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## **Pricing products in inflationary environments: the combined effects of inflation, hyperinflation and interest rates on customer and firm behavior**

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### **Abstract**

Pricing products in markets where there is substantial inflation is a growing management problem as more firms market products globally. Consequently, in order to price products, managers must understand the behavior of customers and of firms in inflationary environments. Proposes a framework suggesting that these behaviors result from the interaction between the inflation rate and the real rate of interest. Applies this framework to describe the behavior of customers and of firms under four different combinations of inflation and real interest rate levels.

Global firms must concern themselves with pricing products in inflationary environments. While most developed nations currently experience low levels of inflation, a great majority of countries have to contend with inflation rates significantly higher than those encountered in the USA and other developed economies. For example, the 1995 estimate of the annual inflation rate is 40 percent in Brazil, 50 percent in Mexico and 140 percent in Russia (*Accelerations*, 1995). Some countries, such as Argentina, Poland, Israel and Brazil, have experienced hyperinflationary periods where price increases went as high as 2 percent a day. In such environments, "the price determination process becomes more difficult and conceivably more of a guessing game" (Dolan, 1981, p. 151).

The integration of the world economy and the creation of regional trading blocks are globalizing the effects of inflation. Price increases in one country affect the daily life of firms and customers in other countries. The North American Free Trade Agreement (NAFTA), for example, integrates the economies of Canada, Mexico and the USA. Thus, US firms competing with Mexican firms must price their products knowing that the competition is exposed to an inflationary environment. Similarly, the increase in global trade forces more USA companies to price their products in foreign markets exposed to inflation.

Inflation generally provides local or established global competitors with a competitive advantage because of their experience in pricing products within inflationary environments. Inflation also affects competitors by magnifying uncertainty in the competitive environment. This additional level of uncertainty comes from the effects of inflation on customer demand, on the unwillingness of firms to make long-term investments and on the lower reliability of economic and financial information. Inflation will distort financial reports in many ways, such as overstated gross margins, profits, return on investment and growth rates (Churchill, 1982).

The purpose of this article is to suggest a managerial framework relating the behavior of

customers and the behavior of firms to pricing in inflationary environments. The framework is based on two premises. First, the behavior of firms and customers is different in inflationary and in hyperinflationary environments. Second, the effects of inflation and hyperinflation are moderated by the interest rate (Sarkar and Haixu, 1994). By combining these two premises, we suggest a managerial framework relating the behavior of customers and of firms in four different environments. These environments are obtained by combining low and high interest rates with inflation and hyperinflation.

The remainder of the article is divided into three sections. The first section reviews Monroe's (1990) four basic rules for pricing products. These rules are comprehensive and assume no inflation. They therefore provide a conceptual background over which the four inflationary environments examined in this article may be discussed. The second section then examines systematically each of the four inflationary environments. A limitation of the framework is also addressed. Finally, the conclusions are presented in the last section.

### **Pricing in noninflationary environments**

The pricing decision is affected by a number of firm-level (internal) constraints and/or market-level (external) constraints (Ogbuehi, 1992-1993). Some firm-level constraints include the specific pricing objectives of the firm (e.g. capture market share via a price-discount strategy, create a high-quality image via a premium-price strategy), cost considerations and the cost of the capital (or interest rate). Certain market constraints would include government policies and the level of inflation.

Monroe (1990) suggests four basic rules which are critical for a firm to be effective in determining the appropriate price levels. These basic rules are:

- (1) Know your objectives.
- (2) Know your costs.
- (3) Know your competition (or marketplace).
- (4) Know your demand (or customers).

Each basic rule is reviewed briefly.

### **Objectives**

Pricing decisions must begin with a firm's objectives. The objectives could include maximizing profits or market share. Monroe (1990) also suggests that some managers may want to maximize profit margins, attempt to attain satisfactory rather than maximum profits or assure the long-term survival of the firm. It is important to realize that different objectives are likely to result in different pricing strategies.

The pricing decision may impact additional objectives of the firm. The price that the seller or marketer sets is likely to affect customers' perceptions of quality, value and their purchase intentions (see Dodds *et al.*, 1991). The price is also likely to affect the frequency of purchase, the volume bought and whether or not the customer stockpiles the product. Furthermore, the price set (and inherent margins) can affect the cooperation level of dealers, distributors and salespersons.

### **Costs**

It is necessary for a firm to be able to identify its costs – both variable and fixed. The variable cost provides the lower bound for the product's price. Knowing one's costs allows a marketer to plan better. When valid, cost data enable the manager to decide between pricing alternatives and to quantify volume discounts, promotional prices and special deals. Cost data are therefore essential to allow the firm to price its products competitively, and simultaneously remain profitable.

### **Customers/demand**

Firms need to conduct research to determine customer perceptions of value and to estimate the level and nature of demand. Price sensitivity and other potential reactions to price changes (both increases and decreases) can also be determined through research. While customer reactions to price stimuli are not as easily quantifiable as cost measurements, they are equally important. This is because customers' perceptions of value provide the upper bound for pricing products.

### **Competition/market**

A firm's demand estimates are affected by competitors' reactions. It is critical that a firm be proactive in its pricing, rather than reacting to

competitors or marketplace pricing changes. One important factor in competitor pricing is the rate of capacity utilization, which influences the market supply and competitor prices. A second factor is price-volume relationships. Understanding how volume affects supplier costs and, therefore, market prices is critical to setting prices and determining competitive bids.

### Pricing in inflationary environments

Recall that Monroe's (1990) rules are adopted to provide the conceptual background for pricing in noninflationary environments. Thus, in this section we will, first, review inflation and interest rates and, second, combine this information with Monroe's rules. Of the four rules suggested by Monroe (1990), we will focus mostly on the behavior of customers and on the behavior of firms. When appropriate, we will also discuss alternative pricing objectives and the behavior of competitors.

#### Inflation

Most developed economies experience low levels of inflation. This is defined as an environment where inflationary concerns are not a factor in most pricing decisions. Prices always vary but there is little expectation of significant price increases in the economy. The USA, Japan and most members of the European Union are examples of this level of inflation. Low level inflation is not considered in this article.

It is best not to assign a quantitative range to characterize levels of inflation. This is because absolute numbers must be interpreted within an historical context in each economy. An inflation rate of 20 percent a year is extremely high for countries accustomed to single-digit rates. The same 20 percent rate may be considered low in countries used to inflation rates of 30 or 40 percent a year. These high rates are partially explained by the regulatory structure often put in place by countries with historically high levels of inflation. Measures such as automatic cost of living readjustments for the workforce or pre-arranged price adjustments in contracts typically attenuate current effects of inflation but also further inflationary pressures. Thus, it is the behavior of firms and of customers which should be used to determine whether inflation is high or hyper.

The first level of inflation considered in this article is high inflation. In high inflation, prices increase within a relatively expected range. Consequently, firms must concern themselves with periodically reviewing their cost structure and their prices (Dolan, 1981). Importantly, prices for most products rise at annual rates which are not significantly different from the overall inflation rate for the economy which, of course, is an average. Thus, for example, if the inflation rate is 10 percent a year, the prices for most products rise at about the same level.

Additionally, firms need to monitor closely the value the customer places on their products and the prices of competitors (Dolan, 1981). High inflation also highlights the need for a firm to develop a flexible pricing system to cope with rising cost pressures. For large contracts, firms have tended to move away from fixed price contracts to alternative flexible price contracts (Allen *et al.*, 1976; Dolan, 1981).

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The second level of inflation considered in this article is hyperinflation. At this level, prices increase at historically very high rates. Price increases for individual products may differ significantly from the inflation rate for the economy, creating severe distortions in the relative prices in the economy. In addition, the rate of inflation, however high, is very erratic. Prices may rise at an increasing rate for a while, only to decline temporarily in response to a new round of government measures. Shortly thereafter, inflation rates start rising again.

One additional problem faced by managers when inflation becomes rampant is that the government often imposes price controls or price freezes for politically sensitive products. In such cases, firms must reduce costs, cease product sales or circumvent government price controls. Thus, firms must learn how to operate in such an environment (see Frank, 1984, for a discussion of operating and adapting to price controls).

**Interest rates**

The interest rate used in this article is the real interest rate. This is the nominal interest rate that banks charge their lowest-risk customers minus the inflation rate. Two levels of interest rate are considered: historically low and historically high. As in the case of the rate of inflation, it is important to use relative rather than absolute values. Countries often differ significantly in the prevailing interest rate in their economies. This may be explained by factors such as, for instance, differences in availability of capital.

**Combined effect of inflation and interest rates**

The combination of the two levels of inflation with the two levels of interest rate considered in this article is presented in Figure 1. There are four cells. Each cell presents the main expected issues in customer and in firm behavior for that particular combination of inflation and interest rate. Cell 1 combines low real interest rate and high inflation. Low real interest rate and hyper inflation are discussed in cell 2. Cells 3 and 4 combine high real interest rate with high and hyper levels of inflation, respectively.

Each cell is discussed individually. The discussion of each cell begins with a review of the

relevant customer and firm related factors. When appropriate, additional factors suggested by Monroe's rules are included. This is followed by an analysis of the effect of these factors on pricing policies.

*Cell 1 – low interest rate/high inflation*

When combined with low real interest rates, high rates of inflation are a strong incentive to consumption. Customers have no motivation to save whenever rates of return are low. They are also encouraged to shop as quickly as possible after receiving their salaries, to hedge against future price increases. This inflation hedging behavior also leads to customer stockpiling.

Search behavior is equally affected by price increases. Time is of the essence. It is risky to bypass a shopping opportunity because prices may increase during the time spent searching. However, the level of inflation is insufficient to prevent customers from maintaining an adequate level of knowledge about the prices of products they normally buy.

Similarly, to hedge against future price increases, firms will often carry large inventories of raw materials. Stocking finished goods can be equally advantageous because the value of the inventory increases with inflation. When interest rates are sufficiently low, the incentive to maintain inventories is furthered by the fact that the increase in the value of the inventory is often superior to the return on investment obtained with alternative investments. In addition, the cost of carrying inventories is also attenuated by the low interest rate.

The profitability of carrying inventories may limit a firm's pressure to sell. Products may be more profitable when unsold. In addition, while costs rise with inflation, the increase is moderate enough to allow the firm to have a good knowledge of its cost structure.

How, then, should firms price their products? Three factors seem to be important: cost increases, strong customer demand, and the rising value of the inventory. At a minimum, prices should reflect the increase in costs. At a maximum, they should also reflect the complementary pressures of customers demanding the product and the interest a firm may have to hold inventories which are appreciating in value.

Consequently, in order to maximize profitability, most firms will readjust prices

Figure 1 Inflation and interest rate matrix

		Inflation rate	
		High	Hyper
Real interest rate	L O W	<i>Customer</i> Strong demand Limited searching Good price knowledge Stockpiling	<i>Customer</i> Strong demand Limited searching Limited price knowledge Stockpiling
	H I G H	<i>Firm</i> High inventory level Cost control Limited pressure to sell Market prices	<i>Firm</i> High inventory level Limited cost knowledge Limited pressure to sell No market prices

according to past or to expected price increases (replacement cost) and then add a market adjustment for the other two factors. Conversely, firms attempting to maximize market share will readjust prices to reflect cost increases only.

In fact, firms with very high inventory turnover rates will often have a higher profitability rate than those investing in the value of their inventories. This is because firms speculating with inventories can only expect them to value at the rate of price increases for that product. A rapid turnover, on the other hand, may produce rates of return that are higher than the margins created by the inflation rate for the product. Importantly, however, the turnover strategy assumes that resupplies are available, which is often not the case when government price controls are used to curb inflation.

*Cell 2 – low interest rate/hyperinflation*

The key difference between high inflation and hyperinflation is that a much greater state of uncertainty exists in a hyperinflationary economy. At any moment in time, prices for similar products vary greatly. In addition, prices increase at very different rates for different products. As a result, customers will no longer have a reasonable idea about market prices for most products. Demand for products remains strong, as customers continue to anticipate purchases and to stockpile as a hedge against inflation. However, significant variations in the prices asked by different vendors of similar products motivate customers into limited search behavior. The search is not extensive because prices change almost daily and the information obtained is rather perishable.

Similarly, firms cannot anticipate variations in the price of raw materials. The cost of carrying inventories is low because real interest rates are low. As a result, maintaining inventories is often perceived as a good investment. During hyperinflation, the state of uncertainty in the economy is so great that the relative prices of all input (labor, raw materials, taxes, etc.) cannot be anticipated without a significant margin of error. The same is true for the price of finished goods offered by competitors and sellers of substitute and complementary goods.

How do firms set prices in such an environment? There are no market references, limited knowledge of one's own cost structure and great

uncertainty about the replacement cost for raw materials. Most firms give up on cost-based pricing. There are no market prices. The alternative is to set *price increases* as opposed to setting prices. Firms use references such as the consumer price index or the value of a foreign currency to determine price increases.

*Cell 3 – high interest rate/high inflation*

Recall that the main difference between a high inflation and a hyperinflation environment is that, under high inflation, prices rise at a relatively expected level. In addition, prices for individual products rise at rates similar to the economy's inflation rate.

In many economies, raising interest rates is one of the most powerful remedies used by governments to reduce the rate of inflation. However, in many economies it is reasonable to expect a high rate of inflation simultaneously with a high interest rate. Three possible explanations for this phenomenon are discussed next. First, in some countries the government will print currency to cover deficit spending without raising taxes or borrowing funds. The second explanation is an oligopolized productive sector. Private and government-owned firms in oligopolized sectors of the economy will continue to raise prices despite an economic downturn. Finally, when economies are not open to imports, customers and industrial buyers have no alternative to domestic suppliers.

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When real interest rates are high, the general level of economic activity is reduced. This triggers a double effect on product pricing. On the demand side, customers have an incentive to save. This results in less spending. When the interest rate is sufficiently high, customers will make short-term investments which will maintain their purchasing power. As a result, the incentive to stockpile products is greatly diminished. On the supply side, firms have an incentive to reduce the size of their inventories and to

control costs. Firms also experience greater pressure to sell because the market slows down.

Typically there is a dual system for setting prices. Firms in oligopolized industries, often industrial commodities and government monopolies, continue to increase prices. In many cases, the downturn in the economy causes them to increase prices even further because losses in economies of scale increase the unit cost. On the other hand, firms in competitive industries, typically consumer goods and the distributive trades, are forced to keep price increases as low as possible in order to compete effectively.

#### *Cell 4 – high interest rate/hyperinflation*

In this cell, the economic slowdown caused by the high interest rates is combined with the overall uncertainty created by hyperinflation. As explained above in cell 2, there are no market prices. Firms live with significant errors in attempting to determine their cost structure, and customers do not have good knowledge of the prices for competing products.

As a result, customers will search before buying products. However, the search is typically not extensive because the price information is perishable. The high interest rate promotes more savings and less spending. Stockpiling behavior is thus uncommon. The high interest rate encourages firms to reduce cost and to minimize inventory investment.

Firms also have an incentive to sell aggressively owing to the increased competition resulting from the market slowdown. The combination of customer search behavior, reduced demand and the high cost of carrying inventories often creates an environment of fierce price competition. In this environment, negotiation skills are key, not only to obtain the best possible price but also to negotiate other financial aspects of the purchase. For example, if inflation is 2 percent a day, then a three-day delay in paying the invoice is equivalent to a price discount of more than 6 percent.

Nevertheless, the same duality in setting prices discussed in cell 3 applies to this case. Firms in oligopolized industries will readjust their prices to maintain margins independently of market considerations. Because cost information is faulty, price readjustments are typically made on the basis of the expected inflation rate

for the economy or the expected devaluation of the local currency against hard currencies.

Firms in competitive industries will attempt to use the same method to set prices, but will often be forced to make downward adjustments in response to competitive pressures. This pressure is less strong than in the case of high inflation because competitive pricing information is perishable and therefore unreliable.

#### **Limitation**

Before presenting the conclusions, a limitation must be addressed. The proposed framework looks at the interaction between inflation and interest rates. In any individual country, however, this relationship may be moderated by additional variables, such as taxes on inventories, price controls or government regulation of interest rates. For example, Venezuela is currently experiencing high inflation and a negative real interest rate (*The Economist*, 1995). Contrary to what is predicted by the framework, however, firms are not stockpiling products because banks have no money to lend. This limitation should be overcome by future research.

#### **Conclusion**

Recall that the purpose of this article is to suggest a managerial framework relating the behavior of customers and the behavior of firms to pricing in inflationary environments. The managerial framework is based on two key variables: the interest rate and the rate of inflation.

By combining these key variables, we have identified a number of behaviors that managers should consider when pricing products in inflationary environments. These behaviors may be divided into customer related and firm related. Each is examined separately.

The behavior of customers in inflationary environments will be influenced by their knowledge of prices. When uncertain, customers tend to shop and then make quick decisions because price information becomes highly perishable as the rate of inflation increases. In addition, customers may also stockpile products as a hedge against rising prices. As discussed earlier, stockpiling behavior tends to occur whenever the interest rates are at historically low levels.

The behavior of firms is often the result of existing pressures to sell. Maintaining high inventory levels is a preferred strategy when the interest rate is low. On the other hand, when the interest rate is high, firms have a strong incentive to sell. Therefore, price competition becomes intense. One additional factor influencing the behavior of firms is the availability of supplies, which may dwindle whenever the government imposes price controls. Finally, firms may be less susceptible to the effects of inflation whenever the number of competitors is small or when the government regulates competition.

### References

- Accelerations* (1995), "Key figures: 1995 and 1996 forecast – Americas, Asia-Pacific, Africa-Middle East, G5 and Europe", *Accelerations*, No. 43, July-August, pp. 6-7.
- Allen, B.H., Tatham, R.E. and Lambert, D.R. (1976), "Flexible pricing systems for high inflationary periods", *Industrial Marketing Management*, Vol. 5, pp. 243-8.
- Churchill, N.C. (1982), "Don't let inflation get the best of you", *Harvard Business Review*, Vol. 60, March-April, pp. 6-22.
- Dodds, W.B., Monroe, K.B. and Grewal, D. (1991), "Effects of price, brand, and store information on buyer's product evaluations", *Journal of Marketing Research*, Vol. 28, August, pp. 307-19.
- Dolan, R.J. (1981), "Pricing strategies that adjust to inflation", *Industrial Marketing Management*, Vol. 10, July, pp. 151-6.
- The Economist* (1995), "Emerging market indicators", *The Economist*, July 15-21, p. 90.
- Frank, V.H. Jr (1984), "Living with price controls abroad", *Harvard Business Review*, Vol. 62, March-April, pp. 137-42.
- Monroe, K.B. (1990), *Pricing: Making Profitable Decisions*, McGraw-Hill, New York, NY.
- Ogbuehi, A.O. (1992-1993), "Pricing strategies in high inflation markets: implications for the multinational corporation", *Journal of Applied Business Research*, Vol. 9, Winter, pp. 44-9.
- Sarkar, B.R. and Haixu, P. (1994), "Effects of inflation and the time value of money on order quantity and allowable shortages", *International Journal of Production Economics*, Vol. 34, February, pp. 65-72.