

THE NON-PRICE EFFECTS OF MONETARY INFLATION

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ABSTRACT: The aim of this paper is to examine the non-price effects of monetary inflation. An increase in the money supply may lead to price inflation, but it may also affect the non-price parameters of goods and services, such as quality or the quantity enclosed in packaging. Based on our analysis, we claim that an expansionary monetary policy may cause a decline in quality (quantity) of produced goods and services if the rise in costs prompts the entrepreneurs not to increase nominal prices of their product but to decrease their product's quality (quantity), increasing its effective price—price adjusted for quality (quantity). In this way, the increase in money supply may have, *ceteris paribus*, a negative impact on innovativeness of entrepreneurs who, instead of improving the quality of products they offer, may in fact take the opposite action in order to avoid evident nominal price increases of their products.

KEYWORDS: monetary inflation, non-price parameters of goods and services, non-price effects of monetary inflation, pricing strategy, product quality

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1. INTRODUCTION

The influence of monetary inflation¹ on price changes has been subject to many research studies (e.g., Cantillon, 1959 [1755]; Mises, 1953 [1912]; Hayek 2008 [1935], Friedman and Schwartz, 1963). However, less attention has been paid to the analysis of the relation between monetary inflation and the changes in remaining parameters of goods and services, such as quantity (actual volume enclosed in packaging), quality, or the type and the date of delivery, etc.² There is plentiful anecdotal evidence on quality or quantity adjustments (e.g., Martin, 2008), but the academic literature on the subject is modest.

Armstrong and Chen (2009) argued that producers may use non-price (rather than price) adjustment mechanisms, if they have more information than consumers about goods' attributes, while Snir and Levy (2011) found that producers are more likely to decrease quantities than increase nominal prices when consumers are more price attentive than quantity attentive, especially in periods of high inflation and in markets where producers face strong competition.

Imai and Watanabe (2013) examined the extent to which product downsizing occurred in Japan in 2000–2010. They found that one pricing strategy adopted among firms reluctant to raise nominal prices was to reduce the size or the weight of a product while leaving the nominal price practically unchanged, thereby raising the effective price. Importantly, the number of product downsizings has been particularly high since 2007, when firms faced substantial cost increases due to the rise in the price of oil and other imported raw materials.

¹ Originally the term "inflation" stood for increase of the money supply, though nowadays this term is identified with the effects of this phenomenon: the increase of prices. Therefore, the term "monetary inflation" is used in this work and it stands for increase of money supply. "Price inflation" stands for increase of prices (Mises, 1998 [1949], pp. 419–421).

² There is a question whether goods of different quality are still the same goods. Therefore, economists investigate the impact of monetary inflation on prices taking into account the *ceteris paribus* clause. However, we believe that focus on the factors economists usually abstract from can be helpful in better understanding the inflationary process and the behavior of entrepreneurs confronted with monetary inflation.

Cakir, Balagtas, and Okrent (2013) analyzed the effects of package downsizing in the United States on household food-at-home consumption and expenditure in 2004–2010, while Cakir and Balagtas (2012) examined package downsizing in the Chicago ice cream market. Both studies found that producers use downsizing to implicitly increase prices in order to pass through increases in production costs.

These mainstream articles, although interesting, do not mention explicitly the link between monetary inflation and the changes in the non-price parameters of goods and services. They also tend to focus only on the package downsizing, omitting the changes in product quality.

Although Austrian economists analyze thoroughly the harmful consequences of rising money supply under the fiat monetary system and fractional-reserve banking, they are not interested in the problem of non-price effects of monetary inflation either. The only two exceptions known to us are Rothbard (2005) and Hülsmann (2008). The former (Rothbard, 2005, p. 53) assumed that consumers are more price sensitive than quality sensitive and wrote:

The general atmosphere of a “sellers’ market” will lead to a decline in the quality of goods and of service to consumers, since consumers often resist price increases less when they occur in the form of downgrading of quality.

The latter (Hülsmann, 2008, pp. 187–88) was a bit less laconic:

Then there is the fact that perennial inflation tends to deteriorate product quality. Every seller knows that it is difficult to sell the same physical product at higher prices than in previous years. But increasing money prices are unavoidable when the money supply is subject to relentless growth. So what do sellers do? In many cases the rescue comes through technological innovation, which allows a cheaper production of the product, thus neutralizing or even overcompensating the counter-vailing influence of inflation. This is for example the case with personal computers and other products made with large inputs of information technology. But in other industries, technological progress plays a much smaller role. Here the sellers confront the above-mentioned problem. They then fabricate an inferior product and sell it under the same name, along with the euphemisms that have become customary in commercial marketing. For example, they might offer their customers “light” coffee and “non-spicy” vegetables—which translates into thin coffee and

vegetables that have lost any trace of flavor. Similar product deterioration can be observed in the construction business. Countries plagued by perennial inflation seem to have a greater share of houses and streets that are in constant need of repair than other countries.

However, neither Rothbard nor Hülsmann analyzed the above-mentioned problem in a systematic way, in contrast to our article. This limited interest in the literature is puzzling for three reasons. First, researchers have already shown that other goods' attributes can also change depending on market conditions. Price is one of several elements that matters for consumers. Actually, in many marketplaces, adjustments in non-price attributes of products may be more important than changes in price. Thus, entrepreneurs may also compete on service quality, product quality, size or weight of a product, methods of distribution, delivery time, and so on. The non-price competition is well established in the literature (Blinder et al., 1998). Carlton (1987) even claims that markets may clear in terms of other factors than price—for example, delivery lags (Carlton, 1983). Therefore, the assumption that entrepreneurs always increase nominal prices in response to monetary inflation and rises in costs is not true.

Second, the growth of consumer prices resulting from monetary inflation is not automatic and deterministic, but depends on autonomous decisions made by entrepreneurs who, dealing with higher expenses, may or may not raise the prices of their products. Austrian economists always criticized the deterministic approaches of mainstream economics, particularly the hydraulic interpretations of the quantity theory of money, which postulate that a given increase in the money supply would lead to a proportional and mechanistic rise in the general price level (e.g., Mises, 1998 [1949], pp. 398–416). Although they are aware that increases in the money supply do not need to be revealed in increases in the consumer price level (e.g., Shostak, 2002), Austrians hardly analyze the impact of monetary inflation on non-price parameters of products.

Third, historically, until the implementation and distribution of banknotes in use, monetary inflation occurred in fact as a coin debasement—that is, a reduction in the weight or a deterioration in the quality (fineness) of coins, without changing the nominal value (Hülsmann, 2008, pp. 89–91). Therefore, economists should be aware that increases in money supply may be reflected in

changes in non-price parameters of products, such as quality or weight (size).

The aim of this article is to fill the gap in the literature and thoroughly examine how the increases in money supply influence the non-price parameters of goods and services, especially how it affects the actual volume enclosed in packaging and the quality of the products. In other words, our goal is to draw a connection between monetary inflation and the non-price adjustments. Hence, we develop a theory of inflation and changes in the non-price parameters of goods and services. It turns out that neither are entrepreneurs greedy individuals who want to cheat consumers all the time, nor are downsizing and reduction in product quality always the optimal market outcome and beneficial for consumers. Our conjecture is that an expansionary monetary policy may, *ceteris paribus*, cause a decline in quality (quantity) of produced goods and services if the rise in costs prompts the entrepreneurs to not increase nominal prices of their products, but to decrease the products' quality (quantity), raising rather their effective prices—prices adjusted for the volume or quality. In this way, the increase in money supply may have a negative impact on innovativeness of entrepreneurs who, instead of improving the quality of products they offer, may in fact take the opposite action in order to avoid explicit nominal price increases of their products.

The remainder of the paper is organized as follows. Section 2 analyzes the link between monetary inflation and non-price changes of goods and services. Section 3 focuses on the downsizing, and section 4 on decreasing quality. Section 5 examines the indirect effects of monetary inflation on quality of goods. Section 6 concludes.

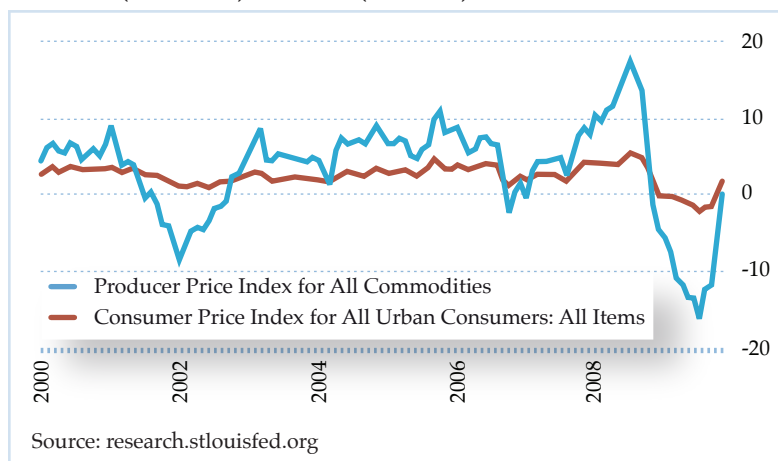
2. MONETARY INFLATION AND NON-PRICE CHANGES OF THE GOODS AND SERVICES

The starting point for our analysis is the Cantillon effect, a distributional effect and price effect resulting from the uneven increase in the money supply (Cantillon, 1959 [1755]). The new money is not evenly distributed in the economy but only runs through specific channels (Sieroń, 2015). This implies that only some entrepreneurs observe the increase in monetary demand for their products (or they observe it earlier than others). Other market actors will be

confronted with a relative increase in the price of the factors of production used by them in the production process. The increase will be particularly widespread if the new money entered the economy through credit expansion (Huerta de Soto, 2006), which would lower the interest rates and, as a consequence, increase the monetary demand for raw materials and producer goods.

The rise in commodity prices was particularly strong in the 2000s (Trostle et al., 2011), when the annual percentage changes in the producer price index (PPI) were usually bigger than changes in the consumer price index (CPI), as one can see in the chart below.³ This chart shows that producers faced significantly rising costs at that time, which could prompt them to reduce either quality or quantity of products, without adjusting nominal prices. Hence, focusing on the CPI is not sufficient in order to understand the inflationary process taking place in the economy. It cannot be ruled out that the greater increases in the PPI in the 2000s could partially have resulted from the fact that producers of consumer goods changed either the quantity or the quality of their products (and these changes were not properly reflected in statistics).

Figure 1: The percentage change from a year before in the PPI (blue line) and CPI (red line) in the 2000s



³ However, the percentage changes in the PPI were often smaller than changes in the CPI in other decades.

Entrepreneurs facing the increase in costs may raise their nominal prices. However, such a solution is not always an optimal one. If the demand for a good is elastic, then an increase in price causes a decrease in revenues.⁴ Moreover, a few articles show that consumers are more sensitive to price than non-price changes due to lack of appropriate knowledge about non-price parameters or cognitive costs associated with processing information about both products' prices and non-price parameters (Gourville and Koehler, 2004; Snir and Levy, 2011).⁵ Moreover, some consumers may be completely aware of an increase in an effective price (price per unit) but focus more on the nominal (absolute) price due to being short on cash.

What is more, sometimes entrepreneurs are not permitted to freely change prices. Price controls implemented by governments to keep inflation in check force them directly to change non-price attributes of products and, for example, reduce the quality or lengthen the delivery time during inflation (Carron and MacAvoy, 1981).⁶ For these reasons, entrepreneurs are forced to adjust non-price parameters of products in order to sustain their level of profitability.⁷

There are many ways to deal with the rising costs. In certain sectors and at a certain point in a company's development, the technological process plays the most important role (Hülsmann, 2008, p. 187).⁸ However, the role and the rate of technological progress vary from one sector to another (Castellacci, 2004). For that reason, some entrepreneurs, operating in industries when

⁴ It is worth mentioning that entrepreneurs always try to establish the price on the level maximizing profit, so any raising of price above the optimum value may lead to a decrease of revenue. Therefore it is not true that entrepreneurs can smoothly pass the rise in costs on to their consumers (Rothbard, 2009).

⁵ On the other hand, Imai and Watanabe (2013) did not agree that consumers are sensitive to price changes but not to size/weight changes.

⁶ Under the communist system, inflation was repressed. The increase in money supply led to shortages and non-price rationing—for example, in terms in time spent in lines (Kolodko and McMahon, 1987).

⁷ A similar example may be a minimum wage. The increase in the minimum wage may prompt employers to reduce fringe benefits or worsen the working conditions (Wessels, 1987).

⁸ Please note that these efforts to deal with monetary inflation decrease the officially reported consumer inflation rate due to hedonic adjustments.

the technological progress plays a much smaller role, may try to implement one of the two following major strategies (or both of them at the same time):

- a) curtailing the amount of product, but keeping the nominal price unchanged (i.e., downsizing); or
- b) reducing costs through offering products of inferior quality.⁹

Surely, entrepreneurs may also adopt other solutions in response to monetary inflation and a surge in costs. However, we focus on the above-mentioned strategies because quantity and quality are the most important (and most general) non-price parameters of products. In particular, entrepreneurs can also increase the costs of shipping, reduce customer service, or move production to cheaper locations. They can also lower product variety because an increase in costs resulting from monetary inflation may reduce their companies' profitability, which may lead to a narrowing of product range only to those products with the highest margin (instead of hiking prices). This is important because the literature shows that product variety enhances customers' welfare (Dong, 2010).¹⁰

3. DOWNSIZING

Downsizing means decreasing the quantity of a product sold at the same nominal price. It seems to be a relatively new strategy, and can be either illegal or legal. The illegal one consists in placing less of the product in the packaging than was mentioned on the label, while the legal one consists in explicitly reducing the net content,¹¹ often

⁹ The difference between them is often very subtle as producers may use cheaper substitutes reducing quality and, for example, add water to foodstuffs in order to reduce the quantity of the primary nutrient used in the production of given goods. It seems however that it is worth distinguishing between these two methods, as the first one does not influence the quality of the products per se.

¹⁰ It is worth noting that non-price changes of a product may cause the relative underestimation of the CPI. We write about "relative" underestimation because it is difficult to determine whether there is absolutely positive or negative measurement bias in the CPI (Rossiter, 2005). However, goods substitution in the basket does not cover the loss of usability resulting from replacing more expensive goods of high quality by cheaper ones with lower quality. On the contrary, economists generally believe that substitution bias overstates the CPI.

¹¹ The number of items or units in the packaging may also decrease, which is not easy to identify—for example, in the case of toilet paper sheets.

in a way unnoticeable for consumers, however. Although sellers are obliged to present unit price as well—that is, price per unit of weight or per product unit—the studies show that consumers are far more sensitive to changes in nominal prices than to the quantitative changes even if they both lead to the same change in effective price (Gourville, Koehler, 2004; Snir and Levy, 2011).¹²

The nature of this phenomenon is complex. On the one hand, some argue that the above-mentioned actions show how greedy producers are and that the actions may be perceived as examples of fraud, or at least misleading packaging practices (Lawrynowicz, 2012). On the other hand, one can claim that producers almost always inform consumers about the actual quantity of the product in the packaging and indicate the unit price, whereas the consumers voluntarily make decisions on the purchase. It may also be true that some of the changes in the packaging may have an innovative character and may be an attempt to meet consumers' needs.¹³

However, it may be that downsizing is only an attempt to ensure profitability by companies facing rising costs and price-sensitive clients. This is not due to the entrepreneurs' greed, but due to inflationary monetary policy. Because of inflation, entrepreneurs devote their time, energy, and scarce resources to producing smaller packaging in an unobvious way instead of offering products in the most appropriate form of packaging from the consumers' point of view.

4. REDUCTION OF QUALITY OF GOODS AND SERVICES ("CANTILLON DEFECT")

Although the phenomenon of decrease in quality of some goods is a subject of research, nevertheless economists generally do not

¹² Although this fact seems to prove that consumers do not always act rationally, it is worth mentioning that comparing both prices and quantity of different products involves additional costs in the form of time and effort (Snir and Levy, 2011). It should also be noted that unit prices are not always given, and even if they are, they are usually written with small characters. Therefore, consumers comparing only nominal prices can be considered rationally ignorant.

¹³ For example, beverages sold in tiny cans are often far more convenient though much more expensive in comparison with bigger containers when adjusted for per-unit volume.

relate it to inflation policy. In this paper, we consider the reducing of quality of goods and services while keeping the same nominal price as a second non-price strategy for enterprises to adjust to monetary inflation and an increase in price of the means of production.

Reducing quality while keeping a stable nominal price, just like decreasing the quantity of the product, may turn out to be an attractive strategy aiming at increasing the effective price of goods or services as it is a parameter substantially harder to measure than price.

Two basic ways of lowering the quality are as follows: reducing durability or modifying components.¹⁴ Reducing durability of the products can be achieved mainly through the use of cheaper components of lower quality. It was recognized in the literature long ago (Swan, 1972; Gregory, 1947; Goering, 1993), but it seems this phenomenon, at least in general perception, has taken on more significance in the last several years.

The modification of components has a particular meaning in the case of non-durables, especially food. Contrary to durables, modifying components of given foodstuffs may rely on extending their durability to the detriment of nutritional values. This phenomenon is based on decreasing the content of the primary component in the product in the face of rising prices of raw materials. It may occur through replacing it with cheaper substitutes¹⁵ (including diluting it with water), using raw materials of lower quality, or adding chemical substances (and applying production methods) that make the product more tasty or durable but harm health.¹⁶

¹⁴ Deterioration of durability may be the result of modifying components used to produce given goods. However, not every modification of components reduces durability, which is why these methods shall be discussed separately.

¹⁵ An example of this problem is the European horse-meat affair, as the horse meat used for bovine hamburgers was cheaper (Wikipedia, 2013).

¹⁶ One research area of particular interest is the coexistence of unprecedented monetary inflation since the 1970s (as a result of President Nixon's definitive break from the gold standard in 1971) and the development of the world obesity epidemic, which in OECD countries dates to the 1980s (OECD, 2010; NIDDK, 2012). There are some indications that low-quality components used for production of foodstuffs, which may partly result from cheaper methods of production adopted by entrepreneurs in the inflationary environment, cause increase of obesity

It is very difficult to evaluate the strategy of reducing the quality of products while keeping the same nominal price. Some will try to find reason for this in entrepreneurs' willingness to increase sales and profits by all means, though some will defend this phenomenon and claim that clients purchase these products voluntarily. However, it should be noted that the voluntary nature of a transaction does not preclude that consumers' utility could be higher if they were offered goods and services of better quality. Public monopoly is an example of such a situation. Clients purchase products voluntarily from the public monopoly, but their situation would be better if there were more competitors on the market.

Analyzing this phenomenon is difficult also because decreasing the quality of goods may result from many reasons, not only from expansionary monetary policy. First, it may result from monopolization of the market (Bulow, 1986). Second, government regulation¹⁷ may influence the quality of the products. Third, the literature on the subject points to asymmetric information (Grout and Park, 2005). Finally, decreasing quality may correspond with real consumer needs. Market actors may prefer less durable goods because of lower prices, changing trends in fashion, or rapid pace of technological developments.¹⁸ It can therefore be reasonably concluded that though some goods were once of the higher quality, only the wealthiest people could afford them. Nowadays, thanks to lower prices, but lower quality as well, these goods are available for a wider range of consumers. From this view point,

(Schoonover and Muller, 2006). Wiggins and Keats (2015) found that in high-income countries over the last thirty years, the cost of healthy items in the diet has risen more than that of less healthy options, thereby encouraging unhealthy diets. The reason may be that it is more difficult to cut costs associated with production of fruits and vegetables than with production of processed foods.

¹⁷ We refer in particular to price regulations, which often apply to the so-called public utility companies. Changes in the quality of services offered by public utilities due to the monetary inflation may have particular significance (Troxel, 1949). Carron and MacAvoy (1981) researched the quality of services of public utilities in the United States in the 1970s. As regulators did not give their consent to increasing prices, the quality of services and the volume of investment expenditure decreased, while delays in delivery appeared.

¹⁸ It should also be noted that "quality" is a wider notion than "durability." Some goods may be characterized by shorter durability, but, for example, extra convenience and functionality.

decreasing quality allows most consumers to purchase desired goods at low price. Simultaneously, there are goods of high quality on the market offered for more demanding and richer consumers.

It is notable, however, that consumers, *ceteris paribus*, prefer more durable goods as they “render more total service” (Rothbard, 2009, p. 16). As Reisman (1990, pp. 214–216) proved, if higher costs of producing more durable goods on the free market are less than proportionate to the product’s longer life, entrepreneurs have incentives to produce more durable products. Thus, it seems that the decreasing quality—including durability—of some goods and services may result from different government interventions, including monetary inflation, that impose higher costs on companies. Monetary inflation decreases innovation of companies, which may choose methods of production not necessarily the most innovative and favorable for consumers but that guarantee the highest rate of return in an inflationary environment.¹⁹

Hence, we call the decline in quality due to monetary inflation “Cantillon defects,” as it occurs because the new money supply does not distribute itself evenly through the economy, but runs only through specific channels. Therefore, if new money enters the economy through the capital-goods and commodity sectors, entrepreneurs producing consumer goods may face rising costs that could prompt them to adjust non-price parameters of products they sell.

5. INDIRECT EFFECTS OF MONETARY INFLATION ON QUALITY OF GOODS AND SERVICES

It is worth pointing out that reduction of the quality of goods and services offered does not have to follow directly the increase of costs of production and be the direct aim of entrepreneurs. The reduction may be only relative and occur with a delay as a

¹⁹ We can argue that inflation, in a sense, forces innovation by producers in cutting costs and investments that allow them to reduce the use of raw materials whose prices increase. However, it should be noted that such an allocation of resources does not have to coincide with a counterfactual free market allocation of resources. Therefore, we can state that though the inflation may, in a sense, cause innovative behavior, it would be innovation going in the wrong direction in comparison to the one that would have occurred in a reality deprived of monetary inflation.

result of restricting investment expenditures, including spending on research and development, in the face of inflation (Able, 1980). Moreover, monetary inflation reduces the supply of savings and increases uncertainty, negatively affecting the volume of investments (Horwitz, 2003, p. 78).

The reduction of the quality of goods and services may also result from other indirect effects of monetary inflation. First, monetary inflation decreases the real value of borrowings and thus discourages saving and prompts debtors, including consumers, to buy goods on credit. Consumers in such a situation, instead of saving for goods of higher quality, which would serve their functions for several years, may prefer to buy cheaper goods of shorter durability on credit.²⁰ In other words, “easy money” policy, which leads to higher prices and higher time preference, may prompt consumers to buy cheaper, less durable goods. Consumers in such economic conditions may prefer lower expenditures in the present day, even if over the years their decision will mean higher total costs for purchasing specific goods (because of their frequent replacement). It happens so because they pay less attention to the future. Such an attitude may be supported through the possibility of buying new products thanks to reduced-interest loans. In this context, it is worth pointing out that the relatively loose monetary policy run by the Federal Reserve System contributed to the development of consumer credit in the 1920s and after the Second World War (Eichengreen and Mitchener, 2003, pp. 36–42; Huerta de Soto, 2006, pp. 487–493).

Second, monetary inflation leads to disturbances in a correctly functioning price mechanism (Horwitz, 2003). Increases in prices resulting from a higher money supply disrupt information conferred through prices, which can unbalance the structure of consumption and the allocation of production factors between goods of higher and lower quality. High price for consumers often stands for high quality (Leavitt, 1954). Therefore, consumers may interpret higher prices resulting from monetary inflation in an

²⁰ Encouraging borrowing would be enhanced if monetary inflation took place through credit expansion, which lowers (*ceteris paribus*) interest rates. The credit expansion (especially if recurrent) does not only cause a market rate below the natural level resulting from time preference, but can also lead to an increase in time preference, which encourages consumption.

incorrect way as an indication of high quality. In fact, they may buy more expensive products of lower quality, which can negatively affect the profitability of companies producing goods of high quality and in this way reduce the supply of high-quality goods.

Third, an increase in prices along with lower variety and lower quality of products may stimulate individuals to self-production. What we can currently observe is the growing popularity of the movement called *do-it-yourself* (Wolf and McQuitty, 2011). Such a movement reduces innovation as it decreases the division of labor as well as efficiency of production.

6. CONCLUSIONS

In this article, we have challenged the common view that monetary inflation automatically leads to increases in prices of consumer products. Changes in prices are always a result of conscious actions of entrepreneurs who, in response to the rising prices of means of production—and according to the Cantillon effect, an increase in money supply does not affect all prices uniformly and simultaneously—may apply other strategies, consisting in decreasing the quantity of product or reducing its quality, keeping the nominal prices unchanged.

Thus, monetary inflation is a factor passed over in the literature that may be partially responsible for downsizing and decreasing quality of some products. From this perspective, the above-mentioned actions taken by entrepreneurs do not have to result from their ill will or inherent greed, but from their effort to remain in business in inflationary and competitive environment. Therefore, it seems that the Austrian theory of inflation should be extended to incorporate non-price effects of monetary inflation.

The non-price effects of increases in the money supply clearly show that the impact of monetary inflation on innovation is negative. Instead of promoting products of higher quality, entrepreneurs spend scarce resources to hide the increase in an effective price through changing packaging or reducing quality, which is detrimental to innovation. That impact does not have to be direct, but can result from cutting costs through limiting expenditures on investments.

This paper does not exhaust the subject, but it contributes to further research, perhaps of a quantitative nature. We believe that the presented considerations on non-price effects of monetary inflation have a solid foundation and contribute to the literature on inflation and business strategies adopted in an inflationary environment.

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