

# **MONETARY POLICY MONITOR**

- **THE WORLD ECONOMY, THE PRICE OF OIL AND MONETARY POLICY**
  
- **CONVERSATION WITH LAURENCE MEYER**

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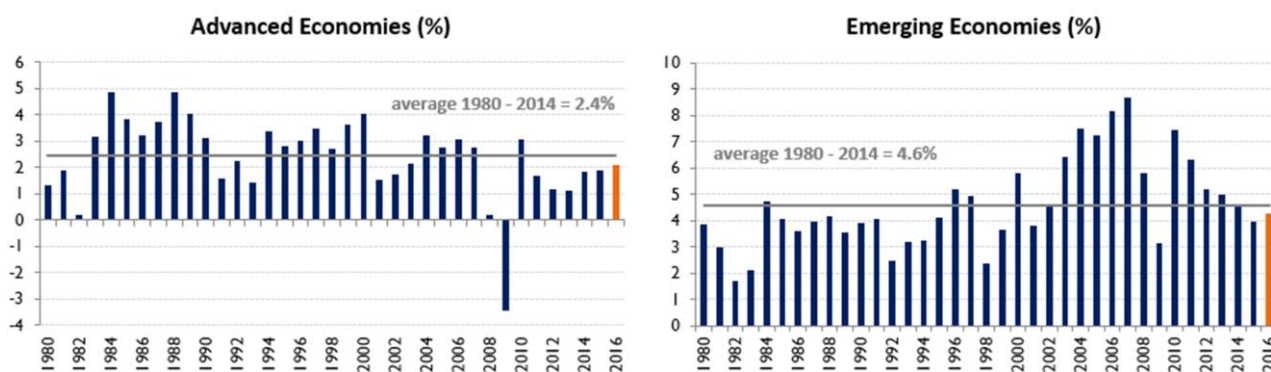
## THE WORLD ECONOMY, THE PRICE OF OIL AND MONETARY POLICY<sup>1</sup>

### The world economy

#### *Secular stagnation*

■ After practically stagnating in 2009, the world economy grew 5.4% in 2010, leaving the impression that the financial crisis was left behind and giving hope that the recovery would be vigorous and sustainable. With the passage of time, though, it became clear how misleading the 2010 results were. Since then, the yearly average rate of economic growth in the advanced world has stayed below its historical average. Emerging market economies performed significantly better, but have been losing vigor year after year. Graph 1 illustrates these observations.

**Graph 1: World GDP Growth Rates – Advanced and Emerging Economies**



Note: 2015 and 2016 = projections by WEO / IMF (January 2016). Source: WEO / IMF.

<sup>1</sup> The author wishes to thank Fernando Veloso and Regis Bonelli for reading the original version of this essay and making useful suggestions. A word of thanks is also due to Marcel Balassiano for his excellent research assistance.

Secular stagnation seems to be a quite plausible explanation for what goes on in the first group of countries. Already discussed in a previous issue of the Monetary Policy Monitor (number 4, reproduced in Senna 2015), this hypothesis has to do with the possibility of a global imbalance between savings and investment. As originally argued by Lawrence Summers in a speech delivered at the November 2013 IMF Economic Forum, the first signs of such an imbalance appeared several years before the acute phase of the financial crisis, a period during which the US economy experienced a couple of bubbles, and bank lending and private sector debt increased at fast rates. According to this line of reasoning, such an environment should have led to an overheated economy, that is, high rates of output growth and inflation; but this was not what happened. (Summers 2013a). Summers would soon elaborate a bit more on his original thoughts, making it clear that he was talking about the developed world, and not only the US. (Summers 2014a).

The experience of industrial countries in the years preceding the crisis led Summers to wonder whether those economies “needed” bubbles to achieve reasonable rates of economic growth. Apparently, in the absence of bubbles, growth would have been anemic due to lack of effective demand.

The secular stagnation hypothesis has to do with possible long-term shifts in aggregate savings and investment. In this case, important structural changes produce an increase in the global propensity to save (a decline in the propensity to spend) while other factors cause a fall in the propensity to invest. In consequence of such shifts, the equilibrium real rate of interest falls. Eventually such rate turns negative, meaning that no positive interest rate balances savings and investment at full employment.

The sub-par rates of economic growth observed since the crisis, the persistence of a very low inflation environment, the observed consistent decline in global interest rates and the fact that central banks in the advanced world continue to resort to non-conventional expansionary policies (the novelty is negative interest rates) speak in favor of the plausibility of the hypothesis.

### *The second machine age*

Identifying the major structural changes affecting the world economy in recent times is certainly a first step towards understanding those possible shifts. Since the industrial revolution, and due to technological progress, the world economy is in a permanent process of change. Economic historians argue that we are now living through the third phase of that revolution. The first one is generally associated with the invention of the steam engine, which dramatically increased the amount of power available for productive purposes, allowed entrepreneurs to locate their factories wherever they found appropriate (freeing them from the need to be close to water flows) and revolutionized the transportation system, both by land and by sea. The second phase refers to inventions like electricity, internal combustion engine and internal plumbing. The third phase has to do with the digital revolution – computers, the web, mobile phones, etc.

In a fascinating book, Brynjolfsson and McAfee notice that the inventions of the first two phases of the industrial revolution (usually referred to as IR#1 and IR#2) “allowed us to overcome the limitations of muscle power, and generate massive amounts of useful energy at will”. Those phases comprise what they call the first machine age. As those authors see it, the third phase corresponds to the second machine age. “Computers and other digital advances – they argue - are doing for mental power [...] what the steam engine and its descendants did for muscle power”. According to their reasoning, “mental power is at least as important for progress and development [...] as physical power. So a vast and unprecedented boost to mental power should be a great boost to humanity, just as the earlier boost to physical power so clearly was”. (Brynjolfsson and McAfee, 2014, pp. 7-8).

The output of any given economy grows with the use of more resources, like labor, capital and land. Over the long run, however, economic growth depends fundamentally on the economy’s ability to generate more product from given volumes of inputs – that is, it depends on productivity. In the words of Paul Krugman, “productivity isn’t everything, but in the long run it is almost everything”. (Krugman 1995, p. 13).

This raises the question of how productivity has evolved since the beginning of the digital revolution. Has it grown faster than before? What do recent statistics show?

Commercial use of computers dates from around 1960. In the following decade, the US economy started to experience a significant slowdown in its rate of productivity growth, giving rise to an intense debate on the nature of such slowdown. Was it a temporary or a permanent phenomenon? As the use of computers became widespread, it was just natural to imagine that productivity growth would go up again. It took about 20 years for the first results to appear, a situation that gave rise to talks about a “productivity paradox”. “You can see the computer age everywhere, but in the productivity statistics”, noted Robert Solow, in 1987.

In the US, the results of the computer revolution finally appeared in the data in the mid-1990s, but they did not last long. Defining productivity as the amount of output produced per hour worked in the nonfarm business sector of the economy, productivity gains were unusually high (about 3.1%), surpassing the pace observed during the golden age of productivity growth (about 2.5%), but they remained high only in 1996-2004. The golden age comprises the approximately seven-decade period ending in the early 1970s - as argued by Robert Gordon, it was made possible by the great inventions of the last three or four decades of the nineteenth century. (Gordon 2014).

The fact that the “New Economy” was short-lived came as a frustration to those who were enthusiastic about the impact of the digital revolution on productivity growth. Gordon did not share that enthusiasm. Back in 2000 he had already claimed that IR#3 was less important and less pervasive than IR#2, with a possibly weaker impact on productivity growth. (Gordon 2000, 2012).

The slow pace of productivity growth observed in the last five years has certainly given a further impulse to the pessimistic view on the future of productivity growth. In the US, for example, the average growth rate of the ratio between output and hours worked in the nonfarm business sector has been just 0.5% per year (average 2011-2015), a rate considerably lower than the 1.4% observed between the early years of the productivity slowdown and the beginning of the New Economy (1972 through 1996).

How can we explain the fact that “in a time of brilliant technologies” – to make use of the expression contained in the sub-title of Brynjolfsson and McAfee’s book - productivity is growing at such a slow pace?

There are two possible explanations. The first one is that time is needed for important innovations to show up in productivity statistics. In order to collect the full benefits of those innovations, there is need for complementary investments, sometimes of an organizational nature, as illustrated by the case of electricity.

The economic historian Paul David examined the process of electrification of American factories in the beginning of the twentieth century. (David 1989, 1990). In plants originally driven by steam engine, the transmission of power used to occur by means of a large central axle, which moved a series of pulleys and gears. Machines were clustered as close as possible to the central axle (including locating them on the floors above and below the steam engine) to reduce the risk of breaking the axle. The simple substitution of the first (large) electric motors for the old steam engines, with no change in factory layout, did not bring any significant efficiency gain.

In their summary of David’s work, Brynjolfsson and McAfee stressed that “only after thirty years – long enough for the original managers to retire and be replaced by a new generation – did factory layouts change. The new factories looked much like those we see today: a single story spread out over an acre or more. Instead of a single massive engine, each piece of equipment had its own small electric motor”. Productivity “doubled or even tripled”, they added. “What’s more, for most of the subsequent century, additional complementary innovations [...] continued to boost manufacturing productivity”. (Brynjolfsson and McAfee 2014, pp. 102-103).

Economists call innovations like steam power and electricity “general purpose technologies” (GPTs). To be part of this group a given technology needs to be pervasive, to improve over time and to give birth to further innovations. No doubt, information and communication technology (ICT) belongs to that category. In the opinion of Brynjolfsson and McAfee, the process of economic growth is “just being held back by our inability to process all the new ideas fast enough”. (Brynjolfsson and McAfee 2014, p. 82).

Those authors believe that it will take some time before the full impact of ICT shows up, as normally happens when a GPT appears. In their own words, “the benefits of electrification stretched for nearly a century as more and more complementary innovations were implemented”. (Brynjolfsson and McAfee 2014, p. 106). The digital technologies of the second machine age are a no less profound phenomenon and continue to improve at an exponential pace. In the end, they will boost productivity.

The second explanation has to do with the possible presence of a measurement problem. After the digital revolution, the volume of economic transactions that do not appear in the official GDP statistics increased considerably. Modern times have seen a tremendous growth in the production of intangibles, of digital goods that are freely available, and the explosion of the so-called sharing economy. This means that many things that we value do not flow through the market system, there being no prices attached to them. Services “bought” at zero prices do not appear in the official numbers. Since productivity measures are directly dependent on GDP statistics, we can say that productivity data (as they are currently measured) are becoming less and less significant.

Independently from how we should interpret the disappointing productivity statistics of recent times, it seems important to stress that this supply-side issue does not properly belong to the secular stagnation hypothesis; after all, such a hypothesis is a demand-related idea. Nevertheless, the productivity issue is part of the debate for the simple reason that the two approaches have in common the same concern, that is, the concern with slow growth.

### ***Lack of effective demand***

As explained above, we still do not have a clear vision of the impact of the second machine age on productivity. There is an aspect of the digital revolution, though, that we seem to understand at least a bit more. It has to do with its impact on inequality, which in its turn relates directly to the secular stagnation hypothesis. The idea is that an increase in inequality may reduce households’ propensity to consume, a typical demand problem.

There is ample evidence that inequality of both income and wealth has increased considerably in the developed world in the last few decades. Technology is certainly

not the only explanatory factor of this phenomenon, but it certainly is quite significant, if not the most relevant one.

In the US, for example, based on data collected by Daron Acemoglu and David Autor, Brynjolfsson and McAfee show that until 1973 “American workers all enjoyed brisk wage growth. The rising tide of productivity increased everyone’s incomes, regardless of their educational levels”. (Brynjolfsson and McAfee 2014, p. 136). From that point onward, though, individuals with low educational background started to experience income losses. Only the most qualified members of the labor force enjoyed income gains, a clear sign that digital technologies favor those with a higher stock of human capital.

Empirical research has also shown that, probably due to automation, the demand for workers in routine tasks, either cognitive or manual, has fallen dramatically, while the demand for workers in non-routine tasks (both cognitive and manual) has grown considerably. This is the so-called job-polarization phenomenon, which implies a considerable contraction in the demand for average-income jobs.

One must notice that income is becoming more concentrated not only in the US but in other developed economies as well. In fact, the authors of a report published by Citi GPS, entitled *Technology at Work: The Future of Innovation and Employment*, show that the average Gini coefficient estimated for a set of 19 advanced economies has gone up from 0.28 in early 1980s to slightly more than 0.33 in 2013. (Citi GPS report, 2015, p. 14).

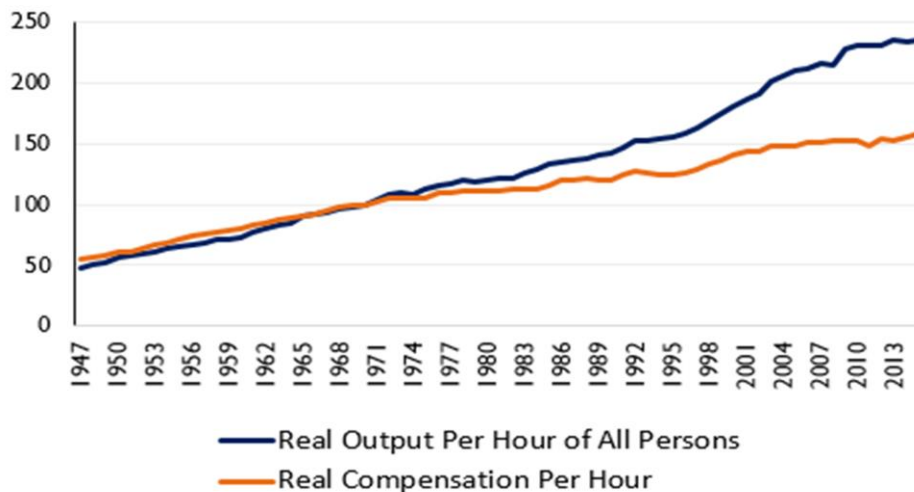
In addition to producing differentiated impacts on the demand for labor, favoring the most qualified workers, technology is also benefiting capital as opposed to labor.

Graph 2 shows the behavior of both labor productivity (real output per hour worked) and real compensation per hour worked. It is transparent that ever since the beginning of the series (1947) labor compensation and productivity rose in tandem. From the early 1970s onward, though, a growing gap has opened, meaning that a greater fraction of output produced in the US economy went to profits. As illustrated in the above-mentioned Citi GPS report, the same phenomenon occurred in other advanced economies as well, as shown in the data for a group of 16 countries. In this case, the



gap started to open a few years later, more specifically in the early 1980s, and widened considerably from 1990 onward. (Citi GPS report, p. 10).

**Graph 2: Real Output Per Hour vs. Real Compensation Per Hour in the US**  
(index: 1970 = 100)



Source: Fed St. Louis.

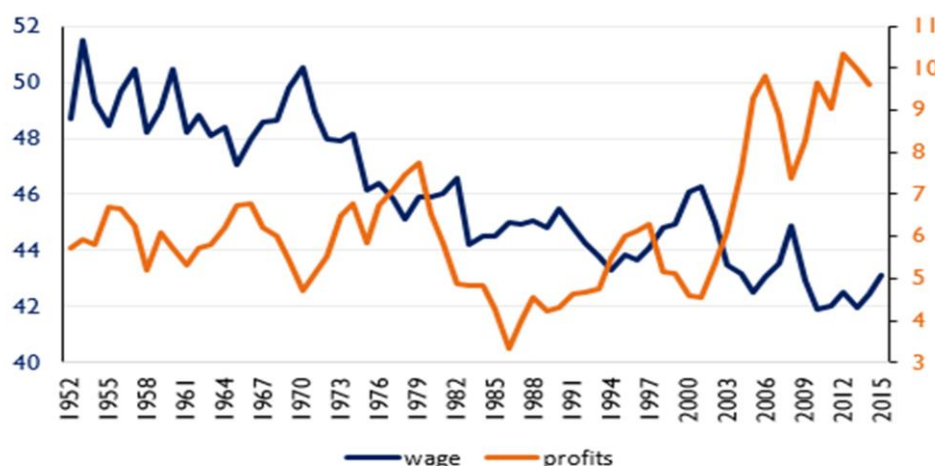
This analysis is consistent with the evidence that the wage share in the American GDP has been declining since the early 1970s. (Graph 3). From 50.5% in 1970 (46.3% in 2001), the wage share fell to 41.2% of the GDP in 2015. This is something new, since the share of the overall GDP going to labor had previously been practically stable for several decades. Once again, a similar phenomenon is present elsewhere in the developed world. (Karabarbounis and Neiman, 2013).

In addition to all this, as noted by Brynjolfsson and McAfee, “the collapse in the share of GDP going to labor actually understates how the situation has deteriorated for the typical worker”. (Brynjolfsson and McAfee 2014, p. 145). Those authors are calling attention to the fact that the official statistics regarding labor compensation include the wages of a small number of superstars, in sectors like sports, media, finance and large corporations. The important point here is that the soaring wages of the superstars were possible due to advances in the digital revolution.

In many markets, the providers of services normally face capacity constraints. As they render their services to someone, or to a group of buyers of those services, they

cannot satisfy the demand of others. If a given professional excels in what he does, he may capture a significant share of that market. The market may recognize him as the best in the field; but he cannot go beyond a certain point, he cannot have more than a given number of clients. Think, for example, of a dentist. In markets of this type, the second best professional may also get a significant share of it. His earnings may be a fraction of the earnings of the number one, but still a very good pay. In such case, earnings tend to relate to absolute performance, to make use of a terminology apparently introduced by Robert Frank and Philip Cook, authors of a 1996 book called *The Winner-Take-All Society*. (Brynjolfsson and McAfee 2014, pp. 152-155).

**Graph 3: Wage Share of GDP vs. Profit Share of GDP in the US**  
(in %)



Note: data = end of period; wages and salaries and corporate profits after tax. Source: BEA; Fed St. Louis.

There are situations, however, in which relative performance is what explains compensation. This happens when the existing technology allows a much larger group of consumers (at the limit, the global market) to have access to the service in question, at zero or low cost. In such cases, the best professional has access to a worldwide audience. He can capture a great share of the whole market, while the second best, even being almost as good as the first one, lags far behind.

Some writers, whose works can be easily reproduced in different types of media and sold in the global market, enjoy nowadays opportunities never imagined by others in a not too distant past. The same is true as regards the top professionals who participate

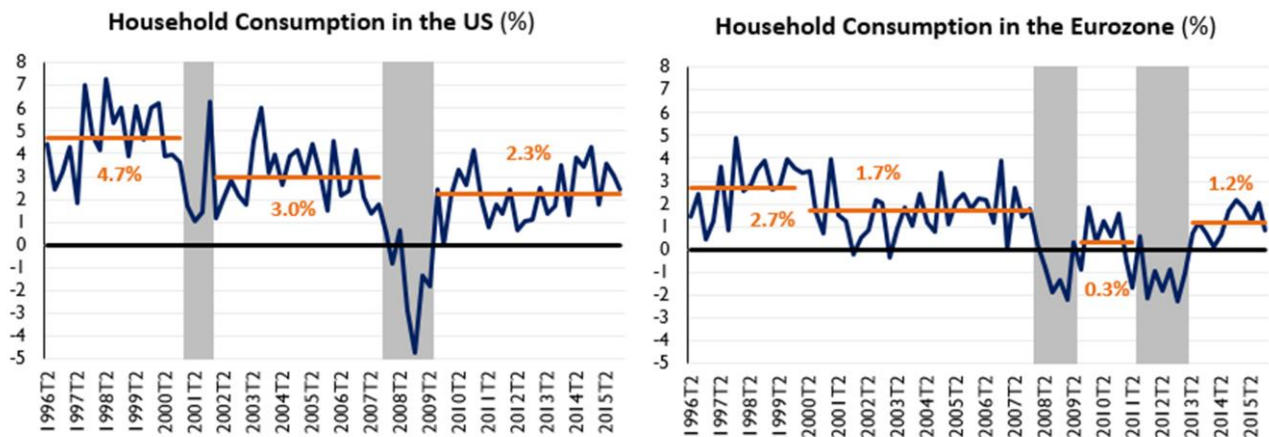
in the production of TV series, presently watched all over the world. Pelé never made a fortune similar to those made by Cristiano Ronaldo, Messi or Neymar, since the technologies available in his time did not allow the worldwide exposure that the big stars of the present have. In sum, the fantastic progress brought about by the information and communication technology (ICT) has greatly enhanced the gains of the most talented individuals, the superstars. This has probably contributed in a significant way to the worsening of the income and wealth distribution.

Approximately one month after Lawrence Summers first launched the idea that the industrial world might be experiencing a secular stagnation, he listed a series of “a priori reasons” why the level of spending has probably declined, for any given level of short-term interest rates. One of those reasons would be a fall in consumption demand, “due to a sharp increase in the share of income held by the very wealthy and the rising share of income accruing to capital”. (Summers 2013 b). In his most recent article on the subject, Summers talks about an “increasing body of evidence suggesting that, over the last generation, various factors have increased the propensity of populations in developed countries to save and reduced their propensity to invest. Greater saving - the argument continues – has been driven by increases in inequality and in the share of income going to the wealthy”, among other factors. (Summers 2016, p. 3). He offers no reference, however, regarding the mentioned body of evidence.

If we look at the data for the two most important regions of the developed world, the US and the Eurozone, we can notice that, in the last 20 years, the rate of growth of domestic absorption has been declining. During this period, the American economy experienced two official recessions and the Eurozone suffered one double-dip recession. If we exclude those recessions from our calculations, we get for the US a rate of growth of domestic absorption of 4.9% in 1996Q2-2000Q4, 2.8% in 2002Q1-2007Q3 and 2.0% in 2009Q3-2015Q4. For the Eurozone we get 3.1% in 1996Q2-1999Q4, 2.0% in 2000Q1-2007Q4, 0.3% in 2009Q3-2011Q2, and 1.2% in 2013Q2-2015Q4. If we do the calculation for the whole period since 2009Q3, we obtain a rate of growth of domestic absorption in the Eurozone of only 0.5% per year. (All rates are seasonally adjusted and annualized).

Graph 4 illustrates the behavior of household consumption in the two regions for the same 20-year period. In the US, the rate of growth of consumption fell from 4.7% per year in the beginning of the period (average 1996Q2-2000Q4) to 2.3% since the end of the last recession (average 2009Q3-2015Q4). In the Eurozone the rate of growth of consumption fell from 2.7% in the beginning of the period (average 1996Q2-1999Q4) to 1.2% since the end of the second dip of the recent recession (average 2013Q2-2015Q4). If we estimate the average growth rate for the period since the end of the first dip of the recession (2011Q2) we find 0.3%.

**Graph 4: Rates of Growth of Household Consumption in the US and the Eurozone**  
(QoQ, seasonally adjusted at annual rates)



Source: BEA; Eurostat.

Thus, the rate of growth of household consumption has fallen in the most recent decades in the two most important regions of the advanced world. What we do not know is how much of that decline can be attributed to the rise in income and wealth inequality. Other factors have probably contributed as well. Deleveraging, for example, may have been one of them. Families who are still attempting to reduce their degree of indebtedness have more reason to restrain their consumption expenditures than those in a more comfortable net-worth situation. Notice that, apparently, the process of deleveraging has not ended in the Eurozone, while in the US the real level of household liabilities has resumed its upward tendency in the second quarter of 2014 (net borrowing became positive once again), indicating the

completion of the process. We should also notice that, to the extent that consumption depends on income, whichever factor holds back the expansion of income indirectly contributes to the slowdown in the growth of spending by families.

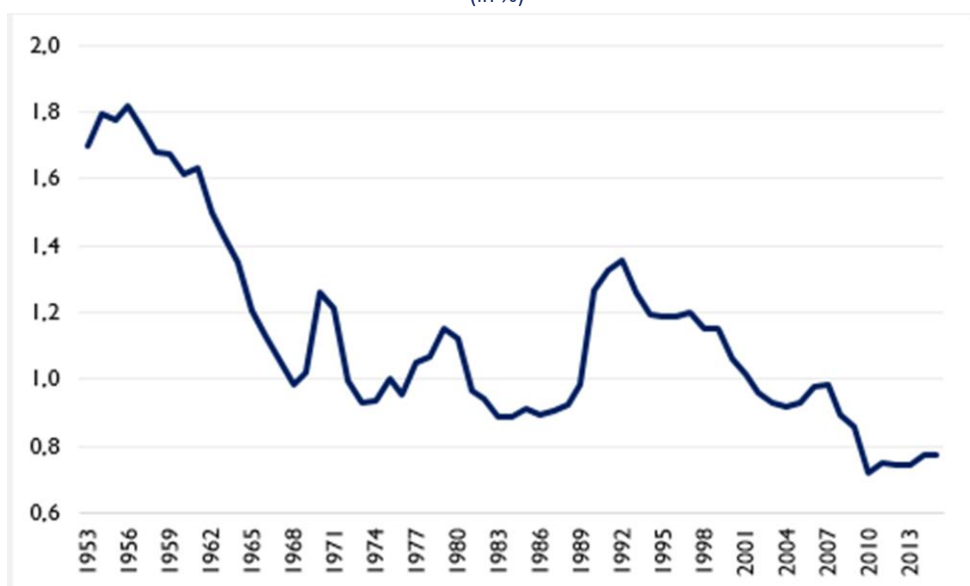
Besides its impact on income and wealth inequality, the new machine era affects the rate of expansion of aggregate demand through another channel, probably contributing to reduce the propensity to invest. As stressed by Summers in several occasions, investments in the new age are much less capital intensive than in the past. The leading technological companies of the new era (Apple, Google, etc) did not have to mobilize huge amounts of capital to reach the very high values that they did in the capital markets. “It used to require tens of millions of dollars to start a significant new venture, and significant new ventures today are seeded with hundreds of thousands of dollars”, says the author. (Summers 2014a, p. 69).

Another potential explanatory factor for the possible decline in the propensity to invest has to do with the argument originally made by Alvin Hansen, the economist who first made use of the expression secular stagnation. In 1938, Hansen became president of the American Economic Association. In his presidential address, he argued that what had made possible the great rise in the standard of living of Western Europe and the United States since the Industrial Revolution was a rapid rate of capital formation. (Hansen 1939). In his opinion, the “external forces” behind that process were: a) inventions; b) the discovery and development of new territory and new resources; and c) the growth of population.

Hansen concluded that “the opening of new territory and the growth of population were together responsible for a very large fraction – possibly somewhere near one-half – of the total volume of new capital formation in the nineteenth century”. (Hansen 1939, p. 9). The then projected decline in population growth, together with the lack of important areas left for exploitation and settlement, meant that one could not count on those two outlets for new investments any longer. As explained by Gordon, an anti-immigration legislation approved in the early 1920s had produced a strong decline in the rate of growth of the population, which “fell from 2.1 percent during 1870-1913 to 0.9 percent between 1926 and 1945”. (Gordon 2016, p. 554). Declining population growth would affect the pace of capital formation especially

through a diminished demand for residential housing and a negative impact on investments in public utilities and in the manufacture of essential consumers' goods. In a few years, many analysts were sharing his view. With the advent of World War II, the concern moved to the post-war years. It proved to be unfounded, anyway. "The war created household saving that after 1945 was spent on consumer goods that had been unavailable during the war, the classic case of 'pent-up demand'", says Gordon. (Gordon 2016, p. 537). Furthermore, the baby boom modified the trend in population growth and productivity gains were high until the early 1970s, allowing the postwar years to be a period of rapid growth and low unemployment. Presently, however, the reduction in the rate of population growth is a reality. To illustrate, Graph 5 shows the recent (fast) decline in the rate of growth of the population in the United States.

**Graph 5: Annual Rates of Growth of the US Population**  
(in %)



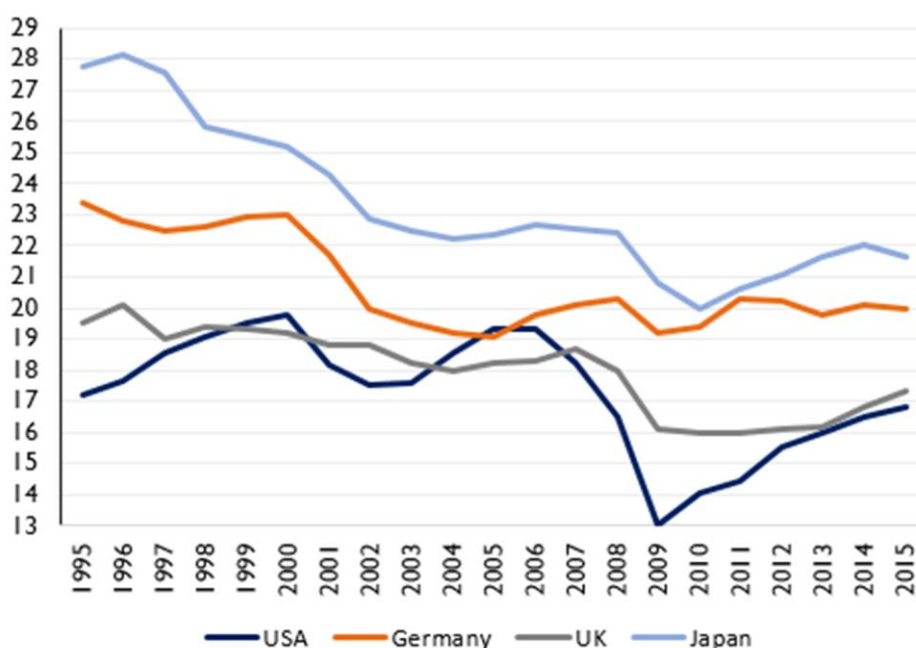
Source: Fed St. Louis.

No doubt, the whole discussion regarding shifts in the propensities to save and to invest refers to shifts in desired savings and desired investments, which are non-observable variables. What we do observe, of course, are ex-post savings and ex-post investments. Graph 6 shows the behavior of the rates of investment in four advanced



economies since 1995. In the case of the US, the ratio between realized investment and GDP was 17.2% in 1995. It reached almost 20.0% in two occasions (2000 and 2005-06) and it is now 16.8%. In the cases of the UK, Germany and Japan, the ratio declined from 19.5% to 17.3%, from 23.4% to 20.0%, and from 27.8% to 21.7%, respectively, over the same period. For the group of advanced economies, the IMF informs that the average ratio declined from 23.6% in 1995 to 20.8% in 2014-15. The fact that the ratio has gone up in the last few years both in the US and in the UK suggests that the behavior of the rate of investment over the last 20 years has been influenced not only by structural forces but by cyclical factors as well, as expected.

**Graph 6: Rates of Investment in Selected Industrial Economies**  
(% of GDP)



Source: BEA; Eurostat; Statistics Bureau – Japan.

### *Too low inflation rates*

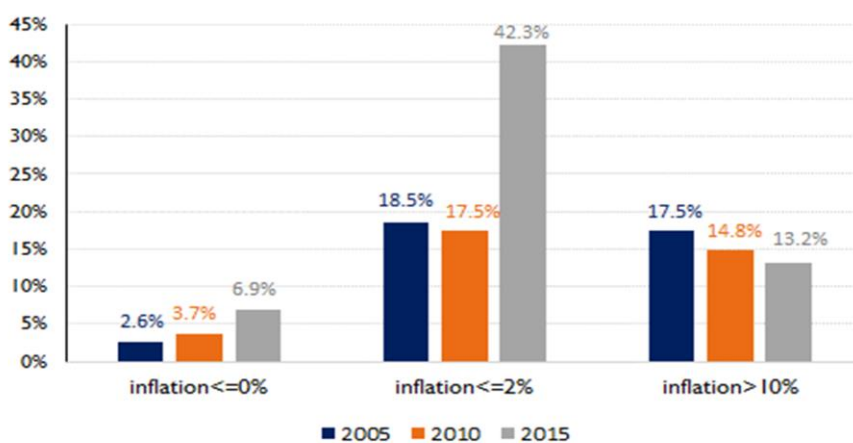
In general, economic activity in market economies oscillates around its potential level. When the economy operates below that level, there is a tendency for inflationary pressures to be moderate, or absent, a situation that may even lead to deflation. When the economy works above the potential level, the tendency is for

inflation to appear. Pressures in such a direction tend to mount the longer the economy operates above normal capacity, that is, the longer it remains in a state of overemployment. For sure, there are cases in which, in spite of operating below potential, the economy suffers inflationary pressures under the influence of other factors, like adverse expectations, inertia, etc. - but these cases are the exception, not the rule.

The recent financial crisis represented a tremendous shock to the world economy, affecting a very large number of economies, if not all of them. The forces produced by the crisis led to situations of underemployment. Economies operating below potential became the norm. As expected, the pace of recovery has varied from country to country. In general, economic activity in the developed world has not resumed all its potential. For those who favor the secular stagnation hypothesis the reason is the weakness of effective demand. As suggested above, such a scenario is compatible with absent or moderate inflation, perhaps even deflation.

If we look at the data for the last few years, we notice a substantial change in the behavior of inflation rates. Most importantly, the change is clear for the world economy in general, and not only for specific regions. Graph 7 shows that in a sample of 189 countries, 42.3% of them experienced inflation rates below 2.0% in 2015, while the corresponding figures for 2005 and 2010 were 18.5% and 17.5%, respectively.

**Graph 7: Recent Changes in the Pattern of Inflation in the World Economy**



Note: Sample of 189 countries; 2015 = projections by WEO / IMF. Source: WEO / IMF.



As suggested above, the low-inflation environment derives from the fact that a large number of economies has been operating below potential, and aggregate demand has not been strong enough to close the existing gap. For (at least) a couple of reasons, the present environment is a great source of concern. First, a number of countries has already experienced some deflation, while others run the risk of migrating into deflationary territory. In case deflation acquires deep roots, classical problems associated with such a situation spring up, especially increased difficulties to face debt obligations. Second, close-to-zero rates of inflation constitute per se a major problem, since such a scenario conveys a message of lack of vigor of the economic system. And a diminished degree of confidence on the working of such system turns consumers and entrepreneurs more reluctant to spend and invest.

## The price of oil

In general, economic analysts and policy makers believe that a major oil price hike tends to be detrimental to the world economy and a major oil price decline tends to benefit the world economy. Since the mid of 2014 we have had a significant price decline. The price of Brent, for example, fell from an average of US\$ 110 a barrel in the first two weeks of June 2014 to an average of US\$ 40 in the end of March 2016. Over the same period, the price of WTI fell from US\$ 104 to US\$ 38. They have both reached a low in the first two weeks of February 2016 (US\$ 33 and US\$ 30, respectively). During the whole period, prices declined by approximately 64%. This has been a major shock.

In many circles, such a shock brought hope that it could be helpful to the recovery of the international economy. To illustrate, let us consider what the Fed's Chairman has recently said on the subject: "For the United States, low oil prices, on net, likely will boost spending and economic activity over the next few years because we are still a major oil importer". (Yellen 2016, p. 8). On the other side of the Atlantic, the President of the European Central Bank has expressed a similar reasoning. In his own words, "the low price of oil should provide additional support for households' real

disposable income and private consumption, as well as corporate profitability and investment". (Draghi 2016).

In spite of the mentioned hope, the fact of the matter is that, so far, there is no concrete sign of any positive contribution of the price of oil to the economic recovery process of the world economy. As we argue below, the net result of this recent oil price shock may be small, perhaps negative.

Following Lutz Kilian, a shock of this type has both direct and indirect effects. (Kilian 2014, pp. 9-17). The direct effect of a major oil price decline has to do with the fact that it increases households' real disposable income, allowing them to expand consumption. In turn, the indirect effects are associated with the impact of a price decline on the profitability and propensity to invest in some segments of the economy, as well as with related dislocations in the labor market. Uncertainty brought about by such dislocations reinforces those effects, that is, the fear of losing their jobs lead many people to reduce their consumption expenditures. In sum, the direct effect tends to produce positive results while the indirect effects work in the opposite direction, making it unclear what the net result might be.

This discussion is particularly relevant for the US economy, the reason being the shale revolution. Due to such revolution, the total oil production almost doubled in seven years, going from 5.5 million barrels per day (mbd) in early 2009 to 9.5 mbd in the first two months of 2016. The US became one of the largest oil producers in the world. The problem is that the cost of shale-oil production is considerably higher than the cost of production of traditional producers. And oil prices in the neighborhood of US\$ 40 or US\$ 50 a barrel make the business economically unviable. The decline in oil price has thus significantly affected the shale-oil sector. Investments have shrank and employment has been badly hurt. The ratio between energy-related investments and non-residential investments, for example, fell from 7.6% in the second quarter of 2014 to 3.2% in the fourth quarter of 2015.

Among the indirect effects of the oil price decline on the American economy, there is also the fact that firms in the shale-oil business are highly leveraged. Under low prices, they face significant difficulties to service their debt. As the price of oil started to fall in mid-2014, yield on bonds issued by firms in the energy sector initiated an

upward movement, going from 5.6% to 14.4% in the end of March 2016. Partly reflecting increased pressures in the energy segment, rates in the high yield corporate bond market went up as well, going from 5.1% to 8.5% over the same period.

In a more general way, investments in the oil business have contracted (they were canceled or postponed), and several oil-producing countries have suffered a strong deterioration in their public accounts, forcing them to react by means of contractionary demand policies. In Saudi Arabia, for example, the fiscal deficit has gone dramatically up, reaching approximately 20.0% of the GDP in 2015. To this one must add the fear (among market participants) that, in the presence of fiscal difficulties, some oil-producing countries might liquidate part of their assets (equities in particular) to raise funds. Many analysts argue that such fear constitutes a possible explanation for the close correlation observed between stock (S&P 500) and oil prices since the beginning of 2016 - the correlation coefficients are 0.95 when using daily WTI prices and 0.90 for Brent prices.

As already mentioned, it is hard to tell whether those indirect effects of the oil-price decline tend to be stronger (in absolute terms) than the more traditional, direct effect. Such possibility has to do with the fact that, at least so far, there is no sign that the lower oil prices have indeed promoted an expansion of consumption. In the US, the saving rate (personal saving as a percentage of personal disposable income) has even gone slightly up rather than down, from 4.8% in mid-2014 to an average of 5.4% in the first two months of 2016. Of course, factors other than the price of oil, like income, wealth and long-term interest rates, are also capable of affecting saving-consumption decisions.

In conclusion, we cannot rule out the possibility that, contrary to general expectations, the recent oil price shock will not represent a major impulse to the growth process of the world economy.

## Monetary policy

We have already noticed that the world economy is probably operating below its potential capacity, implying moderate or absent inflationary pressures, in some cases

deflation. In the most relevant advanced economies, consumer price inflation during 2015 was 0.7% (PCE) in the US, 0.2% in the UK, 0.2% in Germany, 0.3% in France and 0.1% in Japan (CPI ex-fresh food). Perhaps equally important, economic agents in those regions seem to expect inflation to remain low. As of March, for example, inflation rates implicit in financial contracts for the next five years indicated an average of 1.5% in the US and 2.3% in the UK. For Germany and France the rates refer to the next four years (0.6% and 0.7%, respectively). In the US, the reference index for the indexed bonds does not coincide with the preferred index from the viewpoint of the Fed. Considering the historical spread of 30 basis points between the CPI and the PCE, the implicit rate for the PCE for the next five years becomes 1.2% per annum.

The oil-price shock may have increased the dimension of the problem. In principle, we should not expect current price shocks to influence inflation rates projected for a period far away in the future. But if we consider the five-year forward breakeven, that is, the average implicit inflation rate for the five-year period starting five years from now, we realize that we cannot rule out the possibility that the mentioned breakeven rate has been influenced by the oil-price shock. (Graph 8). One explanation for that would be the possibility that market participants are not as confident on the central bank capacity to reach the inflation target as they used to be prior to the oil-price shock.

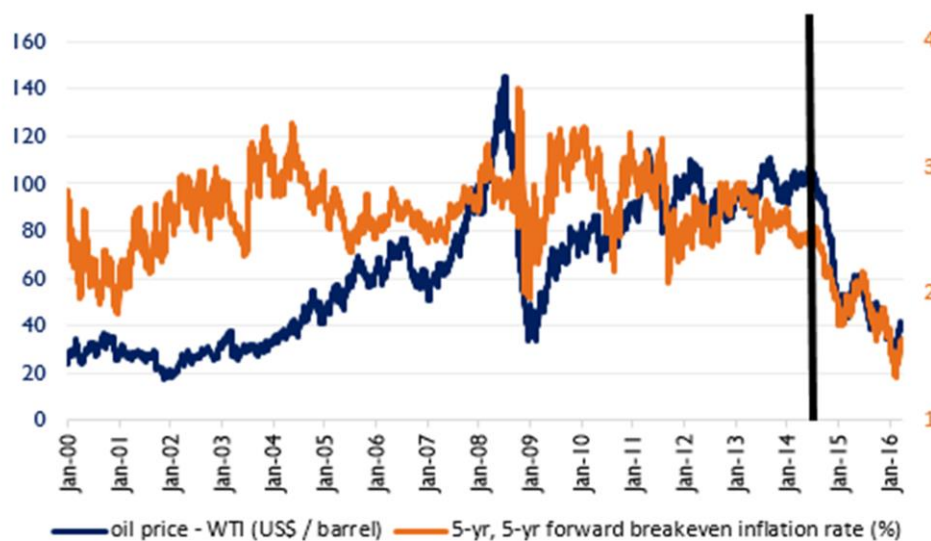
In a reaction to the persistence of the low-inflation environment, central bankers have recently taken another step into the exploration of nontraditional monetary policy instruments. They have adopted negative interest rates, an unprecedented decision.

In general, central bankers conduct monetary policy with an eye on their own estimate of the equilibrium (or neutral) real interest rate. When inflation rates are above the desired level, and the authorities wish to bring them back to that level, the real policy rate has to be set at a level higher than the neutral one. If the economy is weak and the authorities wish to stimulate it, the real policy rate must to be set at a level below neutral.

The main difficulty involved in such an approach has to do with the fact that the equilibrium rate is not an observable variable. The neutral rate certainly varies from

country to country, depending on the economy's degree of financial integration and on specific factors associated with credit risk. If the government securities issued by all the countries in the world were risk free, and there were financial integration among the different economies, arbitrage transactions would guarantee the uniqueness of the neutral real rate.

**Graph 8: Oil Prices and Inflationary Expectations in the US**



Source: Bloomberg.

Very likely, neutral rates have fallen in the last few decades. A study conducted by the IMF shows that the average global rates computed for three months and ten years, for samples of almost 20 countries (weighted by the corresponding GDPs), experienced a clear downward trend since the early 1980s. Both rates fell by approximately six percentage points. The short-term one declined from 4.0% in real terms to minus 2.0%. The long-term one fell from 6.0% to practically zero. (IMF 2014). Those movements possibly guided the central bankers of the developed world in the years preceding the financial crisis. In the US and in the Eurozone, for example, the average real policy rates were 0.3% and 0.4% per annum, respectively, from 2002 through 2007.

In a previous analysis of the secular stagnation hypothesis we argued that in case the central banks had “refused to follow what seemed to be a declining trend of the equilibrium real rate of interest, they would have hurt the growth process and probably allowed for undesirable deflationary pressures. This is probably the gist of the message sent by Summers”. (Senna 2015, p. 89). Summers had repeatedly said that structural changes had probably made it quite difficult for industrial economies to achieve full employment, economic growth and financial stability at the same time.

At the occasion, we added that “the dilemma becomes even more serious if we are willing to accept the hypothesis that the short-term real interest rate consistent with full employment had fallen into negative territory”. (Senna 2015, p. 89). The fact that the central banks of several developed countries have recently adopted negative policy rates in nominal terms suggests that the above-mentioned hypothesis was not as unrealistic as it seemed at the time it was first raised by Krugman and Summers.

The relevant question at this point seems to be: Can we expect the use of the new tool to really stimulate aggregate demand and growth? We have reasons to doubt it.

Requiring banks to pay fees on certain types of deposits maintained by them at the monetary authorities is a policy that tends to reduce the profitability of the banking industry. In general, in countries that adopted such policy, banks have been reluctant to pass on the costs to their clients, an option which could alleviate their burden. Depending on how healthy the banking system of a given country or region is, a measure capable of hurting profits may hurt bank lending activities as well. This is certainly a negative aspect of the new policy.

In a recent post in his Brookings’ blog, Ben Bernanke showed support to the new tool. According to his argument, the strategy works just like conventional monetary policy, forward guidance and quantitative easing. The objective of all of those mechanisms is to reduce the long-term interest rates, which would stimulate aggregate demand. (Bernanke 2016).

In appraising the new policy perhaps it would be wise to look at it from another angle as well, namely the possible impact of the policy on consumption-savings decisions. Given the unprecedented nature of the new strategy, we cannot be sure that households will consume more (as expected by the policy makers) in the presence of

negative nominal interest rates. As interest rates head down, going into negative territory, we have both an income and a price (substitution) effect. And we may very well have a situation in which the income effect is greater (in absolute terms) than the price effect, meaning that households will prefer to save more rather than consume more.

In sum, the impact of the new policy on the banking system's profitability is not its only negative aspect. The new policy may very well affect consumption-saving decisions in a way different from the one generally imagined. It does seem, then, that one cannot count on this policy to change significantly the present sub-par growth scenario.

J.J.S.

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## ■ Conversation with Laurence Meyer

This conversation was held through an exchange of e-mails between J. J. Senna and Dr. Laurence Meyer in the final days of March 2016. Laurence Meyer is a Chief Research Officer and co-founder of LH Meyer, Inc. Dr. Meyer served as a Governor on the Federal Reserve Board from June 1996 through January 2002. Prior to his appointment, he was a professor of economics and a former Chairman of the economics department at Washington University, where he taught for 27 years. During that period, he spent a year as a visiting scholar at both the Federal Reserve Bank of New York and the Federal Reserve Bank of St. Louis. He is a fellow of the National Association of Business Economics and a member of the Board of Directors of the National Bureau of Economic Research, and has served on the advisory panel to the Congressional Budget Office. He is the author of *A Term at the Fed: An Insider's View*, published by HarperBusiness in July 2004.

### The Fed's dilemma

■ You became a member of the Federal Reserve Board of Governors in mid1996, a very challenging time for those in charge of monetary policy in the US. In your book *A Term at the Fed* you recall the discussions prevailing within the FOMC at that time. Greenspan, for example, sustained that “the unemployment rate is low and remained low for quite a while. Anecdotal evidence continues to indicate tight labor markets, but ... broader measures of price inflation are, if anything, still declining”. You also say the Chairman figured out the beginning of the new economy “before the rest of us”. Under those circumstances, it would have been a mistake to embark into a tightening cycle. Today, the unemployment rate is close to what FOMC members believe the long-run level to be, inflation runs below “target”, and inflationary expectations have moved slightly downward. FOMC members keep saying that the next policy movements will be “gradual”. In your opinion, how gradual should that policy be? Before moving the basic rate up, would it not be wiser to wait for clearer signs that inflation is really heading toward the target?

There are definitely similarities today to the period when I was on the FOMC. In the latter case, the shock was the unexpected acceleration in productivity, a shock that is inherently disinflationary. Today's unexpected shock is believed by some to be labor market dislocations that arose from the Great Recession and, while diminishing, have proved persistent—the decline in the participation rate, higher percent of discouraged, marginally, and involuntary part time workers. Some believe these developments mean there is more slack than signaled by the “official” unemployment rate, U3, resulting in lower inflation today at the prevailing U3 than otherwise. But, it's really not clear that a traditional U3 based Phillips curve is over-predicting inflation. A lot of research disputes that. In addition, in both cases, the shocks only temporarily suppress inflation. When the dust settles, inflation will be back in line with the traditional Phillips curve, and, if the unemployment rate at that time is well below the NAIRU, inflation may be unacceptably high. Message: Be careful not to exploit too aggressively the ability to lower the unemployment rate without short-run adverse consequences for inflation. In addition, the more important force holding down inflation in the last couple of years has been the decline in the oil prices and appreciation of the dollar. But here too the effects holding back inflation are temporary. When those shocks dissipate, as is already the case today, inflation will rise toward its “underlying” rate, which even Yellen has said might be as high as 1¾%. At the same time, the unemployment rate is falling below the estimated NAIRU. The case for raising rates today is that it is not prudent to wait to raise rates until inflation is closer to 2% and the unemployment rate is well below the NAIRU! That would require rapid rather than gradual increases in rates later and such a rapid rise in policy rates has been a source of recessions in the past.

## Negative interest rates

■ **Since the adoption of a policy of negative interest rates by the central banks of several advanced economies, I have not seen any profound discussion of such policy within the central banking world. In general, central bankers seem to**

support it. The argument is that the new strategy works just like conventional monetary policy, forward guidance and quantitative easing. In the end, all of them act to reduce the long-term interest rates, which would stimulate aggregate demand. In appraising the new policy, should we not be concerned with the impact of it on consumption savings decisions as well? What do you think of the possibility that, faced with negative rates for ten years, as we see in Switzerland and Japan, for example, households will prefer to save more, rather than consume more, a situation which arises if the income effect of the rate reduction is greater than the price effect?

The possibility that lower rates would discourage saving and therefore reduce rather than increase demand has surfaced many times, and, indeed, economic theory does not pin down the sign of the effect on consumer spending and hence aggregate demand. Most research however estimates that the effect of lower rates on consumer spending comes principally from its effect on equity and housing prices, that is, via an interest induced wealth effect. I know of no evidence that suggests the effect of lower rates is to reduce household spending. But negative rates have an adverse effect on bank profitability and potentially on bank lending, more serious in Europe and most other areas where credit intermediation is so bank centric. The adverse effect reflects, in part, that banks are reluctant to pass on the negative rates on reserves to retail deposit rates. At this point, many of the other adverse effects (increase in currency holding) have not occurred, while the effect longer-term rates, equities and the exchange rate have mostly in line with what would be expected for an easing through lowering rates. For the U.S., circumstances are seen as different and the uncertainty and potential costs higher, principally because of the size of the money market mutual funds industry in the U.S. and the risk of disruptive outflows of investor funds.

## Oil and the world economy

■ Since the early 1970s, and at irregular intervals, the international price of oil becomes an issue for macroeconomists and policy makers, particularly monetary

policy makers. This time, we face a dramatic decline in the price of oil, to quite low levels. The situation is especially interesting because it comes in the wake of a fantastic phenomenon, the so-called shale revolution in the US. As it is widely known, firms in the shale business are highly indebted and have difficulties in surviving at something like US\$ 40 dollars a barrel. This means that the price decline raises frictions in the US labor market, causes investments in the important energy sector to shrink and tends to worsen financial conditions, through increases in junk bond spreads. Do you think these indirect effects might be stronger than the direct effects, according to which a significant fall in the price of oil stimulates households to spend more on non-energy related goods and services, meaning that the net effect of the price decline could be harmful to the world economy?

The positive effect of lower oil prices on aggregate demand at least is now lower than earlier as a result of the shale revolution, and, as a result, the adverse effect on investment spending in that sector. This shale industry has been a rising share of overall business investment and GDP. As a result, the decline in investment in this industry offsets, at least in part, the traditional boost to consumer spending. Second, the firms in the shale industry are smaller firms whose investment is often financed out of revenue or by borrowing in the high yield market. A decline in oil prices increases default risk and leads to a rise in borrowing costs, as seen today in the high yield market. Third, lower oil prices have hit commodity-exporting countries especially hard, many of which are EMs that were already struggling. This has made the effect of lower oil prices less of a plus globally. Given the still small proportion of nonresidential investment accounted for by shale drilling, the traditionally positive effect on consumer spending through the associated rise in real disposable income appears to dominate the decline in investment in the shale industry, leaving the net effect of a decline in oil prices on aggregate demand in the U.S. still positive, but smaller than earlier.

## Productivity slowdown

■ In *A Term at the Fed* you looked at productivity growth in the US since 1889 through the year 2000. You noticed that in periods of low productivity growth the average rate of expansion of output per hour worked is about 1.5% per annum, and that in periods of high productivity growth the average rate of growth of labor productivity is about 3.0%. More recently, though, namely between 2011 and 2015, we observe that the average yearly rate fell dramatically to 0.5%, a level which is three times lower than the historically registered “floor”. In your opinion, how can we best explain this phenomenon? Is this recent period too short to allow a meaningful interpretation of the data?

The rate of potential output growth has been falling since the late 1990s and the early 2000s, from about 3 ½% then to about 1.5% 2% today. There is an active debate as to whether this low rate of growth will prevail going forward. But the consensus today is that growth in the U.S. will average about 2% over the next couple of decades. One source of the decline is clear and ongoing, a slower rate of growth of the population and a declining participation rate as a result of the aging population. But the surprise is the sharp decline in productivity growth. Some of this could reflect the scars of the Great Recession, but it appears it has deeper roots. In an accounting sense, the decline in labor productivity is some combination of less capital deepening (less capital per worker) and less technological progress, slower growth in total factor productivity (TFP). With respect to the former, that reflects the disappointing pace of investment for some time. The latter is the mystery and the source of the active debate. Their decline is dramatic, from near 2% during the mid-1990s to the middle of the next decade to just ½ % per year after. We estimate productive capacity is rising at just a 1½% rate in 2016. This is so low historically, that most forecasters assume it will edge upward to something more normal relative to previous decades, to about 1% per year, bring potential growth to about 2%.

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