ARMEN A. ALCHIAN*

Why Money?

Ignorance of availability of goods and of their terms of trade and attributes will provoke efforts to reduce that ignorance in order to achieve more trade. Several institutions have evolved to reduce costs of reducing that ignorance: money; specialist middlemen who are experts in assessing attributes of goods, who carry inventories, and whose reliability of assurance is high; specialized marketplaces; and even unemployment. This paper concentrates on the way in which that ignorance leads to the use of money and how money requires concurrent exchange with specialist, expert, highly reputable middlemen. It will be seen that the use of money does not rest on a bookkeeping, debt-recording function. The recording function could be done by any good without specialized markets if goods were perfectly and costlessly identifiable in all relevant, present and future attributes, including future terms of trade. We mean by money a commodity used in all, or a dominant number of, exchanges.

Imagine society to be comprised of people with different goods but without costlessly perfect knowledge of characteristics or attributes of each good. Any exchange proposed between two parties with two goods will be hindered (be more costly) the less fully informed are the two parties about the true characteristics of the proffered goods. We assume that interpersonal differences exist in degrees of knowledge about different goods—either by fortuitous circumstance or by

Armen A. Alchian is professor of economics, University of California, Los Angeles.

deliberate development of such knowledge. Goods differ in the costs of determining or conveying to others their true qualities and attributes. People differ in their reputability as sources of reliable information about goods, and their ranking is different among goods. People differ not only in their costs of assaying goods but in searching out potential profferers of the goods. These differences may be fortuitous or may be developed in response to economic motives, a point to which we shall return. With these conditions it can be shown that

a. People will specialize in certain goods in providing information and availability to searching buyers.

b. Specialist purveyors (or buyers) of goods will be reputable (low variance) sources of estimates of the quality of what is being purchased from or sold to that specialist.

c. People who have developed lower costs of identifying characteristics of goods will be specialists in selling, buying, inventorying, and giving information about the good.

d. Trade between a specialist and a novice will involve lower transactions costs than trade between two nonexperts.

e. If some good were sufficiently and most cheaply identifiable so that everyone were like an expert in it, the cost of exchanging that good for any other good would be less than if a more costly to identify good were offered, and it will become a money.

Consider a world of four goods: diamonds, wheat, oil, and the one called just *C*. Not all are immediately identifiable in all their true characteristics at insignificant costs, and some are more expensive to identify than others. The community consists mostly of novices, or nonspecialists, in these goods. Imagine (and this begs a question initially) that four people are experts, one in each of the four goods.

Before two novices complete an exchange of diamonds for oil, each will incur costs of identifying the other's product attributes, including legal entitlements, quantity, and all aspects defining the rights and the quality and quantity of the good being transferred. The net value transfer after subtracting those costs will be less than if they learn the true characteristics of these goods at zero cost.

Table 1 shows the proportions of value *remaining* after "transactions" costs between all pairs of traders with various goods. For example, if a diamond novice were to trade some of his diamonds (no matter why!) for another novice's diamonds, only 4 percent of the (perfect knowledge) value would be remaining, as stated in row one. Why? Each party knows the quality only of his own diamonds. Each would assess the quality of the other's diamonds. Assume the costs of the assay amount to 80 percent of the diamonds tested—a sort of destructive test in which four out of five good diamonds were destroyed for each one determined to be good. Instead of a destructive test, one can think of the costs of determining the quality as being equal to 80 percent of the value of the diamond. If offered one hundred diamonds on a one-for-one basis (prior to tested quality) then *net* of examination costs he is receiving twenty proven diamonds for his hundred. The

TABLE 1

Net Value After Exchanges

Single Party after Inspection	Novices				Experts			
Value	D 0.20	O 0.40	W 0.60	C 0.95	D 0.85	O 0.90	W 0.95	C 0.99
Novices								
D 0.20	0.04	0.08	0.12	0.19	0.85	0.18	0.19	0.20
O 0.40	0.08	0.16	0.24	0.38	0.34	0.90	0.38	0.40
W 0.60	0.12	0.24	0.36	0.57	0.51	0.54	0.95	0.59
C 0.95	0.19	0.38	0.57	0.90	0.81	0.86	0.90	0.99
Experts								
D 0.85	0.85	0.34	0.51	0.81	1.00	1.00	1.00	1.00
O 0.90	0.18	0.90	0.54	0.86	1.00	1.00	1.00	1.00
W 0.95	0.19	0.38	0.95	0.90	1.00	1.00	1.00	1.00
C 0.99	0.20	0.40	0.59	0.99	1.00	1.00	1.00	1.00

second party, also a novice, will incur the same costs in examining the first party's stones. He will net only twenty of the hundred diamonds he would receive. So, knowing his own proffered diamonds are good, the first party would be willing to offer only twenty of his diamonds for the hundred untested ones of the other party. The second, who would receive twenty untested diamonds, would end up with four tested, proven diamonds after he incurs his tests. So the second party would have given one hundred of his diamonds to get back four tested ones—a loss from exchange of 96 percent of the value of what he gave up. An exchange is not likely.

If a pair of novices were to make an agreeable exchange of a diamond for some oil, their costs of ascertaining the qualities of the two products to be purchased would, according to Table 1, amount to 92 percent of the value of the goods. Only eight cents on the dollar would be remaining. Unless at least one of the parties had a very high marginal personal value for one of those goods, no trade would occur. A very large part of that net potential gain would be dissipated in the transactions costs.

If a diamond novice were to trade his diamond for wheat from a wheat novice, 12 percent of the value of the two goods would remain.

By definition of C, a novice trading diamonds with a novice in C would lose less than he would by trading diamonds for any other good, as can be seen from the first row, left side. The first row is pertinent to a novice in diamonds who proposes to sell a diamond. The right half of the row is the result of trades made by our diamond novice with experts in diamonds, oil, wheat, or C. An expert is defined as one who has a lower cost function for identifying attributes of a good. (We temporarily beg the question of why some are more expert than others.)

It will cost a novice less to trade with an expert than to trade with another novice, if the novice who buys the product from the expert will rely on the expert's word. The expert's word will have value if he develops a reputation for honesty and reliability in his assessment. The expert will then sell his knowledge at a price lower

than the cost for a buyer to get such information in other ways. It is not necessary that the expert be the seller of the good in which he has expertise. He could be an independent assayer, but for reasons to be discussed later, experts will tend to be dealers in the commodity in which they are experts—and dealers will tend to be experts in the goods in which they deal.

The right-hand half of row one indicates that a diamond novice trading his diamond for some from a jeweler (diamond expert specialist)—no matter why such a trade would be made—will experience a lower loss of value than if he sold the diamond to an expert in any other good. Trade of a diamond for a diamond will get better terms because the expert is an expert in both what he is getting and what he is giving (here just one kind of good), whereas a diamond novice buying oil from an oil expert will save on oil identification costs, but not on diamond identification. Hence the costs of transactions between a novice and an expert in the same commodity are less than those between a novice and an expert in a different good.

The matrix is completed, with some redundancy, by filling in the row cells in the bottom half, representing sales by experts in diamonds, wheat, oil, and C to novices (in the left-hand half of those rows). Exchanges between pairs of experts, one in each commodity, are represented in the lower right-hand half. We assume experts are perfectly knowledgeable in the commodities in which they specialize and are 100 percent honest. This assumption may be too strong, but we make it.

Less loss occurs with trade between two novices when one exchanges diamonds for C than when he trades diamonds for wheat. It may be tempting, but erroneous, to conclude that trades should occur of diamonds for C and then of C for wheat. That is not correct.

To test that, try to find how a *novice* in one good could trade for another good with a novice and gain by going through an intermediary good. It cannot be done in the upper left-hand portion of the table because the costs of recognizing the intermediate good are an added cost, while the costs of identifying the two "basic" goods are not reduced.

Using the specialist expert involves an extra exchange, a cost of identification of another good—the one offered to him, in which he is not an expert. An expert is an expert in one good only, not in all *pairs* of goods. Hence the problem of identification costs persists. Now, if there is some good in which identification costs are both (a) *low* and (b) low for *everyone,* that will permit purchase of product identification information cheaply from the specialized intermediary expert. If his costs of identifying that offered (money) good are less than the reductions in costs by using the specialist for information about the basic goods, the total costs of identification can be reduced.

The cost of identifying that intermediary good is less than the reduced costs by use of a specialist who provides information about the basic good at a low cost. That double event, (1) a low identification cost to everyone about the intermediate commodity *and* (2) specialist-experts who provide quality assurance and information more cheaply than novices can provide for themselves, explains the use of a low identification cost commodity—money—as a general intermediary medium of

exchange. It permits purchase of information from lower cost sources, a cost reduction that exceeds the added cost of using an intermediary good for indirect exchange. Indeed, it is a general prevalence of double coincidence of information rather than wants by both parties that would avoid the use of money.

The matrix illustrates the above propositions. For example, consider some alternative routes of exchange for a novice with diamonds who wants some wheat.

1. Diamonds to wheat, novice to novice $(D_n \longrightarrow W_n)$. A diamond novice exchanges diamonds for wheat with a wheat novice. The net value obtained by the diamond novice, according to the matrix of information-transaction costs, is 0.12.

2. Diamonds to oil to wheat, all through novices $(D_n \longrightarrow O_n \longrightarrow W_n)$ yields 0.0196 (=1 × 0.08 × 0.24). This is less than 0.12 because of an extra pair of identification costs of oil.

3. Diamonds to C (cash) to wheat, all through novices $(D_n \longrightarrow C_n \longrightarrow W_n)$. The result is a net value of 0.108 (=1 × 0.19 × 0.57). Identification costs for cash are less than for oil. Though better than through any other mediary it is not as cheap as either direct or indirect barter (routes 1 and 2).

4. Diamond novice to wheat with wheat expert $(D_n \longrightarrow W_e)$. The net result is 0.19. Contrasting this with the prior route shows the gain from using the wheat expert. The difference is the saving to the diamond novice in identifying the wheat, because the wheat expert offers him "wheat assurance" at a lower cost. And the wheat expert's word, his reputable reliability, is a source of income. A dishonest expert would lose a source of income if he destroyed his credibility. So an established wheat merchant, or specialist, will be an expert in wheat and has more incentive to make honest statements about the quality of his wheat than does a transient novice.

5. Interposing the intermediary good C into route 4 will worsen matters because the costs of identifying an intermediary good are added to the process, with no reductions in any other costs. For example, going from a diamond novice through a C novice—or even a C expert—rather than through a diamond expert first won't help. Some buyer of the novice's diamonds still has to value them. Evaluation by anyone other than a diamond expert (who becomes a specialist middleman) won't reduce costs. An introduction of C as another good only adds another identification cost. The net value of a route from diamond novice through C through a wheat expert is 0.1715, compared to 0.19 for a direct barter via route 4 without intermediate goods.

6. A gain would arise if the lower cost services of a *diamond* expert could be used in the exchange process. What does permit further lowering of costs through an intermediary good is the use of *two* experts—in wheat and in diamonds. The diamond novice sells to a diamond expert (who assesses qualities more cheaply than any other buyer could), and then our novice takes the proceeds of C and purchases wheat from a wheat expert, relying on the experts' reputations and knowledge as a cheaper substitute for the diamond and wheat assessment costs by novices. The extra costs of using C are offset by the expert's lower diamond-assessment costs.

In our matrix we can compute the net value (0.767) of the intermediate-good,

two-middleman route wherein a diamond novice goes to a diamond specialist and then to a wheat specialist using the good C as the medium between specialists. The value is 0.767, as the product of 0.85×0.9025, the values respectively of (a) the diamond specialist who pays C and (b) the entry in the cell for the C novice (the former diamond novice who now offers C to the wheat specialist) selling C to the wheat specialist.[1] This increase in value to 0.767 is the result of ability to get quality assurance at a lower cost from the diamond and wheat experts without imposing on them the higher costs of identifying goods other than C, in which most people are nearly experts.

The feature emphasized here (without excluding others) is the use of the pair of experts in diamonds and wheat to reduce information costs. With only one expert, no intermediary good helped (see routes 2-5). The intermediary good C would be of no use in this context if *two* (or more) experts were not used as economical sources of quality assurance. It is both (1) the presence of *more* than one expert and (2) the generally low identification-cost good, C, that enables indirect exchange to reduce cost of ascertaining quality. By using C as the intermediary good with the lowest *general* identification costs, the novice can obtain information more cheaply from several experts.

What properties of the matrix of information costs are critical? First, experts permit lower costs, as indicated by the larger numbers in the cells in the upper right-hand or lower left-hand quadrants. Secondly, the row and column of C for novices is larger uniformly than any other row or column, and the corresponding rows and columns for experts are also dominant. It is the dominance of the *row* of C both for the novice and for the experts in other goods that seems critical. Since everyone can assess the qualities of C, it can be used as a low-cost means of purchasing information about other goods from experts without imposing offsetting high costs on the experts to identify the good C.

An alternative view of the reason for use of a common medium of exchange is in its presumed role of avoiding the necessity of a double coincidence of wants. But any commodity used as an intermediary would do that. If goods were perfectly identifiable at zero costs, rights to goods could be transferred and any commodity would serve as measure of debt. This would then leave some goods as presumably less volatile in value so that the exchange value of units of those goods would be preferred. But this confuses the store of value with the medium of exchange. The two need not be the same good.

Another presumed rationale is the cost of search over the population for potential demanders of a good. If everyone uses a good, it is more likely that it could be a medium of exchange. But again everyone uses bread or milk. Universality of use aids but is neither a sufficient nor a necessary precondition. Generality here is a

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[1] Where does the diamond specialist get C to pay the diamond novice who offers diamonds? From a C specialist. The diamond specialist will have an inventory of C on hand because that will economize on information costs when the novice purchases wheat from the wheat specialist. Of all the intermediary goods to be used by a novice between successive specialists, the best is C, a generally easily recognizable good. Try interposing others and the poorer results will be demonstrated with the data of the matrix.

result of people using a good as a medium of exchange, not a cause of its becoming a medium. For example, chocolate candy and nylons became a near money during price controls in post-war Germany in the absence of other "money." The items were cheaply identifiable by many people—not necessarily consumed by everybody.

Costs of identifying qualities of a good are what count. If costs for some good are low and generally low across members of society, the good will become a medium through which information costs can be reduced and exchange made more economical. But it will rise only with the rise of chains of experts in various goods and commodities, who know the goods cheaply, whose reputation for reliable evaluation is high, and who, because of that knowledge and the low cost of assuring buyers, become specialist middlemen in the good both as inventory carriers and buying and selling agents. Other explanations of the occurrence and use of money are silent or vacuous on the existence of specialists and their reliability and activities.

This analysis explains the use of money, which good becomes money, why it is not necessarily also the store of value, the existence of two or more experts in the sequence of exchanges with money, the reputability of experts as an integral part of their capital values, and the reason experts are also dealers.

This model is also consistent with the explanation of unemployment as a search and selection process for best work opportunities during demand shifts among potentially performed activities. Commodities or services that are more difficult to assess in qualities will experience greater losses or changes in values consequent to demand shifts. That higher cost tends to act like specificity of a good to particular tasks. The higher costs of assessing their attributes is like a tax on transfer. Hence the larger gains (or avoidance of loss) from more expensive search in the event of a demand shift (with a large change or high variance of next best known opportunities) induces greater or longer search. It is not simply a task of searching out best opportunities, but also a search for potential demanders to assess productive qualities. Those costs of becoming informed about what a good or service or rented good will do raise transfer costs and also reward longer or greater searching activity by potential buyers or employers. Commodities or services with qualities that have high costs for other people to ascertain will tend to be held longer in inventories awaiting sale and will suffer greater costs of exchange—as evidenced by larger bid-ask spreads, wholesale-retail spreads, or "unemployment" lengths. Since the commodity used as money will have low cost in these respects, we conclude money will have the lowest "unemployment" rate.

It is not the absence of a double coincidence of wants, nor of the costs of searching out the market of potential buyers and sellers of various goods, nor of record keeping, but the costliness of information about the attributes of goods available for exchange that induces the use of money in an exchange economy—if some good has low recognition costs for a large segment of the population, while other goods do not. A result is the use not only of money but of knowledgeable experts, with high reputability, who deal in the goods in which they are specialists.

Because most of the formal economic models of competition, exchange, and equilibrium have ignored ignorance and lack of costless full and perfect information, many institutions of our economic system, institutions that are productive in creating knowledge more cheaply than otherwise, have been erroneously treated as parasitic appendages. The explanation of the use of money, expertise with dealing in a good as a middleman specialist with a trademark or brand name, reputability or goodwill, along with advertising of one's wares (and even unemployment) is often misunderstood. All these can be derived from the same information-cost factors that give rise to use of an intermediary medium of exchange.