Volume Title: Inflation: Causes and Effects

Volume Author/Editor: Robert E. Hall

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-31323-9

Volume URL: http://www.nber.org/books/hall82-1

Publication Date: 1982

Chapter Title: The Disruptive Effect of Inflation on the Organization of Markets

Chapter Author: Dennis W. Carlton

Chapter URL: http://www.nber.org/chapters/c11456

Chapter pages in book: (p. 139 - 152)

6 The Disruptive Effect of Inflation on the Organization of Markets

Dennis W. Carlton

This paper argues that a neglected but significant effect of inflation is the disruption of the way firms conduct business. Evidence on actual transaction prices is used to illustrate how far actual market behavior differs from that predicted by simple supply equal to demand models. A theory is presented that accounts for the evidence and links together liquidity of markets, product heterogeneity, price rigidity and quantity rationing, and firm size. The concluding section applies the theory to analyze the effects of inflation and presents data on the effects of inflation. The paper concludes that inflation has forced firms to rely on more liquid markets, to use more standardized products, and to make greater use of prices to allocate goods than they would have without inflation.

6.1 Introduction

Inflation has plagued the United States economy since the late 1960s. I use the word "plagued" because there seems to be a unanimous sentiment that inflation is bad. There is much less agreement among economists as to why inflation is bad. This paper discusses what I believe to be a neglected but significant effect of inflation, namely the disruption of well-established methods of transacting business.[1] Because of this effect, inflation can cause dramatic and undesirable changes in the types of goods that get sold and in the structure of markets.

Dennis W. Carlton is with the Law School of the University of Chicago and the National Bureau of Economic Research.

The author thanks P. Diamond, R. Hall, E. Kitch, R. Lucas, F. Mishkin, L. Telser, and R. Topel for helpful comments, and V. France, R. LaLonde, and R. Miller for research assistance. This research was supported by the NSF.

The next section reports on the pattern of transaction prices found in a sample of businesses during a relatively noninflationary period, 1957–66. These data enable us to learn how businessmen like to structure their transactions and emphasize how far actual market behavior deviates from that predicted by a naive textbook model in which price continuously adjusts so as to keep supply equal to demand. Motivated by the empirical findings of section 6.2, section 6.3 sketches the general theory of the close relation between the organization of markets, the size and structure of firms in the industry, and the transactional arrangements used by business. Section 6.4 uses this theory to discuss and present evidence on the impact of inflation on markets and firm structures.

6.2 Evidence on How Actual Markets Work

One of the first lessons an economics student learns is that the competitive price of a homogeneous product is determined by the intersection of a supply and demand curve. This very simple model predicts that price should be continuously changing in response to changes in supply and demand. The model also presumes a highly liquid market in the sense that any buyer can buy and any seller can sell at any time at the known market price. Since there is a single market price, all buyers' prices change simultaneously when either demand or supply changes. Price is the sole mechanism used to allocate goods to buyers.

Economists recognize that this simple model may not provide an accurate description of how all markets operate. In fact, markets differ greatly in how well their behavior conforms to that predicted by the simple model. At one extreme are highly liquid markets, like organized exchanges (e.g., New York Stock Exchange), where transactions can take place almost instantaneously at the market price, which is determined at each moment by the interactions of many potential buyers and sellers. At the other extreme are highly illiquid markets where the good that is transacted has attributes customized to the individual transaction between the buyer and seller and where there is no continuously available "market price" quoted because each transaction involves a unique good.

To determine how close the behavior of any market is to that predicted by the simple supply equal to demand model, it is necessary to examine the behavior of transaction prices in that market. We examine transaction prices during the period 1957–66. This period was characterized by relatively low rates of inflation. The data, collected by James Kindahl and George Stigler, report the transaction prices paid by buyers for various goods usually on a monthly basis for the ten-year period 1957–66.[2] The buyers provided practically all the price information. The buyers were composed primarily of large companies, but also included hospitals and federal, state, and local governments.

Table 6.1 lists by product the average duration of price inflexibility in months and the standard deviation of duration. The calculations are based on the total number of spells during which the transaction price between a particular buyer and seller remains unchanged. (For each observed pairing of buyer and seller, there is a price series reflecting the actual transaction prices paid over time. Since a buyer typically continues to do business with the same seller after a price change, each pairing of a buyer and seller produces a price series with several spells during which the transaction price is unchanged.)

Table 6.1 is based on an interpolation of the price series. The main assumptions underlying the interpolation are that when data are missing (most relevant when a series is reported only every three months) then if the price is unchanged between reports it is assumed constant between reports. If the price changes between reports, we assume only one price change. This method creates an upward bias in estimated rigidity, though examination of some complete data series appears to indicate that the bias is not sufficiently important so as to alter the inferences to be made from table 6.1.

Several facts are striking about table 6.1. First, it is evident that for many transactions between individual buyers and sellers, price once set tends to remain unchanged for substantial periods of time (over one year in many cases). This fact suggests that quantity allocations (e.g. rationing) and not price may be the mechanism used to allocate some goods when supply or demand changes. Presumably, the seller's personal knowledge about the demander's needs will influence the allocation.

Table 6.1 **Price Rigidity by Product**

Product	Number of Contracts Observed[a]	Average Duration of Price Rigidity (months)	Standard Deviation of Duration (months)
Steel	348	13.0	18.3
Nonferrous metals	209	4.3	6.1
Petroleum	245	5.9	5.3
Rubber tires	123	8.1	12.0
Paper	128	8.7	14.0
Chemicals	658	12.8	10.7
Cement	40	13.2	14.7
Glass	22	10.2	12.1
Truck motors	59	5.4	6.3
Plywood	46	4.7	7.7

[a]"Number of contracts" means the number of price series between individual buyers and sellers for a good of specified characteristics.

Second, for any one product, the standard deviation of length of rigidity is quite high. This suggests that for any one product there are a wide variety of contracts with differing price flexibility. In other words, it appears from table 6.1 that there are some contracts that have very flexible prices while others have very inflexible prices for the same broad commodity group. This suggests (and more detailed studies confirm) that the correlation of price movements among different contracts for the same type of commodity need not be very close. We expect that the goods whose prices are flexible are more standardized in their characteristics than the goods whose prices are inflexible. (The more customized the good, the fewer the number of potential buyers and sellers and the less liquid is the market, and hence [as we shall explain more fully in section 6.3] the less flexible the price.) Finally, there are enormous differences across industries in degree of price flexibility.

In table 6.2 evidence is presented on the frequency of price rigidity for two of the many types of transactions represented in table 6.1, annual and monthly. Transactions were classified as monthly or annual according to the buyer's reporting of the duration of the current agreement. "Monthly" means that there is no negotiated understanding beyond the current month, while "annual" means there is a contract that lasts for one year. I will refer to these two types of transactions as monthly contracts and annual contracts. Table 6.2 provides us with more detailed evidence than table 6.1 on the flexibility of prices.

Many interesting facts emerge from an analysis of the data in table 6.2. The contracting structures for each product are obviously different. A curious finding is that there are many "annual" contracts whose prices change well before one year has elapsed while there are many "monthly" contracts whose prices often do not change for one year. The implication seems to be that contract terms are obviously very flexible and adaptations to sudden changes in market conditions are frequent. Ongoing relations between buyer and seller probably account for this type of behavior.

We expect the monthly contracts to represent purchases of less stable buyers and therefore expect less reliance by a seller on his personal knowledge of the buyer's needs to allocate goods and more reliance on the price system. Table 6.2 confirms this view by showing that monthly contract prices move more frequently than those for an annual contract. This also establishes that there are contracts whose prices remain unchanged at the same time that demand and supply forces are changing other contract prices for the same general commodity. This confirms what we had inferred earlier from table 6.1, namely that correlation of different contract prices for the same general commodity need not be high.

It is possible to use the data of tables 6.1 and 6.2 to hazard some guesses as to which markets resemble liquid markets with flexible prices perform-

Table 6.2 **Frequency of Duration of Price Rigidity for Annual and Monthly Contracts Based on Spells of Price Rigidity**

Product	Contract Type	Number of Contracts[a]	0–3 Months	3 Months–1 Year	1–2 Years	2–4 Years	Over 4 Years
Steel	Annual	11	.11	.41	.24	.22	.03
	Monthly	111	.48	.27	.15	.07	.04
Nonferrous metals	Annual	8	.16	.69	.12	.03	0
	Monthly	87	.78	.20	.02	.01	0
Petroleum	Annual	66	.20	.69	.07	.04	0
	Monthly	16	.83	.15	.02	0	0
Rubber tires	Annual	32	.19	.72	.07	.01	.01
	Monthly	24	.44	.42	.07	.01	.06
Paper	Annual	22	.04	.69	.18	.08	.01
	Monthly	36	.46	.36	.12	.04	.02
Chemicals	Annual	286	.11	.58	.17	.09	.06
	Monthly	134	.53	.27	.09	.06	.04
Cement	Annual	8	.04	.78	.13	.04	0
	Monthly	4	.64	.29	.02	.04	.02
Glass	Annual	8	0	.87	.10	.03	0
	Monthly	9	.51	.22	.18	.09	0
Truck motors	Annual	8	.05	.86	.09	0	0
	Monthly	34	.69	.26	.04	.01	0
Plywood	Annual	0					
	Monthly	2	.99	.02	0	0	0

Note: The numbers in the rows of the table may not add to one because of rounding.
[a]Note that "Number of Contracts" is not the number of spells of price rigidity in all contracts. See the discussion preceding table 6.1 and footnote a of table 6.1.

ing the allocative role and which markets resemble illiquid markets with fixed prices and quantity allocations performing the allocative role. Nonferrous metals, petroleum, and plywood seem likely to have submarkets that are highly liquid (for these three categories, over 75% of monthly contracts change price within three months), while steel, paper, and chemicals seem likely to have submarkets that are highly illiquid (for these markets, over 25% of the annual contracts change price less than every year). It is very obvious from table 6.2 that for some goods there are likely to be both highly liquid and highly illiquid submarkets. The highly liquid submarket probably involves a more standardized variant of the product than the illiquid submarket. The evidence of table 6.2 suggests that both liquid and illiquid markets were significant factors in United States manufacturing in the period 1957–66.

6.3 The Theory of Market Organization and Firm Structure

Every market economy must simultaneously solve the problems of which type of goods to produce, how large and vertically integrated the producing firms should be, and how sellers should transact with buyers. Whether the transactions for a certain good take place in a liquid or illiquid market will turn out to be a key factor in explaining the evidence of the previous section and in understanding how inflation will affect a particular market.[3]

A requirement for a market to be liquid is that there be many potential buyers and sellers at each moment. In order for markets to be liquid it is often necessary for the quality attributes of the good to be very standardized to assure that any two units of the good should be regarded as highly intechangeable from a buyer's or a seller's point of view. This standardization is designed to generate lots of potential buyers and sellers for *the* product. (If goods are not standardized and not regarded as interchangeable, then each transaction is unique and there can be no liquid market for *the* product since there is no one product.) The advantage of a liquid market is that it is easy (i.e. not costly) to transact quickly at the market price. The disadvantage of a liquid market is the standardization of the product. Each buyer will usually want some slightly different attributes in the product. For example, if the buyers are other firms purchasing inputs, the idiosyncratic nature of each buyer's production process might lead each buyer to want a slightly different design of a particular machine. There cannot be a liquid market for every single slightly different variety of good—there would not be enough buyers and sellers to ensure the liquidity of any of the markets.

There will therefore be a very close relation between how liquid markets are and the variety of slightly different models of a product produced. At one extreme, everyone uses a standardized product (e.g. wheat futures) and a liquid market (e.g. Chicago Board of Trade for wheat futures) can exist. (Whether the liquid market is an organized exchange or not is not as important as whether it is highly liquid.) At the other extreme, each buyer wants a uniquely designed product and no liquid market can exist. In general, we expect to see demanders using the liquid market to purchase the standardized goods for some of their needs and using an illiquid market to contract forward to buy highly individualized varieties of the good. As preferences shift from standardized to custom designed products, the liquidity of the market for the standardized good diminishes until eventually no liquid market remains. The observed degree of product heterogeneity and market liquidity will be a result of balancing the benefits from increased liquidity against the costs of reduced product heterogeneity.

Liquid markets which determine *the* market price at which buyers and sellers can always transact serve another valuable purpose in addition to providing liquidity—they reveal the market price to both traders and nontraders.[4] Suppose that the firm purchases a customized input on a forward contract with a seller. Initially, competition among sellers assures the buyer of a competitive price. However, as time progresses, the seller who initially obtained the business may be in a position to exert temporary monopoly power over the buyer, since he is the only seller who can satisfy the buyer's needs quickly. How can a buyer ensure that when the seller changes the price for the customized product the seller is not exercising monopoly power? Alternatively, suppose a firm decides not to use a standardized input product and instead decides to produce the customized product itself—i.e. the firm vertically integrates. How can the firm determine if its production division is producing the customized input efficiently? The answer to both questions is that the firm can use the price movements in the highly liquid market for the standardized product to monitor the cost of either buying or producing the customized product. Using the readily available price movements of the standardized product will be a good way to monitor provided that the costs of producing the standardized and customized products are highly correlated. The presence of a closely related liquid market makes it easier to transact in or internally produce an illiquid good.[5]

Whenever a product is sold in an illiquid market, setting the price requires a negotiation between the buyer and seller. Since negotiations are time-consuming and therefore costly, both the buyer and the seller will not want to be always renegotiating the price.[6] (Even when there is a closely related liquid market whose price can be used to index the contract price in the illiquid market, it will still be the case [as long as the relation between the liquid and illiquid market is not perfect—i.e. the indexing is imperfect] that transacting in the illiquid market is more costly than transacting in the liquid marked.) Therefore it is reasonable to expect and the evidence presented earlier confirms that price (or the price structure if there is [imperfect] indexing), once set, may not change for some period of time. But if the price is unchanged over time, how do goods, or more precisely, how does the sellers' productive capacity, get allocated efficiently to buyers? The answer is that the price system is not the sole mechanism used in the short run to allocate goods in illiquid markets. It is possible to show that in a world of uncertainty with illiquid markets it can be more efficient to use fixed price contracts combined with quantity rationing than to use variable price contracts. The reason is that in a liquid market, *the* market price is readily known while in an illiquid market it is not. Any method of allocation has costs. Using prices may be inefficient if *the* market price can only be guessed with error.

Quantity and price allocation may be preferable to pure price allocation whenever sellers have very good knowledge of the *relative* needs of their customers. (E.g. a supplier may know that two of his customers have identical needs even though the supplier is unable to guess the market clearing price.) In an illiquid market, the more homogeneous are the needs of buyers and the greater is the variability in demand, the more efficient is the price plus quantity allocation likely to be. Roughly speaking, price is used to weed out those who generally want the good from those who do not, while rationing (quantity allocations) is used to get the good to those who need it most at each instant.

We have now outlined the relation between the existence of liquid and illiquid markets, the variety of goods produced, the use of various contractual arrangements, vertical integration, and price and quantity allocation mechanisms. In order to completely link the existence of markets to the structure of firms, it is necessary to discuss firm size. Most economists would agree that explanations of firm size based on production economies cannot convincingly explain the distribution of firm size across industries. We focus on how the failure to have property rights in information plus the nonexistence of futures or spot markets explains the size distribution of firms.[7]

Suppose that an individual has special knowledge that the price of wheat will rise. That individual can take advantage of his information by buying long on the futures market for wheat. Futures markets enable individuals to take advantage of any special information without having to become a wheat dealer. Suppose that a futures market does not exist, but a spot market does. Then, the individual with knowledge of a price rise could become a wheat broker and earn a capital gain on his wheat. The nonexistence of a futures market forces the individual to enter the wheat business to take advantage of his information. (Taking advantage of the information by investing in equity [i.e., common stocks] of wheat firms or in firms that sell products whose price is affected by wheat prices is likely to be less desirable than going into the wheat business because the correlation of the wheat price with other [even closely related] prices is not likely to be perfect.) Moreover, the special information the buyer has about wheat prices may be derived from special knowledge about the prices of specialized (illiquid) inputs used to produce wheat (e.g. specialized labor). In such a case, the efficient way to take advantage of the information is not to become a broker middleman but rather to become a wheat producer who utilizes inputs in the most efficient way.

When either organized futures or spot markets fail to exist, we can expect the most informed firm to be a producer firm in the industry. The firm earns a return on its information not through financial transactions involving pieces of paper but through real transactions involving the good. The firm takes advantage of its information by varying its output,

so we expect the best informed firm to have the most flexible production technology of the firms in the industry.[8] Also, because of knowledge about specialized input prices, we expect the most informed firm to be the most vertically integrated firm in the industry.

This completes the sketch of a complicated set of interrelationships between market organization and firm structure. The theory just outlined is capable of explaining the evidence examined earlier and is necessary in order to properly assess the disruptive effect inflation can have.

6.4 Effects of Inflation

Inflation is often defined to mean a general increase in all prices. That definition fails to emphasize a key fact—namely that inflation increases uncertainty. During inflation there is greater uncertainty about what future price levels will be. Moreover, during inflation there is greater uncertainty about relative prices (the price of one good relative to that of another good). The view that completely separate forces determine relative prices and the general price level is not valid on either theoretical or empirical grounds. (See e.g. Cukierman 1979 for a theoretical discussion, and Vining and Elwertowski 1976 and Parks 1978 for empirical evidence showing that the variability of relative prices depends on inflationary conditions.)

What effect will this added uncertainty have? First, it will mean that it is more difficult for firms to plan for the future since the added uncertainty makes it more difficult to predict the future. Second, it will change the relative advantages of liquid versus illiquid markets.

Recall from section 6.3 that the advantage of not using a highly liquid market was that the buyer could custom design the product rather than take delivery of a standardized product. The complication was that if a buyer contracted with a seller for a customized product in an illiquid market, it was hard to determine what the market price should be especially after the contract had been entered into. The presence of a liquid market with a market price always readily available for some related product made it easier to transact in the illiquid good by enabling the buyer to monitor the seller when the seller wished to alter price. If inflation injects uncertainty into the price system, then it is likely to become more difficult to use the price of a good sold in a liquid market to estimate the marginal cost of the closely related good sold in the illiquid market. Buyers in illiquid markets therefore will be less able to use the market price of the liquid market to monitor their own contracts. In other words, inflation degrades the information content of price in the liquid market and makes it harder to transact in the illiquid market. (More precisely, inflation causes the error in predicting real marginal cost to rise.) Moreover, we saw earlier that to avoid the problem of continuous,

costly renegotiation, buyers and sellers prefer to have a fixed price (or fixed price structure if there is indexing) for some time period. However, sellers will be increasingly reluctant to give fixed price contracts (or contracts in which the price is indexed to a product whose price is not perfectly correlated with its own production costs) as price variability increases. Therefore, since the relative advantage of using an illiquid market decreases during inflation, we expect to see a shift away from specialized goods sold in illiquid markets to more standardized goods sold in liquid markets.

Even neglecting the renegotiation problem and the reluctance of sellers to offer long-term fixed price contracts, we expect the use of illiquid markets to diminish. Recall that in illiquid markets, quantity allocations are based not only on price but on a seller's judgment as to which of his customers needs the good the most. As inflation injects uncertainty into the system, the judgments of the seller about the relative needs of different buyers may become less accurate, so the method of allocating goods by judgment becomes inefficient relative to the use of price alone.

An alternative that avoids the problems of renegotiation and the reluctance of sellers to get locked into a fixed price (structure) is for the buyer to produce the customized good internally. The difficulty with internal production is that without a liquid market for a closely related product, it may be difficult for the firm to easily monitor whether its internal production costs are reasonable. If inflation injects uncertainty into the economic system and lessens the ability to use the price in the liquid market to predict the cost of the illiquid good, then vertical integration becomes less desirable since monitoring becomes more difficult.

In summary, in response to inflationary uncertainty, we expect to see fewer contracts with fixed prices for long time periods, fewer customized goods, greater use of standardized goods sold in a liquid market, a move from outside contracting of customized goods to internal production through vertical integration, and a move from vertical integration to reliance on standard quality goods sold in a liquid market where *the* market price is easy to observe. All of these changes may be undesirable from an efficiency standpoint.[9] Without inflation, the desired combination of liquidity and product diversity was achieved by balancing the (private) benefits of diversity against the (private) costs of illiquidity. Inflation injects uncertainty into the system, alters trade-offs, and causes deviations from the initially desired combinations. It is unfortunately very difficult to document whether the above predictions on the effect of inflation reflect the experience of the United States economy in the 1970s. No data source comparable to the one used to construct tables 6.1 and 6.2 is available. However, there have been reports of abandonment of fixed price contracts in such commodities as paperboard, domestic copper, and coal.

If inflation adds uncertainty to the economic system, we can expect there to be a greater divergence in beliefs about future prices. This will lead to an incentive to create markets for people to act on their beliefs (Grossman 1977); hence we can expect futures markets to become more prevalent. If a futures market already exists, we expect it to be used more during inflationary times.

Table 6.3 shows the number of new futures markets that have been established during the periods 1960–73 and 1974–78 on the major exchanges in the United States. The table supports the theory that the average yearly rate of new contract introduction should be much higher in the more recent inflationary period.

Another measure of the importance of futures contracts is the volume of contracts traded. Table 6.4 presents evidence on futures contracts traded at the Chicago Mercantile Exchange (excluding the International Monetary Market) and on grain futures contracts traded at major grain exchanges.

Table 6.4 indicates a strong positive correlation between volume traded and inflation, just as the theory predicts. Moreover, the recent introduction and growth of financial futures since 1975 and the options market since 1974 provides further support for the theory that the importance of futures markets increases as inflation increases. My own preliminary econometric research suggests that holding crop size constant, an unanticipated 1% change in the rate of inflation raises volume traded on grain futures markets by about 1 to 5%.

The increase in the use of futures markets and liquid spot markets should have a definite effect on the size of firms. Without liquid markets in which it is easy to transact, it is necessary to become a member of the

Table 6.3 Introduction of New Futures Contracts and Inflation

	1960–73	1974–78
Number of new futures contracts introduced on the major U.S. futures exchanges[a]	95	50
Average yearly rate of introduction of new futures contracts	6.8	10
Average rate of inflation (measured by Dec. to Dec. changes in the CPI)[b]	3.3	8.0

[a]I am grateful to John Labuszewski, formerly staff economist at the Chicago Board of Trade and now director of economic research at the Mid-America Commodity Exchange, for compiling these data using information from the Association of Commodity Exchange Firms and "Ranking of Commodities/Market Share Report, Part I, 1979," an internal CBOT memorandum.

[b]Source: *Economic Report of the President, 1982*, table B-55. Washington: Government Printing Office.

Table 6.4 **Volume of Futures Trading and Inflation**

Year	Volume of Contracts on CME (thousands)[a]	Volume of Sales in Bushels on Futures Markets, All Grains (billions)[b]	Inflation Rate During the Year (Measured by Dec. to Dec. Changes in CPI)[c]
1955	549.0	12.4	.4
1960	567.3	11.2	1.5
1965	889.0	26.9	1.9
1970	3,317.4	25.5	5.5
1975	5,758.8	67.7	7.0
1978	10,008.9	93.5	9.0

[a]Source: *Chicago Mercantile Exchange Yearbook*, 1978, p. 6.

[b]Exchanges included are Chicago Board of Trade, Chicago Open Board of Trade, Kansas City Board of Trade, and Minneapolis Grain Exchange. Source: *Chicago Board of Trade Statistical Annual Report*, 1978, p. 9.

[c]Source: *Economic Report of the President, 1982*, table B-55. Washington: Government Printing Office.

industry in order to earn a return on superior information. As discussed earlier, those firms with the best information are likely to be vertically integrated, the most profitable, and the most flexible. However, with well-organized spot and especially futures markets it is possible for someone with superior information to earn a return on that information without physically producing or, in the case of futures markets, storing the good. The individual simply takes a position in the futures market or, lacking a futures market, buys and sells on the spot market. Therefore, in inflation we expect to see a rise in the number of liquid spot markets and futures markets, a rise in the number of brokers (people who just buy and sell) if only a spot market comes into existence, and perhaps a decrease in the concentration of industry (because now a firm does not have to produce to earn a return on its information). Once again, it is difficult to use available data to test these hypotheses about inflation.

Inflation is not a *uniform* general increase in all prices that can be easily handled by indexing all prices. Instead, inflation is a general increase in prices accompanied by much uncertainty that disrupts the methods of conducting business and alters the characteristics of goods that are produced. Inflation forces greater reliance on liquid markets—i.e. it forces greater reliance on the price system to allocate relatively homogeneous goods. What is important to recognize is that this move toward the simple model of supply and demand may be *undersirable*; (see note 9). The greater reliance on the price system may represent a serious cost of inflation. What the theory and the evidence outlined earlier tell us is that it is sometimes better to have illiquid markets with customized products than to have a liquid market with a homogeneous product. The efficiency

of an economic system is not measured by the liquidity of its markets, the degree to which it uses price to allocate goods, or how closely the simple supply equal to demand model predicts market behavior, but rather by how well diverse consumer demands are satisfied. By injecting needless uncertainty into the economic system, inflation may interfere with the efficient methods of satisfying consumers and may impose substantial costs on society by forcing consumers and business firms to use markets they would not otherwise have used and to consume more standardized products than they would otherwise have chosen. It is this disruption of transaction, consumption, and production patterns that helps explain why the public dislikes inflation.

Notes

1. Two noteworthy articles recognizing the effect of inflation on transaction costs are Okun (1975) and Wachter and Williamson (1978). The spirit of my paper and its conclusions are similar in many respects to those of Wachter and Williamson (1978).

2. I thank C. Freidland and G. Stigler for their help in explaining the data to me. See Stigler and Kindahl (1970) for an analysis of these data.

3. See Telser and Higginbotham (1977) for a discussion of liquidity and its relation to future markets.

4. The literature in finance examines this point in detail. See, for example, Grossman and Stiglitz (1980) and the references cited therein. Also, see Kitch (1980).

5. Will the optimal number of liquid and illiquid markets be established by private market forces? The answer appears to be no. Liquidity generates a positive externality for which no compensation is necessarily received.

6. See Wachter and Williamson (1978).

7. See Kitch (1980) for an interesting discussion on this point. See also Carlton (1980).

8. See Carlton (1982).

9. As section 6.2 (see note 5) pointed out, there is an externality associated with the existence of liquid markets. The theory of second best, applied to the problem under study, shows that it will be difficult, theoretically, to make unambigious welfare statements about inflation. Only statements about private (not social) benefits and costs are possible. Because of the second-best problem, the analysis implies that a zero rate of inflation is not likely to be socially optimal. However, it seems clear that as the rate of inflation increases, the increased private costs of inflation identified in this paper can eventually overwhelm second-best considerations. Therefore the effect of inflation on the organization of markets and transactions does represent a potential cost to society and is a cost that analysts should be aware of.

References

Carlton, D. 1980. Discussion of "The law and economics of rights in valuable information: A comment." *Journal of Legal Studies* 9 (December): 725–26.

———. 1982. Planning and market structure. In J. J. McCall, ed., *The economics of information and uncertainty*. Chicago: University of Chicago Press for the NBER.

Cukierman, A. 1979. Relative price variability, inflation, and the allocative efficiency of the price system. Mimeo, Carnegie-Mellon University.

Grossman, S. 1977. The existence of futures markets, noisy rational expectations, and informational externalities. *Review of Economic Studies* 64 (October): 431–49.

Grossman, S., and Stiglitz, J. 1980. On the impossibility of informationaly efficient markets. *American Economic Review* 70 (June): 393–408.

Kitch, E. 1980. The law and economics of rights in valuable information. *Journal of Legal Studies* 9 (December): 683–724.

Okun, A. 1975. Inflation: Its mechanics and welfare costs. *Brookings Papers on Economic Activity* 2: 351–401.

Parks, R. 1978. Inflation and relative price variability. *Journal of Political Economy* 86 (February): 79–95.

Stigler, G., and Kindahl, J. 1970. *The behavior of industrial prices*. New York: Columbia University Press for the NBER.

Telser, L., and Higginbotham, H. 1977. Organized futures markets: Costs and benefits, *Journal of Political Economy* 85 (October): 969–1000.

Vining, D., and Elwertowski, T. 1976. The relationship between relative prices and the general price level. *American Economic Review* 66 (September): 699–708.

Wachter, M., and Williamson, O. 1978. Obligational markets and the mechanics of inflation. *Bell Journal of Economics* 9 (Autumn): 549–71.