

Another example of the inadequacy of the stock market can be given. Suppose that all firms tend to be profitable or unprofitable together, due, for example, to shifts in foreign demand. The investors would like to find insurance against a generally unfavorable development, but they cannot find it by any amount of diversification. There may indeed be individuals or organizations who would be willing, at a price, to pay compensation for the occurrence of the unfavorable event, but the stock market does not provide any opportunity for a mutually advantageous insurance transaction to occur.

It would prolong the analysis too much to go into other types of risk-shifting, such as forward contracts. In each case, one can see that not all the risks which it would be desirable to shift can be shifted through the market.

The incomplete shifting of risks gives rise to problems which have been recognized by society and solved in different ways. Let me start with one example different in character from those represented before. An individual who needs the services of a physician is uncertain of the quality of medical care he will get. He is further unable to buy insurance against poor quality of care. Society has met this problem by insisting on the licensing of physicians; the uncertainty is reduced by a special process of information gathering and, at the same time, restriction of entry. It is not left to the market to discriminate among different qualities of physicians.

A second solution to problems created by the inability to shift risks is represented by bankruptcy and limited liability laws. The law in effect requires creditors to assume some of the risks of the debtor; it does not leave him free to negotiate a risk-free

investment, and it provides for an inalienable limitation of risks to the debtor. The law thus steps in and forces a risk-shifting not created in the market place.

A still further step in surmounting market limitations to the shifting of risks is expansion of the scope of direct authority. In all countries, we have seen the development of large integrated business organizations. Within these organizations, there are economic problems of allocation and distribution, and in particular there are risk elements, most especially in the production and delivery of component parts and semi-finished goods which go into assembly or other additional processing. But the price system, which the economist tends to regard as essential to the rational allocation of resources, is not used within a business organization at all. There are, of course, many reasons for the superior survival value of large organizations, but one of the most important, surely, is its ability to bear risks in individual parts of its total activity.

To illustrate, consider the activity of supplying engines to an automobile assembly line. The engines could in principle be produced by a company different from that assembling the automobiles; indeed, just such a separation does occur in aircraft manufacturing. However, relatively minor variations in the rate at which engines are delivered may cause very considerable losses to the automobile assembly plant, which might find the resulting risks too great to bear. An ideal market for risks, of the type sketched earlier, would create appropriate incentives to the supplier to regularize his delivery, for example by building up inventories. The way this works is that the assembly plant would be willing to pay large premiums for insurance against delivery delays; the supplier would find it profitable to sell such insurance and then take steps to minimize his payments of claims. In addition, it may be profitable for third parties to sell such insurance if they have a greater capability for pooling risks.

This ideal market could be approximated by an agreement between the two parties whereby the supplier pays penalties for poor timing of his deliveries. But such arrangements quickly become too complex for practical application. Instead, we have a

tendency towards vertical integration. The supplier of engines and the assembly plant are placed under single management. The overall efficiency of the two units is now achieved by authoritarian rather than market relations; the engine supply is regularized, insofar as possible, by direct orders to do so, rather than by price incentives.

Thus, in one way or another, the failures of the market to achieve adequate risk-shifting lead to compensatory alterations in social institutions, licensing, bankruptcy and limited liability, and large business organizations. But all of these institutions are steps away from the free working of the price system, which, with the defects that we have noted, has also many virtues which do not need to be expanded on here. Especially, we expect all these institutions to decrease the flexibility and responsiveness of the system to change and innovation. What we observe is that the failure of the price system to handle risk-bearing adequately leads to a diminished use of prices even in contexts where they would be most useful in bringing about a careful and flexible confrontation of needs and resources.

Let us now ask why the economic system has not developed a more completely adequate set of markets for risk-bearing. To gain insight, we return to the workings of the insurance sector, where risk-bearing markets appear in their purest form. As suggested at the beginning of this paper, we start from the observation that the operations of insurance are limited in many ways; the reasons for these limitations are the primary reasons for the limited markets for risk-bearing in general.

In the first place, insurance is limited as to scope. Many (indeed, most) risks are classified as "uninsurable". (This concept is not absolute; the risks that are regarded as insurable vary somewhat from company to company, and there are special groups, such as Lloyd's of London, which will, for suitable prices, insure many risks that ordinary insurance companies will not.)

In the second place, insurance is frequently limited as to amount. Thus, an insurance against fire or similar property loss is invariably limited to the amount of actual loss. This seems so reasonable that one may be surprised at my bringing this up; but

in fact the matter is not so simple. If the fire or other loss is a purely random affair, the company is engaging in a bet; if it finds the odds satisfactory, there is no reason why it should not take as much of the bet as the insured wants, provided any individual policy is still relatively small compared to the total resources of the company.

In the case of fire insurance, it might perhaps be held that a rational insurer would never want to insure for more than the value of the loss; but it is easy to find similar types of insurance, most especially private medical insurance, where the limitation on the total amount for which the company is liable is in fact very undesirable for the insurer. Indeed, it is precisely the rare case of extraordinarily high medical expenses that one would most want to be insured against.

A third limitation of insurance from the economic viewpoint is its resort to direct controls over the insured. He must submit to a medical examination, in the case of life insurance; his premises must be inspected and he must agree to certain precautions, in the case of fire insurance.

The reasons for these limits have been discussed of course in the standard insurance literature. There are more than one reason, and it would be tedious, though not unprofitable from our general point of view, to examine them in detail. But the factor known as the moral hazard is perhaps the most important. *The insurance policy might itself change incentives and therefore the probabilities upon which the insurance company has relied.* Thus, a fire insurance policy for more than the value of the premises might be an inducement to arson or at least to carelessness.

Once stated, it is clear that this principle explains the limitations of both insurance in particular and risk-shifting through the market in general. The problem is that the insurer, or more broadly, the risk-bearer cannot completely define his risks; in most circumstances he only observes a result which is a mixture of the unavoidable risk, against which he is willing to insure, and human decision. If the motives of the insured for decision are to reduce loss, then the insurance company has little problem. But the insurance policy may, as we have seen, lead to a motive for

increased loss, and then the insurer or risk-bearer is bearing socially unnecessary costs. Either he will refrain from insuring or he will resort to direct inspection and control, to make as certain as he can that the insured is minimizing all losses under the latter's control.

The case of cost-plus contracts, discussed earlier as a risk-shifting device, has indeed attracted much attention. The supplier is relieved of all risks attached to costs; by the same token he has no incentive to keep costs to a minimum. If life is made more comfortable by not paying strict attention to economy, it is to be expected that costs will show a tendency to rise above the necessary level. Indeed, it is widely charged that this is precisely what does occur.

It is now easy to see why insurance against failure of businesses or of research projects has not arisen; the incentive to succeed may be too greatly reduced.

I have now first sketched an ideal method of shifting risks and then argued that the moral hazard, as well as other factors not discussed, will prevent the method from being realized in practice. Can we say nothing further? I think we can go back to insurance practice once more for a general principle, that of "coinsurance". When told that two ideals are in conflict, the economist's typical reaction is, or should be, that some middle way can be found which will best compromise the two goals. If a complete absence of risk-shifting is bad because it inhibits the undertaking of risky enterprises and if total risk-shifting is bad because it reduces the incentives for their success, then it is reasonable to suggest that partial risk-shifting might be best. This is precisely what is meant by coinsurance; the insurer pays some stated proportion of the loss. Devices can undoubtedly be found whereby part but not all of the risks on new businesses or on research projects will be borne by others, reducing as far as possible the obstacles to risk-taking without diluting too greatly the necessary motivation for efficiency.