

Secular stagnation and growth measurement

Summary of the conference held on 16 January 2017 in Paris, organised by the Banque de France and the Collège de France

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Growth in gross domestic product (GDP) per capita in most advanced countries has slowed markedly since the 1970s. The purpose of the conference was to analyse this phenomenon, which is referred to as secular stagnation. The first session addressed problems in the measurement of GDP: these result in a significant understatement of growth, although without altering the fundamental assessment that productivity growth has slowed over the recent period. Secular stagnation can be interpreted as a weakness in demand, reflected in low interest rates and stemming from factors such as debt deleveraging, population growth or inequality. The second session explored the quantification of these factors, and looked at the link between weak demand and potential growth, and the possible implications for economic policy. The third session examined the supply side, and discussed the contribution of new technologies to productivity growth. Today's disruptive technologies may depress productivity in the short term and only increase it after a certain amount of time. In addition to these observations, the conference suggested that secular stagnation is not inevitable and that public authorities have the tools available to find a solution.

Key words: secular stagnation, productivity, monetary policy, innovation, growth measurement

JEL codes: E01, E20, E50, E60, N10, O40

Key figures

**0.80% (2015-2040)
after 2.11% (1920-2014)**

growth in US output per capita
(projections by Robert Gordon)

3.5% in 1990 compared with -1.5% today

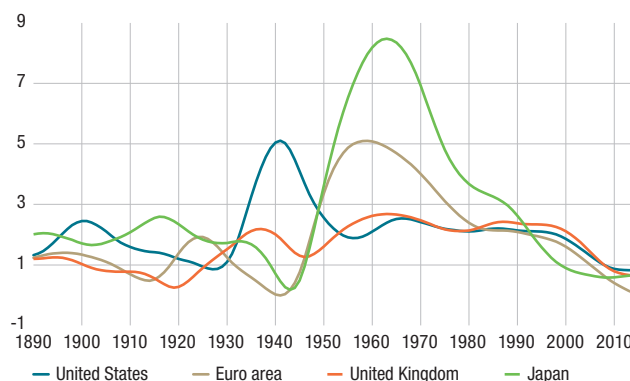
real US interest rates
(calculations by Hamilton et al. 2016)

**Around 1% compared
with 1.5-2% before the crisis**

euro area potential growth (according to Peter Praet): euro area GDP finally exceeded its pre-crisis level in the third quarter of 2015

Growth in GDP per capita

(annualised growth; Hodrick Prescott filter where $\lambda = 500$, in %)



Source: Bergeaud, Clette and Lecat (2016), data available at: www.longtermproductivity.com

The Collège de France and Banque de France organised a joint international conference in Paris on the theme of secular stagnation and the measurement of growth. Ten academic contributions were presented over three themed sessions. These were followed by a panel discussion on policies that can be used to address potential stagnation.

François Villeroy de Galhau, Governor of the Banque de France, opened the conference by highlighting the need for central bankers to pay particular attention to the risk of secular stagnation – defined as a prolonged period of anaemic growth. A persistent slowdown in trend output growth can make an economy more vulnerable to shocks that push the natural interest rate below the effective lower bound. Moreover, weak growth and inflation reduce the efficiency of standard monetary policy tools, as well as affecting the sustainability of public and private debt.

The conference focused on three key questions: are we underestimating growth? Is the slowdown linked to demand? And is this persistent phenomenon linked to supply-side factors, such as a slowdown in the pace of innovation?

1. Measurement aspects

The first session aimed to determine the extent to which the recent slowdown in productivity growth reflects an actual trend in advanced economies or, on the contrary, stems from time-varying biases in the way productivity is measured.

Philippe Aghion, professor at the Collège de France, presented a paper (Aghion et al., 2017) investigating the consequences of creative destruction for the measurement of real growth.

His work looks at how to adequately capture the entry and exit of products in the consumer price index (CPI). As the change in prices is

used as a production deflator, overstating CPI inflation essentially equates to an understatement of real growth. In the United States, some 40% of goods exit the CPI sample in a typical year. When calculating rates of inflation, national statistics offices generally assume that new producers charge the same quality-adjusted price as the producers they replace. However, the authors point out that some products disappear precisely because they are displaced by more attractive products. As a result, conventional methods of calculation tend to overstate inflation. Building on this premise, the authors explore the extent to which US growth has been understated. They also examine whether the share of missing growth caused by creative destruction has evolved over time and whether this can explain the recent slowdown in productivity growth. To conduct their analysis, the authors develop a Schumpeterian model which allows them to express missing growth as a function of the market share of incumbent producers and new entrants. Using this method, they estimate that US growth is understated by between 0.5 and 1.0 percentage point per year. However, they also note that this result appears to remain stable over time and thus cannot account for the recent slowdown in productivity growth.

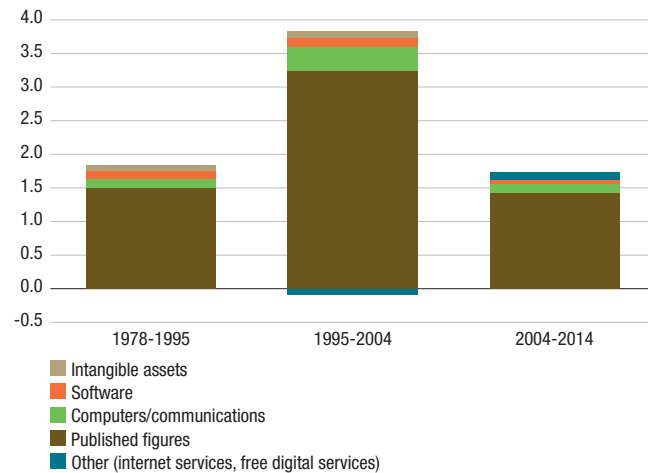
John Fernald, Senior Research Adviser at the Federal Reserve Bank of San Francisco, also explores the issue of how to measure US productivity growth (Byrne et al., 2016), and seeks in particular to determine whether the post-2004 slowdown is real or stems from a worsening problem of mismeasurement. The authors adjust official statistics for various biases and then verify the extent to which this affects growth rates for the periods 1978-1995, 1995-2004, and 2004-2014. They first investigate whether productivity growth has slowed because industries with low measured growth, such as healthcare and other services, have an increasing weight in the economy. Their conclusion is that this has no effect, suggesting that the slowdown in productivity growth is a within-industry rather than a between-industry phenomenon. The authors

then use improved, consistent deflators for a range of information-technology-related products. Although there is indeed considerable evidence of mismeasurement, they find no indication that the problem has increased in recent years. Computer prices, for example, are increasingly poorly measured, but the weight of this sector in total US output is declining. On balance, this source of mismeasurement was more significant in the period 1995-2004 than in the period 2004-2014. In sum, while measurement problems are indeed pervasive, the productivity slowdown since 2004 appears to be real, as shown in Chart 1.

Daniel Sichel, professor at Wellesley College, presented some of his recent work aimed at determining whether mismeasurement in the prices of high-tech products could affect the pattern of multifactor productivity (MFP) growth across industries (Byrne et al., to be published in 2017). His paper stems from the observation that, according to official US data, prices for microprocessor units (MPUs) have barely declined in recent years. This contrasts sharply with the rapid falls observed from the mid-1980s to the early 2000s. The authors build new hedonic indices for quality-adjusted prices using price data published by Intel – a leading MPU manufacturer – for the period 2000-2013. Using these indices rather than the official Producer Price Index (PPI), the authors then gauge the extent to which their “alternative tech prices” (as well as those developed by Byrne and Corrado for a range of high-tech products) change the allocation of MFP growth across industries. The results suggest that adjusting the price of high-tech products implies a much higher rate of MFP growth in recent years for the overall tech sector, and a slower rate outside the tech sector. Given that key innovations in the economy have been driven by the revolution in computer processing capacity, the authors conclude that faster MFP growth in the tech sector might presage faster future growth in the rest of the economy. However, the findings also deepen the productivity paradox, as the stronger pace of

C1 Adjustments to growth in output per hour

(in percentage points)



Sources: US Bureau of Labor Statistics, Fernald (2014), authors' calculations.

growth in the tech sector does not show up in conventional statistics on aggregate productivity.

Jean Luc Tavernier, Director-General of the French statistics office Insee and chair of the session, summed up the first session by concluding that mismeasurement, although pervasive, does not account for the recent slowdown in measured productivity. He said that the papers presented in the session implied that standard CPI tends to overstate prices, contrary to the general public's belief that national statistics offices underestimate inflation. Statistics offices do not measure the consumer surplus – the difference between the total amount consumers are willing to pay for a good or service and the total amount they actually do pay – nor do they take into account all non-monetary transactions. Consequently, measures of well-being need to include items that do not show up in conventional GDP figures, including non-monetary activities such as those found in the sharing economy. Lastly, globalisation poses new challenges for statisticians, as it is becoming increasingly difficult to locate sources of output and value added in a global economy.

2. Is the slowdown in growth linked to weak demand?

In his introduction to the second session focusing on demand, Marc-Olivier Strauss-Kahn, Director General Economic and International Relations at the Banque de France, reiterated the factors thought to lie behind a secular stagnation: demographics, productivity, deleveraging, risk aversion and inequality, among others.

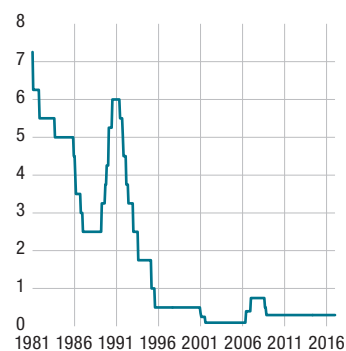
In advanced economies, the Great Recession was followed by a decline in potential growth (or a slow recovery). The first paper of the session (Benigno and Fornaro, 2016), presented by Luca Fornaro, researcher at the *Centre de Recerca en Economia Internacional* or CREI, sought to explain how a prolonged period of weak aggregate demand can lead to a decline in potential growth. The study uses an endogenous growth model with nominal rigidities and a zero lower bound on the nominal interest rate. The model allows for two equilibria: one with full employment and positive growth, and one where pessimistic expectations lead to a permanent state of stagnation with a liquidity trap, as illustrated in Chart 2 for Japan. Intuitively, firms' investment endogenously determines the growth

rate of productivity and depends on expectations of future profits. Pessimistic expectations for future growth lead to a decline in household spending and firms' profits, and low profits in turn lead to weaker corporate investment and productivity growth, thereby validating the pessimistic expectations. In such a set-up, it makes sense for governments to consider subsidising investment in productivity-enhancing activities. The paper adds to the existing literature by demonstrating that these policies act not only through the supply side, but also by stimulating aggregate demand during a liquidity trap. The authors show that sufficiently large subsidies for innovation can help to pull an economy out of stagnation and restore full employment.

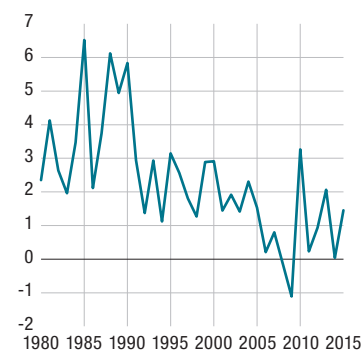
Jordi Gali, Director of Research at the CREI, described the effects of a fiscal stimulus (Gali, 2014). Using a New Keynesian model, his paper looks at the macroeconomic impact of a fiscal stimulus (cut in taxes or increase in public spending) when it is financed first by standard increase in debt, and second by money creation. A stimulus financed by the money creation has a greater impact than one financed solely by debt. If the zero lower bound is not binding (liquidity trap), a money-financed fiscal stimulus lowers real rates,

C2 The case of Japan (1980-2014)

a) Central bank policy rate (%)



b) Real GDP/hour worked (annual growth rate in %)



Sources: Benigno (G.) and Fornaro (L.) (2016).

which in turn leads to a rise in consumption. In the case of a debt-financed stimulus, however, real rates remain constant following a tax cut (due to Ricardian equivalence), or rise following an increase in government expenditure (due to monetary tightening). In a liquidity trap, money creation acts as a “forward guidance” policy, and implies a period of monetary accommodation after the end of the trap. This in turn increases inflation expectations and leads to a rise in present consumption. Due to the constraint on nominal rates, monetary policy accommodation is not immediate, and the gain from money-financed stimulus compared to a debt financed stimulus is smaller than when there is no liquidity trap.

The third paper in the session (Marx et al., 2017), presented by Benoit Mojon, Director of Monetary and Financial Analysis at the Banque de France, proposes a quantitative explanation for the contrasting trends in real interest rates and returns on capital. Risk-free rates have declined since the 1980s, whereas the return on capital has not. The paper analyses these trends in a calibrated overlapping generation model, incorporating growth in productivity and in the labour force, a borrowing constraint and a variable risk to productivity growth. Using this method, the authors show that declining labour force and productivity growth imply a limited decline in real interest rates. Moreover, deleveraging cannot account for the joint decline in the risk-free rate and increase in the risk premium. When the authors allow for a change in the perceived risk to productivity, they find that the joint change in the risk-free rate and return on capital requires an increase in risk, and does not rely on a decrease in the borrowing capacity of indebted agents. This finding is consistent with the increase in public and private debt since the crisis, but refutes the role of deleveraging in explaining the observed decline in real rates. The authors also note that, for the data on returns on risky assets, stock returns could be used in place of the return on capital, as both display a similar pattern.

In summing up the session, Marc-Olivier Strauss-Kahn noted the different timing perspectives of the presentations, and then tried to draw some lessons for fiscal policies. According to Luca Fornaro, well-targeted public spending, notably on innovation, can boost productivity and income from labour, and thus help to avert a stagnation trap. For Benoit Mojon, if public debt can be considered a safe asset, then an increase in its supply will push real rates higher; however, if public debt becomes too risky, then it differs significantly from the injection of central bank money in Jordi Gali’s model. Marc-Olivier Strauss-Kahn concluded by stressing the extent to which demand and supply are interlinked. In the United States, for instance, can we really talk about a lack of demand when the unemployment rate is so low? And in other countries, if supply factors are the main causes behind an economic slowdown, then policies to support demand can buy time for other policies, such as structural policies aimed at restoring potential growth.

3. On the supply side: a slowdown in the pace of innovation?

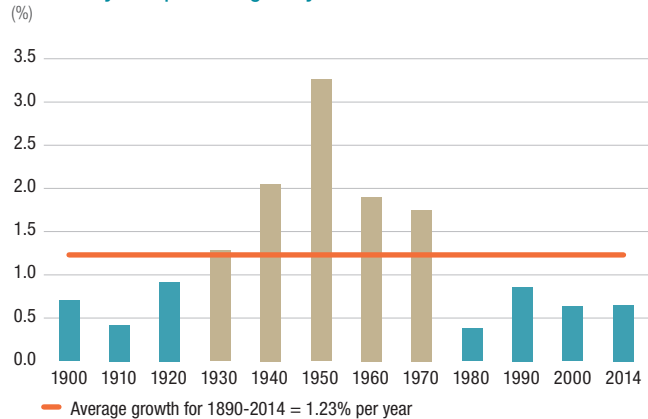
Robert Gordon, professor at Northwestern University, has for many years propounded the theory of a supply-side driven slowdown in productivity. Referring to the origins of the term “secular stagnation”, he explained that Hansen worried about slow population growth at the end of the 1930s, but not about anaemic productivity growth as the latter remained dynamic. Today, we are faced with stagnant growth in population levels as well as in productivity. This implies a lower stock of capital and therefore a lower level of investment, which further weakens productivity growth as machinery is replaced less frequently with newer and more efficient models. Gordon showed that the third industrial revolution (since the 1960s with information and communication technologies) only had a limited and short-lived impact on productivity, at the turn

of the 2000s. By contrast, the first and second industrial revolutions (1770-1840 with the steam engine, railways and steel; and 1870-1920 with electricity, the combustion engine, the telephone, running water and chemicals) both had a massive and lasting impact on productivity. He concluded by saying that the most recent innovations, such as driverless cars or artificial intelligence, are evolutionary, not revolutionary, and cannot be expected to bring about any substantial improvement in productivity.

Nicholas Crafts, professor at the University of Warwick, presented a detailed analysis of the Great Depression. Using improved estimates of the quality of labour and capital, he confirmed that growth in total factor productivity was very dynamic in the 1930s, albeit slightly less so than previously estimated because labour quality grew more quickly. While the productivity gains were exceptionally high in those sectors marked by “great inventions”, productivity growth remained dynamic in all sectors of the economy. For Crafts, investment was low in the 1930s because of the credit crunch and increased uncertainty.

Barry Eichengreen, professor at UC Berkeley, used insights from the Great Depression to analyse the recent US crisis. He confirmed Crafts’ findings on labour quality and productivity, and emphasised the extremely rapid growth in TFP and output after 1937 – which was partly due to fiscal stimuli, especially military spending in the period 1940-1941. By contrast, today’s disruptive technologies depress productivity and only increase it after a certain amount of time. With unemployment in the United States currently at 4.7%, there are no spare resources, so a fiscal stimulus would essentially increase imports and drive up the value of the dollar. Finally, the steady decline in US labour force participation is a structural phenomenon and has not been caused by the crisis.

C3 Average annual growth in TFP in the 10 years preceding the year shown



Source: Presentation by Gordon.

Gilbert Cette, Deputy Director General at the Banque de France and associate professor at the *Université d’Aix-Marseille*, documented the evolution of productivity in the majority of advanced economies over the 20th century (Bergeaud et al., 2016). Productivity growth reached a peak in the United States during the two world wars, and at a later stage in the euro area due to the catch-up process. These waves of long-term productivity growth can partly be explained by improvements in the measurement and quality of production factors (education levels for labour, and the age of equipment for capital stock), and by the diffusion of technology. However, even after taking these elements into account, we still cannot fully explain the waves of productivity growth. As a result, we need to look at other possible causes, such as the allocation of production factors, or changes in production processes and management practices.

Jean-Claude Trichet, former Governor of the Banque de France and former President of the European Central Bank (ECB), asked the panel whether there was a link between the 1973

(negative) oil supply shock and subsequent decade of historically low productivity growth, and between the lax financial regulation/low interest rates from 1995 to 2005 and the rapid growth in productivity. Crafts replied that in Europe, productivity increased in the 1950s and 1960s as a result of reductions in inefficiencies; the subsequent slowdown would therefore have occurred anyway, although the oil shock certainly made it more abrupt. Gordon added that many of the sources of productivity gains in the United States (railways, air conditioning in the south, aeroplanes) had already been exhausted by 1970. Cetto concurred and explained that a break in TFP growth appears in the United States in the 1960s. Eichengreen added that in the 1970s, productivity growth decreased less in those countries that spent more on education, had a stable political regime and were less reliant on investment. Asked about the impact on productivity of the creation of the European Single Market in 1992, Crafts replied that most models showed it had had a positive impact on the level of productivity, but not on its growth, and that this is indeed visible in the data. However, the effect is small as Europe is still a long way from completing the Single Market. Eichengreen added that US productivity increased considerably in the 19th century thanks to market integration and railroad expansion.

4. How can we avoid a potential secular stagnation?

Anne Le Lorier, First Deputy Governor of the Banque de France, introduced the panel discussion by highlighting the challenges raised by low growth, particularly for policy-makers. She emphasised that monetary policy should not be the only game in town, and stressed the need for it to be followed up with other policy tools. With regard to demand, the composition of public spending and coordination of fiscal policies are central to the debate. On the supply side, there is a strong need for reforms, but the main difficulty is how to make sure they are understood and accepted.

Claudio Borio, Head of the Monetary and Economic Department at the Bank for International Settlements, focused on the demand aspect of low growth. He said that the world is not suffering from a secular stagnation but rather from the consequences of the financial crisis, and in particular from the misallocation of resources during the pre-crisis financial boom and the long shadow this has cast post-crisis, and from a serious debt overhang. Rather than reflecting a deep seated structural weakness in aggregate demand, low growth is the result of a major financial boom and bust that has left long-lasting scars on the economy. This analysis suggests that macroeconomic policies, and in particular monetary policy, should be adjusted to better respond to phases of expansion and recession.

Catherine Mann, Chief Economist at the Organisation for Economic Co-operation and Development (OECD), said there is a lot that policies can do to fight low growth. One important issue is the lack of innovation diffusion from the most productive firms (those at the technological frontier) to the rest of the economy. Frontier firms can afford to pay their employees higher wages, which in turn increases inequality. Although each country has unique policy needs, policy makers should consider making reforms that i) ensure competition, entry and exit; ii) support labour market fluidity; and iii) improve the performance of the financial sector. Policies that prevent the exit of firms in order to maintain employment may lower productivity growth by protecting less productive firms. This can also lead to an increase in non-performing loans, thereby posing a threat to financial sector stability. Macroprudential policy should therefore be coordinated with microstructural policies.

Fabrice Lengart, Deputy Commissioner-General at France Stratégie, underlined the very real risk of a downward spiral. Low growth raises concerns over the long-term sustainability of pension systems, particularly in countries such as France. Preventing a secular stagnation requires a combination of measures to strengthen both

demand and supply. First, public investment must be increased, since well-targeted investments can help to lift potential growth. In Europe, in order to abide by European fiscal rules, any rise in public investment would require a more coordinated approach. A second way forward is to increase aggregate demand and improve the allocation of labour and capital by tackling income and wealth inequality. A third solution is to design mechanisms that would increase predictability for companies, by providing them with a guarantee that technological innovation will be encouraged rather than quashed by regulations.

Peter Praet, Member of the Executive Board and Chief Economist at the ECB, said that, to be effective, the policy response to low growth should be comprehensive, consistent, well sequenced and incentive compatible. Secular stagnation is

not inevitable, but is a possible outcome of bad macroeconomic policies. Monetary policy faces three key challenges, related to measurement uncertainty, the instruments it can use and its relationship with other economic policies. First, policy makers should not base their actions solely on intangible variables such as the equilibrium real interest rate or output gap. This is why the ECB has always pursued a comprehensive monetary policy strategy, based on two pillars, and has in practice always looked at a broad range of indicators when determining its policy stance. Second, policy-makers have to remove certain theoretical constraints when this is deemed necessary, as was the case when the ECB used non-standard measures to help the economy recover. Third, Praet said that monetary policy cannot do everything and nor should it. To manage this risk, central banks should always stick firmly to their mandate.

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