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Monetary Dividend

A new tool of monetary policy to handle tech deflation

By François-Xavier Oliveau

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About the Author

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A business leader and writer, François-Xavier Oliveau was a consultant at the Boston Consulting Group before holding P&L responsibilities in companies ranging from start-ups to large corporations. Within a French leading investment firm, he also supported the development of businesses, including their digital transformation and the implementation of artificial intelligence tools.

For twenty years, he has been contributing to research on technology and its economic and social impacts building on his operational experience. He notably worked with Andrew McAfee in 2001 on the limits of networks (Confronting the limits of networks, MIT Management Review, 2002) and contributed to MP Christian Blanc's report on clusters (Pour un écosystème de la croissance, 2005).

In his first essay Microcapitalisme (PUF, Generation Libre collection, 2017), he analyzes the impacts of the technological revolution on society and the economy. He proposes and details a complete overhaul of the French social model. The book received the Jury Prize of the Turgot Committee in 2018, a group of French leading economists.

Since 2016, he has been studying the interactions between technology, price and money, drawing on the work of technology thinkers (Schumpeter, Fourastié, Henderson, Rifkin, Kurzweil, Rifkin, Brynjolfsson, McAfee) and economists (Bodin, Cantillon, Smith, Fisher, Keynes, Friedman, Hayek, von Mises, Bernanke). This note summarizes his conclusions.

He is vice-president AIRE, a French think tank promoting and modelling basic income schemes. He regularly produces content for two other think tanks, Institut Sapiens and Generation Libre.

He graduated from Centrale Paris, Sciences Po Paris and holds an MBA from Harvard Business School.

This paper only involves his personal views, and not in any case that of his current or past employers.

Key impacts in a few words

This memo describes a new monetary policy tool aimed at enabling the ECB to meet its objective of stabilizing the price level in a context where technology is driving them down continuously. Here are the impacts, in a few words and for various stakeholders.

For all: a regular monthly payment

The Monetary Dividend will result in a sum of money provided every month without compensation to the residents of the euro area, including children. This amount will vary from country to country. It could be expected to be on average between 50 and 100 € per month and per person, children included. It will tend to increase when the economic situation deteriorates, and to fall in case of overheating of the economy.

This dividend materializes a gain of purchasing power obtained by the fall in prices linked to technological progress. The creation of money captures this gain in purchasing power, which is then logically redistributed to households under the form of the dividend.

This distribution is expected to represent between 200 and 400 billion euros in the euro area, replacing an equivalent amount issued today in the form of debt. Interest rates will rise to a moderate level,

slightly above inflation. The pace of rise in real estate prices is likely to slow down.

For bankers: interest rates back to normal, more stability, better ratios

The Monetary Dividend will release the debt from its unnatural role of stabilizing the price level. The debt can then be focused on its only legitimate objective, ie. financing projects and investments. Interest rates can be increased to a chosen level, positive in real terms. The downward pressure on prices will be offset monthly by the issue of a dividend to euro area residents, distributed without counterpart. Its amount will depend on each country and will be adjusted to stabilize inflation at the same target level throughout the euro area.
The tool will complement the current ECB toolbox, which lacks an effective means to fight deflation. Those implemented over the past ten years have shown limited effectiveness and produced considerable adverse collateral effects. These disappointing results are largely related to the deflationary effect of technology on costs and its transmission into prices via competition. This permanent deflation must be neutralized by a permanent issue of money, and not by a debt which is by definition temporary.

For economic and political leaders: more stable market conditions

The Monetary Dividend will provide a more stable macroeconomic environment with predictable interest rates and inflation. It will reduce the likelihood and magnitude of financial bubbles. It will strengthen the soundness of the banking system by improving capital ratios. It will contribute to the reduction of inequalities and will support the purchasing power of the most modest ones. It will incite governments to fiscal restraint, as any policy based on the fiscal deficit will naturally lead to a decline in the Monetary Dividend. It will strengthen the euro area.

Synthesis

The Euro area banking system produces every year 500 billion euros of money in the form of debt. This high production is geared at stabilizing the level of prices, using debt as a tool to control inflation. However, it fails to reach the targeted inflation level and yields significant unwanted collateral effects. Rather than producing money under the form of debt, it would be more effective to create it as central bank currency and distribute it to European residents. This form of money creation, which the ECB has already declared as part of its tools, would enable the central bank to fulfill its inflation-stabilization task much better. It would make the economic system more robust and the banks more resilient to crises. It would encourage governments to balance their budgets. European citizens would receive on average variable monthly amount, currently estimated between 40 and 120 € per person, including children. This amount would vary from one country to another, depending on local economic conditions.

Progress is driving down prices. It is obvious for tech products, but this has been happening for almost all goods and services for several centuries. Jean Fourastié has shown that the price of wheat has been divided by 400 since the early 18th century. Back then, it was necessary to work more than

6 hours to buy a kilogram of wheat; today it takes less than a minute. If we travelled back in time to 1910 and paid with our current euros, a piece of bread of 250 grams would cost us € 4, a kilogram of beef € 92 and a bicycle more than € 5,000. Only a man's haircut, at 13 €, would still seem cheap: its technology is the same than 100 years ago, so its price has not changed.

However, daily observation of prices show that they go up. This phenomenon, inflation, did not always exist. Thomas Piketty calls it "*an invention of the twentieth century*". Inflation is driven by the fact that we create massive amounts of money each year. This pushes prices up, especially those of assets and real estate. The more money, the higher the price.

This money is created by the banking system, in the form of loans. In the euro area, 500 billion euros are created each year. This is a considerable amount, far greater than the wealth created by growth, 200 billion euros in 2018. Our economy creates more debt than what we need and does so by cutting the price of money: interest rates are kept at an artificially low level to encourage borrowing. These low rates make the economic system more unstable. They weaken the banking system. They create assets bubbles. And the debt increases to infinity.

This extra money is issued to stabilize the price level. It therefore captures the purchasing power created by lower prices and transfers it into debt. It is a profoundly inegalitarian mechanism that deprives the citizens of the euro area of 300 billion a year. It fuels the crisis of the purchasing power of the middle classes. History will more than likely consider the last ten years of massive money creation as one of the main root causes of political turmoil in Europe, including Brexit, Italian elections and French "yellow vests movement".

The solution exists. It was first formalized by Milton Friedman, winner of the Nobel Prize in Economics in 1976. It consists in creating money and distributing it directly to the citizens, without any compensation. This creation of money allows to stabilize the price level in the long term. It gives back consumers the purchasing power taken away from them by creating money.

Specifically, each European citizen would receive a monthly variable amount typically between € 40 and € 120. Underage children would receive the same amount, distributed to their parents.

Although this scheme seems surprising, it is well known by the ECB. Peter Praet, one of its leaders, said in March 2016 that it was part of the Bank's

toolbox. It would make it much easier for the ECB to fulfill its mission of stabilizing inflation. The banking system would be greatly strengthened by avoiding artificially low rates. The economy would be more resilient to crises. Real estate prices would increase more moderately. And the inequalities would be reduced.

The ECB must now seriously consider this scheme and implement it before 2021. This is the only solution to avoid a very serious economic and social crisis.

Introduction

Who gets it? Who really gets it?

Never before has the world of banking and finance seemed so lost. The global leaders driving monetary policies candidly admit they do not understand the current situation of low inflation. Larry Summers, Bill Clinton's former Secretary of Treasury has been talking since 2013 about "secular stagnation," a period of limited growth, no inflation. Christine Lagarde, Managing Director of the IMF, speaks of "new mediocrity."

Since 2010 and the end of the crisis, growth is expected to start again strongly, as it did after previous crises. During the recovery, companies usually hire, unemployment drops, wages rise, inflation picks up, the economic machine is running at full speed.

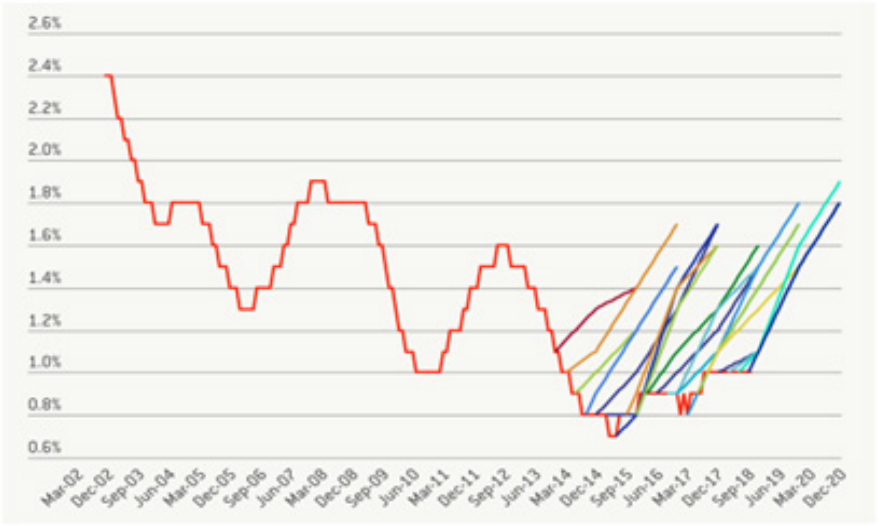
But the recovery was slow. A series of unprecedented measures have been deployed to trigger it. Money was injected at high doses into the system. Free money, at zero interest rate and sometimes negative: we paid states to borrow, and banks now have to pay for holding cash. New monetary tools have been invented and deployed with unprecedented scale. At the peak of quantitative easing, the monetary creation of the European Central Bank was € 960 billion a year, roughly Spain's GDP. An unprecedented injection. With such a regime, all economists were convinced that the machine would start again soon.

It didn't. The slightly cruel graph below (Fig.1) shows the inflation forecasts of the following year by the ECB since 2013, and the reality (red curve). Reality is systematically lower than the forecasts. The machine, which is expected to be overheating, is cold as ice.

Inflation starting next year: five years of dilusion

Fig. 1 - Inflation forecasts from the ECB since 2013

Source : Zslot Darvas, Bruegel Institute, dec. 2018



The ECB is not the only central bank to be puzzled. For the ninth consecutive year, the Fed[1] failed to meet its inflation target. Janet Yellen, its former president, declared in September 2017: "*This year, the shortfall of inflation from 2 percent, when none of those factors is operative, is more of a mystery, and I will not say that the Committee clearly understands what the causes are.*" [2]

Massive cash injections by central banks have not given place to the expected results. Moreover, they are widely criticized for their destabilizing impacts on the markets. Patrick Artus, Chief Economist of Natixis, has unequivocal words: "*The madness of central bankers are putting the global economy on fire.*" He added: " *Both Janet Yellen, head of the Fed, Mario Draghi for the ECB, Mark Carney at the Bank of England, or the governor of the Bank of Japan, Haruhiko Kuroda... all have left the floodgates of liquidity wide open, always disappointed not to drive credit and growth up again. But the supposed magic potion does not work. "*[3]

"*We have had the biggest monetary stimulus that the world must have ever seen*" says Mervyn King, the former governor of the Bank of England, "*and*

1 Federal Reserve System, the central bank of the United States
2 Presse conference, September 20th, 2017
3 "Patrick Artus, « Tous les marchés sont gavés de liquidités », Libération, 11 février 2015

we still have not solved the problem of weak demand."[4]

Jacques de Larosière, former governor of the French central bank, clearly speaks of "*dysfunction of the international monetary system*". He adds : "*central banks seem to have lost their power to influence inflation. But, despite this - or because of this - they persist in massively creating money: this is certainly the best way to undermine the stability of the financial system and therefore to jeopardize future growth.* "[5]

Daniel Tarullo, a former member of the Board of Governors of the Fed, admits: "*We do not, at present, have a theory of inflation dynamics that works sufficiently well to be of use for the business of real-time monetary policymaking.*" [6] No theory of inflation dynamics for an organization whose primary job is to manage inflation? This is rather unsettling. There is a pilot in the plane, but he admits he doesn't understand flight mechanics.

Financial elites are unable to give a credible explanation of the world. Fought throughout the 90s, inflation has disappeared, and no one knows where. We have been looking forward to its return, as a sign that the world is finally working again. But inflation is like Godot in Beckett's play, like the Tartars in Buzzati's novel: we expect it, but it does not come back. Ever.

And here we are now at the end of a ten-year growth phase without inflation. But the horizon gets cloudy. Growth is weaker than expected in the euro area, as it is everywhere in the world. The ECB, which planned to raise rates in 2019, has already dropped the idea and is likely to take strong measures in the fall of 2019. But flexibility on rates is now very low, as long-term interest rates are now negative in most European countries. In the US, the Federal Reserve is likely to decrease interest rates quite significantly in the coming months.

The issue is twofold: the remedy has accentuated the imbalances, and therefore the risk of crisis has greatly increased; and we now run out of drugs to treat it. As Larosière recalls, "*it is to be feared that when the next crisis occurs, the central banks will no longer have margins to lower rates and will face a recession they can no longer overcome with monetary heterodoxy, given the difficulty of lowering rates below zero.* "[7] The next crisis is likely to be violent, and we have not secured a solution.

4 "More QE won't help world economy, says ex-BoE governor King", Reuters, 20 Janvier 2015
5 Conference at Institut de France, November 20th, 2017
6 Monetary policy without a working theory of inflation, Brookings, October 4th 2017
7 Conference at Institut de France, November 20th, 2017

The gray suits of New York, Frankfurt and London clearly state their utter lack of understanding facing a depressing environment. To cheer ourselves up, we have to fly. To San Francisco.

Because the mood is quite different among the startuppers in jeans and shorts. In the Silicon Valley, the fourth industrial revolution is happening daily. Artificial intelligence will change the world. Robots will free us from work. Cars will drive alone. Disruption is everywhere. We are entering a new era of prosperity, where nothing will be impossible.

The contrast is striking. On the one hand, a world of finance distraught by an obscure economic situation, briefly summarized by Larry Summers: "we are in a secular stagnation". On the other hand, a permanent dynamic of wealth creation and unprecedented perspectives of new products and services, evoked by the futurologist Vernor Vinge with emphasis: " *We are on the edge of change comparable to the rise of human life on Earth.*" And here we are in between, poor citizens of the world, trying to understand how seemingly sensible people may disagree to such an extent, seeing inequalities widening, fearing our children may have a worse life than ours.

These two worlds would benefit in talking to each other. Because the answer to the questions asked by the gray suits are found in a simple observation, very mundane for startuppers: technology drives prices down.

This phenomenon that every high-tech product buyer intuitively understands has been core to economic development since the beginning of the industrial revolution. It has driven a historically unprecedented enrichment of people over the past two centuries. It allows us to have access to more and more goods, working much less than our ancestors.

Prices are decreasing even quicker with the technological revolution. It is the reason for the lack of inflation, despite the monetary injection. Because prices are the combination of two processes: first a microeconomic process of innovation and balance between supply and demand; second a macroeconomic process of monetary creation.

As prices are falling, why on earth are we waiting for inflation to return? It has no reason to come back. As Friedman said, it is only a monetary phenomenon. We must now learn to handle deflation and stop relying on an unrealistic return of inflation. Monetary policy needs to take into account how technology works and adapt to it.

This note will connect technology and currency as two complementary pieces of the same puzzle. We will connect two distinct schools of thought. On the one hand, technology thinkers: Schumpeter, Fourastié, Henderson, Kurzweil, Rifkin, Brynjolfsson, McAfee; on the other hand, monetary policy economists: Bodin, Smith, Fisher, Keynes, Friedman, Hayek, von Mises, Bernanke.

From this will emerge new approaches and new economic tools, radically different. We will proceed in four stages.

The first part will help us understand why inflation is not coming back. It does not exist, at least not in times of peace and technological progress. A well-functioning market economy is constantly inventing ways to produce more and cheaper. Real prices, i.e. measured in working time, are therefore constantly falling. This creates purchasing power for households, but is paradoxically difficult to manage, as it can also lead to lower wages.

To compensate for this deflation, we issue money - we will see how in the second part. This essential sovereign function has been delegated to commercial banks, which produce money through debt. We are therefore offsetting a permanent and irreversible phenomenon (technological deflation) by creating a temporary money to be repaid (debt). Treating a permanent phenomenon with a temporary solution is a nonsense. It creates economic imbalances, generates bubbles, weakens the banking system and the economy. Moreover, it widens inequalities and results in a loss of purchasing power for the middle classes.

The only reasonable solution is to issue money and distribute it directly to households. We will study this somewhat surprising option in the third part. We will verify its robust theoretical foundations, note its very positive impacts on economic agents, and deal with objections that are sometimes opposed to it.

The fourth part will be devoted to a practical implementation scheme in the euro area: what amount, how often, how it will be distributed. We will look at how to set it and ramp it up.

We will conclude with the major positive political impacts that the Monetary Dividend can bring. By enabling citizens to reap the benefits of the market economy and free competition, the Monetary Dividend can reconcile citizens with the European institutions.

I - Tech deflation

Tech has been driving down prices for more than two centuries

Inflation did not exist for most part of human history. In the Middle Ages, prices varied widely from year to year depending on the harvests. But up and down fluctuations compensated overall, and long-term prices remained very stable.

The first period of significant inflation took place in Europe between 1520 and 1640, and Jean Bodin identified its cause in 1568: "*The abundance of gold and silver made all things ten times more expensive than they were a hundred years ago*." The conquistadors brought a large quantity of gold and silver from the Americas. The quantity of money therefore increased while goods remained in limited quantity: the law of supply and demand automatically led to an increase in prices in proportion to the quantity of money available. This is the first concrete example of what will later be called the quantitative theory of money.

Apart from the effect of the quantity of money, prices were generally stable until the beginning of the industrial revolution. A radically new phenomenon then appeared. It was the Scottish philosopher David Hume who first observed it in 1752: "*Provided the money increase not in the nation, everything must become much cheaper in times of industry and refinement, than in rude, uncultivated ages.*"[8]

8 Political Discourses, 1752

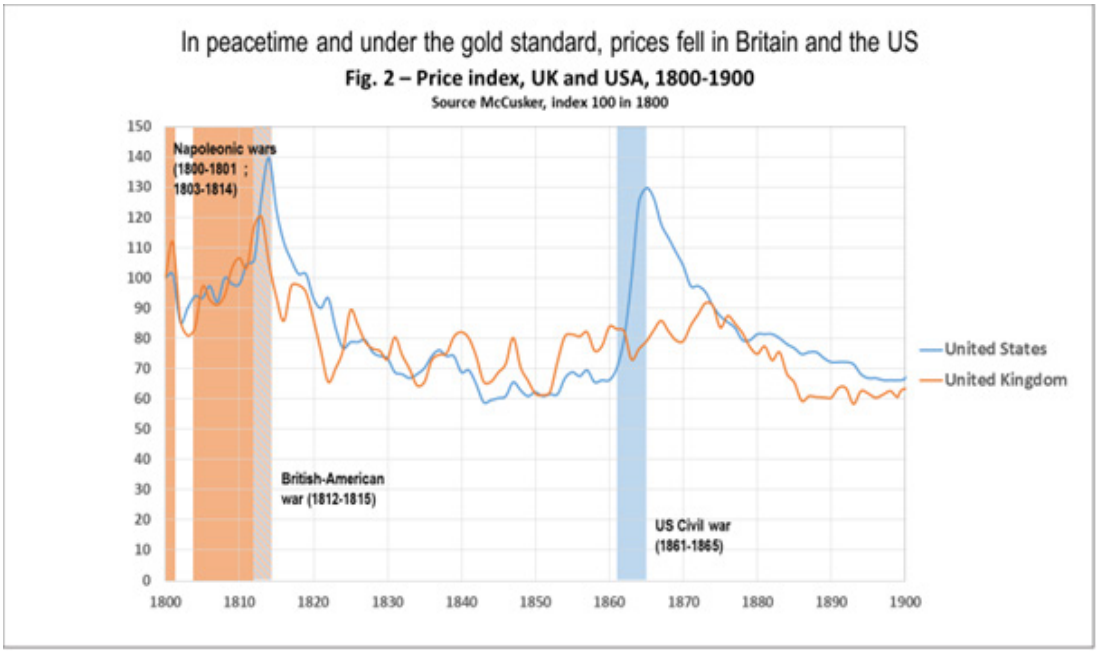
Hume's observation is very simple: technology makes goods cheaper. Thanks to machines, goods can be produced in larger quantities and at a lower cost. Prices naturally decrease, provided of course that the quantity of money doesn't increase. Hume thus implicitly confirms Jean Bodin's observation on the inflationary impact of money creation.

In a visionary statement, Hume brilliantly summarizes the two factors impacting prices: technological progress, which reduces them; monetary creation, which increases them. He is the first to highlight the fundamental link between technology, price and money.

The next two centuries confirm his intuition. The study of prices throughout the 19th century clearly shows the decline in prices in peacetime. On the contrary, in times of war, the destruction of both goods, means of production and supply chains tends to push prices up.

Prices in Britain were high throughout the Napoleonic wars, only going down during the 17 months of the Amiens peace, the mere truce in fifteen years between France and England. From 1815 onwards, prices began to fall steadily. They fell by a third in the twenty years following the end of the Napoleonic wars, then by a quarter during Queen Victoria's long reign.

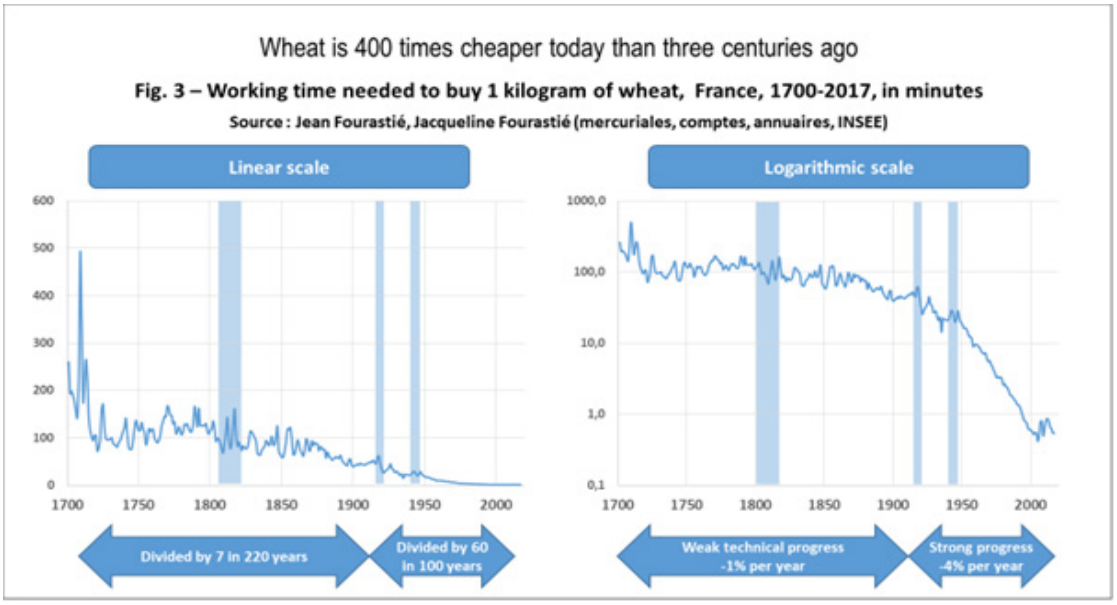
The United States were also affected by trade disruptions related to the Napoleonic wars and the continental blockade. Prices rose sharply during the war with England between 1812 and 1815. They then fell massively, and were halved in 35 years, rose slightly during the gold rush before doubling again during the Civil War, and finally were halved again during the last 35 years of the century.



The reading of prices in the 19th century was facilitated by monetary stability and the use of the gold standard. But most of the major countries dropped the gold standard from 1914 onwards, increasing devaluations and eventually producing large quantities of currency. How can we compare prices over long periods of time?

Adam Smith offers a simple answer in Wealth of Nations, explaining: "*The value of any commodity [...] is equal to the quantity of labour which it enables him to purchase or command. Labour, therefore, is the real measure of the exchangeable value of all commodities. The real price of everything, what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it.*"[9] The universal measure of prices is the unit of work: how long do I need to work in 1800, 1900 or 2000 to buy, say, a 500-gram loaf of bread? Jean Fourastié, a French economist, used this measure to compare the prices of goods and services at different times. He has built up a database of several thousand products, and he largely confirms David Hume's intuition: progress massively drives down prices.

The price of wheat, for example, has been divided by 400 in three centuries. In the early 18th century, it took, depending on the year, between three and eight hours of work to buy a kilogram of wheat. Today, it takes less than a minute. The two diagrams below (Fig. 3) show the same figures with two different scales. The linear scale on the left illustrates the magnitude of the decline. The logarithmic scale, on the right, allows a more detailed analysis of the rate of decline. It was moderate, about 1% per year, until the First World War. It then accelerates to 4% per year, thanks to the arrival of machines, first the tractor, then the combine harvester.



9 Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, 1776, chapter V. He adds "Labour, therefore, it appears evidently, is the only universal, as well as the only accurate, measure of value, or the only standard by which we can compare the values of different commodities at all times, and at all places".

Fourastié demonstrates the decrease in prices on a very wide range of products. It is far from homogeneous: manufactured products prices fall on average more than agricultural products prices, which themselves fall more than service prices. In other words, technology content drives quicker and stronger price decrease.

Figure 4 describes the decline in prices of consumer goods between 1910 and 2010 in France. The price of a tennis ball has been divided by 52 in a century. Mechanical products such as rail travel or bicycles by a factor of 12 or 15. Agricultural products (bread, steak, whiting) by a factor of 5 to 8. Services decreased less, and the price of haircuts is almost unchanged: now as before, it still takes a pair of scissors and a rough half hour from one person to make a man's haircut.

1910 – 2010 : one century of ordinary price drops

Fig. 4 – Price of various products in minutes of minimum wage, 1910, 1960, 2010

Source : Jean & Jacqueline Fourastié

Products or services	1910	1960	2010	Divided by	Annual change	1910 prices, in current €
Tennis ball	218	102	4	52	- 3,9%	52 €
Cheese (camembert, one piece)	164	38	7	23	- 3,1%	39 €
Bike	22 727	4 826	1 396	16	- 2,8%	5 370 €
Train, 100 km (3° puis 2° classe)	900	204	78	12	-2,4%	213 €
Fish (whiting, 1 kg)	327	53	41	8	- 2,0%	77 €
Coal (50 kg)	469	191	70	7	- 1,9%	111 €
Water (Paris, 1 m3)	73	28	8	9	- 2,2%	17 €
Usual bread (1 kg)	71	16	14	5	- 1,6%	17 €
Steak (1 kg)	395	282	84	5	- 1,5%	93 €
Doctor's appointment	455	215	97	5	- 1,5%	108 €
Man's haircut	55	67	80	1	+ 0,4%	13 €

The last column of the table expresses the prices of 1910 translated into today's euros. It allows us to better understand the extent of the price decrease. If a haircut for men without shampoo was only worth €13 in 1910[10], a 250-gram "baguette" was then worth €4 and 1-kilogram steak, €93. A tennis ball cost 52 €, the price of an entry-level racket today. A bicycle required a €5,370 check, enough to buy a 300cc motorcycle from a good brand today.

In 1984, while all western governments were struggling against galloping inflation, Jean Fourastié published a book with a delightfully provocative title, Why do prices go down., in which he wrote that "*in the long term, technological progress plays a decisive role in most price movements.*" He added: "*fluctuations due to annuities and profits do not exceed[...] 0 to 20% on average, while at the scale of the century, variations due to technological progress are easily in the order of 200 to 1,000% and go beyond that to 10,000%.*[11]"

10 The haircut was then without shampoo. Today, the median price of a haircut for men in France is € 19 including shampoo. At the scale of a century, we can consider that the price is remarkably stable.

11 Jean Fourastié, Pourquoi les prix baissent, 1984

Fourastié confirms David Hume's observation. Schumpeter does not say anything different: "*in the long run, prices do not fail to adapt themselves to technological progress— they frequently fall spectacularly in response to it – unless prevented from doing so by monetary events and policies.*[12]". Innovation and the market economy make products cheaper and accessible to everyone: "*Queen Elizabeth*[13] *owned silk stockings. The capitalist achievement does not typically consist in providing more silk stockings for queens but in bringing them within reach of factory girls.*" He adds: "*the capitalist process, not by coincidence but by the virtue of its mechanism, progressively raises the standard of life of the masses.*"

Three main mechanisms explain this constant drop in prices.

The first one is the use of machines in the production process. The first three industrial revolutions were organized around systemic technologies: first the steam engine, then electricity and the internal combustion engine, and finally IT. These technologies contribute to producing abundant and cheaper energy, increasing workers' productivity and developing new and ever cheaper products.

The second phenomenon is the improvement of labor organization. New work methods have contributed to reducing costs: first of all, the invention of the wage system, which allows employers to keep a trained workforce over the long term. Then the scientific organization of labor and Taylorism, continuous improvement, lean manufacturing, statistical methods (6-sigma), design-to-cost, purchasing management... Each year, these methods reduce the cost of products again and again.

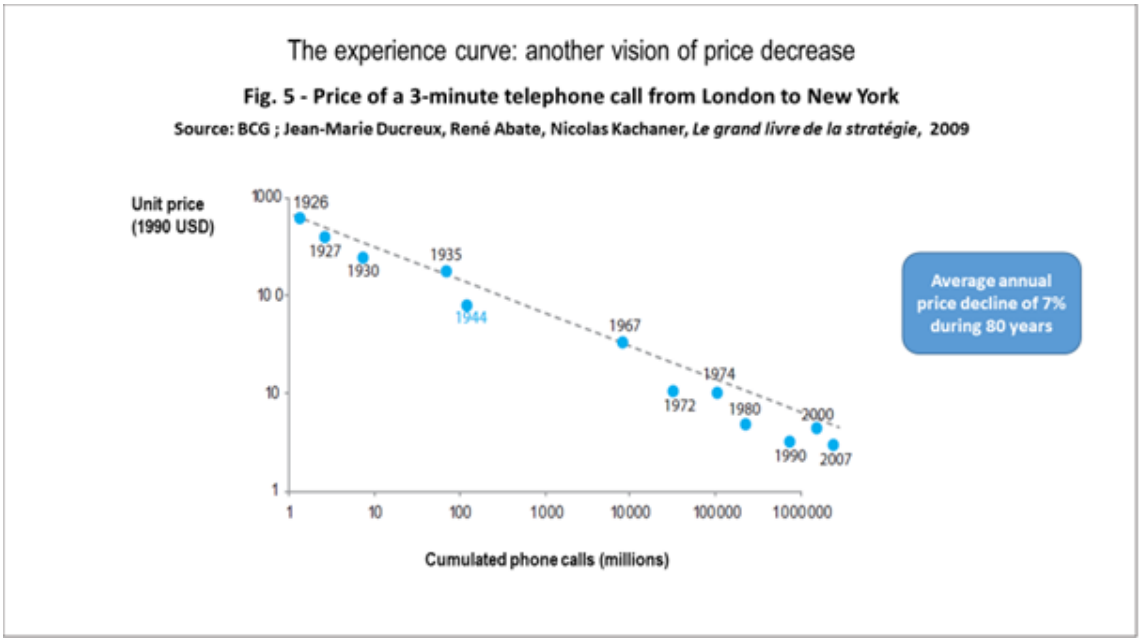
Finally, the increase in production volumes and the penetration of innovations create economies of scale by better amortizing fixed costs. Prices drop, quantities increase, which reduces costs all over again. The virtuous circle is set in motion.

Bruce Henderson, founder of the Boston Consulting Group, invented the experience curve, which summarizes all three of these effects. This is an empirical law that shows that for a given product or service, production costs decrease by 15 to 30% each time the cumulative production volume doubles. The cost of telephone communication with New York, for example, decreases by 23% each time the cumulative number of calls doubles, which corresponds to an average annual decrease of 7% per year. Over 80 years, between 1926 and 2007, this corresponds to a division by about 250.

12 Joseph Aloys Schumpeter, Capitalism, socialism and democracy, 1943

13 This is of course Elizabeth Ist who ruled England from 1558 to 1603. When Schumpeter wrote these lines in 1943, Elizabeth II was not yet Queen.

The phenomenon can be observed in all industries, with significant declines with each doubling of cumulative volumes: 20% for air transport, 22% for insurance, 23% for Ford T, 24% for oil shales production, 24% for long-distance phone calls, 27% for air freight, 30% for dynamic memories (DRAMs) to name a few examples.[14]



However, these productivity gains could be captured by the producer to increase his margins. This is where the second step comes in: the transmission in prices through competition. In a competitive market without a cartel, there will always be at least one player who will use his gain by lowering prices to try to gain market share.

Economic theory thus postulates that in a competitive situation, profit tends towards zero. Reality confirms it: while companies' margin rates may vary from year to year, they do not increase over the long term. The gains caused by technology therefore end up in the consumer's pocket, as gains in purchasing power.

Deflation, in the end, should not surprise us. In times of peace, the economy constantly creates more and more goods and services through progress. If we keep the quantity of money constant, it is normal that the same unit of money should allow us to acquire more goods. The abundance of goods reduces their prices, as well as the scarcity in wartime makes them rise.

Lower prices are a sign of the functioning of a healthy, innovative and competitive market economy. In times of peace, progress and lack of money creation, prices fall.

14 Jean-Marie Ducreux, René Abate, Nicolas Kachaner, Le grand livre de la stratégie, Eyrolles, 2009 ; Jean-Marie Ducreux, Maurice de Marchand-Tonel, Stratégie – les clés du succès concurrentiel, Editions d'organisation, 2004

Technological deflation accelerates

Should this evolution now be expected to continue? Won't we end up reaching some kind of plateau?

In fact, the exact opposite is happening. The formidable technological revolution we are entering should be fiercely deflationary. In all likelihood, the price decline that is expected will be much greater in magnitude and speed than anything we have ever seen.

First because the three mechanisms that caused prices to fall are more relevant than ever. A new systemic technology is emerging, artificial intelligence, which will enable considerable productivity gains to be achieved by replacing an impressive number of human tasks. It will be combined with other technologies with very high potential: connected objects, virtual and augmented reality, 3D printing, all facilitated by exponentially increasing computing power. The combination of these technologies drives a flurry of applications – from robots to drones and autonomous cars. The price decrease that was mainly for products will now extend to services, as a growing number of products will now be distributed "as a service."

Methods continue to improve. The agile method, for example, allows to quickly develop a "minimum viable product" at a low cost that fulfils the elementary functions of a product to develop a market while improving the following versions. The development of venture capital helps finance losses on an innovative project for several years, allowing players such as Uber or Tesla to disrupt markets despite existing barriers to entry.

Scale effects are always valid and materialize all the faster as the penetration of innovations accelerates. Invented in the 1900s, it took 45 years for the telephone to be owned by half of American households. Color television, launched in 1960, took only ten years to reach the same threshold. Today, some iPhone applications get there in a few weeks.

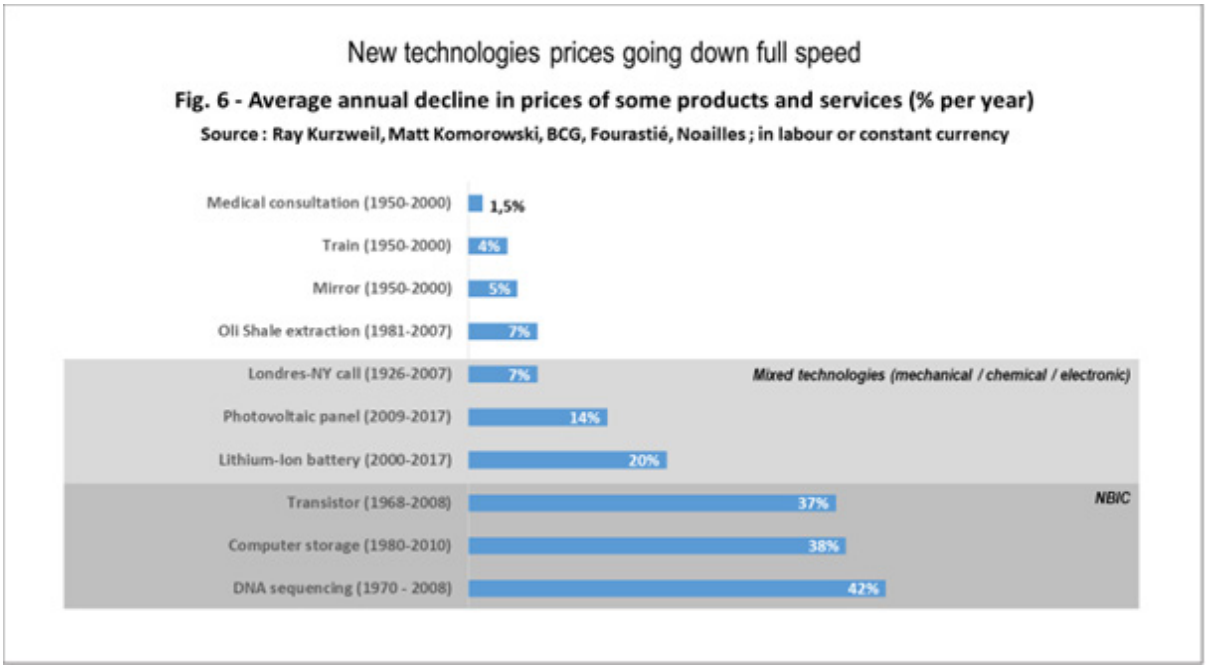
On top of it, new powerful deflationary mechanisms are emerging. Many technologies comply with Moore's law, which stipulates that computing power doubles every 18 to 24 months. If it is first and foremost a technical law, it obviously has consequences on costs. Ray Kurzweil estimates that "*the cost of information is subject to deflation of about 50% per year*." That means a price divided by a thousand in a decade, by a million in twenty years[15].

15 Ray Kurzweil, The web within us: when minds and machines become one, conference at Google, July 2009

Reality sometimes even exceeds this rate. In 1996, the US government invested $55 million to build ASCI Red. It was then the most powerful computer in the world, the first one capable of calculating more than a thousand billion operations per second (1 Teraflop). It occupied 160 sqm and was used for nuclear reactor simulations. Ten years later, in 2006, the Japanese launched a computer of the same power. It was called the Sony PS3, on sale for $500 in supermarkets. It sold 64 million units. In ten years, the price of computing power has been divided by 10,000. That is a 60% decrease each year.[16]

Most NBIC technologies (nanotechnologies, biotech, IT and cognitive sciences) are affected. The cost of IT storage decreases by 28% each year. The DNA sequencing rate has declined by 42% per year since 1970, with a recent acceleration to -73%, a flabbergasting fourfold division every year.

Hybrid technologies, comprising a mechanical or chemical part and a NBIC part, have a lower but still very high rate of price decrease. Photovoltaic panels prices are dropping by an average of 15% per year. In 2008, the French government set the purchase price for solar energy at 57 cents per kWh to foster the development of photovoltaic installations. Today, the French operator EdF purchases the kilowatt-hour of a solar source for between 15 and 18 cents, and the construction cost of current power plants is based on a cost of 2 to 3 cents. As for batteries, their cost goes down by about 20% per year.



The most extreme effect of technological deflation is seen in all software products. Chris Anderson, former editor-in-chief of Wired magazine, makes

16 See Erik Brynjolfsson and Andrew McAfee, The second machine age, 2014, W.W. Norton & Company

it clear: *"If it's digital, sooner or later it's going to be free. In a competitive market, price falls to the marginal cost. The Internet is the most competitive market the world has ever seen, and the marginal costs of the technologies on which it runs — processing, bandwidth, and storage — get closer and closer to zero every year, free becomes not just an option but an inevitability. Bits want to be free."*[17]

The digitalization of the economy is pushing for an extreme price decrease, tending towards free. The screen of your smartphone will easily confirm this. You will find many free products that would have accepted to be charged for ten years ago. Some of them have probably become essential to you.

The logic of zero marginal cost will be extended to other areas. Jeremy Rifkin[18] offers several examples: energy, produced at zero marginal cost by the solar panel; 3D printing, which will be able to manufacture an object for the price of the powder used to print it; education, where the rise of MOOCs could upset one of the last activities that was recently able to increase its prices; and finally all the legal, fiscal and administrative services that will be provided by artificial intelligence.

Two other impacts of the Internet complete the picture of a world where prices are on a long-term downward trend. The first is the declining role of intermediaries. Products are more easily transferred from the producer to the consumer. Reducing the number of steps lowers transaction costs. The second is the ability to make better use of economic assets. The transparency of information makes it increasingly possible to find an Airbnb apartment or a shared means of transportation. Usage replaces possession more and more, which will increase utilization of a house or a vehicle. Fixed costs will be better amortized, and therefore the total cost will decrease.

The price decline we have experienced for two centuries will not stop, far from it. It is likely to accelerate significantly.

Desperately waiting for inflation – to no avail

Meanwhile, central banks are waiting for inflation to return. For the past ten years, they have been planning it. They even desire it, as their tools are totally unsuited to a world where prices are falling.

17 Chris Anderson, Free: The Future of a Radical Price, Hyperion, 2009

18 Jeremy Rikfin, The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism, Palgrave McMillan, 2015

The paradox is staggering. Technology promises us a tsunami of falling prices, and central banks are patiently waiting for them to go up. Their expectations are generally based on two assumptions: the first is the rise in commodity prices, especially oil. The second is the rise in wages as a result of a recovering economy. Let us examine these two hypotheses in detail.

First, let's take oil. It is a resource that is destroyed when used and is in finite quantity. It is the archetype of a resource that is becoming scarce, and which price should increase massively, pushing all prices up. At first glance, this is the case. A barrel of oil was worth less than 2 dollars in 1970, it is now worth 60 dollars. The nominal price per barrel has increased by a factor of 30 in fifty years.

But this figure is very misleading, first and foremost because these are not the same dollars. The 1970 one could be traded at the U.S. Federal Reserve at a fixed rate of $35 for an ounce of gold. The barrel was therefore worth 1.50 g of gold at the time. But it now takes nearly $1,300 to buy an ounce of gold. The $60 barrel is therefore worth 1.30 g of gold. Expressed with a gold standard, the price per barrel has therefore fallen since 1970, despite the oil crisis. It is contrary to all intuition.

What happened? New reserves have been brought into production, particularly in the North Sea, production processes have been improved and costs have fallen. Despite the massive increase in world consumption, oil reserves are still estimated at more than 50 years. Refining methods have also improved.

Let us look at how gasoline prices have evolved. Today, the hourly median wage in the US is $ 23.31,[19] which buys you about 9 gallons of gasoline at current prices.[20] In 1971, when Richard Nixon dropped the gold standard, the median hourly wage was $ 3.24, which would buy the same quantity of gasoline at the price then, $ 0.36 per gallon. Gasoline prices remained stable in purchasing power the US since 1971, despite oil shocks. The only difference? Car mileage more than doubled since 1971 from 12 to 25 miles per gallon. Car mobility is therefore twice cheaper in the US today than what it was in 1971.

Despite the use of a finite raw material, despite two oil crises, despite the increase in fuel taxes, and contrary to all our perceptions, driving is today much cheaper than what it was fifty years ago, with a lead-free gasoline that pollutes way less than it used to.

19 Source US Bureau of Labor statistics, April 2019
20 8.88 liters at $2.625 per gallon in March 2019

This simple example dramatically contradicts our perceptions. Prices, in fact, are falling massively. And the scarcity effect is secondary compared to the technology effect. Potential rises in prices due to commodities becoming scarce are overwhelmed by decreases related to technology. Waiting for a return of oil-led inflation has been so far completely vain, and is likely to remain so as energy technologies price effectiveness improves at a high rate.

How about wages? Central bankers have the Phillips curve in mind. William Phillips was an economist from New Zealand who observed in the 1950s a correlation between unemployment and wage levels: the lower the unemployment rate, the higher the wages. This makes sense: in times of labor shortage, employees have a better ability to negotiate wage increases, or to find better paid work. The Phillips curve is a specific case of the law of supply and demand applied to the labor market.

After ten years of growth, and apart from countries which have struggled to reform like France, most countries are close to full employment. This is the case, for example, in the United States, where unemployment is very low. But wages are not rising significantly. "*The Phillips curve looks rather flat*" notes the Bank for International Settlements.[21] Indeed, even markets in full employment like the US do not see significant growth in wages.

Here again, the explanation is most likely to be found in technology. The share of labor in value added has been steadily declining since the 1970s. New technologies tend to accelerate the substitution of work by machines. It becomes difficult to negotiate higher wages when you are a factory worker, after having gone through years of downsizings and line robotization. The simultaneous development of robotics and artificial intelligence will not reverse the trend, far from it. And rising trends like self-employment and the gig economy will further reduce the weight of trade unions and their bargaining power.

Apart from specific skills of highly qualified people who have the ability to negotiate their remuneration effectively, the long-term trend seems to lean more towards downward pressure on wages rather than upward pressure.

In the 19th century, technological deflation resulted in both wage increases and price decreases, respectively by +0.3% per year and -0.6% per year in England. Technological deflation today is more powerful and will create much more value. But given the massive pressure on wages, it should mostly materialize in much lower prices, with flat wage growth at best.

21 Annual report 2017 (p.66)

Central banks' inflation expectations are therefore vain. Oil may push prices up over short periods of time, after which it corrects downward. Wages remain under long-term pressure. And other economic prices are on a downward trend, with deflation likely to accelerate.

Desperately waiting for inflation is vain and doomed.

The deflation paradox: an uncomfortable value creation

La Deflation is traditionally considered a nightmare by economists. Still, it basically creates wealth. Think of the sales period: dropping prices do increase consumer purchasing power.

But it also creates issues which are difficult to handle. In particular, it has the same effect on labor as on goods and services: by increasing productivity, by substituting work with machinery, it puts downward pressure on labor prices, i.e. wages. If my company needs less work, then it is less willing to pay me. If tomorrow, my work can be partially done by a robot or artificial intelligence, then I risk losing it, or being paid less.

In fact, a slightly positive level of inflation is useful from both business, social and political standpoints. It gives business managers a certain degree of freedom to adjust wages. It acts as a capital tax and redistributes part of the assets to the labor force.[22] It therefore has a natural redistributive effect, and helps stabilize society.

Most governments therefore prefer a situation of low inflation. To move from deflation to inflation, money must be injected into the economy. This injection of money is anything but neutral: by increasing prices, it deprives citizens of the benefits of deflation, to redistribute them to the beneficiaries of the currency created.

Monetary creation does not create value, but it does redistribute existing wealth. The losers are those who should have benefited from the price decrease, i.e. everyone. The winners are those for whom money is created. We will see who, but they are to be found rather among the people who already have money.

22 See Piketty, Capital in the Twenty-first Century, 2013, Harvard University Press

Keynes describes this redistribution very clearly in The economic consequences of the peace: "*By a continuous process of inflation, governments can confiscate secretly and unobserved an important part of the wealth of their citizens. There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction - and does it in a manner in which not one man in a million is able to diagnose.*"[23]

What is the amount of this redistribution? In other words, how much money is created each year? In Europe, more than 500 billion have been created in debt every year since March 2015.[24] That is a considerable amount of money. Part of this debt is legitimately used to finance growth. But the growth created by the economy in 2018 is only 200 billion in the euro area, much less than the currency created. We create much more money than the necessary amount, and therefore redistribute a considerable amount of wealth, much higher than the level of growth.

This shows the crucial importance of the subject of monetary creation. Given its impact on the standard of living, it should be absolutely central in our democratic debates. Yet the topic is perceived as technical and only within the scope of bankers and economists.

This is a terrible mistake. Considering the massive amounts at stake, people must by all means get involved in this essential topic.

23 1920, Harcourt, Brace and Howe

24 At the beginning of quantitative easing. Monetary aggregate M2 went up from € 9 810 bn to € 11 717 bn between March 2015 and December 2018, ie € 509 bn per year on average

II - The inadequacy of current monetary policies

How is money created?

Money creation is a fundamental process of the economy, and yet it is far from being well known. Readers familiar with money and the role of the central bank can speed up their reading. For others, some explanations may be useful.

There are two different types of money: central bank money, the most familiar part of which is coins and notes, and debt money, which generally accounts for more than 80% of the total amount of money in circulation in an economy. Debt money is created directly by banks, in the simplest way possible: loans. When a private individual or company borrows € 100,000 from the bank to purchase a property or finance a new investment, the bank does not take the money anywhere. It simply credits the borrower's account with € 100,000 and enters the same amount in its liabilities to be reimbursed. € 100,000 of money has been created "out of thin air." The money is then gradually destroyed as the loan is repaid. At the last payment, the money created completely disappears.

This may seem unlikely, and indeed it is, even for economists themselves. Maurice Allais, Nobel Prize in economics, even makes a radical judgment:

"In its essence, the current ex nihilo monetary creation by the banking system is identical, I do not hesitate to say this to clarify what is really at stake, to the creation of money by counterfeiters, so rightly condemned by the law. In practice, it leads to the same results. The only difference is that those who benefit from it are different."[25]

However, banks must comply with some constraints. On the one hand, a bank must deposit a fraction of its outstanding loans with the ECB. These are the mandatory reserves, currently up to 1% of the amounts lent. On the other hand, banks must themselves hold a minimum proportion of their own capital of at least 7%, this amount varying according to the strength of the banks. Their possibilities for creating money are therefore not infinite.

Banks are not always popular, but they have an essential role in the economy. By providing credit, they make productive investment and wealth creation possible. But the ability to actually mint money also gives them a much more questionable role, historically rather conferred on governments.

This role developed in particular during the 20th century, from 1914 onwards, when debt was the main means for States to finance wars, and especially since 1971, when the gold standard was definitely abandoned. No longer does any currency rely on a material underlying, such as gold or silver.

Creating money to handle prices

Currency and prices are closely related. As we have seen, inflation appeared in Europe around 1520, when the conquistadors began to bring massive quantities of silver and gold from the Americas. Prices rose then for more than a century, in unprecedented proportions.[26]

The phenomenon is a simple consequence of the law of supply and demand: if the quantity of goods and services to be purchased remains the same and there is twice as much money, then prices double. If we stop producing money, prices stabilize: this is what happened from 1660 onwards, after the gold and silver mines of the Americas were exhausted.

The French economist Jean Bodin revealed this correlation as early as 1568. The quantitative theory of money was born. It was then largely confirmed by the various episodes of inflation, particularly in the 20th century. It is today expressed by the equation MV = PQ, which reflects the relationship between

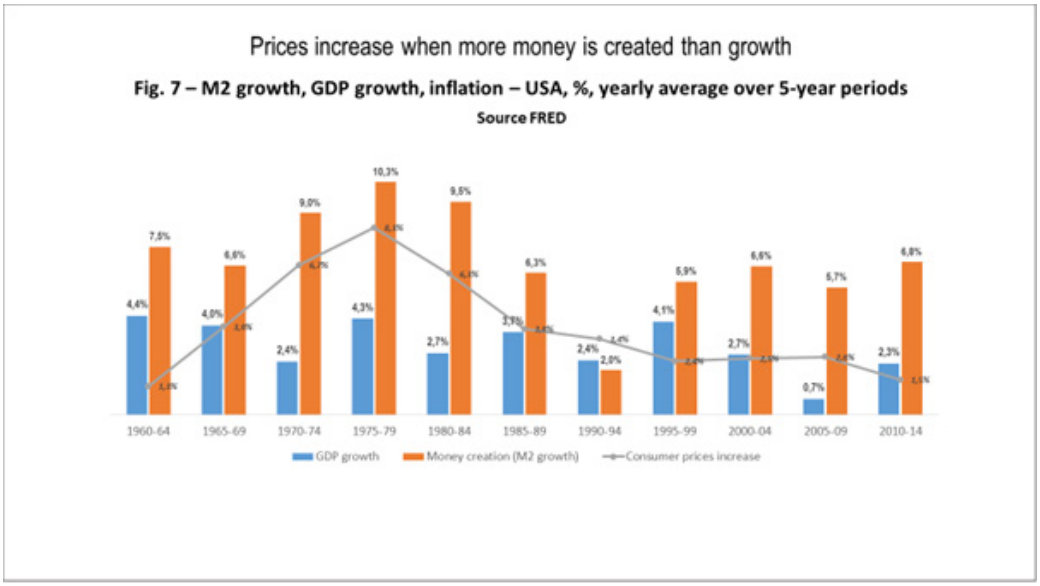
25 Maurice Allais, La crise mondiale aujourd'hui, 1999

26 Between 1209 and 1540, prices rose in England on average by 0.2% per year. Between 1540 and 1660, it went up to 1.2%, then went back down to 0.2% per year until 1914. Since then, average inflation has rocketed to 4.4% a year, an almost 80-fold multiplication in a century. Source Gregory Clark, UC Davies

money supply (M), price level (P) and trade volume (Q). [27]

Simply put, the production of money is a means of ensuring economic development. But if more than the economy needs is produced, the surplus translates into higher prices. Milton Friedman sums it up in a famous sentence: " *Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output.*"[28]

This is precisely what happened in the 20th century, especially after the gold standard was abandoned in 1971. The 1980s were marked by very high inflation, linked to an annual production of currency close to 10%. Inflation was brought under control in the 1990s by reducing money issuance. The graph below illustrates the phenomenon in the USA. Systematically, the creation of money (in orange) was higher than production (in blue), which led to inflation.



It was also in the 1990s that central banks were made independent of governments. The objective was to avoid the misuse of money to finance public spending. Since then, the main role of central banks has been to stabilize the price level. They do this by controlling the amount of money in circulation in the economy. If prices rise, the central bank slows down money creation. If they drop, it speeds it up.

This action is indirect though: since the banks create the money, the role of the central bank is to facilitate its creation or to make it more difficult

27 The fourth term V describes the velocity of money, i.e. the number of times it changes hands in a given period of time. It can be approximately considered as stable over time. In any case, it varies much less than the other three parameters.

28 The Counter-Revolution in Monetary Theory, 1970

depending on the situation. It does this mainly by setting the interest rates at which banks borrow money from each other. By raising interest rates, the central bank raises the cost of credit granted by commercial banks. Borrowing becomes more expensive, volumes borrowed fall, less money is issued, inflation decreases.

Conversely, in the event of deflationary pressures, the central bank lowers rates to facilitate borrowing and to have more money issued by commercial banks. But deflation is a much more difficult phenomenon for a central bank to manage. For you can increase rates to infinity, but you can't lower them below zero.

Since the 2009 crisis, all central banks have struggled to regulate inflation. Rates have been reduced massively. The main rate of the ECB remains at zero, and market risk-free rates are even slightly negative in Europe. But the tool proved to be insufficient. Central banks then implemented unconventional policies, including quantitative easing. They create money and use it to buy back debt securities on the market. Private financial actors then find themselves with excess liquidity from the sale of these securities and seek to use them by loans. They have therefore to be more aggressive on prices, ie. lending rates, in order to invest these large cash stocks. Another way to encourage banks to lend is to facilitate their ability to borrow, including by granting longer loan terms.[29]

Considering that the interest rate at which businesses and households borrow is made up of the cost to the bank plus its margin, the central bank acts both on the cost by keeping the bank's borrowing rate at zero, and on the margin by pushing it down through quantitative easing.

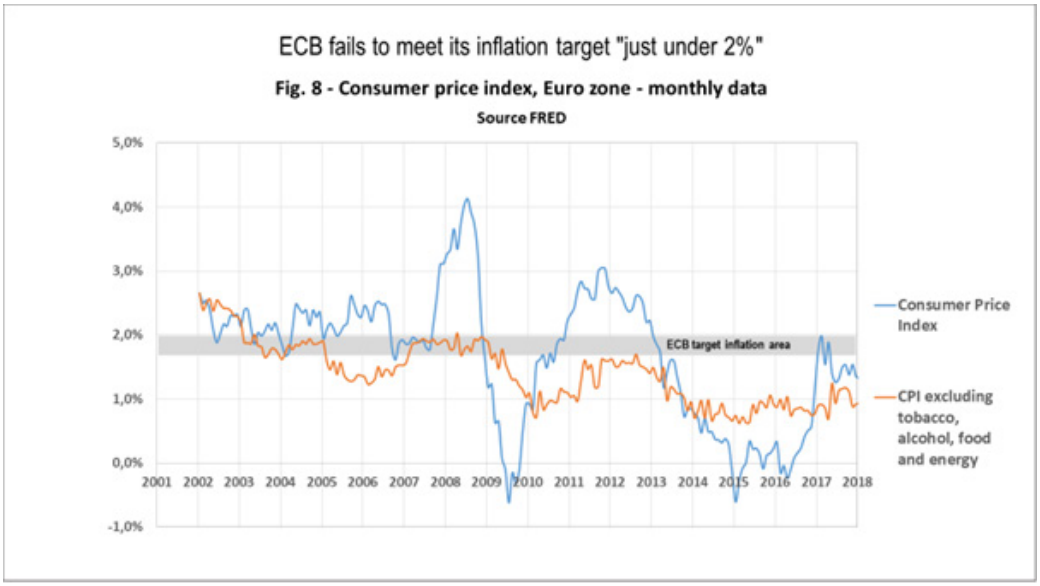
A policy with limited effectiveness and adequation

The ECB has long been reluctant to use unconventional policies. But the euro crisis in 2012 left no choice. On July 26th that year, ECB President Mario Draghi announced that it would do "whatever it takes" to save the euro. In March 2015, the ECB embarked on a massive program of unconventional measures, leading to the creation of 2,600 billion in central bank money, which increased Europe's money supply by 2,000 billion in four years.

Mario Draghi's 2012 stand provided strong support to the euro area and may have saved the future of the common currency. However, despite this massive injection, the ECB is unable to achieve its inflation target, which is "slightly below 2%". Inflation has not reached this level since 2013; and

29 In Europe, these are the LTRO and TLTRO mechanisms. At its meeting in March 2019, the ECB announced that it was resuming this policy because inflation was below its expectations.

this was due to the rise in oil prices, which was quickly erased afterwards. By correcting highly volatile energy and commodity prices, the ECB has not achieved its target for 10 years.



Central banks have failed to solve the issue of low inflation. They are struggling to understand the causes, as Fed former board member Daniel Tarullo admits.[30] Like other central banks, the ECB has not properly identified and modelled the phenomenon of technological deflation, which is at the heart of price formation. As a result, its monetary policy, like that of other central banks, is not designed to manage permanent deflation.

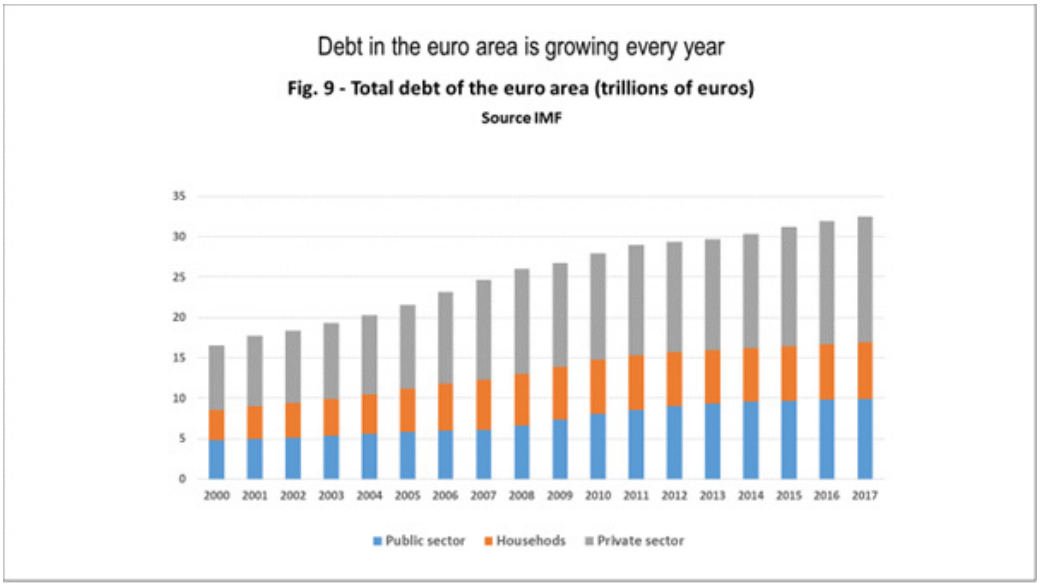
Central banks seem to have a rather traditional view of prices: they consider that prices follow a succession of phases of inflation and deflation, depending on the relative scarcity of production factors. Money must grow faster than the economy if prices are falling, and slower than the economy if prices are rising. If this vision were true, debt would be the ideal instrument. More debt would be created in deflationary phases, and more repaid in inflationary phases.

But this vision has been false since the beginning of the industrial revolution. In peacetime, falling real prices expressed in terms of working time are now the norm in an economy. Every engineer who invents a new device to perform a task faster or cheaper, every buyer who renegotiates prices by 1 or 2% per year, every entrepreneur who disrupts a business model, every CFO who validates an investment at short payback contributes to the relentless price decline in the economy, dominated by the fundamentally unidirectional and asymmetric phenomenon of technological deflation.

30 "We do not, at present, have a theory of inflation dynamics that works sufficiently well to be of use for the business of real-time monetary policymaking." Monetary policy without a working theory of inflation, Brookings, October 2017

Central banks handle this permanent with debt supply. But this answer is inadequate, because debt is essentially a temporary currency. It is intended to be refunded. How could a permanent phenomenon be neutralized with a temporary tool?

The consequence is inevitable: the temporary becomes permanent. Each new year of technological innovation brings a new drop in prices and calls for a new creation of net debt. The stock of debt mechanically increases endlessly. And every year, the IMF announces a new record for world debt, both in absolute terms and as a percentage of GDP. In the euro area, total debt amounts to €32,500 billion, about three times its GDP.



These perpetual records are not so much the mark of inconsistent governments or irresponsible citizens shifting their responsibilities to future generations. They are rather the perfectly logical and unavoidable consequence of the way we create money. Every year, deflation calls for fresh money. And every year, we feed it in debt.

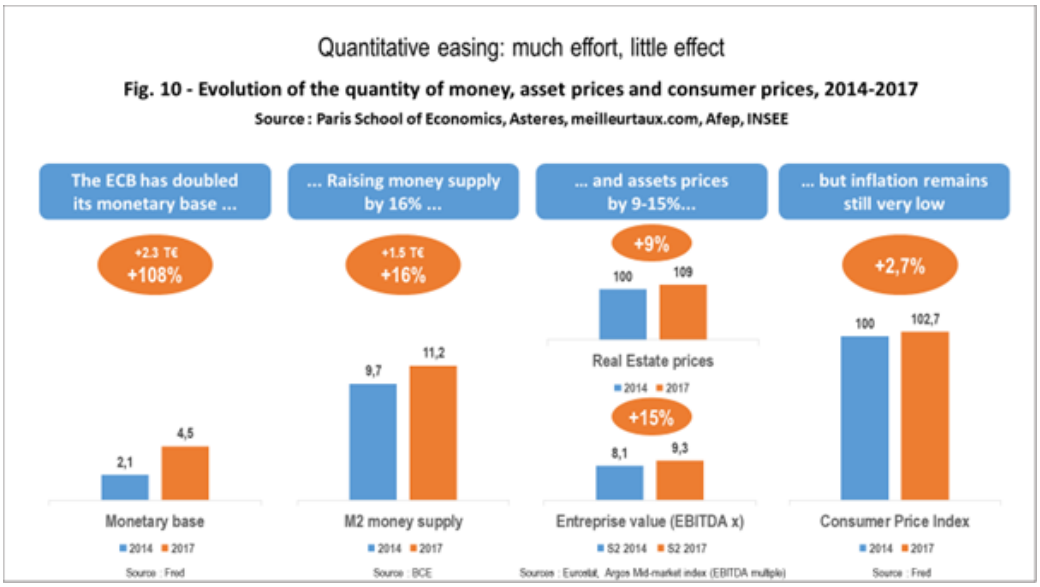
Collateral damages

This creation by debt causes considerable collateral damage, which has been widely highlighted in recent years by many observers. They are summarized by Jacques de Larosière, former Governor of the Banque de France, who does not hesitate to talk about the "dysfunction" of the monetary system when describing the consequences of the central banks' monetary policies:

- *"The rise in debt beyond sustainable limits;*
- *The increasing vulnerability of indebted countries to changing market perceptions;*

- *The worsening of global external deficits*
- *The increase in volatility of capital movements;*
- *The disproportionate expansion of short-term speculative flows*
- *The constitution of asset bubbles*
- *The weakening of pension savings institutions*
- *A succession of financial crises;*
- *A considerable increase in the United States' debt (more than $20,000 billion), in return for the reserves accumulated by emerging creditor countries".* [31]

Let us focus on the rise in asset prices. The creation of money through debt tends to push them up. If economic agents can get into debt more easily to buy a good, the demand for that good will grow and therefore its price will increase. This is what happened in real estate in the years 2000, particularly in the United States. This is also what drives up company valuations. This phenomenon is well known in the private equity sector. Valuations are measured as multiples of profitability, measured by EBITDA. On average, a company was valued 7 times its EBITDA in 2009, 8.1 times at the end of 2014, 9.3 times at the end of 2017 and 10 times at the end of 2018.[32]



By being created as debt, the fresh money is logically used to finance the purchase of assets (securities, real estate, capital goods) rather than consumption. It did indeed push up asset prices in the euro area during the three years of the ECB's quantitative easing program. By doubling the quantity of central bank money, the ECB has increased the total money supply by 16% in three years. Prices of privately-owned companies rose by 15% during the

31 Conference at Institut de France, 20 November 2017
32 Source: Argos Wityu.

same period, property prices rose by 9%. But consumer prices rose by less than 3% only. Injected into financial markets far away from the consumer market it is supposed to regulate, new money does not feed the right price increases.

Another issue is not mentioned by Jacques de Larosière. Yet it may be the most serious, as it weakens our societies. The drop in prices caused by technology and competition creates value from which all citizens should in theory benefit, in proportion to their consumption – they should buy cheaper goods thanks to it. However, money creation captures this value by stabilizing prices. It therefore deprives citizens of the benefits of lower prices.

Who benefits from this deprivation? Directly, no one. The value captured by the currency is redistributed to borrowers, but only if they repay it. It is somehow "stored" into debt. However, this debt indirectly benefits borrowers: through its inflationary effect on assets, it leads to a rise in wealth that is faster than that of the wealth generated by growth.

However, as an accurate French saying puts it "Money is only lent to the rich. " In other words, a bank requires a collateral to grant a loan. Borrowing capacity is directly proportional to assets ownership. Therefore, money is naturally created to the benefit of those who already have some. The past few years have seen a widening of inequalities, mainly due to the increasing valuation of assets.

The middle classes are the losers. The benefits they should receive from technological deflation are confiscated. Through debt issuance, they fuel the rise in house prices. The consequence? Housing became a larger part of household budgets over the past 40 years, both through increases in rents and purchases.

The current monetary creation mechanism is therefore not only inefficient, it is also deeply unfair. The middle classes revolt that has been taking place since 2016 in all countries and has produced Brexit, Trump, Salvini, Bolsonaro and the French "yellow jackets" is largely due to the confiscation of the fruits of economic growth by monetary creation in the form of debt.

This is not about throwing stones at bankers. After all, they are only doing their job by issuing loans on the terms they are given. We simply need to question the very idea of linking money creation and debt financing of the economy. It is an economic nonsense that is being transformed into social injustice and now becoming a source of major political instability.

Not creating money or going back to the gold standard: it only works in theory

Creating massive amounts of money through debt is not a sustainable solution. Another possibility could be not to create money at all. It is proposed by the Austrian school of economics, whose masters of thought are Friedrich Hayek, Ludwig von Mises or Murray Rothbard. Coming back to the gold standard is an alternative and somewhat equivalent solution, as the quantity of gold is more or less constant.

We would then find ourselves in the world described by Hume and Schumpeter in the absence of monetary creation, a world where prices would fall permanently. This was already the case in the 19th century, as we have seen. But today, with both accelerating technological deflation and Western societies globally equipped with manufactured goods, well fed and well dressed, so with moderate demand, the price decline would most probably be much higher - probably at least 2%, perhaps 3% per year.

The table below compares prices in France between 1970 and 2019, expressed in currency (French Francs or Euros), in time at minimum wage and in gold. The last column suggests therefore how would prices have evolved under the gold standard.

Under the gold standard, all prices would fall including wages

Fig. 11 - Prices of various goods in current currency, working hours, grams of gold – France, 1970-2019

	Current currency ($, F/€)			Real prices (Labour hours at minimum wages)			Gold standard (grams)		
	1970	2019	Evolution	1970	2019	Evolution	1970	2019	Evolution
1 crude oil barrel	$ 1,90 (1,60 €)	$ 60 (54 €)	+3250% +7,5% / yr	3 h	6 h	+100% +1,5% / yr	1,5 g	1,3 g	-15% -0,3% / yr
1 liter gasoline	1,10 F (0,17 €)	1,50 €	+900%+ +4,8% / yr	19 mn	10 mn	-45% -1,2% / yr	0,16 g	0,04 g	-77% -3% / yr
1 car (Citroen 2CV / Logan)	7000 F (1070 €)	8 000 €	+750%+ +4,5% / yr	2000 h	900 h	-55% -1,6% / yr	1000 g	200 g	-81% -3,3% / yr
1 hour minimum wage	3,50 F (0,53€)	8,74 €	+1650% +6% / yr	1 h	1 h	=	0,5 g	0,2 g	-58% -1,8% / yr
1 gram of gold	$ 1,24 (1,04 €)	$ 46 (41 €)	+3700% +7,7% / yr	2 h	4 h 40	+140% +1,8% / yr	1 g	1 g	=

Note: some numbers were rounded for better liability. Minimum wages are net from social security contributions and include government work incentive (PPA)

The conclusion is quite clear. Should France have reinstalled the gold standard in the seventies, all prices would have come down, including labor prices, i.e. wages. At the gold standard, the minimum wage in France would have gone from 0.51 g/hour in 1970 to 0.21 g/hour today, a decrease of nearly 60%, almost -2% per year.[33]

33 It could legitimately be observed that if gold were to become the standard again, the demand for yellow metal would be higher. The current gold prices would most certainly be exceeded. The actual price reductions would therefore be even greater than those mentioned here.

As French economist Jean-Marc Daniel rightly points, the evolution of purchasing power under the gold standard in the last century "*would have been fed by productivity translating into lower prices, and not higher wages*."[34] Today, despite massive money creation, wages are already under strong pressure, and increase very little for some professions. A return to the gold standard would still result in an increase in purchasing power, most certainly under the form of a high drop in prices and a more moderate drop in wages.

In a world of gold standard, a business manager's speech during the annual salary negotiations would look like this: "*My dear employees, thanks for your hard work this year. I have good news for you: I'm only cutting your salaries by 2%. Since deflation is 3.5%, you gain 1.5% of purchasing power*. "

From an economic standpoint, this reasoning is bulletproof. She does offer her employees a real increase in wages in relative terms, which probably corresponds to a real effort for her company. But this position is obviously totally inaudible for unions or employees. Like it or not, we have lost the habit of seeing our wages fall in nominal terms. Employees will prefer a 2% increase with 2% inflation, rather than a stable salary while prices fall by 2%, even though the second option is more favorable to them, as it creates purchasing power. This is what Irving Fisher and John Maynard Keynes called monetary illusion.

In a gold standard regime, indexing the minimum wage to inflation would logically mean that it would decline every year. Same with pensions. Cash would automatically appreciate, even with very low interest rates.

In theory, this world is perfectly possible. Surprisingly, it would be socially much fairer than the one in which we live, because the purchasing power gains associated with technological deflation would remain with the middle classes, and not be absorbed by money creation as they are today.

In practice, it is socially unacceptable and politically impossible to sell. How can we imagine a candidate in elections obtaining a majority on the basis of a program explaining that wages will now fall?

Not creating money worked very well in the absence of technological progress. All human history up to the 18th century was made with a stable currency. Revenues could increase or decrease from year to year, depending on economic conditions. But with a stable currency and no technical progress, prices and wages remained stable over time. The system did hold up during the 19th century thanks to a moderate technological progress resulting is a somewhat limited pressure on prices, and with

34 « Nous devons absolument revenir à la stabilité monétaire », Jean-Marc Daniel, Les Echos, January 23rd, 2019

wages which were adjusted downwards in several instances.

We no longer have this option today. The discontinuation of the gold standard is no accident of history. It is the inexorable consequence of both accelerating technological progress and downward wage rigidity. There is no going back.

Like it or not, we are condemned to create money.

Separating money creation from debt

The question then becomes: how to create money in the most virtuous way? What monetary creation to stabilize the functioning of the economy, minimize market disruptions and fairly distribute the wealth created?

The key to the solution is to separate money creation and debt creation. Their association is not a necessity, as Milton Friedman points out: " *In modern financial systems, the creation of money is linked with lending and investing activities and changes in the stock of money generally take place through the credit markets. There is, however, no necessary connection*." [35]

The only mission of debt should actually be to finance investment projects taking into account the level of risk. Providing debt with the additional job to regulate the level of prices is a perversion, a completely unnatural assignment. It is actually becoming a disaster in the context of technological deflation, which constantly calls for more monetary creation.

On the contrary, as we have seen and as economist Murray Rothbard points out: "*While credit expansion by a bank seems far more sober and respectable than outright spending of new money, it actually has far graver consequences for the economic system, consequences which most people would find especially undesirable*".[36] We still need to create money but stop doing so through debt. As we will now see, the solution is simple, logical, and still somewhat unsettling.

35 Milton Friedman, A program for monetary stability, 1960, p. 43
36 Murray Rothbard, Man, Economy and the State, 1962

III - The Monetary Dividend

So here we are with the absolute need to create money. The one we produce today has three major flaws. It is temporary because it is issued in the form of debt. It is remote because it is issued in financial markets, very far from a consumer market that it aims to regulate. It is unfair because it captures the wealth of all and partially redistributes it to borrowers by increasing asset values.

Correcting these three flaws means creating permanent, close and fair money altogether. Permanent means non-refundable: the money created must be given, not lent. Close means that it must be issued as close as possible to the target market, that of consumption. Fair means that it must benefit everyone.

The solution, in the end, is very simple: it consists in giving the same amount of money to all individuals. In other words, the Central Bank issues a monthly amount of money calculated to stabilize inflation at a target level and distributes it without counterpart to each of the people living in their economic zone.

Let's take an example. Suppose that the ECB wants to stabilize the level of inflation at 1%. Citizens receive, say, €60 per month which they use for their consumption. This money supports demand and price levels. If this amount is insufficient to meet the inflation target, it is increased the next month until the inflation target is reached. If inflation becomes higher than the target, the monthly amount is reduced and even brought to zero if necessary.

Debt therefore ceases to be the means of stabilizing prices. The ECB can gradually raise interest rates to a desired level, for example to have risk-free market rates around 2 to 3%. Any downward pressure on the price level is offset by an increase int the value of the Monetary Dividend. In this scheme, the ECB chooses both the level of rates and the level of inflation. The amount distributed to citizens is used as an adjustment variable.

Described in these terms, the scheme may look like the sweet dream of an illuminated person or the pitch of a left-wing leaflet. In fact, it is strong grounded in the economic theory. The tool is well known to money economists and recognized as part of the central bank toolbox. We will first understand its theoretical foundations, then examine its positive impacts, and finally deal with the objections that are sometimes raised against it. We will finally see how to implement it in detail.

Let us call this mechanism a "Monetary Dividend." The term "dividend" reminds that the amount distributed is neither stable nor guaranteed. Nor is it discretionary, because it corresponds to the value produced by the economy. An innovative, competitive economy, where goods and services circulate freely, is efficient and puts prices under strong downward pressure. The better the economy works, the lower the prices and the higher the amount to be issued. The Monetary Dividend rewards the good performance of an economy. The term "Monetary" states that even if it has positive social impacts, the tool is first and foremost targeted at price stability. It prevents prices from falling and distributes the wealth created: it ultimately returns to the consumer the purchasing power that is captured by money creation, but does so by targeting inflation, not by implementing redistributive or fiscal tools.

Robust theoretical foundations

The story of a very unlikely idea

This scheme may seem totally implausible. It is actually less so than the current system, which allows your banker to create money in a few minutes by a mere book record. Above all, its effectiveness is largely supported by an impressive lineup of leading economists. The first to describe it was Milton Friedman, Nobel Prize laureate in economics in 1976, a most influential economists and certainly one of the best specialists on monetary issues. In 1969, he wrote The Optimum Quantity of Money in which he conceptualized the idea of a price increase obtained by a uniform distribution of money. He uses the metaphor of a helicopter dropping bank notes. The term "helicopter money" was coined after his metaphor, which became quickly negatively undertoned.

The first to propose a concrete application was Ben Bernanke in 1999. The man who later became the head of the Fed and who led it during the 2009 crisis was then an economist at Princeton. He suggested using money creation to fight deflation in Japan.[37] Japan eventually chose a quantitative easing policy instead, as other central banks did afterwards.

The concept gradually reappeared after the 2009 crisis, as the limits of monetary policies were becoming more and more obvious. From 2014 onwards, many economists started evoking it as a desirable alternative.

In France, economist Patrick Artus, Director of Research at Natixis, wrote in 2015: "For the ECB's monetary policy to have an effect on growth and therefore on inflation in the euro area, it should directly support demand for goods, and not through inefficient intermediaries such as the exchange rate, credit or asset prices. This is only possible if the ECB uses helicopter money: creating money and distributing it to households, and not as a counterpart to purchases of financial assets."[38]

In 2016, a Deutsche Bank report stated that ""helicopter money" could be far more impactful than QE or fiscal policy" and adds that " the constraints are lower than is commonly assumed, even for the ECB."[39] Economist Romain Baeriswyl of the SNB, the Swiss central bank, published an article calling for a direct injection of money for the benefit of citizens in order to separate the creation of money from that of debt.[40]

Spring 2016 marked a peak in the debate on helicopter money. The context was favorable then: despite the ECB's massive monetary injection, inflation remained desperately low. The drop in oil even made it nil in 2015, flirting with deflation. The idea got back in the public debate. Mario Draghi, President of the ECB, described it as "very interesting" at a press conference in March 2016. A few days later, its Vice-President Peter Praet confirmed, even more explicitly, that helicopter money "enters the ECB's toolbox" even if he described it as "really extreme".[41]

For the same reasons, the year 2019 logically saw a new resumption of the debate, with the combination of a decline in oil prices compared to 2018 and weak growth making inflation targets unsustainable once again. Ollie Rehn, President of the Central Bank of Finland and one of the potential successor

37 Ben Bernanke, "Japanese Monetary Policy: a Case of Self-Induced paralysis?", Princeton University, December 1999

38 Flash économique, Natixis, 11 December 2015 « Ce qui marcherait dans la zone euro est impossible : c'est « l'helicopter money. »

39 Helicopters 101: your guide to monetary financing, Deutsche Bank Research, 14 April 2016

40 The case for the separation of money and credit, Romain Baeriswyl, Swiss National Bank

41 La Reppublica, 18 March 2016

candidates to Mario Draghi, called on March 15th for the introduction of "new tools" to enable the ECB to fulfil its mission. In August, Philipp Hildebrand, former president of the Swiss central bank and Vice Chairman of BlackRock called for helicopter money to be implemented in the euro area.[42] The arrival of Christine Lagarde as the new head of the ECB in November would be an ideal timing to examine such a scheme.

Financing citizens or governments?

We must distinguish here between two schemes, illustrated by the positions of Friedman and Bernanke. Friedman's money creation scheme is directly geared at households. Bernanke's scheme is done by funding governments, which then lower taxes or launch Money Financed Fiscal Programs (MFFPs). [43]In this case, the increase in purchasing power is channeled through the government.

This note endorses without any hesitation Friedman's scheme. Bernanke's scheme is certainly easier to implement technically; it would also still be better than the current quantitative easing. But it would have many disadvantages compared to a direct injection.

In terms of efficiency, it would take a long time for the money to reach the final consumer. It takes time to implement a new income tax scale or new VAT rates. Conversely, if inflation resumes temporarily, the government probably does not want to raise taxes immediately. The scheme would be much less responsive than the direct distribution of a Monetary Dividend. Inflation would therefore be more difficult to control.

From a legal point of view, governments would reinstall themselves at the center of the monetary creation mechanism, thus challenging the dogma of central banks' independence from governments. Most of them are prohibited from directly financing public deficits. This is the case in Europe, where Article 123 of the Lisbon Treaty formally prohibits the financing of governments. The ECB would therefore be in breach of its mandate if it were to set up such a mechanism.

A monetary creation placed directly at the service of the public authorities would also create an undesirable concentration of powers. It would not encourage governments to manage carefully public money and could even provide it with convenient liquidity to finance election promises. Ben

42 BlackRock Investment Institute, Dealing with the next downturn; from unconventional monetary policy to unprecedented policy coordination, August 2019

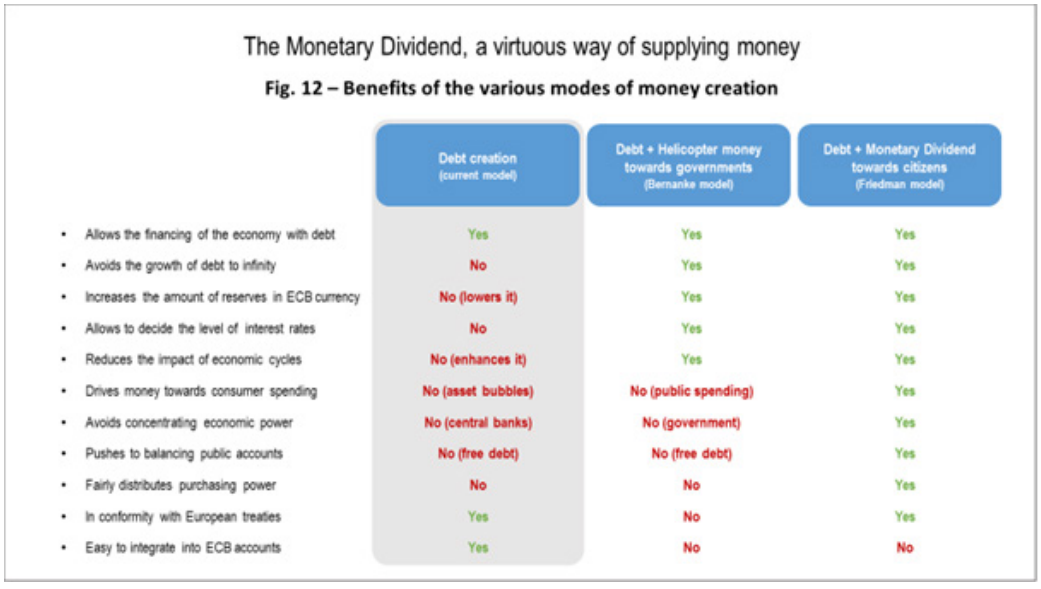
43 Ben Bernanke, What tools does the Fed have left? Part 3: Helicopter money, Brookings, 11 April 2016

Bernanke is himself very aware of the limitations of the system he proposes. He describes the issue of governance as the main limitation of his MFFP program and mentions the risk of a slippery slope.

Such a distribution would be more focused on the taxpayers who pay the most taxes. In terms of efficiency, they are also the ones who have a higher propensity to save. The risk would be to give money to taxpayers who could save it. The consequences would ultimately be quite similar to the issuance of money in the form of debt: the orientation of money towards investment rather than consumption, the rise in asset prices, and the widening of inequalities through the appreciation of wealth.

The last argument is probably the most fundamental. The wealth created by falling prices belongs to consumers, and therefore to citizens. To capture it through money creation and redistribute it to governments would be a transfer of wealth from citizens to governments, in other words a tax. The ECB has no legitimacy whatsoever to create a tax on behalf of governments. Citizens would be deprived of their constitutional right to consent to tax, without any recourse since they do not participate in the appointment of ECB members.

The only democratically acceptable solution is for the value created by technological deflation to be returned directly to citizens. It also happens to be the most equitable and economically efficient solution. It is therefore the one that must be put in place.



Monetary Dividend vs. Universal Basic Income

Distributing money to households reminds a scheme that was quite debated

recently, ie. Universal Basic Income (UBI). The idea of a UBI is not new, but it came up strongly with the uncertainties related to the evolution of work. In 2017, three candidates for the last French presidential election - Yannick Jadot, Nathalie Kosciusko-Morizet and Benoît Hamon - included it in their projects. A year later, it was also included in the program of the M5S party which now belongs to the governing coalition in Italy.

The two systems have in common that they provide citizens with money without demanding anything in exchange. But beyond this similarity, they are actually quite different.

UBI is a social and fiscal measure. It provides a constant therefore predictable income stream, on which the beneficiary can rely. It is financed by taxes. It does not create money, so it is financed as part of a national redistribution. In its most realistic sense, this is a tax system. By far the most relevant economic model is the remarkable work of Marc de Basquiat and Gaspard Koenig.[44] Its simplicity and balanced sizing are the basis for all the realistic proposals on the subject, for example that of Nathalie Kosciusko-Morizet during the French right-wing primaries in 2016.

The Monetary Dividend is a variable amount scheme, the purpose of which is neither social nor fiscal. It is not related to government policies. Its sole objective is to create the conditions for price stability in the best possible way. Its renewal is not guaranteed. Its amount is not the result of a political decision, it is purely the result of a technical mechanism to regulate price levels.

The sole purpose of the Monetary Dividend is to fulfil the central bank's mandate to control inflation. It also has a considerable collateral social benefit (more precisely it removes a current injustice, the fact that citizens are deprived of part of the creation of wealth by current monetary policies), but this impact is in no way its purpose, nor is it to reduce inequalities.

In a way, UBI looks like a constant and predictable salary whereas Monetary Dividend reminds a variable and cyclical stock dividend. The two devices must be considered as independent. They are not mutually exclusive.[45] But their logic and modalities are extremely different, and they should not be confused.

44 Marc de Basquiat, Gaspard Koenig, LIBER, un revenu de liberté pour tous, Editions de l'Onde ,2014 ; LIBER, une proposition réaliste, idem, 2017

45 François-Xavier Oliveau, Microcapitalisme, vers un nouveau pacte social, PUF, 2017

Impacts et benefits of the Monetary Dividend

For the central bank

The Monetary Dividend will likely become an essential tool of the ECB. The ECB's current toolkit is very well suited to handle inflation. Raising interest rates or prudential ratios are effective means to limit the issue of credit and therefore money supply.

But when it comes to managing deflation, the ECB, as all other central bank, does not have satisfactory tools at its disposal. For rates cannot fall permanently below zero,[46] and the so-called non-conventional policies implemented since 2015 have, as we have seen, limited effectiveness and disastrous collateral effects.

The possibility of issuing money directly to euro area citizens will finally provide the ECB with an effective tool to deal with price decreases.[47] By helping sustain the level of prices, the Monetary Dividend will allow the debt to be refocused on its true function: financing the economy's growth by charging the adequate price for the risk taken.

The ECB will then regain the freedom to set rates at a level that is truly economically relevant, rather than being forced to keep them artificially low. Any upward or downward movement in rates will have an impact on the creation of money, and therefore on inflation, which will then be offset by a change in the amount of the Monetary Dividend. The ECB will provide a sound environment for financing businesses, with the Monetary Dividend as an adjustment variable.

In concrete terms, the ECB will be able to choose the level of nominal interest rates in order to have slightly positive real rates. For example, if the target inflation rate is 1%, one can imagine fixing the ECB main rate at 1.5% (instead of 0% currently), which would allow market rates to be higher than inflation. Although not free anymore, debt would remain relatively cheap, but the banking system would work much better. Savings would get a fair compensation back again, and available cash would tend to be invested.[48]

What should be the target interest rate then? One option would be to choose the level of rates that would eventually align the creation of money by debt

46 Negative rates are becoming very detrimental to the banking system, see Vivien Lévy-Garboua, Le Monde à taux zéro, PUF, 2017

47 The accounting treatment will be discussed below in this note

48 Which would facilitate a way out from the current liquidity trap

with growth.[49] In the euro area, it would be sufficient to issue 200 billion in debt, instead of the current 500 billion. This would leave 300 billion to be issued in the form of a Monetary Dividend.

In the shorter term, however, it seems reasonable to first reduce the massive amount of debt which was built in the economy over the last decades. The ECB can position rates at a level which would allow for a gradual reduction in net debt.

The increase in interest rates will be matched by an increase in the Monetary Dividend. By supporting consumption and the price level, this will prevent any recessive effect linked to the rise in interest rates. Companies will thus benefit from an environment where inflation and interest rates are largely predictable, which in turns supports investment.

For commercial banks

The introduction of the Monetary Dividend for commercial banks would have mostly upsides.

The first upside would be the return to a normalized interest rate situation. As Vivien Levy-Garboua, former director of BNP Paribas, explains, "*banks do not like low rates*" to the point where "*low rates are a much more serious poison than regulation.*[50]" In particular because the bank earns interest on the difference between the rate on its loans and the rate on non-interest-bearing deposits, i.e. 0%. The lower the loan rates, the lower the margin. Low interest rates have a dire negative impact on banks' profitability.

This positive price effect should more than compensate the likely reduction in the volume of bank loans. Banks would certainly have lower business but overall better profitability. They would continue to finance economic growth through credit.[51]

The second advantage is that the creation of a central bank currency mechanically strengthens the banking system. The Monetary Dividend is created in central bank money: it therefore increases the relative quantity of

49 This separates two components of money creation in the monetarist equation MV = PQ. Debt is used to support Q's growth, and the Monetary Dividend to stabilize the level of P by fully offsetting technological deflation.

50 Le monde à taux zéro, PUF, 2017, Chapter 5

51 "Even in the most extreme and unlikely scenario, where the central bank would issue CBDC with deposit attributes and the public would massively adopt it, banks' role in distributing credit should not be seriously impaired" Christian Pfister, "Monetary Policy and Digital Currencies: Much Ado about Nothing", Banque de France, September 2017

central bank money and decreases the relative quantity of debt money. Each time a bank's customer transfers her Monetary Dividend to her bank account, she actually drives up the bank's reserves, exactly as she was depositing cash. Bank solvency ratios are more easily achieved and the risk and impact of bank runs are reduced.[52] The overall strength of the system improves.

By being freed from their current, unnatural role of stabilizing inflation, commercial banks will be able to focus on their real and essential function, the financing of the economy, with sustainable operating conditions. The banking system as a whole will be considerably strengthened.

For firms

What will be the impact of the Monetary Dividend on the competitiveness of companies? Overall positive, with three main benefits.

The first is that consumption will be supported by the Monetary Dividend, both in terms of price and volume. It should benefit many sectors, particularly the retail sector, which has greatly suffered over the past ten years.

The second benefit is a much more stable macroeconomic environment, with predictable interest rate and inflation as well as a reduced level of general risk. This is a favorable context for investment, the level of which should be maintained with rates remaining low, even if they will be higher than today.

Companies may possibly encounter a third benefit: a price competitiveness gain obtained by lowering the exchange rate of the euro. By increasing the quantity of money, the Monetary Dividend tends to weaken the currency against other currencies. The country's costs are decreasing, expressed in foreign currencies: products and services are becoming more competitive in exports.[53] This effect, however, would be partly offset by the increase in interest rates.

For goverments

52 The implementation of the Monetary Dividend brings us closer to the "100% Money" scheme devised by Irving Fischer, in which there is no risk of a bank run. It is however not the same scheme, as the banks continue to lend in the present proposal.

53 The Monetary Dividend has the same effects here as a competitive devaluation. The major difference with a devaluation is that citizens do not lose in wealth since the Monetary Dividend compensates for the loss in value of the currency. It is similar to a share detaching a dividend. If a share with

To support demand, most European countries ran a Keynesian-inspired budget deficit policy. They let public deficits slip away and thus inject money into the economy. They go into debt to finance their deficits, leaving it to future generations to pay for these expenses. In Europe, France, Spain and Italy still have a materially negative budget deficit, while the other countries went back to balance or in surplus.

The Monetary Dividend mechanism encourages fiscal virtue. As a matter of fact, monetary policy replaces fiscal policy: if a state reduces its budget deficit, it reduces its injection of money into the economy. Demand tends to fall, so do prices, and the Monetary Dividend increases. Monetary creation automatically compensates a tighter fiscal policy.

This phenomenon of substitution between monetary and fiscal policies is well known. It is visible in the United States, for example. Donald Trump cut taxes massively, injecting money through the budget. Anticipating inflationary pressures, the Fed logically raised interest rates, much to the fury of Donald Trump, who accused Jerome Powell, Governor of the Fed, of sabotaging his stimulus plan.

With the Monetary Dividend, governments have every interest in letting the central bank inject the necessary money into the system, and therefore in reducing their own public deficit. A virtuous government with balanced public accounts will tend, all other things being equal, to obtain a higher Monetary Dividend for its citizens. Increasing the Monetary Dividend can therefore be a political objective. The government has no direct control over its amount, but it can influence it indirectly through its fiscal policy. Good government can mechanically result in a higher Monetary Dividend.

This is a major difference with the now popular idea of "Modern Monetary Policy," which calls for higher public spending financed by the low level of interest rates. By creating money and using it in government spending, MMT is similar to an invisible tax to which voters did not consent. By continuously creating additional debt, it does not handle properly the permanent pressure that technology puts on prices. It does not appear as a suitable and sustainable way to handle deflation.[54]

a price of €100 pays a dividend of €5 to its holder, the share price naturally adjusts to €95. Contrary to a widespread idea, the shareholder's wealth does not change after the dividend distribution, since he still owns € 100: € 95 in shares, € 5 in cash. The same applies to citizens who receive a Monetary Dividend. The Monetary Dividend therefore solves the currency dilemma. On the one hand, a strong currency that allows citizens to enrich themselves (high purchasing power at import) but penalizes exports. On the other hand, a weak currency that promotes cost competitiveness and exports, but at the cost of a loss of wealth for the citizens, resulting in more expensive imported products.

54 I described this more in detail in Les Echos, June 26th, 2019, "Modern monetary theory: false theory, real tax."

The government has other means to increase the Monetary Dividend. It can promote innovation and competition, liberalize markets, reduce customs duties for example. These measures will lead to increased competition, stronger deflationary pressures and therefore a higher injection of Monetary Dividend. The Monetary Dividend eventually allows citizens to see the benefits of virtuous public policies directly in their bank accounts, and thus makes those policies politically attractive for governments.

The implementation of the Monetary Dividend ends up making any Keynesian stimulus policy unnecessary and inadequate. The government is naturally encouraged to focus on its core functions, particularly its sovereign tasks. It also has an objective interest in reducing its debt.

This incentive to government virtue would strengthen the euro area. Monetary creation would naturally be directed towards the most virtuous countries. The Maastricht criteria would then become useless: the citizens of a country running public deficit would be de facto penalized with a lesser Monetary Dividend.

For citizens

Some schemes of helicopter money are sometimes intended for social redistribution. As we have understood, this is not the case with the system described here, whose sole purpose is monetary. The Monetary Dividend is solely a mechanism for stabilizing the price level.

But it has a significant positive social impact. Price drops should normally benefit households, but they are currently being captured by debt creation. As unintentional as it may be, it does deprive households from a fair benefit of free markets. The Monetary Dividend returns to them the value captured by the money created.

In Europe, the average monthly distribution would probably be between 50 and 100 € per person, a significant additional income for modest families. The Monetary Dividend would reduce both poverty and inequalities.[55]

For all savers, and in particular in the case of retirement savings, the return to a situation of positive real rates would restore the profitability of their investments. The possibility of setting aside part of one's income to build up wealth would become possible again, unlike the current situation where risk-free investments have a return lower than inflation, putting a

55 In France for example, the scheme would reduce poverty by two points, from 14% to 12%. The ratio between the richest 10% and the poorest 10% would be reduced from 6.6 today to 6

high pressure on pension systems.

Finally, the Monetary Dividend should have a positive impact on housing affordability. By reducing assets bubbles, it would avoid excessive growth in house prices and reduce the share of rent in household spending. It would likely contribute to better access to housing for households with a low income. The increase in interest rates should be offset by the Monetary Dividend and the moderation of asset prices.

Objections to the scheme – and their rebuttal

The distribution of money to households is an astonishing and possibly frightening device. Let us examine the most frequent objections to it.

Is there a risk of hyperinflation?

The creation of money without a collateral sometimes raises the question of the risk of hyperinflation. Can the system get out of control? Can we find ourselves in the situation of Germany in 1923, or Venezuela today, where inflation in 2018 reached 1 350 000%?

Hyperinflation is defined as monthly inflation of at least 50%. If the Euro area were to go into hyperinflation, any item priced today at € 1 would cost € 130 in a year's time. If hyperinflation were at Venezuela's level, the same item would cost more than € 10,000 in a year.

The phenomenon of hyperinflation is linked both to the creation of money and to the acceleration of its circulation. In hyperinflation, consumers anticipate the relentless decline in the value of the currency, so they spend it as quickly as possible. Any item is good to buy rather than to keep cash. [56]There are 57 historical cases of hyperinflation, and they all occurred under highly deteriorated political conditions, often associated with war, severely deficient public policies or a very weak government.[57]

The solution to hyperinflation is to stop money creation (both in central bank money and in debt money). Inflation continues for a few months, then prices drop sharply to stabilize at the level corresponding to the

56 In the equation MV = PQ, it is therefore the simultaneous increase of M and V that produces the high growth of P

57 Steve Hanke et Nicholas Krus, Cato Institute

amount of money in circulation. Germany did this in 1923, and it solved the problem within six months.

In the case of a Monetary Dividend, the ECB will seek to regulate an annual inflation level of 1 to 2% per year, or about 0.1% to 0.2% per month. If inflation goes beyond this level, the ECB will reduce money creation and quickly stop it. All this is done in a democratic political context and within a functioning market economy.

None of the factors carrying a risk of hyperinflation are present - neither the weakness of the state, nor the lack of credibility of the central bank, nor the self-fulfilling expectations of hyperinflation. Money creation can be stopped instantly, and it can be triggered as soon as inflation exceeds 0.2%. If it is not enough, the toolbox of central banks is very well equipped and has historically proven very effective to handle inflation. Interest rates can be increased or reserve ratios strengthened. The risk of reaching a monthly inflation of 50%, or even 10%, or even 2% is simply nil.[58]

Is the central bank within its role?

The question of governance is legitimate. Does the central bank have the legitimacy to intervene in the distribution of wealth? Isn't the Monetary Dividend a form of fiscal policy, which should be conducted by governments?

In fact, central banks already impact largely the distribution of wealth. A monetary policy always implies a choice between one category and another. When a central bank lowers interest rates, it benefits borrowers and penalizes lenders. Keeping inflation low benefits pensioners and penalizes employees whose salaries do not increase; it benefits older people who have built up assets at the expense of young people. A higher inflation target would have the opposite effect.

The Monetary Dividend has a form of neutrality, since it is distributed equally within a given territory. As underlined by economists Mojmír Hampl and Tomáš Havránek, "direct support of consumption only makes these transfers explicit, transparent, and probably fair in most peoples' eyes, because each person receives the same amount: akin to a dividend paid by the central bank to citizens (who, in democracy, have an equal

58 Even economists who are not in favour of direct money creation acknowledge that it does not carry a risk of hyperinflation. See for example Toby Nangle, "How helicopter money works," Columbia Threadneedle Investments, May 2016

share in state institutions)."[59]

Who should choose inflation and interest rate targets? These are technical choices but they also have an impact on the economy, investment and redistribution. The central banks could propose their target levels, which would then be validated by the European parliament. A cap on target inflation may also be considered and included early on in the scheme by mutual agreement between the Euro area countries.

Will part of the distributed amounts be saved?

Definitely. Some of the amounts will be saved and therefore not be immediately reinjected into the financial system. The Monetary Dividend will not deliver a 100% yield. However, it is likely to bring a better yield than quantitative easing.

The average saving rate in the euro area is 12.1%: a European citizen saves on average €12.10 for every €100 bill received. But the savings rate increases with income: additional money is less and less vitally necessary, and so it is saved more and more. A Monetary Dividend is more likely to be saved because some of the current expenses have already been made by households. This "marginal propensity to save" can be grossly estimated to 30% in Europe.[60]

This 30% value is also suggested by analyzing the 2001 tax cuts in the United States. These tax cuts are a distribution of purchasing power: what proportion is spent, what proportion is saved? One third of the amounts distributed in tax cuts were spent in the first quarter, another third in the following quarter, which suggests one third was saved.[61] In 2008, a new wave of tax cuts happened. 70% of tax incentives were spent, which still leads to a 30% marginal propensity to save.[62]

An estimate of 30% savings leaves a likely 70% yield. This is of course less than 100%, but it is not a major problem for two reasons.

The first is savings return sooner or later into the economic circuit, and

59 "Central Bank Capital as an Instrument of Monetary Policy, ZBW", 2018, Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel und Hamburg

60 Source Eurostat – note 149/2017 for the average saving rate. The estimate of the marginal rate at 30% is based on an extrapolation of the average rate / marginal rate ratio for France (17% and 40% respectively).

61 European Parliament Research Service, Helicopter money: a cure for what ails the euro area?, April 2016

62 Parker, Souleles, Johnson & McLelland "Consumer Spending and the Economic Stimulus Payments of 2008", American Economic Review 103(6), 2530-2553

partially to consumption. Some of it will be used to finance the purchase of durable goods - a car, a TV, a home cinema, a kitchen... and will therefore have a positive impact on the price level, even if it is deferred.

The second reason is that a yield of 70% is likely to be higher than the current yield of quantitative easing. The latter is difficult to estimate, but comparing an annual monetary creation of 5% during quantitative easing[63] with an inflation rate of only 1% suggests that the current yield on monetary policies is far from 100%.

Can the ECB legally do it?

From a legal point of view, the implementation of the Monetary Dividend seems possible within the current framework. Article 20 of the ECB Statute stipulates in particular that "*the Governing Council may, by a majority of two thirds of the votes cast, decide upon the use of such other operational methods of monetary control as it sees fit, respecting Article 2.*"[64] It therefore gives the Governing Council considerable freedom. The "efficient allocation of resources" mandate mentioned in Article 2 of the Statute[65] is rather a good argument in favor of a Monetary Dividend.

This legal possibility is also made possible by the fact that the Monetary Dividend is a non-government version of helicopter money, as it targets households. A helicopter money scheme for financing countries, such as the one promoted by Ben Bernanke, would be illegal in Europe as in most legal systems. In Europe, Article 123 of the Lisbon Treaty[66] explicitly prohibits

63 4.9% - average growth of the M2 money supply in the Euro area between March 2015 and December 2018

64 Article 20, Other instruments of monetary control, Protocole on the statutes of the European System of Central Banks and of the European Central Bank

65 "[…] the primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2 of this Treaty. The ESCB shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources, and in compliance with the principles set out in Article 4 of this Treaty"

66 "1. Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (hereinafter referred to as "national central banks") in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments.
2. Paragraph 1 shall not apply to publicly owned credit institutions which, in the context of the supply of reserves by central banks, shall be given the same treatment by national central banks and the European Central Bank as private credit institutions."

central banks from directly financing the State or any public body. Victor Constâncio, Vice-President of the ECB, recalled this in 2015: "*The main idea of helicopter money refers to the direct financing of public expenditure. It's not an option for us. It's not something we're looking at.*"[67]

On the other hand, it is not prohibited to pay an amount to citizens. As Deutsche Bank analysts explain, "*the ECB somewhat ironically has greater potential to pursue the most unconventional forms of "helicopter drops" in the form of direct transfers to households, while the more conservative options of transfer to governments or unilateral restructuring appear more restricted.*" [68]Peter Praet, then Chief Economist of the ECB and member of its Executive Board, explicitly mentioned this in March 2016: "*We can create money and distribute it directly to the population. The question is: when to use this type of instrument, really extreme.*"[69]

The ECB has since taken a more conservative stance on the subject. In a letter to Member of the European parliament Jonas Fernandez,[70] Mario Draghi argues that a form of helicopter money distributed to citizens could possibly be considered as a substitute for an obligation of the state towards its citizens. In all honesty, the argument does not apply well to the Monetary Dividend scheme, which does not in any way substitute for state action and is not taxable. There is therefore no way it can finance the state, even indirectly. Conversely, the current policy of buying back government bonds via the quantitative easing scheme allows governments to finance themselves indirectly at a lower cost. It is therefore much more suspicious of contravening Article 123.

Finally, there is a degree of political freedom in the interpretation of Article 123. Article 125 specifies that "the Council, on a proposal from the Commission and after consulting the European Parliament, may, as required, specify definitions for the application of the prohibitions referred to in Articles 123 and 124 and in this Article." An agreement between the Council and Parliament would remove any legal uncertainty regarding the possibility for the ECB to set up a Monetary Dividend issue.

Some economists actually go further by claiming that the distribution of money to households is an obligation of the ECB, since its role is to stabilize inflation independently and without financing governments. Since it is unable to do so by the current means and is prohibited from financing governments by helicopter money, its duty is to set up a form of monetary

67 December 2015, quoted by EPRS, « Helicopter Money: a cure for what ails the euro area ? », April 2016

68 Deutsche Bank, "Helicopters 101: your guide to monetary financing", 14 April 2016

69 La Reppublica, 18 March 2016

70 Letter L/MD/16/504, 29 November 2016

dividend for citizens. This is the position of economist Eric Lonergan[71] or Willem Butler, Chief Economist of Citigroup,[72] for example.

The accounting issue

While the practical arrangements for allocating the Monetary Dividend are relatively simple, there is a significant accounting issue for the central banks themselves.

Like all companies, accounting rules require them to balance their assets and liabilities on an ongoing basis. For example, when they create money to buy a government bond, the liability generated by the creation of money is exactly offset by the value of the bond, which appears on the assets side of the balance sheet.

However, the counterpart of the Monetary Dividend is a value creation linked to technology, which does not benefit the central bank but the citizens. In accounting terms, the simple distribution of a Monetary Dividend would result in a loss for the central bank. A permanent issue of Monetary Dividend could therefore lead to perpetual losses.

This situation illustrates quite well the conceptual change required by the technological deflation thesis. Accounting mechanisms are designed for a balanced, stable world where assets and liabilities offset each other over time. They are not well suited to take into account the irreversible, one-way nature of technological deflation.

It should be noted that this is only an accounting issue. If there is one player who has no reason to run out of money, it is the one whose job it is to create it: "*A central bank's uniqueness rests in its ability to run infinite losses as it controls its own unit of account.*"[73]

As the authors of a BIS report on central bank finances admit: "*Most central banks could lose money to the point of negative equity while still operating*

71 Eric Lonergan, "Legal helicopter drops in the euro area", on his blog Philosophy of money

72 "The primary objective of the ECB is price stability, operationally defined as an inflation rate (on the HIPC measure) below but close to two percent per annum in the medium term. If the only way to pursue this primary objective of price stability is to engage in helicopter money drops, and if Article 123 of the TFEU is deemed to rule out a joint monetary-fiscal policy stimulus by the ECB and 18 (in 2014, 19 from January 1, 2015, when Lithuania joins the EA) national fiscal authorities, then one could argue that the Treaty not only permits but demands helicopter money drops from the ECB. Output legitimacy may trump the lack of input legitimacy." Willem Buiter, Chief Economist, Citigroup, "The Simple Analytics of Helicopter Money : Why it works – Always", August 2014

73 Deutsche Bank 2016

perfectly normally."[74] It has also been shown that the fact that a central bank makes losses does not affect its long-term ability to fight inflation. [75] And there is no legal obligation to recapitalize the ECB on the part of its shareholders, the national central banks.

Nevertheless, although perfectly possible, negative equity could have some disadvantages, one of which would be to blur the quality of the management of the central bank. It may require profitability targets excluding Monetary Dividend. It could also be a significant obstacle to central banks' acceptance of the scheme. Several economists have used it to argue against any monetary creation mechanism without collateral.[76]

Alternative options could avoid running perpetual losses by creating an asset on the central bank's balance sheet. The first possibility would be to distribute the Monetary Dividend as a perpetual debt with zero interest and infinite maturity, the repayment of which would be in the hands of households. Of course, no household would ever ask to repay a free and perpetual debt, while providing to the ECB an asset to record in the balance sheet.[77] The downside of this option would be to still artificially expand the stock of global debt. It may also be harder to explain to citizens, with a risk of reducing its impact as some citizens may prefer not to contract what would formally be a debt.

A second option would be to record an intangible value as an asset, which would be the exact amount of the total amounts distributed as Monetary Dividend.[78] This goodwill would measure the value created by technological progress and therefore most probably increase every year. A rather attractive option, as it solves the accounting issue without an artificial increase in the amount of debt. It would also give a clear message to households that the Monetary Dividend is not redeemable, ensuring full adoption.

Whatever the chosen option, it will have in any case to be well and properly

74 Bank of International Settlements paper n°71, Central Bank finances, David Archer, Paul Moser-Boehm

75 Hampl, Havranek, « Central Bank Capital as an intrument of Monetary Policy », Econstor, Leibniz Information Center for Economics

76 Bruno Moschetto, « Une distribution de monnaie par hélicoptère serait suicidaire », Le Monde, 23 March 2016 ; Julien Pinter, « Les illusions de la monnaie hélicoptère », Le Monde, 3 June 2016. Both authors oppose the accounting argument to any helicopter money scheme. They promote instead a very traditional cash injection through the budget deficit. In other words, they propose to downgrade the public accounts indefinitely in order not to downgrade the ECB's balance sheet.

77 Proposed by Sascha Bützer "(Monetary) Policy Options for the Euro Area: A Compendium to the Crisis", October 2016.

78 Thomas Mayer, « From Zirp, Nirp, QE and helicopter money to a better monetary system", Flossbach von Storch Research Institute, 16 mars 2016

explained to the markets, in order to avoid any loss of confidence in the currency. In this case, the distribution of a Monetary Dividend to households, if properly explained, should be very well received by the markets, since it helps to support both demand and prices while strengthening the banking system.

IV - Implementing the Monetary Dividend: a practical guide for the ECB

The implementation of a Monetary Dividend requires implementing a sizeable infrastructure. On the one hand, the central bank must obtain from the government the list of eligible persons, which must be kept constantly updated. On the other hand, it must be able to set up a distribution system allowing beneficiaries to have access to monetary creation.

As far as the euro area is concerned, the subject is getting more complicated. The sharing of the same currency by 19 countries calls for specific additional rules. Each of the 19 countries of the euro area has its own characteristics, its own rules of law, its own internal market, its own culture. The economies of the euro area do not have the same operating rules, maturity, growth potential and ultimately inflation.

Germany is an ageing, mature and well-managed economy. Estonia is a catching-up economy, very dynamic and growing fast. Ireland has built its success on its tax attractiveness. Greece is a traditional economy that has made a remarkable reconstruction effort and now has balanced public accounts. France is a mature country struggling to reform itself and balance its public accounts.

The amount of money to be created in each of these countries to stabilize inflation simply cannot be the same. The amount of the Monetary Dividend will differ from one country to another. This is an essential principle, to be

kept in mind.

However, various countries may share the same inflation target. If the target inflation rate is 1% for the euro area as a whole, then it must also be 1% in each country. The amount of the Monetary Dividend should then be tailored for each country in order to achieve this target.

We will thereafter propose a number of practical terms and conditions for the Monetary Dividend. The goal of injecting fresh money is to spend it as much as possible in order to support consumer prices. When arbitrage is needed between schemes, the choices will often be taken so as to maximize efficiency. However, they are definitely open to debate.

Q&A on the Monetary Dividend

Which inflation target?

We first need to choose what should be the best indicator for inflation. The natural measure would be the general consumer price index (CPI), which is the most common and widespread measure of inflation.

However, taking this target objective as a target would have a disadvantage. It is strongly influenced by changes in the price of raw materials, particularly oil. Let us suppose that the barrel of oil is rising sharply, as for example happened in 2018. Inflation is picking up again. Mechanically, less money must be injected into the economy. The Monetary Dividend would therefore fall, precisely at a time when purchasing power would already be reduced by the rise in oil prices. Conversely, in the event of a sharp drop in the barrel, the dividend would increase.

Including the price of oil would therefore lead to significant variations in the amount of the dividend, and those variations would accentuate the cycle. It seems therefore wiser to exclude oil and highly cyclical commodities from the indicator.

The most relevant indicator is therefore likely to be the price index excluding energy and unprocessed food, also called “core inflation. It covers 85% of the household basket[79].

The ECB’s current objective is to achieve a level of inflation “close to but below 2%”, including energy and commodities. The 2% target is chosen to maintain

79 Eurostat, 2019

some headroom and avoid deflation. A reasonably equivalent target for the core inflation index could be a clear 1.5% target.

This target must be designed over a rolling 12-month period. If the Monetary Dividend injection is too high and leads to an average inflation of 1.7% over three months, the ECB must target 1.4% over the following nine months to ultimately achieve an inflation of 1.5% over 12 months.

The target could be probably lowered to 1% if deemed relevant, or to mitigate initial fears of loss of inflation control. Could we aim for less? For example, a perfectly stable price level, with zero inflation? In theory, this is possible. [80]However, a moderate level of inflation facilitates relative price adjustments, and reduces the risk of having some wages to negotiate downward. A slightly positive objective is therefore much preferable.

When?

How often should the Monetary Dividend be distributed? A monthly basis seems ideal, as it corresponds to the current frequency of household budgets, perhaps between the 15th and 20th of each month, at a particularly critical time for many families. The idea is to ensure that the amount will be spent as much as possible, in order to support the price level in the economy.

From the ECB perspective, the monthly basis allows injecting new money in moderate and regular quantities. It should be preferred to trimester or yearly injection, as the effect will be much more regular throughout the year. It will also provide more data points to analyze the reaction of the economy to the money injection, and make it much easier to tailor for the ECB.

To whom?

The beneficiaries would be all legally authorized residents of a country in the euro area. Should children be included? Most certainly, first because they are European citizens even if they do not have the right to vote. Moreover, households with children are more likely to consume and save less. For the sake of efficiency alone, the ECB has every interest in including children in the scheme, on par with adults. The amount of the dividend will not be paid directly to minor children, but to their beneficiaries, possibly in proportion to custody rights in the event of divorce or separation of the parents.

It may be useful to set minimum residence requirements for non-European citizens. The fear of a possible risk of migrants coming to recover the Monetary

80 Voir Michael Bordo et Andrew Levin, « Central Bank Digital Currency and the Future of Monetary Policy", May 2017, NBER

Dividend might be more fantasized than real, but the current sensitivity of the matter requires caution. The dividend could therefore be payable to any citizen who is a national of a euro area country and resides in the euro area (not necessarily in his or her home country), as well as to any non-national of the euro area subject to residence in the euro area for more than three years, for example.

Country public authorities have an important role to play. They must provide the files of eligible citizens (surname, first name, date of birth, social security number, address, related children) and update them on a monthly basis.

How much?

As already mentioned, the amount will depend on the country of residence. It will first be estimated by the ECB according to the country's economic conditions and then adjusted for inflation until it reaches a level that stabilizes inflation at the target level.

One major point needs to be very clear: the amount of the dividend is not discretionary. It is not decided by the ECB, but is estimated and adjusted according to objective economic criteria.

Process engineers will recognize a fairly common control loop. Let's take the example of an electric radiator heating a cold room during the winter. The thermostat set point is, say, 18°. The radiator will produce the amount of heat necessary to reach this temperature. It will stop as soon as it reaches it, starting heating again as soon as the temperature drops below the set point.

The thermostat does not need to be smart neither to understand why the room is at a given temperature. Fortunately, because the room temperature is the result of many parameters: its size room, insulation, whether it is occupied or not, the outside temperature, whether a window is open or not.... The thermostat, without apprehending these details, must simply heat up until the right temperature is reached. It does not take any decision, has no discretionary power. It follows a simple instruction: heat if the temperature is below 18°, do not heat otherwise.

The Monetary Dividend mechanism is somewhat comparable. The central bank must increase the dividend until it reaches the inflation target and reduce it if it exceeds the target. There is no need to model all the parameters of the economy. The ECB has no discretionary power on the amount of the dividend. If it issues too much, it will then have to compensate with a smaller amount to smooth out the variations.

This control loop guarantees that inflation will stay under control. It is a fundamental element to avoid a slippery slope towards inflation, and therefore reassure markets.

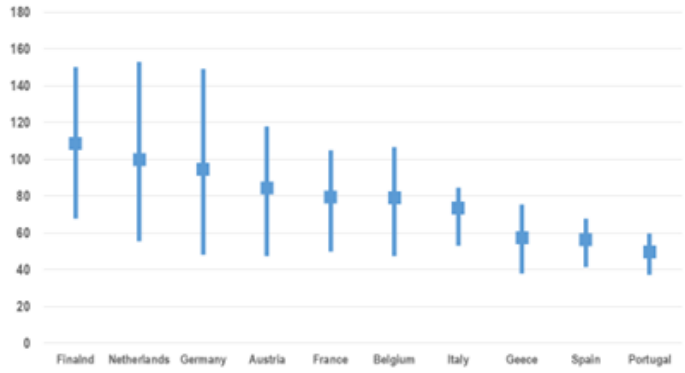
The right amount to issue is difficult to predict in advance. The model below gives some orders of magnitude, starting from the amounts issued today by quantitative easing policies.

Details of the calculation are provided in the appendix. As will be seen, the necessary assumptions are such that the amounts estimated here are highly indicative. The final amount will depend on economic conditions, the willingness of economic agents to invest and consume, fiscal policies or the speed at which the economy will pay down debt.

The amount distributed depends on the economic and budgetary conditions of each country

Fig. 13 - Monthly illustrative amounts of the Monetary Dividend for ten countries in the euro area

Estimated range, € per beneficiary and per month, based on 2018 economic conditions



These amounts are reasonable orders of magnitude, which help to foresee the concrete impacts on the monthly household budget. They are comparable to other estimated calculations.[81]

Let us focus on the differences between countries, and more generally on what drives the amount of the Monetary Dividend.

The first driver is how much wealth produces the national economy. The higher it is, the higher the dividend. Countries with high GDP per capita create more wealth, and therefore more deflation in absolute terms. They will naturally pull a higher dividend.

The second driver is fiscal policy. The budget deficit works like an injection of

81 Sascha Bützer provides a conservative estimate of € 60 per month in the euro area in "(Monetary) Policy Options for the Euro Area: A Compendium to the Crisis", October 2016.

money into the economy through public debt. It can therefore be expected that countries with high deficits (France, Spain, Italy) will benefit from a lower dividend than virtuous countries with a budget surplus, all other things being equal (Germany, Netherlands, Greece).

Modelling is particularly difficult for countries such as the Netherlands and Ireland, where part of GDP is largely dependent on an accommodating tax policy.

On average in Europe, the likely amount of the Monetary Dividend can be estimated between 40 and 120 € per month and per person. For a household with two children, it means a monthly amount ranging between 160 € and 480 €. Not enough to stop working and go and live in the sun, but a real plus to make ends meet for many households.

How?

Some economists propose to distribute the dividend in the form of vouchers or checks to encourage consumption.[82] The objective is to avoid that the dividend ends up being deposited on a savings account. The dividend should then be fully converted into consumption, otherwise the check will expire after a given time.

In practice, such a modality would be quite cumbersome to implement, for a likely impact close to zero. Suppose that a beneficiary of a €100 dividend wants to spend €80 on additional consumption and save €20. If the dividend is distributed in the form of currency, she will spend €80 directly and put €20 into her bank account. If the dividend is distributed in the form of a check, she will spend her check for €100, but will spend €20 less on the income she otherwise receives, which she will therefore save.

The final impact ends up being absolutely the same, largely because the Monetary Dividend remains marginal in relation to income. Distributing it as a check would have hardly any positive impact while largely increasing the complexity and costs of the system.

A central bank digital currency

Distributing cash to 300 million beneficiaries is significantly more complicated than repurchasing debt securities or even transferring money to governments. The ECB is not a retail bank and is not intended to be.

82 For example Hampl, Mojmir; Havranek, Tomas (2018), op. cit.

The system to be put in place must remain manageable for the ECB. It should build on the existing financial ecosystem. The simplest option for the ECB is the introduction of a central bank digital currency (CBDC)[83] – let us call it the digital Euro (€D). It would circulate within a closed digital money system (central bank digital currency system or CBDCS). [84] In practical terms, it is a secure IT platform hosting bank accounts in digital currency.

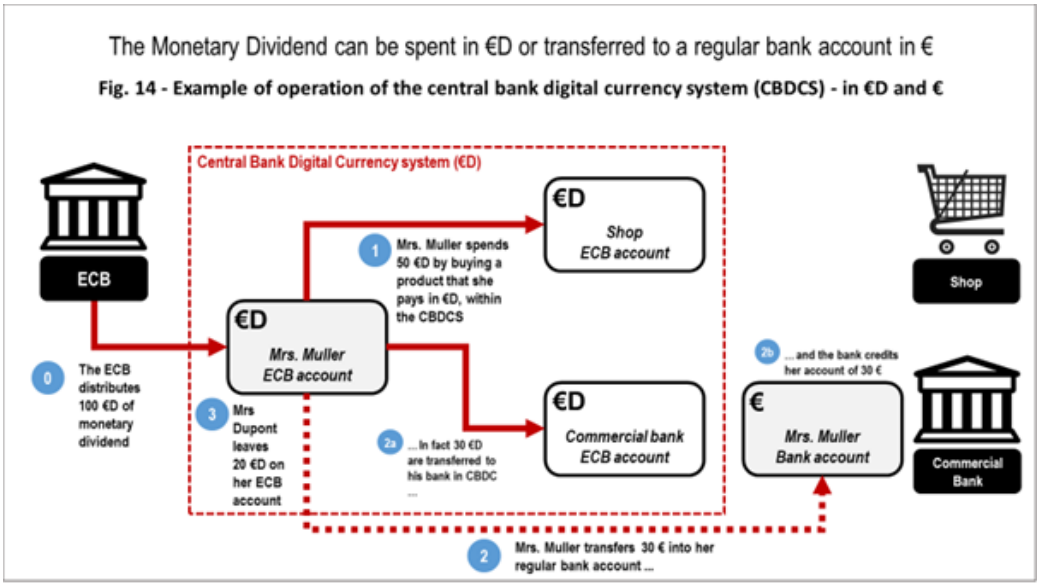
The management of the CBDCS would be delegated to an ad hoc subsidiary of the ECB to be set up. The CBDCS should contain three types of accounts:

- "Resident" accounts whose holders are people. There is one for each beneficiary of the Monetary Dividend. The information needed to keep these accounts up to date would be provided by the countries. These accounts would be free of charge for their holders.

- "Banks" accounts: each commercial bank or holder of a bank license has an account in the CBDCS.

- "Business" accounts: any legal entity should have the possibility of opening an account in the CBDC system. These accounts could be subject to fees.

Distributing the dividend is quite simple. The ECB pays the amount of the Monetary Dividend to each beneficiary's accounts in €D every month (Flow 0 on the diagram in Fig. 14). 1 €D is worth exactly €1, the parity being guaranteed by the ECB. The beneficiary - let's call her Mrs. Müller - has three options for using her dividend.



83 The ECB aslo uses another acronym, DBM – digital base money

84 Central bank digital money is currently the subject of much work, for example in China, England, Sweden or the Euro area. The Bank for International Settlements produced a very comprehensive report on the subject in March 2018. The system is often considered unnecessary in the current economic context. It makes much more sense indeed with the introduction of the Monetary Dividend.

The first is to spend it within the CBDCS. Mrs. Müller can transfer money to someone else or to a company to complete a regular transaction (Flow 1). In this case, the digital currency is used like a PayPal account. The transaction is of course taxable, either within or outside the CBDCS.

The second option is to transfer this money to one's bank account. Mrs. Müller then makes a payment from one account to another (Flow 2). However, from an accounting point of view, the money does not leave the CBDCS: it is paid into the bank's digital currency account (2a), the bank then crediting the beneficiary's current account in euros (2b). The operation is equivalent in accounting terms to a cash deposit into a bank account: ownership of the money is transferred to the bank, which registers a debt obligation to the benefit of Mrs. Müller in return. The flow of outgoing transfers from the CBDCS therefore strengthens banks' reserves and constantly improves their solvency ratios.

The third option is simply to keep the money in one's bank account for future transactions. (3) This money does however not bear interest. CBDC accounts are only unpaid deposit accounts, a kind of electronic wallet.[85] It is very similar to a dematerialized banknote. However, it is not intended to replace cash.

In order to make it easier, the role of the ECB's subsidiary could be limited to the mere management of accounts.[86] Private actors would then offer payment services, such as credit cards in €D or mobile transfer services.

By not offering any services or remuneration on its accounts, the ECB would avoid competing with commercial banks.[87] However, the decrease of amounts deposited in bank accounts may pose a problem in the long term. The banking model is largely based on the difference between interest-bearing loans and deposits, the most profitable of which are those that are not remunerated.[88] Losing some of the unremunerated deposits can theoretically be an issue for banks profitability.[89]

But this business model is in fact already largely endangered by the fall in interest rates, which reduces the remuneration of loans made by banks. The issue of Monetary Dividend would be combined with a raise in interest rates, restoring the spread between interest rates and deposits. Considering the

85 Technically, the proposed CBDC is therefore "token based", non-anonymous, uncapped, unpaid and permanently available

86 See Positive Money, "Digital Cash – Why Central Banks Should Start Issuing Electronic Money", January 2016

87 Christian Pfister, "Monetary Policy and Digital Currencies: Much Ado about Nothing?", Banque de France, September 2017. The present proposal is close to the C2 scenario, with a non-remunerated CBDC.

88 Vivien Lévy-Garboua, Le Monde à taux zéro, PUF, 2017

89 Bank of International Settlements, "Central bank digital currencies", March 2018

appalling current level of spreads, banks would have much more to gain in high rates than to lose in deposit volumes.

As Christian Pfister[90] points out, the role of banks should remain broadly unchanged in the context of setting up a CBDC, especially in the context of setting up a Monetary Dividend that raises the level of interest rates.

CBDC also raises questions about the stability of the banking system. The CBDC belongs to the account holder, while the bank deposit is a claim of the account holder against the bank. The bank deposit is therefore at risk in the event of a bank default, unlike the CBDC.

In the event of a bank's difficulties, one could therefore imagine massive transfers from bank accounts to €D accounts, facilitated by the digital nature of the CBDC.[91] Safeguards should be put in place to avoid this risk. In addition to existing state guarantees of deposits, it is conceivable that banks may limit the amounts which could be transferred to the CBDCS in certain circumstances, just as they can limit today cash withdrawals.

In the context of the introduction of a CBDC associated with the Monetary Dividend, the risk remains somewhat limited, and decreases over time: the permanent increase in the proportion of central bank money in the system tends to strengthen it overall.

A three-step implementation

Preparation

Although current European rules would allow a Monetary Dividend, it is not conceivable that such a bold scheme would be implemented unilaterally by a mere decision of the ECB. A joint agreement to set a Monetary Dividend should take place between the 19 countries and the ECB, which would include an agreement on the rules and the commitment of governments to provide the list of eligible residents.

Unanimous consent between 20 bodies is a touchy exercise by all means.

90 Ibid.

91 « Digital runs » as described by the BIS (« Central bank digital currencies », March 2018, p16); see also Benoît Coeuré's speech, « The future of central bank money », International Center for Monetary and Banking Studies, Geneva, May 14th, 2018

In this specific case however, the political advantage of agreeing to the distribution of money to voters seems attractive enough to ease an agreement. The need of finding a solution to the downward pressure on prices in the current context of a fragile economy is also highly likely to facilitate an agreement.

Once the decision to set up a Monetary Dividend has been taken, it will be necessary to prepare for operational implementation. This preparation should be based on two pillars.

The first is the creation of the CBDC system, within an ad hoc organization to be incorporated. It will have to set up the secure platform to host accounts (300 million resident accounts and several tens of millions of legal entity accounts) and manage transactions within the system.

The second is the provision by the various countries of the list of beneficiaries, i.e. their eligible residents. It must include for each beneficiary surname, first name, date of birth and a unique identifier, typically the social security number. For children, it is also necessary to include the beneficiaries, possibly prorated in case of shared custody. This list is likely to come from social security institutions for most of the euro area countries.

The list needs to be updated every month: deaths, births, changes in beneficiaries (divorce), possible court decisions temporarily or permanently depriving beneficiaries of their rights. This update must be done by the countries, as the ECB has neither the capacity nor the authority to do so. Even if most of these updates will be automated, it is very likely that dedicated teams will have to be set up in each country to manage the database, which can be implemented by redeploying public agents or subcontracting them to private companies. This should be part of the preliminary agreements between the ECB and the countries. The work is far from negligible.

The ECB will then open an CBDC account for each eligible resident. It will provide a secure website allowing beneficiaries to access their CBDC account and link it to its traditional bank account, with the option of automatically transferring the dividend on their regular bank account as soon as it is paid. The account holder will also be able to make transfers to another natural or legal person within the CBDC system from this interface, for example to make purchases.

Launch and ramp-up

Once the digital currency is in place, the ECB will be able to start Monetary Dividend distribution and start measuring the impact on inflation. The initial amount should be significantly lower than the target amount. A reasonable starting point could be a distribution of 5 to 10 billion euros per month. This may seem high, but it is materially lower than the amounts of quantitative easing, which varied between 15 and 80 billion per month between 2015 and 2018.

This amount should be expected to increase inflation by about 0.5% to 1% per year. Currently at 1%, it should thus move closer to the ECB's 2% inflation target. As soon as inflation exceeds 1.5% on an annual basis, the ECB will be able to very gradually start raising its key interest rates. By adjusting the monthly amount of the Monetary Dividend, the ECB will progressively bring back its main rate between 1.5 and 2% for example, while keeping core inflation at 1.5% - ending up in real interest rates back in positive territory. In parallel, the ECB may also start to deflate its balance sheet by not replacing the maturing bonds acquired during the QE program. The return to normal rates and the gradual deflation of the balance sheet will reduce the stock of debt, which will then be offset by the issuance of CBDC distributed as a Monetary Dividend, always calculated to keep inflation on target.

Stabilization

It should take at the very least two years to reach steady state, and possibly three or four. The ECB will then have a clear understanding of the economy's responsiveness to the injection of the Monetary Dividend, and it will be able to submit to the European Parliament its proposals on the parameters to be set: target inflation level, interest rates level, debt reduction target.

One possibility could be to stabilize the total amount of debt as a proportion of GDP. Debt issuance by commercial banks will therefore only be used to finance growth, with price control being completed thanks to the Monetary Dividend. But another choice could be to reduce overall debt as a proportion of GDP. This would be done by raising interest rates further and therefore increasing the Monetary Dividend. The level of interest rates will determine the speed of debt reduction: the higher they are, the faster the debt will be reduced. A higher Monetary Dividend will keep inflation on target.

Once the system is stabilized, the macroeconomic context will be as follows:

- *Stable interest rates, slightly positive in real terms*
- *Stable and predictable inflation*
- *Debt total amount flat or decreasing*[92]
- *Variable monthly payment to households with a stabilizing effect (increases when the economic situation decreases)*
- *Stronger banking system (positive rates, rising reserves)*
- *Likely lower market volatility with reduced bubble risks*

The creation of the Monetary Dividend should bring a much more stable and predictable economic situation, strengthening the confidence of economic agents and facilitating both investment and consumption.

92 Not taking into account the Monetary Dividend should it be accounted by the ECB as a zero coupon, perpetual loan. It would technically be a debt but would not represent a liability to households.

Conclusion: reconciling citizens with Europe

The Monetary Dividend is first and foremost a technical scheme which will considerably improve monetary creation. It will help restore the debt's basic role: to finance future projects at a market price that takes into account their level of risk.

Debt is not bad in itself, on the contrary. It is an essential element of growth. And the banks issuing it are an essential part of the economy. But the debt has been given a function that it should never have had, namely the stabilization of the price level. And as a result, banks have been somehow delegated the sovereign function of creating money, even though they have neither the legitimacy nor the right tools.

The cost of this unnatural assignment is staggering: several hundred billion euros every year, the amount of unnecessary debt issued by twisting market conditions. This bad cholesterol in the economy feeds bubbles, destabilizes the markets and increases both the probability of crises and their potential severity. The harmful impact is not limited to the economic sphere. It is also social, and now political. Monetary creation through debt deprives the middle classes of the value created by the decline in prices linked to technological progress.

This dispossession is not in any case the result of some sort of conspiracy conceived in dark rooms by voracious capitalists. The current system has been put in place by people of good will who are trying to stabilize the

economic conditions of a world that is complex to control and apprehend. Within the tools which were available, the ECB did what it had to do and should be praised for avoiding the euro area to collapse. But their toolkit is incomplete, and the very starting point, using debt to handle inflation, is simply flawed.

The market economy and democracy are a collateral damage of these policies. They end up being rejected despite creating incredible wealth every year. They triumphed over totalitarian regimes in the 21st century, driving Francis Fukuyama to predict The end of history in 1992. It seemed obvious then that democracy and the market economy were the only remaining reference system, the only one which could reasonably prevail.

But the modalities of money creation deprive the majority of citizens of this wealth. And the middle classes voters reject the "system". Brexit, the election of Donald Trump, the populist governments in Italy, Hungary and Brazil are only the first examples. The rapid and simultaneous occurrence of these events after a decade of monetary creation of a magnitude unique in human history should not be viewed as a coincidence. And without a radical change in monetary policies, such events should be expected to multiply, until we reach a point of rupture threatening the fragile political balance of the world.

Current monetary policies are a deadly threat to our democracies and the market economy - and there is no emphasis whatsoever in this statement. Because people will no longer accept to be dispossessed.

The Monetary Dividend solves this economic and political deadlock. It is the missing link in any monetary policy, enabling smart management of technological deflation, which is at the heart of the value creation process.

Technological deflation is first and foremost enabled by innovation. But its transmission from costs to prices is the result of competition, and therefore driven by consumers. Eventually, they are the "invisible hand" of the market. By choosing entry range butter, comparing prices online, negotiating a discount on the purchase of a car, each of us plays this essential role in the economy. It is only fair that the profit gained from lower prices is passed on to consumers. The Monetary Dividend could be viewed as a legitimate compensation for this crucial role of spending time comparing prices and arbitraging consumption. It returns to consumers the gains from the very deflation they have helped to achieve.

The market economy, economic liberalism and democracy remain by any means the best economic and political models. By changing the way we

create money, we can put them at the service of European citizens. We can achieve a historical reconciliation between the people and the technocrats.

Because why would I reject a Europe that contributes directly to my purchasing power? How can I not want to reduce my country's public deficits, if this translates directly into an increase in my income? How can I object to free markets if it leads to a larger price drop that turns into an income for me and my family?

We can now stop pitting liberal Europe against popular Europe. We can build a free and prosperous Europe for the benefit of the people. Now.

Appendixes

Appendix 1 – Quantitative theory and technological deflation

The evolution of the price level is the result of three phenomena:

- *The impact of the scarcity of raw materials and commodities (PR)*
- *The impact of progress, technology and competition (PT)*
- *The impact of monetary creation (PM)*

If P is the price level, we can state that P = PR x PT x PM. By deriving and stating that inflation i = dP/P, total inflation is obtained as the sum of the impacts of the three phenomena on inflation, i.e. $i_R + i_T + i_{M.}$

The quantitative theory of money does not take into account either commodity inflation or technological deflation. It only describes the impact of money creation on the price level, and therefore it determines PM. Based on our terminology, MV = PQ is therefore written MV = PMQ and $m + v = i_M + g$, g being the growth rate of the economy.

In the proposed scheme, we seek to regulate so-called "core" inflation, i.e. excluding commodities. It can be written as $i_C = i_T + i_{M.}$

The monetary creation necessary to stabilize the price level is derived from the two previous equations:

$$m = g + (ic - it) - v$$

In other words, money creation has three impacts:

- *It finances the growth of the economy*
- *It stabilizes the price level by compensating for technological deflation*
- *A last part of monetary creation is "lost" in the inefficiency of the system, by slowing down the speed of circulation of money.*

Appendix 2 - Estimate of Monetary Dividend amounts by country

As described above, the amount of the Monetary Dividend is assessed iteratively in order to stabilize the level of inflation. It is not decided by a higher authority, but it is the consequence of the functioning of the economy. It can therefore vary from one month to another, and it will depend on multiple parameters, including:

- *Microeconomic parameters: intensity of competition, market access facilities, quantity and quality of innovation, quality of the entrepreneurial ecosystem, access to and use of the Internet, marginal propensity to save…*
- *Macroeconomic parameters: GDP, growth, budget (dis)balance, trade balance, exchange rates….*

The multiplicity of parameters and the lack of usable data, particularly on microeconomic phenomena, prevent any accurate modelling. What will be done very simply by iterations is therefore very complex to calculate theoretically. However, a very basic model can be made to give some orders of magnitude.

Calculation of the total amount to be issued

The annual monetary issue in the Euro area is € 500 billion.[93] It serves two purposes [94]:

93 From December 2017 to December 2018, € 532 billion in M1, € 509 bn in M2, €508 bn in M3
94 See appendix 1

- *Financing growth*
- *Balancing the price level*[95]

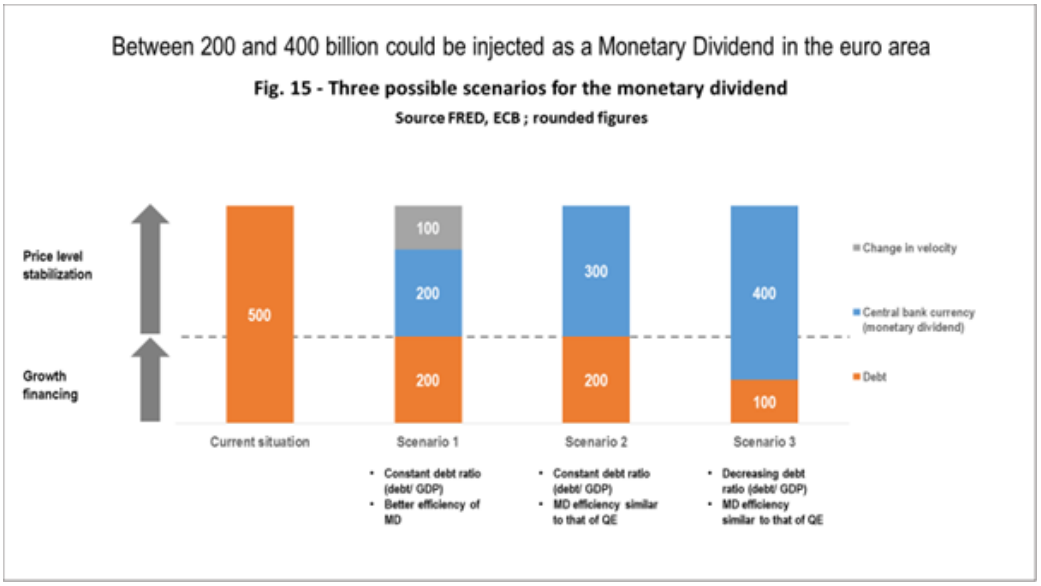
Growth is 200 billion euros.[96] This amount may be financed in whole or in part by the issuance of net debt. As for the price level, it should be fully managed by a Monetary Dividend issue, while it is only offset by creating net debt today.

If a monetary creation of € 200 billion in debt is kept to fully finance growth, it leaves € 300 billion out of the €500 billion created today to stabilize the price level. This constitutes 3% of GDP, with inflation of 1.6% and core inflation of 1.2%.

We will consider three possible scenarios:

- *Scenario 1: Growth is entirely financed by debt. The Monetary Dividend ends up being more effective than quantitative easing, and reduces by one third the monetary creation needed to stabilize the price level (improvement in the velocity of the currency)*
- *Scenario 2: Growth is entirely financed by debt. The Monetary Dividend ends up having the same effectiveness as quantitative easing.*
- *Scenario 3: The Monetary Dividend ends up being as effective as quantitative easing, and growth is financed half by debt, half by monetary issuance.*

These three scenarios are summarized below, starting from the current amounts of money creation. The amounts distributed in each of the three scenarios range from € 200 billion to € 400 billion.



95 For the sake of simplicity, "stabilizing" or "balancing" the price level is to be understood as "achieving the core inflation target." Strictly speaking, it actually means making them slightly rise.

96 Based on an estimated growth rate of 1.8% in 2018

Breakdown by country

The amounts are then distributed by country, with the objective of achieving an inflation rate of 1% in each country.

The modelling uses consumption (C) as the main aggregate against which the impacts of the dividend are measured. This is certainly a better proxy than GDP, which would lead to biases, particularly in the case of Luxembourg, Ireland, Malta and probably the Netherlands, whose GDPs are to a large extent impacted by financial flows unrelated to consumption.

An adjustment is also made for the current level of inflation in these countries to calculate the amount to be injected. The respective weights of the different countries are then written: C x (iC - iT - i), i being the real inflation.

The calculation is therefore done for the three scenarios:

- *In scenario 1, the amount injected is 70% of the € 300 billion. The assumption is that the yield of the dividend injection is better than by the usual methods (respective yields of 70% and 50% are assumed), therefore the amount to be injected is lower in proportion to the ratio of the two yields*

- *In Scenario 2, the efficiency of the two injections is assumed to be equivalent. The entire € 300 billion is included.*

- *In Scenario 3, the return is equivalent to that of Scenario 2, but a debt reduction assumption of one percentage point of GDP is also made. The impact of budgetary policies are also added in this scenario, as they can be a substitute for monetary policy. The amount of the budget deficit (adds the amount of the surplus) is subtracted from the debt reduction.*

The average dividend amount is calculated in all three scenarios. The range is then formed by the two extreme scenarios. The amounts obtained are those in Figure 13.