

Analyzing inflation: Measurement problems and trends

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ANALYZING INFLATION: MEASUREMENT PROBLEMS AND TRENDS

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Abstract

As a consequence of the crisis of 2007/2008, which started in the United States of America within the financial sector and which then spread to the real sector, the governments of several countries had to bail out financial institutions and companies. Central banks, especially in the U.S. and Europe injected liquidity in large volumes into the markets in order to stabilize the financial sector, a process which might produce higher inflation. This article discusses how inflation is measured and found that the measurement does not include adequately the development of prices of financial assets. Furthermore, it discussed that money supply should include loans, as credit serves as money and has an impact on inflation. One of the main conclusions is that there is a real possibility that inflation rates will increase in the medium term future.

Keywords: Inflation, Prices, Purchasing power, Money supply, Credit, Debt, Crisis.

ANALIZANDO LA INFLACIÓN: PROBLEMAS DE MEDICIÓN Y TENDENCIAS

Resumen

Como consecuencia de la crisis de 2007/2008, que inició en los Estados Unidos en el sector financiero y que luego se extendió a la economía real, los gobiernos de varios estados tuvieron que rescatar a instituciones financieras y a empresas. Los bancos centrales, especialmente en los EE.UU. y Europa, inyectaron en grandes volúmenes liquidez a los mercados con el fin de estabilizar el sector financiero, un proceso que podría producir una mayor inflación. En este artículo se analizó cómo la inflación se mide y se encontró que la medida no incluye adecuadamente la evolución de los precios de los activos financieros. Por otra parte, se discutió que la oferta de dinero debe incluir los préstamos, ya que crédito tiene las características de dinero y tiene un impacto sobre la inflación. Una de las conclusiones principales es que existe una posibilidad real de que las tasas de inflación se incrementarán a medio plazo en el futuro.

Palabras clave: inflación, precios, poder adquisitivo, oferta monetaria, crédito, deuda, crisis.

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1. Introduction

As a consequence of the crisis of 2007/2008, which started in the United States of America within the financial sector and which then spread to the real sector, the governments of several countries had to bail out financial institutions and companies. Central banks, especially in the U.S. and Europe injected liquidity in large volumes into the markets in order to stabilize the financial sector. One impact is that unsustainable levels of sovereign debt can be observed in several parts of the world. Another consequence might be that we will face a significant increase of currency inflation in the future, in both, throughout the world and Colombia. In Colombia the Federal Reserve Bank (el Banco de la República de Colombia) routinely reports data about the current state of the monetary system and the economy in Colombia. These reports are designed to make the decisions of the Bank transparent and pretend to make a contribution to improve the understanding and credibility of monetary policy. For example, a Central

Bank report was published in January 2012 which covers the development of inflation and monetary policy decisions based on data of December 2011 (Banco de la República de Colombia, 2012). In Colombia monetary policy "is governed by an inflation targeting scheme, where the principal objective consists in guaranteeing low rates of inflation and stability with respect to output growth, close to its long-term trend" (Banco de la República de Colombia, 2012). The annual inflation rate should be close to three percent in the long run (Banco de la República de Colombia, 2012).

However, the question is, if inflation rates will stay at historically low levels or if stakeholders, for example companies, in Colombia and elsewhere have to adjust their expectations to a scenario that will bring much higher inflation. This article analyzes this question and is organized as follows. First the theoretical concept of inflation and its main causes will be described, making reference to the current Colombian context. Then, a description and analysis of inflation measurement will be presented. Based on this foundation

some conceptual shortcomings will be revealed and discussed, which will lead to the identification of some trends. Finally, some concluding remarks and ideas for future work will be presented.

2. Conceptualization

2.1 Defining inflation and factors that determine the behavior of prices

The Spanish Royal Academy defines inflation as "a significant rise in price levels with adverse effects on the economy of a country" (Real Academia Española, 2012) ¹. According to this definition, inflation refers to the increase of price levels within a given time period. That is why inflation is dynamic and normally varies over time (Totonchi, 2011). The phenomenon is as old as humanity itself and inflation has been the reason for decision making with respect to economic policy, the dynamism of markets and social movements, among others. High inflation translates into a lower purchasing power, generating less consumption of goods and services and thus lower welfare. Basically, it has similar effects like a flat tax, but with the big difference that inflation does not generate any direct cash inflows for governments. Data collection and processing for measuring inflation is an arduous, tedious and costly task. That is why the evaluation of inflation focuses

1. With respect to the origins and the evolution of the term inflation, see (Bryan, 1997).

on goods and services that are most influential in consumption decisions of households and production decisions of companies and furthermore it focuses on areas where information can be provided that allows the measurement of inflation over time.

Determining the behavior of prices is complex, as it depends on many factors such as weather conditions, liquidity in the economy, changes in demand and supply of goods and services, the velocity of the circulation of money, expectations, salary negotiations and external factors, such as the behavior of the exchange rate and foreign economic policies. That is why there is no single theory and consequently different theories regarding inflation have been developed. From the perspective of macroeconomics (Totonchi, 2011) identified eight theories of inflation, which include: a) the quantity theory, which is based on the expression that was introduced by Irving Fisher ²: $M \times V = P \times Y$ ³, and which will be discussed in more detail later on in this text; b) monetarist theory, based on the contribution of Milton Friedman,

2. Fisher, I. (1912). *The Purchasing Power of Money: Its Determination and Relation to Credit, Interest and Crisis*, New York, Macmillan Company.

3. Either the rise in prices might be due to the scarcity of goods or it might be due to the superabundance of money, but as a matter of actual historical fact it is, so far as I know, universally true ... that it is the change in the money that makes the changes in the value of the money, and not changes in the goods" Irving Fisher, cited in (Bryan, 1997).

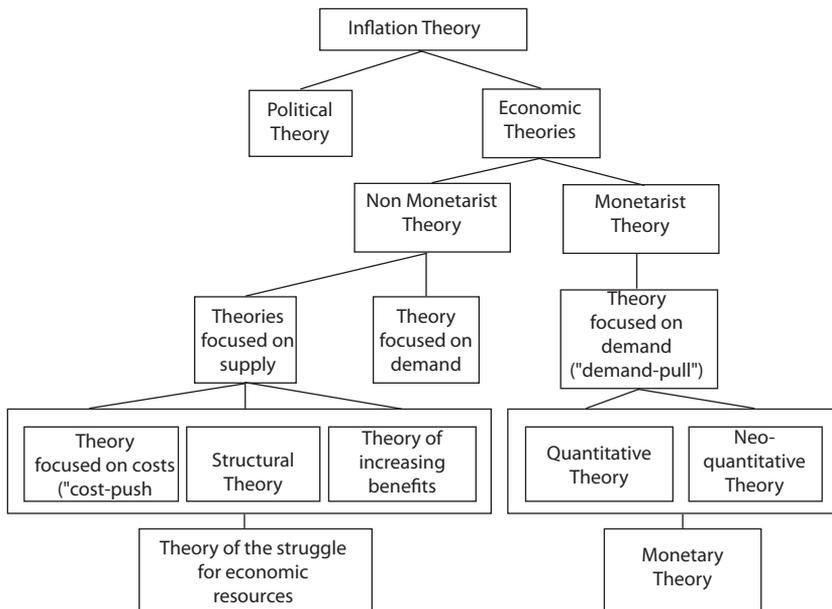
which postulates that money supply determines the level of inflation; c) the theory of 'demand-pull' which focuses on the increase of market demand as a determinant of inflation; d) the 'cost-push' theory, which claims that increased costs do account for inflation; e) the structural theory of inflation, which perceives the structure of an economy as the main determinant of inflation.

This includes for example an increase of competition, based on population growth, as a determinant of inflation; f) the theory of the rational expectations revolution, which considers that economic agents form their expectations not only based on

relevant data from the past, but also based on present data; g) the new neoclassical synthesis; h) the theory of new macroeconomic policies of inflation, which includes factors such as the political process, institutions, political credibility and stability as determinants of inflation. For example, in 1972 the former German Chancellor Helmut Schmidt made the following and well known policy statement: "I rather prefer 5% of inflation than 5% of unemployment".

In accordance with this revision of literature, the different currents of inflation theory can be summarized as follows:

Exhibit 1. Different theories of inflation. Source: (wirtschaftslexikon24).



These theories explain inflation in different ways. The main determinants of the behavior of prices in an economy, particularly in the Colombian economy, can be summarized as follows:

Monetary policy. One of the main tools that most economies use to control the price level is the amount of money in circulation. This amount depends on factors such as the prevailing interest rate for repos⁴, the exchange policy, discount window operations, bank reserves and to a minor extent on the use of seigniorage, which refers to the difference between the value of money and its cost of production.

An increase in interest rates for repos decreases the amount of money in circulation, as it encourages market makers to buy more government bonds and therefore liquidity is reduced. Whereas when the central bank is buying currencies, liquidity increases. An increase in bank reserves reduces the amount of money in circulation, because this deposit represents a percentage that the bank has to hold in cash in order to meet its obligations. An increase of these reserves reduces the amount of money available that can be lent to clients.

The velocity of circulation of money. Money does not remain static, it

4. Repos are repurchasing agreements that involve the sale of securities at a given price, with a commitment to repurchase the same or similar one at a fixed price at a future date or on demand.

changes the "owner" and the faster this is done the greater the dynamism of markets, as greater movement of economic transactions is the result. This dynamism can generate an increase in price levels, when an economy with a high employment level is running almost at full capacity. As a consequence, demand will grow faster than supply, which eventually causes an increase in price levels. This can be formalized as follows:

$$M \times V = P \times Y \quad (1)$$

Where:

M: is the amount of money in circulation.

V: is the average velocity with which money circulates in an economy (the average velocity with which money changes the owner).

P: is the price level.

Y: is the production of an economy; that is, the amount of goods and services produced.

The amount of money in circulation (M), generally, is divided into the following monetary aggregates: M1, M2, and M3 (Banco de la República de Colombia, s.f.).

Where:

M1: current accounts plus cash held by the public.

M2: M1 plus quasi money.

M3: M2 plus other liabilities that are subject to reserve requirements and not included in M2, like repos.

The expectations of economic agents and salary negotiations. Since salaries in Colombia are determined for periods of one year through negotiations of unions, companies and the government, nominal salary demands are addressed based on the expected price level for the next period, which in turn is influenced by past data; that is past behavior and its evolution. In this context the bargaining power of unions depends on several factors like the employment rate, because the greater the demand for labor, the greater the bargaining power and hence higher salary demands will be articulated. An increase in labor productivity increases the bargaining power of unions as well.

External factors. The behavior of the currency exchange rate is one of the determinants of movements in trade balances. A revaluation of the domestic currency increases the cost of imports, and if these imports are used for domestic production, then the price level of these products tend to increase the more inelastic these products are.

Foreign monetary policy. An expansive foreign monetary policy, combined with tight national monetary policy, implies an inflow of capital and therefore affects the behavior of the

exchange rate, revaluing the currency as it used to happen presently.

2.2 Inflation in Colombia

In Colombia and other countries inflation is calculated as the annual change in the consumer price index (CPI). According to the Federal Reserve Bank of Colombia, annual inflation was 3,73% in December 2011 (Banco de la República de Colombia, 2012). This value was above the stated objective of 3%, indicating that the purchasing power of the currency, in this case of the Colombian peso, fell by 3,73% between December 2010 and December 2011. Importantly, this value of 3,73% does not mean that all prices in Colombia rose at this rate. The CPI calculation refers to a basket of products and services that are typically consumed by a Colombian household. For example, in the fourth quarter of 2011 the behavior of inflation (CPI) can be largely explained by the movement of food prices (Banco de la República de Colombia, 2012), which means that food prices had more influence on the CPI than other products of this basket, which might happened because of external events, such as weather changes (winter time) that affected crops and caused food prices to rise.

In Colombia the DANE, the National Department of Statistics (Departamento Administrativo Nacional de Estadística) publishes information about both,

the composition of the basket (DANE, 2009) and the evolution of the prices of the various products that conform the basket (DANE, 2012). Currently, the basket (the technical name is IPC-08) contains products and services of the following nine groups, where the value in parentheses indicates the weight of each group in the basket: 1. Food (28,21%), 2. Housing (30,10%), 3. Clothing (5,16%), 4. Health (2,43%), 5. Education (5,73%), 6. Culture, entertainment and recreation (3,10%), 7. Transportation (15,19%), 8. Communications (3,72%) and 9. Other expenses (6,35%), (DANE, 2012).

Analyzing the evolution of prices that refer to products of the basket, the behavior of prices can be observed through groups that contribute most to the average (monthly) variation of prices. In February 2012 for example,

prices of the group 'education' increased by 4,24% and only 0,44% with regard to the group of 'food'. Within the latter the most significant change of the month was the price increase of onions that showed a variation of +9,48% (DANE, 2012). From the data it can also be concluded that prices generally behave differently in different regions and cities (DANE, 2012).

In November 2011, in January 2012 and again on February, 24th of 2012 the Central Bank increased the interest rate for central bank intervention by 25 basis points (Banco de la República de Colombia, 2012). This increase was motivated by the objective of curbing inflationary trends. At the end of February 2012 the inflation rate was located at 5,25 % (El Colombiano, 2012). The evolution of the inflation (CPI) in Colombia is shown in the following

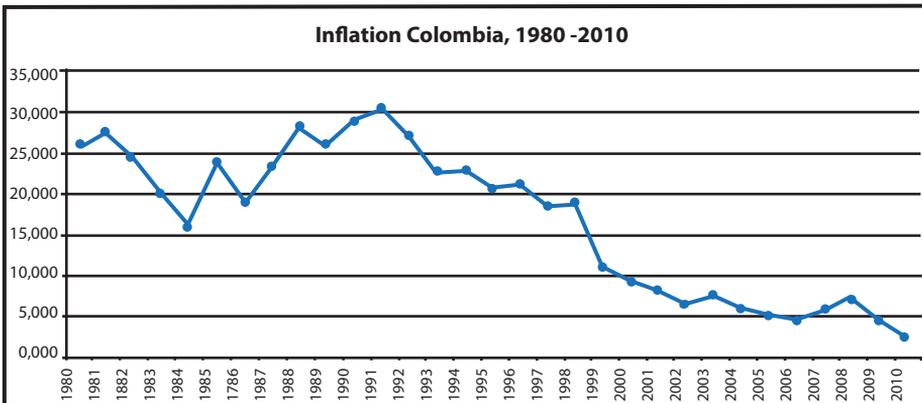


Exhibit 2. Annual evolution of inflation in Colombia.

Source: Elaborated based on data of (Indexmundi, 2011).

chart, which clearly presents a downward trend for the last 20 years:

It is worthwhile to mention that the CPI is not the only index that measures the change in price levels. The PPI (Producer Price Index) "is an economic indicator that shows the variation of prices in the first stage of commercialization within the productive structure of a country" and allows in particular the "detection of the channels where inflationary transmission occurs" (DANE, 2009). However, in the publications of the Central Bank the PPI is not drilled down like the CPI. According to DANE the variation of the Producer Price Index (PPI) was 0,13% in February 2012, which means that the value was different compared to the CPI value, which was 0,61% in the same month (DANE, 2012). Furthermore, DANE also publishes other indices that measure the change of price levels and which are available on the website of this institution (<http://www.dane.gov.co>), but which are not directly part of the inflation report that is periodically published by the Federal Reserve Bank of Colombia. These indices include the index of housing construction costs (ICCV), the index which tracks the costs of heavy construction (ICCP), the index of freight costs (road), (ICTC), the index that tracks the costs of private higher education (ICESP), the price index for new buildings (IPEN), the price index

of new housing (VNPI) and the index of real estate valuation.

It is also important to note that the national currency (the peso in the case of Colombia) not only can lose purchasing power due to a higher level of product and service prices that result from domestic production; the currency can also lose or gain against other currencies. For example, if the peso gains value compared to the dollar, an exporter in Colombia will lose a part of his competitiveness in international markets due to the fact that the buyer has to pay more for the same product in terms of dollars (Representative Exchange Rate). All this underlines that the concept of inflation includes several components. For companies some are more important than others, depending on factors like the economic sector, the industry, the region or city where the company is doing business.

2.3. The international situation - expansionary monetary policy.

In response to the financial crisis of 2007/2008 and with the objective to "stabilize" the financial sector several central banks pumped money into the affected economies and bought bonds. In the case of Europe and in the U.S. mainly bonds that were issued by the government that needed liquidity in order to attend the affected industries ("bail outs"). That means that various

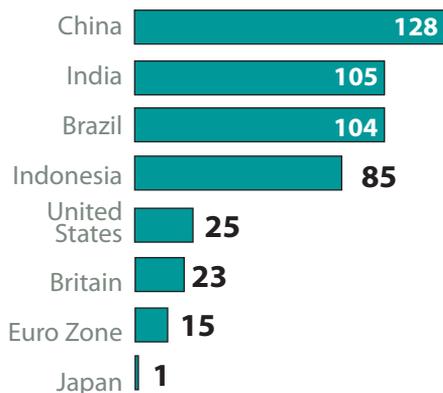
Federal Reserve Banks exchanged money (liquidity) for bonds, often securities of poor quality, and finally they had to register these bonds on their balance sheets. These interventions were carried out in large volumes, which “inflated” the balance sheet for example of the ECB (European Central Bank) to a value of 2,73 trillion Euros at the end of 2011 (balance sheet extension). That is why the ECB's assets now amount to nearly 30% of the GDP (Gross Domestic Product) in the Euro area. This value is much higher than the portfolio of the Federal Reserve in the U.S., where the value of the balance is about \$ 2.9 trillion or approximately 19% of the U.S. GDP (Hilsenrath, J.; Blackstone, B., 2012).

Both cases have in common that central banks bought assets principally of indebted countries or companies, which ultimately means that debts were and still are socialized. To get a better idea of the volume, the before mentioned figures can be compared to Colombia, where the total assets on the balance sheet of the Federal Reserve Bank of Colombia are barely worth 78.080.988.727 thousands of pesos, cutoff date November 30th of 2011 (Banco de la República de Colombia, 2011), which equaled at the time of writing to approximately 44 billion dollars.

Since the financial crisis of 2007/2008, the monetary base expanded not only in the U.S. and Europe, but also in other

Cash flood

Expansion in broad money between 2007 qnd 2012 (% in local currency)



Source:CLSA SCMP

Exhibit 3. Monetary expansion in different regions of the world, 2007 - 2012

Source: (Holland, 2012)

parts of the world, as evidenced in the following exhibit.

Here, we will not go into the question, why other countries like China and India are expanding the monetary base as well and if this is a competition of debasing currencies, since the objective of this work is different as the aim is to discuss, if this monetary expansion will cause significant inflation.

The exhibit 3 shows that liquidity is injected in large volumes to markets (QE, quantitative easing), which means that central banks do generate money

on a large scale. With this policy Central banks expanded their traditional role of protecting the value of the currency (inflation targeting) and began to support or guarantee the financial stability of the system (Bernanke, 2011). Up to date the result has not been an increase of inflation and interest rates stayed relatively low. In many countries

loans remain relatively inexpensive and in some parts negative real interest rates can be observed (The Economist, 2012).

If we analyze for example the situation of inflation for the U.S., it can be stated that the official inflation rate, calculated as a moving average of recent years, is just 2,49% (as of November 2012), and therefore inflation is at historical low

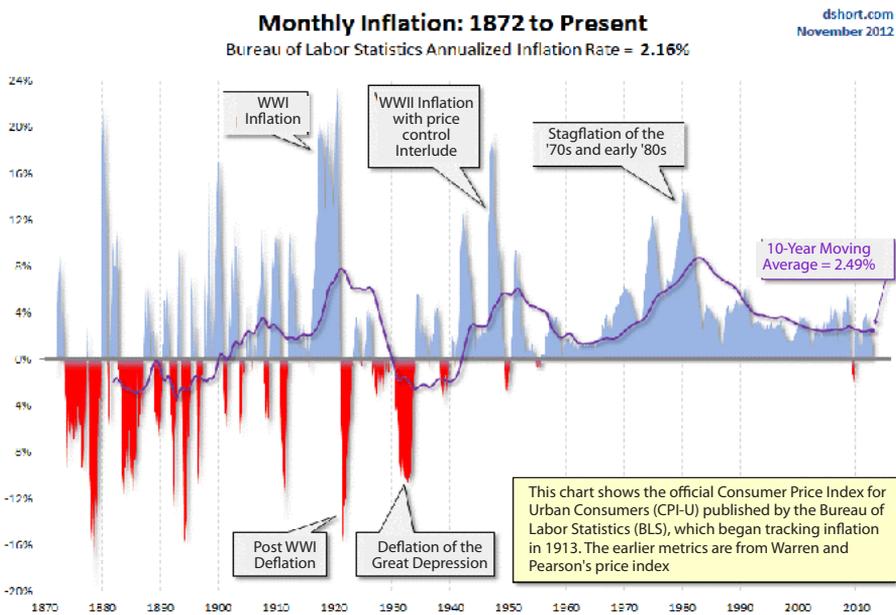


Exhibit 4. Annual evolution of inflation in the U.S., 1872 – November of 2012

Source: (Short, 2012)

levels, as shown in the following chart which presents data from 1872 to 2012 for the U.S.

In the Euro area the picture is very similar. Due to the downturn in countries in southern Europe, the price

levels so far tend to go down and not up. For Colombia, it is estimated that the twelve months of 2012 will end with an average inflation of about 3.1%, as measured by the CPI (Rombiola, 2012). Within the context of Colombian history

this represents a relatively low value, as shown in exhibit 2.

If inflation has not increased until now, then this means that the injected money has not taken the transmission path as indicated by the monetary theory

and has not increased the price level of the products of the basket (CPI), which is the basis for measuring inflation in many countries.

However, some assets increased in value and market prices went up in

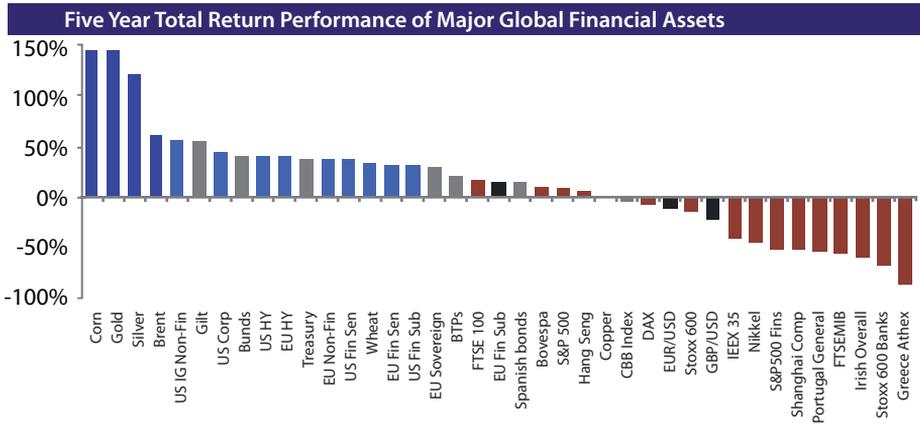


Exhibit 5. Return of major global financial assets

Source: (Okanecapital, 2012)

recent years. According to Deutsche Bank (August 2012) financial assets were valued as shown in the following exhibit.

As can be observed in this chart, prices in general, went up for commodities. For example the gold price increased in recent years. The Bank of International Settlements stated in December 2012 (Bank of International Settlements, 2012):

“Asset prices generally increased during the period from the beginning of September to early December, supported by further easing of monetary policies

and perceptions that some major near-term downside risks had eased ... some asset prices started to appear highly valued in historical terms relative to indicators of their riskiness”.

3. Analyzing the current concept of Inflation

3.1. Measurement based on the CPI and PPI.

As has been described, inflation in Colombia and elsewhere is usually measured through the CPI (consumer

prices) or PPI (producer prices), which means that an increase in the price level of assets that are not part of the CPI or PPI, but which are acquired by private people and businesses for saving or investment purposes, is not accounted in the same way and with the same rigor and accuracy as in CPI or PPI calculations. An example would be an investment fund that is made up of a portfolio of shares, bonds or derivatives, where the latter in the form of "outstanding OTC derivatives" actually represents the gigantic amount of 639 trillion dollars⁵ (Bank of International Settlements, 2012). Although there are price indicators for certain categories of financial assets, currently there is no general index for financial assets that indicates inflation particularly for this asset class (Hüfner, 2012), (Shedlock, Inflation: What the heck is it?, 2006). Consequently, inflation measurement is not complete as financial assets and their prices are not captured in the same way as products that are part of the CPI or PPI basket.

Additionally, it has to be taken into account that products of these baskets (CPI and PPI products) are subject to innovation and therefore renewed. For example, personal computers or cell phones nowadays are widely used, but they did not exist years ago. So how

5. As was stated by (Duncan, 2012), this value is much higher than the world's total GDP which was estimated for 2011 at about 69 trillion dollars (indexmundi, 2012).

should a basket which includes these products today should be compared to a basket without these products? Is it correct to say that in the past the price of these goods was "indefinitely", since these products could not be purchased at any price and that is why prices fell in time, just because these products can be acquired at affordable prices today? How do you compare the price of a black and white TV set that was used some decades ago with the current color TV sets of the type LED and that also offer additional services like Internet access or the connection to mobile devices like tablets and smartphones? (Shedlock, Inflation: What the heck is it?, 2006). In many cases technological progress generates an increasing productivity, as the latter often goes hand in hand with the discovery and implementation of new technologies, which leads to a decrease in the corresponding prices. These are all reasons why in many cases relative prices simply cannot be determined in terms of a precise measurement over time.

When some prices go up and others go down, does this mean that inflation and deflation can exist at the same time? The answer is no, because a decrease in prices is a symptom of deflation, but not the definition of this term. That is, a reduction in the level of prices can accompany deflation, but it is not a sufficient condition for having deflation (Shedlock, 2009).

3.2. Expansionary monetary policy and inflation

The prevailing expansionary monetary policy (resulting in deficit spending) ensures that interest rates (the price for money) stay at historical low levels, as money supply exceeds demand. However, this abundance of money and the availability of "cheap" credit still have not increased GDP growth rates in the desired way and also have failed in reducing unemployment significantly. Although, according to monetarism, this should be the appropriate recipe: inject money to lower interest rates in order to boost the economy. That means that the effects of monetary expansion and its effects in our globalized and highly indebted world are not well understood as we are navigating in uncharted waters ("The New Normal"), (Inman, 2012). A consequence is that the excess of liquidity has been parked in the accounts of central banks. For example, with the cutoff date of January, 22nd of 2012 banks in the Euro zone placed more than 491 billion Euros in very short term accounts of the ECB. The ECB in turn paid 0.25% annual interests for these deposits. In normal times, the possibility to "park" money overnight in central bank accounts is not an option for the banks as they can find better investment opportunities (Bogs, 2012). Thus, it can be concluded that market players sit and wait what will happen in the context of the actual situation.

Furthermore, it should be emphasized that according to Keynesian theory, it is recommended that deficit spending is a measure to smoothen the economic cycle and is not a measure of economic growth policy (Scherf, 1986). The problem that we face in these days, four years after the start of the crisis in the U.S., cannot be described as a problem of the normal economic cycle. Nevertheless, PIMCO, the world's largest active global fixed income manager (elEconomista.es, 2012), estimates that monetary expansion will continue (Die Welt, 2012).

Accordingly, the question actually is, if the supply of money (quantitative easing) can be extended without causing inflation in the medium or long term?

According to Irving Fisher's formula ($M \times V = P \times Y$), the relationship between money and output ("two sides of the same coin") is as follows. The real GDP (Y) evaluated at market prices (P) translates into the nominal GDP ($P \times Y$), where this part can be expressed as the product of the amount of money (M) times the velocity of circulation (V). As shown in exhibit 3, the amount of money (M) has increased at least since 2008 and prices (P) rose at the rate of inflation in countries like the U.S. or like in some other countries in Europe, which was around 2,5% on average. In these countries nominal GDP increased around 2% on average

in recent years. Assuming (V) remained essentially constant or declined since 2008, it can be deduced that $M \times V$ has increased faster than $P \times Y$. That is why an imbalance between these two parts can be assumed. Thus, unless the economy shows significant growth in terms of (Y), the theory indicates that prices (P) possibly will rise in order to re-establish the balance between the two parts of the expression. This is probably why some authors like Peter Schiff, James Turk, John Williams, Marc Faber or Charles Goyette (Moheban, 2011), among others, have found that there is a high probability that inflation will rise significantly in the coming years, with negative implications for the economies of the countries. Consequently, they recommend the acquisition of real goods like gold for example as a hedge against higher inflation.

While supporters of monetarism indicate that an increase of money supply causes inflation, the followers of the theories of Ludwig v. Mises, a representative of the Austrian neoclassical school, believe that inflation is the increase in money supply and a raising price level is a result of inflation:

“What people today call inflation is not inflation, i.e., the increase in the quantity of money and money substitutes, but the general rise in commodity prices and wage rates which is the inevitable consequence of inflation” (L. v. Mises,

Planning for Freedom, p. 79), cited from (Ludwig von Mises Institute, 2012).

Hence, from either of these two perspectives, it is important to analyze (M). However, it should be noted that (M) does not only increase due to an expansionary monetary policy of central banks, but also because of the possibility of getting leveraged through “fractional reserve lending”. This finally allows commercial banks to create credit (money that can be consumed or invested) based on the fact that a large part of the deposits, which are sitting in the bank accounts of their clients, never is withdrawn and therefore can be transformed into credit (“creating money out of the blue”⁶). Thus, it is recommended to differentiate conceptually between money and credit with respect to (M), (Shedlock, Inflation: What the heck is it?, 2006). That means, that the term inflation can be defined differently as the ‘net increase in money supply plus the increase in loans’ (Shedlock, Inflation: What the heck is it?, 2006).

However, the question is, if the central bank money and the opportunity for banks to generate credit from it will actually develop demand in the real economy, in terms of investments or purchases of goods or services. According

6. From an accounting perspective handing out a credit means that the lender (bank) will show the amount of the loan on its balance sheet as an asset and in the current account of the borrower (client) as a liability. Thus, credit generation translates into an expansion of the bank's balance sheet, exclusively based on book money.

to Bill Gross, co-founder of PIMCO, currently "it is not easy for a lender to lend money to an obese and over-indebted borrower, which is rather obvious, but neither he issues credit when the performance and return on the investment is so low that it cannot compensate for the overhead costs of his business model" (eIEconomista.es, 2012). At present the problem for companies of the real economy often is, if they receive new loans and thus leverage their business, it is simply not profitable in the actual economic situation. Moreover, many governments, companies and

individuals are over-indebted (Ardila, Lochmüller, Marquez, & Peña, 2012) and started to deleverage, which means that they reduce their loans and demand for money, some of them forced through bankruptcy or insolvency. In an extreme form these deleveraging processes can be observed in countries like Greece, where the so-called troika⁷ ordered the implementation of a policy of austerity. However, it is not only that countries like Greece are affected, because it is a more global phenomenon like can be seen in the following chart which presents the demand for credit developed by the business sector.



Exhibit 6. Demand for credit (per loan officer survey), 1991-2012.

Source: Morgan Stanley, taken from (Zeroledge, 2012).

7. The troika consists of the International Monetary Fund, the European Commission and the European Central Bank.

For the U.S. economy, where consumption contributes about 70% to GDP, the New York Federal Reserve Bank notes in its November 2012 report on the evolution of household credit something similar and stated a reduction with respect to the demand for credit (Federal Reserve Bank of New York, Research and Statistics Group - Microeconomic Studies, 2012).

Due to the lack of demand for loans, many economies are stagnant or GDP ($P \times Y$) currently is decreasing. Based on the phenomenon of indebtedness and credit, (Duncan, 2012) proposed a change concerning the (M) in the expression $M \times V = P \times Y$ and to replace (M) through (C) in order to emphasize the role of credit, because he argues that

1. In an economy where the currency is not backed by a physical asset like gold and where the acceptance of a currency is primarily based on trust, (M) basically is composed of credit. If the system reaches a point where people and companies lose the confidence in the currency and consequently will not go into more debt and furthermore withdraw their money from their bank accounts (as happened for example in Spain and Greece during 2012), then the money system has come to a certain end, as money (credit) which should serve as a lubricant for the system turned into a hiccup;

2. In our globalized world credit now meets the criteria which are normally required for any currency: a) it must be a medium of exchange, b) it must be able to store the value c) it must serve as a calculation unit. Today there are liquid markets for credit, for example the repo markets or other markets that were created through the securitization of credit.

3.3. Trends with respect to (M) and inflation

When extending the traditional definition of (M) and credit is included, the picture changes and the interpretation with respect to inflation is different, in the actual context of high levels of debt. If borrowers currently, despite an expansionary monetary policy, demand less credit and lenders provide less credit then companies and people invest and spend less. Thus, (M) in its broader definition (including credit), should be seen in a more differentiated way. On the one hand central banks run an expansionary monetary policy, but on the other hand and under current economic and political conditions, banks in general reduce their leverage, as well as companies and individuals. That is, we are in a phase of deleveraging where the volume of credits is reduced⁸. This means that (M) is not expanding in

8. That means, that you can lead a horse to the water, but you can't make it drink. That is why the mechanism of transforming monetary expansion in additional demand and GDP growth currently is not working adequately.

terms of the real economy and therefore the expression $M \times V = P \times Y$ is not that unbalanced as mentioned before in this article and consequently we do not observe higher levels of inflation.

If the expansionary monetary policy will continue, despite the fact that there is a decline in demand for credit and despite the fact that expectations are that GDP in many economies will not grow or will only grow at very moderate rates, perhaps around 1% per year, then inflation ultimately has to be a political phenomenon. That means, that it is a political decision to keep on injecting more money into the economy, although there are diminishing marginal returns in doing so, just as the political theory of inflation predicts it. Thus, the question is what are the main reasons to continue with this policy of monetary expansion?

- Given the prevailing high levels of debt, one reason is that interest rates have to stay low. An increase in interest rates would lead to insolvency for many borrowers with severe effects on the economy. However, another impact is that low interest rates actually make savings unattractive compared to investments in stocks, as dividend yields are relatively more attractive.
- Additionally, the actual composition of savings in different developed countries has to be taken into account. For example for the U.S. the last

measurement (as of September, 30th of 2012) of the Federal Reserve Bank (FED) showed that U.S. households owned in total 78.2 trillion dollars of assets. This amount is divided into \$ 24.6 trillion of tangible assets and 53.6 trillion dollars of financial assets (Board of Governors of the Federal Reserve System, 2012), (ZeroHedge, 2012). This means, that more than two thirds of the assets of all U.S. households are financial assets, and their value in turn depends on the prices that are negotiated on the stock markets. If stock indices decrease or if they increase less than inflation, then this affects negatively and directly U.S household wealth. Consequently, both, politicians and central banks have an interest in providing "sufficient fuel", via an expansionary monetary policy, to keep stock markets stable or even going up.

- Another reason for an expansionary monetary policy is that this policy allows to monetize fiscal debts and deficits, because central banks are buying bonds emitted by the government and the government in turn will be paid with new money which will be deposited in its bank account, that allows financing current expenses.

4. Conclusions

It can be concluded that currently there are some shortcomings in the measurement of inflation, as inflation primarily is measured in terms of an

increase in the price level of CPI and PPI, which do not capture sufficiently the increase in prices of financial assets.

Furthermore, prices in general tend to fall, due to the observable technological progress, which usually increases productivity as well.

That is why we should start to rethink the definition of inflation that currently is focused on price levels, and define it as 'a net increase in money supply plus the increase in loans (credit)'.

It can be concluded that a monetary system where the currency is not backed by gold (or another tangible assets) and where the prevailing system of "fractional reserve lending" makes, that the (M) of the expression $M \times V = P \times Y$ in reality should be a (C), as credit. This means, that the whole systems is based on confidence (this is in essence the meaning of the word credit).

After the crisis of 2007/2008 a deleveraging process has started and a reduced loan demand can be observed in different countries, and as additionally inflation actually is measured in terms of prices, the official inflation rates are still moderate.

However, if all the liquidity that has been and will be injected into the system, leads to a lack of confidence or if the injected liquidity finally will lead to an increase in demand or costs, then it is more than likely that inflation rates will go up significantly in the future,

assuming that the liquidity overhang will not be removed from the markets by central banks through a restrictive monetary policy.

When inflation is gaining strength, then Colombia should be prepared and should have thought carefully about its consequences, as it is likely that Colombia will import inflation that might be generated elsewhere. More research is needed to create new and more knowledge about the timing and consequences of measures that can be taken in order to mitigate the threat of an inflation problem.

References

- Ardila, H., Lochmüller, C., Marquez, J. I., & Peña, A. (2012). El Riesgo del Endeudamiento: La Crisis de la Deuda Soberana y posibles Implicaciones. *Revista Soluciones de Postgrado EIA*, Número 8, 129-147.
- Banco de la República de Colombia. (November, 30th of 2011). Balance Noviembre 2011. Accessed on February, 3rd of 2012, at <http://www.banrep.gov.co>: http://www.banrep.gov.co/documentos/el-banco/estados-financieros/balance/2011/BG_nov.pdf
- Banco de la República de Colombia. (January 2012). Informe sobre inflación - Diciembre de 2011. Accessed on

- March, 11th of 2012, at <http://www.banrep.gov.co>: <http://www.banrep.gov.co/documentos/publicaciones/inflacion/2011/diciembre.pdf>
- Banco de la República de Colombia. (January of 2012). Resumen inflación diciembre 2011. Evolución de la situación inflacionaria y decisiones de política monetaria. Accessed on March, 11th of 2012, at <http://www.banrep.gov.co>: http://www.banrep.gov.co/documentos/publicaciones/inflacion/2011/diciembre_resumen.pdf
- Banco de la República de Colombia. (n.d.). Manual Sectorización Monetaria y Económica. Accessed on November, 23rd of 2012, at <http://www.banrep.gov.co>: <http://www.banrep.gov.co/sectormon/archivos/sectormon.pdf>
- Bank of International Settlements. (December 2012). Amounts outstanding of over-the-counter (OTC) derivatives. Accessed on December, 6th of 2012, at <http://www.bis.org>: <http://www.bis.org/statistics/otcder/dt1920a.pdf>
- Bank of International Settlements. (December 2012). BIS Quarterly Review December 2012. Accessed on December, 14th of 2012, at <http://www.bis.org>: http://www.bis.org/publ/qtrpdf/r_qt1212a.pdf
- Bernanke, B. S. (October, 18th of 2011). The Effects of the Great Recession on Central Bank Doctrine and Practice, At the Federal Reserve Bank of Boston 56th Economic Conference, Boston, Massachusetts. Accessed on February, 3rd of 2012, at <http://www.ritholtz.com>: <http://www.ritholtz.com/blog/2011/10/the-effects-of-the-great-recession-on-central-bank-doctrine-and-practice/>
- Board of Governors of the Federal Reserve System. (December, 6th of 2012). Flow of Funds Accounts of the United States, statistical release Z.1. Accessed on December, 10th of 2012, at <http://www.federalreserve.gov>: <http://www.federalreserve.gov/releases/z1/Current/z1.pdf>
- Bogs, S. (January, 23rd of 2012). Einlagefazilität wieder bei 491,780 Mrd. Euro. Accessed on February, 3rd of 2012, at <http://www.verschuer.de>: <http://www.verschuer.de/einlagefazilitat-wieder-bei-491780-mrd-euro/>
- Bryan, M. F. (October, 15th of 1997). Federal Reserve Bank of Cleveland. Economic Commentary: On the Origin and Evolution of the Word Inflation. Accessed on November, 23rd of 2012, at <http://www.clevelandfed.org>: <http://www.clevelandfed.org/Research/commentary/1997/1015.pdf>
- DANE. (2009). Metodología índice de precios al consumidor (IPC) núm 62. Accessed on March, 11th of 2012, at <http://www.dane.gov.co>: <http://www.dane.gov.co/files/investigaciones/fichas/IPC.pdf>

- DANE. (2009). Metodología Índice de Precios del Productor IPP. R Accessed on March, 11th of 2012, at <http://www.dane.gov.co/files/investigaciones/fichas/IPP.pdf>
- DANE. (March, 5th of 2012). IPC Febrero 2012. Accessed on March, 11th of 2012, at http://www.dane.gov.co/files/investigaciones/boletines/ipc/ipc_prese_feb12.pdf
- DANE. (March 2012). Número índices y ponderaciones para grupos de gastos. Total ingresos 2009-2012 (Febrero). Accessed on March, 11th of 2012, at http://www.dane.gov.co/files/investigaciones/ipc/feb12/grupos_gastos_total_ingreso.XLS
- Die Welt. September, 20th of 2012). Pimco-Chef warnt vor gigantischer Geldschwemme. Accessed on November, 23rd of 2012, at <http://www.welt.de/article109347721/Pimco-Chef-warnt-vor-gigantischer-Geldschwemme.html>
- Duncan, R. (2012). The New Depression. The Breakdown of the paper money economy. Singapore: John Wiley & Sons.
- El Colombiano. (February, 25th of 2012). Emisor no se desvía de la meta de inflación: subió tasas al 5,25%. Accessed on March, 11th of 2012, at http://www.elcolombiano.com/BancoConocimiento/E/el_emisor_no_se_desvia_de_la_meta_de_inflacion_subio_tasas_al_525/
- elEconomista.es. (September, 5th of 2012). Bill Gross, de Pimco: "La Fed y los bancos centrales son responsables del naufragio económico". Accessed on November, 23rd of 2012, at <http://www.eleconomista.es/mercados-cotizaciones/noticias/4228047/09/12/Bill-Gross-de-Pimco-La-Fed-esta-equivocada-y-danando-a-la-economia-de-EEUU.html>
- Federal Reserve Bank of New York, Research and Statistics Group - Microeconomic Studies. (December 2012). Quarterly Report on Household Debt and Credit, November 2012. Accessed on December, 10th of 2012, at http://www.newyorkfed.org/research/national_economy/householdcredit/DistrictReport_Q32012.pdf
- Hilsenrath, J.; Blackstone, B. (January, 27th of 2012). Central Banks Diversify Their Arsenals. Deploying Unconventional Balance-Sheet Techniques From Bank Loans to Securities Purchases. Accessed on February, 3rd of 2012, at <http://online.wsj.com/article/SB10001424052970203363504577185151569908014.html>

- Holland, T. (September, 17th of 2012). Bernanke may have hidden agenda in printing money. Accessed on November, 7th of 2012, at <http://www.scmp.com>: <http://www.scmp.com/business/article/1038532/bernanke-may-have-hidden-agenda-printing-money>
- Hüfner, M. W. (February, 12th of 2012). Wir messen die Inflation falsch. Accessed on November, 23rd of 2012, at <http://www.risknet.de>: <http://www.risknet.de/risknews/wir-messen-die-inflation-falsch/5ac11d6fa7d8c9a97d3e00a1bc b909f0/>
- Indexmundi. (2011). Colombia Inflation rate (consumer prices). Accessed on March, 11th of 2012, at <http://www.indexmundi.com>: [http://www.indexmundi.com/colombia/inflation_rate_\(consumer_prices\).html](http://www.indexmundi.com/colombia/inflation_rate_(consumer_prices).html)
- indexmundi. (July, 26th of 2012). GDP (official exchange rate): GWP (gross world product). Accessed on November, 23rd of 2012, at <http://www.indexmundi.com>: http://www.indexmundi.com/world/gdp_%28official_exchange_rate%29.html
- Inman, P. (September, 6th of 2012). QE experiment has backfired, consultancy says. Accessed on November, 23rd of 2012, at <http://www.guardian.co.uk>: <http://www.guardian.co.uk/business/2012/sep/06/qe-experiment-failure>
- Ludwig von Mises Institute. (2012). The quotable Mises - Inflation. Accessed on November, 23rd of 2012, at <http://mises.org>: <http://mises.org/quotes.aspx?action=subject&subject=Inflation>
- Moheban, R. (November, 27th of 2011). Hyperinflation USA? Accessed on November, 23rd of 2012, at <http://www.hyperinflation-us.com/>: <http://www.hyperinflation-us.com/>
- Okanecapital. (August, 9th of 2012). Five Year Total Return Performance of Major Global Financial Assets. Accessed on November, 23rd of 2012, at <http://www.okanecapital.com>: <http://www.okanecapital.com/index.cfm/2012/8/9/Chart-Five-Year-Total-Return-Performance-of-Major-Global-Financial-Assets>
- Real Academia Española. (March 2012). Entrada al diccionario palabra Inflación. Accessed on March, 11th of 2012, at <http://buscon.rae.es>: http://buscon.rae.es/draeI/SrvItConsulta?TIPO_BUS=3&LEMA=inflación
- Rombiola, N. (November, 3rd of 2012). IPC Octubre 2012. Accessed on November, 23rd of 2012, at <http://inflacion.com.co>: <http://inflacion.com.co/ipc-octubre-2012.html#more-2244>
- Scherf, H. (1986). Enttäuschte Hoffnungen - vergebene Chancen: Die Wirtschaftspolitik der Sozial-Liberalen Koalition 1969-1982. Göttingen: Vandenhoeck & Ruprecht.

- Shedlock, M. (February, 2nd of 2006). Inflation: What the heck is it? Accessed on November, 23rd of 2012, at <http://globaleconomicanalysis.blogspot.com>: <http://globaleconomicanalysis.blogspot.com/2006/02/inflation-what-heck-is-it.html>
- Shedlock, M. (August, 14th of 2009). Misguided Worries About Inflation. Accessed on November, 23rd of 2012, at <http://globaleconomicanalysis.blogspot.com>: <http://globaleconomicanalysis.blogspot.com/2009/08/misguided-worries-about-inflation.html>
- Short, D. (November, 15th of 2012). A Long-Term Look at Inflation. Accessed on November, 23rd of 2012, at <http://www.advisorperspectives.com>: <http://www.advisorperspectives.com/dshort/updates/Inflation-Since-1872.php>
- The Economist. (June, 30th of 2012). Keeping it real. The side-effects of low interest rates. Accessed on November, 23rd of 2012, at <http://www.economist.com>: <http://www.economist.com/node/21557758>
- Totonchi, J. (2011). Macroeconomic Theories of Inflation. International Conference on Economics and Finance Research (págs. 459-462). Singapore: IACSIT Press.
- wirtschaftslexikon24. (n.d.) Inflationstheorie. Accessed on November, 23rd of 2012, at <http://www.wirtschaftslexikon24.com>: <http://www.wirtschaftslexikon24.com/d/inflationstheorie/inflationstheorie.htm>
- Zerohedge. (December, 6th of 2012). On The Demise Of Animal Spirits. Accessed on December, 7th of 2012, at <http://www.zerohedge.com>: <http://www.zerohedge.com/news/2012-12-06/demise-animal-spirits>
- Zerohedge. (December, 6th of 2012). US Household Assets: \$78.2 Trillion, Liabilities: \$13.5 Trillion; Net Worth: \$64.8 Trillion. Accessed on December, 10th of 2012, at <http://www.zerohedge.com>: <http://www.zerohedge.com/news/2012-12-06/us-household-assets-782-trillion-liabilities-135-trillion-net-worth-648-trillion>