

Secular Stagnation: Facts, Causes and Cures

Edited by Coen Teulings and
Richard Baldwin



CEPR Press

A VoxEU.org Book

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Introduction

Coen Teulings and Richard Baldwin¹

University of Cambridge and CEPR; Graduate Institute, Geneva and CEPR

Six years after the Crisis and the recovery is still anaemic despite years of zero interest rates. Is ‘secular stagnation’ to blame? This eBook gathers the views of leading economists including Larry Summers, Paul Krugman, Bob Gordon, Olivier Blanchard, Richard Koo, Barry Eichengreen, Ricardo Caballero, Ed Glaeser and a dozen others. It is too early to tell whether secular stagnation is really secular, but if it is, current policy tools will be obsolete. Policymakers should start thinking about potential solutions.

Six years after the Global Crisis exploded and the recovery is still not going well. Pre-Crisis GDP levels have been surpassed, but few advanced economies have returned to pre-Crisis growth rates despite years of near-zero interest rates. Worryingly, the recent growth is fragranced with hints of new financial bubbles.

The length of the Great Recession, and the extraordinary measures necessary to combat it, created a widespread but ill-defined sense that something had changed. This ill-defined sense was given a name when Larry Summers re-introduced the term ‘secular stagnation’ in late 2013. But what does secular stagnation really mean? What has changed? And if this is secular stagnation for real, what should be done about it?

With these questions in mind, we assembled a group of leading economists to offer their views on secular stagnation. This is far from a homogenous group – they come from different continents and different schools of thought. Their contributions were

¹ We thank Axel Gottfries for skilful technical assistance and the Centre for Macroeconomics for financial support.

uncoordinated and they do not entirely agree, but a fairly strong consensus has emerged on three points.

- First, a workable definition of secular stagnation is that negative real interest rates are needed to equate saving and investment with full employment.
- Second, the key worry is that secular stagnation makes it much harder to achieve full employment with low inflation and a zero lower bound (ZLB) on policy interest rates.

Larry Summers' chapter adds in financial stability: "It may be impossible for an economy to achieve full employment, satisfactory growth and financial stability simultaneously simply through the operation of conventional monetary policy".

- Third, it is too early to know if secular stagnation is more than just old-fashioned slow growth, but economists and policymakers should start thinking hard about what should be done if secular stagnation materialises – the old macroeconomic toolkit is inadequate.

Another important point concerns the US-Europe distinction. "Europeans should be much more afraid than Americans", Nick Crafts notes in his chapter. "The depressing effects of slower growth of productive potential will probably be felt more keenly in Europe." Juan Jimeno, Frank Smets, and Jonathan Yiangou also make similar arguments in their chapter.

The rest of our introduction structures the secular stagnation (SecStag for short) debate. Section 1 disentangles various interpretations of SecStag as a roadmap for the rest of this eBook. Section 2 digs deeper into the evolution of one variable that turns out to be crucial to the debate: the real interest rate. Section 3 deals with a potentially nasty consequence of low real interest rates: the emergence of bubbles. Section 4 sketches the policy implications of the debate. Many engrained policy concepts fail in a SecStag world. New economic thinking is needed. We trust the chapters of this book will offer plenty of inspiration.

1 Secular stagnation: What it is and why it matters

In 1938, nine years after the beginning of the Great Depression, Alvin Hansen delivered his presidential address, “Economic Progress and Declining Population Growth”. Hansen held his talk after an era of unprecedented expansion of the US economy, both in terms of population and the land available. The end of this period and the experience of the Great Depression led Hansen to wonder whether there would be sufficient investment demand to sustain future economic growth.

Larry Summers recently resurrected this idea in his November 2013 speech to the IMF Forum – fleshing out his thinking in a February 2014 speech to the National Association for Business Economics (Summers 2014). The ‘secular stagnation’ term struck a chord. As Barry Eichengreen puts it in his perceptive contribution to this eBook: “The idea that America and the other advanced economies might be suffering from more than the hangover from a financial crisis resonated with many observers.”

The resonance, however, did not produce harmony. As Barry Eichengreen observes: “But while the term ‘secular stagnation’ was widely repeated, it was not widely understood. Secular stagnation, we have learned, is an economist’s Rorschach Test. It means different things to different people.” Fortunately, Macroeconomics 101 provides a straightforward way of structuring the various views.

1.1 Organising the SecStag discussion

Basic macroeconomics provides a three-pillar framework for thinking about an economy’s future growth. First is the economy’s long-run *potential growth* rate. Second is the deviation of *actual* growth from its potential. Third is one-off changes in the *level* of GDP without a change in the long-run growth *rate*. All the various contributions stress one or more of these. We address the pillars in turn.

Diminished long-run growth potential

- The first pillar focuses on Solow-Romer factors – growth may be low since the long-run potential growth rate has fallen.

The first pillar comprises two blocks, since an economy's growth potential depends on: (i) the growth in productive inputs, and (ii) the growth in the efficiency with which inputs are combined to produce output.

Bob Gordon's chapter presents a thorough analysis of the pillar-one reasons for slow future growth for the US. Going beyond his earlier work, Gordon stresses that his 2012 piece (Gordon 2012) is commonly misperceived as focusing only on technology. His chapter also refines his view on technology: "In my numbers there is no forecast of a future technological slowdown – productivity growth adjusted for educational stagnation is predicted to be just as fast during 2007-32 as during 1972-2007." His argument is not that technological progress has stopped, but rather that it has returned to its (low) historical norm. For the three decades before 1930 and the four decades since 1980, US total factor productivity (TFP) growth averaged about 0.5% annually. The aberration was the intervening five decades where TFP grew three times faster.

Beyond technology, he focuses on four structural 'headwinds'.

1. Demography: The population is stagnant, life expectancy is increasing rapidly.
2. Education: The mass education revolution is complete, no further increase in the average US education level is to be expected.
3. Inequality: The raising share of the top 10% of the income distribution has deprived the middle class of income growth since 1980.
4. Public debt: The gloomy outlook for public debt makes current public services unsustainable.

These will, he projects, knock off 1.2% from the 1891-2007 average US per capita growth rate of 2.0%. On top of this, he deducts an additional 0.6% for productivity growth that he views as being slower in coming decades than it has been in the past.

Joel Mokyr, Ed Glaeser, and Nick Crafts cast serious doubts on his technology projections. In his chapter, Mokyr claims that IT, biotech, and new materials are going to revolutionise the world. He claims that the contribution of IT to our wellbeing is not evident from the productivity statistics because the way “we measure GDP and productivity growth is well designed for the wheat-and-steel economy”. It works when pure quantities matter; it does not for measuring the fruits of the IT revolution. Or as Glaeser puts it: “During the first ten years of my life (1967-1977), the only major technological innovation that I observed entering our apartment was colour TV, and that TV broadcast roughly the same set of channels over the decade. How can such a world possibly be compared with innovations of the past decade?”

Glaeser’s chapter also introduces a fascinating twist on the faltering-innovation idea. While rejecting the notion that human inventiveness has stalled, he questions whether today’s inventions bring widespread benefits. “Perhaps, we are just experiencing an era in which innovation benefits the few rather than the many”, he writes. New technology impacts people as consumers and producers. Pre-1990 innovations tended to benefit ordinary citizens as both consumers and producers. But today, he notes, “[h]ighly paid workers work constantly to improve a service that is provided freely to hundreds of millions of poorer users”. While he doesn’t tie this “inversion of the traditional nature of innovation” to secular stagnation, it surely links up with Gordon’s inequality headwind.

Persistent GDP gaps

- The second pillar of the SecStag discussion is firmly Keynesian with all its modern amendments and refinements – growth may be low since it is below its long-run potential growth rate.

This was the basic premise of Summers' 2013 remarks.² As he put it: "Suppose that the short-term real interest rate that was consistent with full employment had fallen to negative two or negative three percent sometime in the middle of the last decade. ... [W]e may well need, in the years ahead, to think about how we manage an economy in which the zero nominal interest rate is a chronic and systemic inhibitor of economic activity, holding our economies back below their potential."

This aggregate-demand-shortage view is also stressed in Paul Krugman's chapter: "Secular stagnation is the proposition that periods like the last five-plus years, when even zero policy interest rates aren't enough to restore full employment, are going to be much more common in the future..."

Summers' chapter in this eBook is plainly in the second-pillar, Keynesian camp, but it shows an evolution of this thinking. His well-known 2014 address mentions financial instability only once. His chapter in this eBook makes it part of the fundamental policymaking predicament. "Macroeconomic policy as currently structured and operated may have difficulty maintaining a posture of full employment and production at potential", he writes, "and if these goals are attained there is likely to be a price paid in terms of financial stability." In short, SecStag may force policymakers to choose between sluggish growth and bubbles.

One long-lasting source of excess savings – and one that is particularly relevant to European nations like Ireland and Spain – is the 'balance-sheet recession' notion stressed by Richard Koo in his chapter. When a debt-financed bubble bursts, firms and households simultaneously attempt to pay down their debt. While sensible at the individual level, the result is an enduring lack of aggregate demand. If the new savings fail to find new investment opportunities, GDP may fall and Keynes's paradox-of-thrift can worsen balance sheets, thus prolonging the recession.

² A transcript is available at <https://m.facebook.com/notes/randy-fellmy/transcript-of-larry-summers-speech-at-the-imf-economic-forum-nov-8-2013/585630634864563>. The video is available at <https://www.youtube.com/watch?v=KYpVzBbQIX0>.

One-off supply-side damage

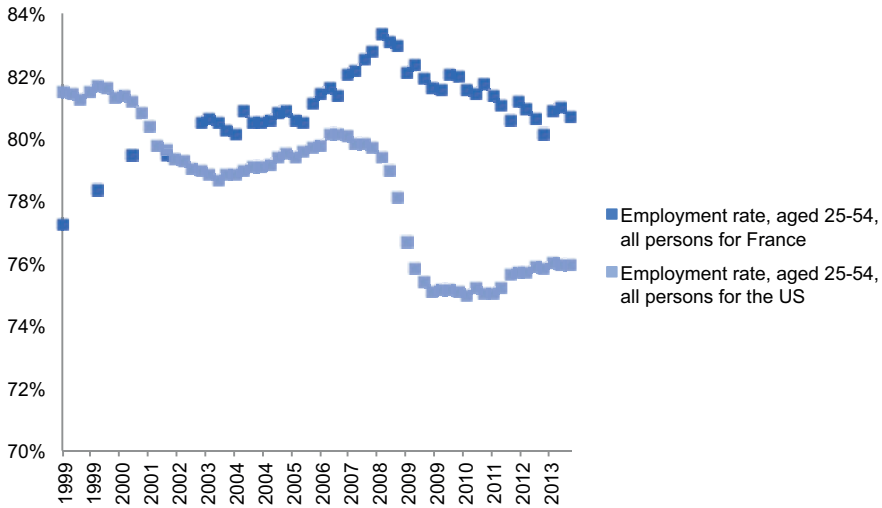
- The third pillar in our Macro 101 framework emphasises levels rather than growth rates – especially one-off, crisis-linked damage to the economy’s potential output.

This part of the SecStag discussion draws on a much older literature on labour market hysteresis. In their seminal paper, Blanchard and Summers (1986) coined the term ‘Euroclerosis’, as they viewed hysteresis as a European problem. After each recession, unemployment jumped up, never to return to its pre-recession level.

Glaeser shows that up to 1970, the share of US prime-aged males without jobs was 5% in good times and 8% in downturns. After 1970, a ratchet effect kicked in; recession-linked rises in joblessness were not fully reversed during recoveries. The damage is permanent, according to Glaeser: “Human capital depreciates off-the-job, so talent is lost.” This sort of one-off supply-side damage could account for why US growth seems to have converged back to its pre-Crisis rate, but not to its pre-Crisis trajectory. Gordon’s chapter cites recent research showing that about half the US decline in participation comes from ageing and the other half is from declining participation within age groups, due in part to weak economic conditions.

Importantly, ratchet-like labour participation problems don’t seem to be the story in Europe, as Figure 1 shows. Employment rates in old sclerotic France improved, while those in the US worsened.

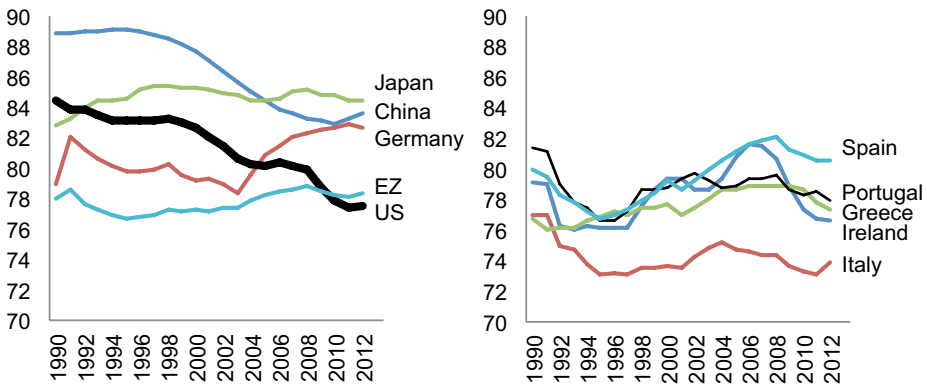
Figure 1 Employment rate, ages 25-54, US and France



Source: FRED online database, <http://research.stlouisfed.org/>

Indeed, the left panel of Figure 2 shows that the US is an outlier among the four largest economies (US, China, Japan, and Germany) and the Eurozone (EZ). The data show the clear secular decline for the US, with US participation now by far the lowest among the world's four largest individual economies (although it is similar to the Eurozone's overall average). More than one in five prime-aged American men are without a job.

Figure 2 Labour force participation rate of men aged 15-64, 1990 – 2012.



Notes: The figure focuses on prime-aged males to avoid issues regarding changes in the societal views on child-care governing female labour supply and issues regarding the take-up of education and retirement.

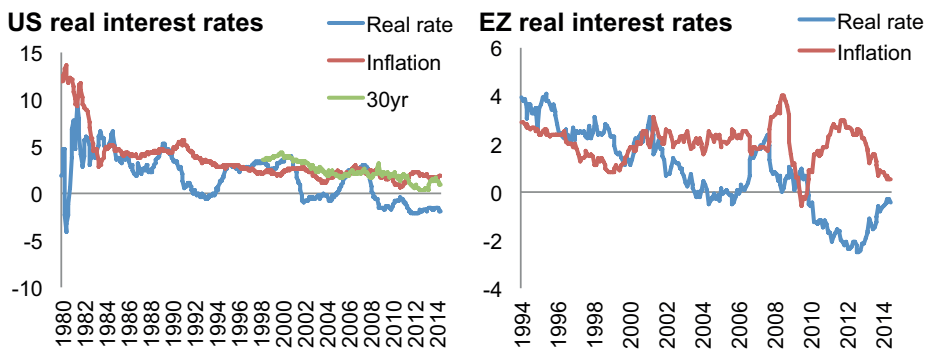
Source: World Bank online database, series SL.TLF.ACTI.MA.ZS.

The right panel of the chart shows the same figures for European countries hit severely by the Crisis. Here again, the US ratchet pattern is missing, with Italy being perhaps the exception. Spain, Portugal, Greece, and Ireland experienced recession-linked dips in labour force participation, but these are not particularly marked compared to the early 1990s recession, though a particularly high share of labour is unemployed in both Spain and Greece. Given the importance of employment rates in the SecStag debate, this striking transatlantic difference surely deserves further attention.

2 Low real interest rates: Why they matter and why they fell

Krugman's chapter shows that the US real interest rates averaged over peak-to-peak business cycles dropped from 5% in the 1980s, to 2% in the 1990s, and to just 1% in the 2000s. Since the Lehman collapse, they have averaged about -1%. Figure 3 shows the long-run decline in the US and the recent decline in the Eurozone, as well as their connection to inflation.

Figure 3 Real interest rates in the US and the Eurozone



Note: The US chart depicts both the real interest rate calculated as the difference between overnight interest rate and inflation and the rate for 30-year inflation-linked bonds. The latter is less sensitive to business cycle fluctuations and therefore provides a cleaner picture of the decline.

Source: ECB and Bloomberg.

2.1 Why low interest rates matter

Low real interest rates play a linchpin role in the secular stagnation debate for two reasons.

- First, if real rates are low in normal times, adverse macroeconomic shocks are more likely to require negative real rates to restore a full-employment investment-savings balance.

In today's low-inflation environment, this tends to undermine the effectiveness of monetary policy.

- Second, low nominal and real interest rates undermine financial stability.

Summers lists three channels through which low rates may foster instability: (i) they increase risk-taking as investors reach for yield; (ii) they promote irresponsible lending as coupon obligations become very low and easy to meet; and (iii) they make Ponzi financial structures more attractive as interest rates look low relative to expected growth rates. "Something of this kind was surely at work during the 2003-07 period", he asserts.

2.2 Why real interests have fallen

A bouquet of contributions focuses on why equilibrium real interest rates have fallen steadily over the past few decades. Standard determinants of the 'natural' or 'Wicksellian' rate are: (i) the savings-supply schedule, (ii) the investment-demand schedule, and (iii) the relative demand for safe versus risky assets.³ The chapter by Olivier Blanchard, Davide Furceri and Andrea Pescatori looks at determinants of the natural rate of decline from a global perspective, while the chapter by Juan Jimeno, Frank Smets and Jonathan Yiangou focuses on the Eurozone.

³ In the short run, monetary policy can also influence the real rate. But Blanchard, Furceri and Pescatori find that "the monetary policy stance of most advanced economies was on average neutral, contributing little to the determination of long-term real interest rates".

We consider these factors in turn.

The supply of loanable funds

An outward shift in the supply of loanable funds could help explain the lower real interest rates. Such shifts are tied to demographics assuming people saving to smooth lifetime consumption. The chapter by Gauti Eggertsson and Neil Mehrotra chapter is theoretical, but the demography-savings link can be quantified.

In Table 1 we have calibrated their model to calculate the stock of saving required for consumption-smoothing for the world's four largest economies – assuming that there were no pay-as-you-go (PAYG) transfers between generations. The numbers show that the demographic shift has led to a dramatic increase in the required stock of savings in all four countries over the past 40 years.

For example, required savings rose from almost two times GDP in 1970 to three and a quarter times GDP in 2010 for Germany. Three factors contributed to this increase:⁴ the increase in life expectancy (see Table1), the lower [retirement age](#), and the decline in the [growth rate of the population](#). The increase in [years of education](#) is the only factor pushing in the other direction. The latter explains why the US has seen the most dramatic increase in the required savings despite its demography shifting the least. By 1970, the education revolution was almost over in the US, while in other countries the take-up of education by new cohorts has gone up substantially since 1970.

Our rough calculations suggest that there was sizeable swing between 1970 and 2010 in the required stock of savings necessary to smooth lifetime consumption. Given the size of the nations listed (40% of world GDP) and the fact that the rest of Europe resembles Germany and many developing nations resemble China, it seems clear that the increase in the required stock of savings has been a global phenomenon.

⁴ Tables for each of these variables are available [here](#).

Table 1 The implications of demographic change for the required stock of savings

	Share of world GDP (%)	Life expectancy (years)			Required stock of savings (share of GDP)		
	2010	1970	1990	2010	1970	1990	2010
US	23.37	70.90	75.30	78.60	-2.28	-0.20	0.52
China	9.26	62.90	69.50	74.90	-0.40	-0.48	0.86
Japan	8.58	72.00	78.90	82.90	-1.76	-0.27	1.19
Germany	5.17	70.60	75.30	80.50	1.89	2.49	3.25

Note: The required-savings calculation assumes perfect consumption-smoothing from the age of ten until expected death, using life expectancy. The calculation takes into account the years of education before the start of the labour market career, the age of retirement, and the population growth rate. The formula used for the calculation can be found here.

Source: IMF, OECD and own calculations for required savings stock.

Demand for loanable funds

Blanchard, Furceri and Pescatori attribute little explanatory power to the investment side. But Glaeser makes some interesting points about how the heightened role of IT sectors could shift the investment demand schedule. The key is that the development of high value-added services by Google, Microsoft, Amazon, Facebook and the like require relatively little investment. Summers (2014) makes a similar point in noting that WhatsApp has a greater market value than Sony but required next to no capital investment to achieve it. More detailed work is needed, but the rough numbers suggest it could be important. According to PwC’s *Global Top 100 companies*, IT companies account for 25% of the market capitalisation of the top 100 companies in 2014.⁵

Relative demand for safe assets

Most real interest rate calculations are based ultimately on the nominal return to safe assets such as US Treasury bills. The price of such bonds depends, *inter alia*, on their

⁵ IT includes Amazon (which is classified by PwC as Consumer Services). The grand total excludes Financial Services to avoid double-counting.

supply and the safety preferences of financial investors. There are good reasons for supposing that both have shifted.

Ricardo Caballero and Emmanuel Farhi show in their chapter that the supply of safe assets fell from 37% of world GDP in 2007 to 18% in 2011. The financial crisis carved out almost half of the supply of safe assets. The main culprits are the collapse of the market for asset and mortgage-backed securities and the downgrading of sovereign debt from Italy and Spain. The financial technology for producing risk-free assets proved to be inadequate.

On the demand side of the market, an opposite trend hit. Pension funds, banks, and insurance companies were forced by regulators to increase their holdings of safe assets. This led to massive excess demand for safe assets. Not surprisingly, the risk-free interest dropped to a historic trough.

3 Bubbles and low interest rates

Beyond ZLB issues, which have been the main concern in the SecStag discussion to date, low real rates can produce bubbles and foster financial instability – as Summers argues forcefully in his chapter. When the real rate, r , falls to values close to the economy's growth rate, g , asset prices start to explode in a 'rational' way (as pointed out by Tirole 1985).

A typical example is gold. If the gold supply is fixed and everyone invests a fixed share of their rising income in gold, the price of gold will rise at the income growth rate, g . As long as g is at least as high as the alternative real interest rate r , we get a rational bubble – defining a bubble as an asset whose price exceeds the present value of its associated

income stream.⁶ But even without such extreme outcomes, low r tends to encourage bubbly asset prices, as Summers argues.

Bubbles are an alternative way for society to deal with excess saving when fiscal policy does not take up the challenge. Buying bubbly assets with the intention of selling them at a later date is an alternative route of saving for future consumption. When nobody wants to invest because r is below g , and hence buys bubbly assets, the price of these assets goes up, yielding windfall profits to their sellers who are therefore able to increase their consumption. This additional consumption restores the balance between supply and demand for loanable funds on the capital market. This explains why so many high-valued apartments in Shanghai are vacant. They are just bubbly assets, stores of value. This fits theory: g is high in China, r is not, and rational bubbles are thus likely to emerge.

Richard Koo stresses in his contribution the necessity for fiscal policy to absorb the excess saving after a bubble has burst and the private sector has to deleverage. The above argument takes this reasoning one step further: fiscal policy should help to avoid rational bubbles to emerge. This is the *paradox of ageing societies*. Ageing leads – other things being equal – to an increase in the required stock of savings (see Table 1). A greater supply of savings is one of the Wicksellian forces pushing the real interest rate down. Hence, ageing societies might run a greater risk of bubbles popping up.

As Blanchard, Furceri and Pescatori show, the capital market has become increasingly globalised. From that perspective, dealing with excess saving is a global issue, as demonstrated in the years prior to the Great Recession, when the US housing market absorbed China's excess saving. However, in times of crisis capital tends to repatriate to its country of origin. From that perspective, China and Europe – the two parts of the world economy that have the most excess saving – should solve their saving problem

6 The real estate bubbles in Spain and Ireland were irrational, at least in retrospect. One could know that there would be no demand for such a high construction volume. The more price elastic the supply of a bubbly asset, the greater the risk that a bubble goes bust, as more and more people start investing in the production of the bubbly asset. This makes real estate in the centre of prime cities an attractive bubbly asset – its supply is limited by the availability of land in the city centre (see the analysis of debt-financed bubbles in Koo's contribution).

themselves. Other parts of the world are unlikely to provide the investment opportunities they are looking for.

Such issues, however, deserve more attention. As Summers writes: “There is important work to be done elucidating the idea of secular stagnation in an open economy context.”

4 Policy responses

Slow growth is hardly a novel policy problem; why should calling it ‘secular stagnation’ change anything? The analysis of many authors in this eBook provides a clear rejection of this scepticism.

- Secular stagnation is different since it undermines the most powerful and flexible tool we have for keeping growth near its potential rate – standard monetary policy.

A workable definition for secular stagnation is that negative real interest rates are needed to equate saving and investment with full employment. As such, secular stagnation raises the likelihood that full employment cannot be achieved because low inflation and the ZLB on nominal interest rates keep real rates firmly positive.

Krugman goes further: “The idea that the liquidity trap is temporary has shaped the analysis of both monetary and fiscal policy. ... [T]he real possibility that we’ve entered an era of secular stagnation requires a major rethinking of macroeconomic policy.” If monetary policy continues to be constrained by the ZLB, “we’d expect the world to look a lot more like that envisioned by Hansen than that envisioned by most macroeconomists during the Great Moderation era”.

Summers goes even further in summarising his chapter: “I explain why a decline in the full employment real interest rate (FERIR), coupled with low inflation, could indefinitely prevent the attainment of full employment. I argue that even if it were possible for the FERIR to be attained, this might involve substantial financial instability.”

Advanced economy central banks have demonstrated admirable creativity in overcoming the ZLB problem with their balance sheets. But raising central bank assets by several trillion dollars is not a trick that is going to work frequently – or at least vastly more research is needed if quantitative easing is to become the new *modus operandi* of G7 central banks.

- Fiscal policy may also need a rethink.

Krugman argues that temporary fiscal stimulus to support demand while the private sector gets back to spending normally may not be enough if negative natural rates are persistent. Koo argues that governments may have to provide stimulus for years to offset the drag of prolonged private-sector balance-sheet repair: “Any premature withdrawal of fiscal stimulus would unleash the deflationary forces as unborrowed savings are allowed to become a leakage in the economy’s income stream. Indeed, the US in 1937, Japan in 1997 and the UK and Eurozone in 2010 all experienced serious double-dip recessions when their governments pursued fiscal consolidation while their private sectors were still in the process of repairing balance sheets.”

4.1 Difficult but uncontroversial policy responses

The policy responses suggested by the authors form a rich and varied assemblage. There is, however, a set of policy that almost all would agree upon – the set of pro-growth policies that economists have urged for years. But this is not just old wine in new bottles. These policies take on a new hue when viewed through secular stagnation glasses.

The point rests on two simple premises. First, as most saving behaviour is slow moving, boosting investment is one way of eluding the ZLB. Second, Macro 101 tells us that the steady-state capital stock grows at the sum of the growth rates of productivity and labour inputs. Thus, policies that stimulate innovation and increase efficiency and those that boost hours worked will raise the natural rate and help us elude the ZLB problem.

For authors like Gordon and Glaeser, who are largely untroubled by negative natural rates and liquidity traps, pro-growth reforms are a good idea without any reference to secular stagnation. For those like Summers and Krugman who worry about systematic saving-investment mismatches, the reforms are especially meritorious since they build a buffer against the difficulty of pushing real rates below zero. The corresponding policy responses correspond to the first pillar of the Macro 101 frame in that they aim to raise economies' long-run growth potential. They include the following:

- Improving the education system.
- Investing in the physical infrastructure.
- Removing barriers for labour mobility between firms by trimming down employment protection legislation.
- Increasing incentives for low-skilled workers to participate on the labour market.
- Simplifying procedures for starting up businesses.
- Applying anti-monopoly policies to reduce the profit margins in new IT industries.

These new IT industries are characterised by large network externalities and hence low investment demand. Anti-monopoly policies increase the share of profits available for less monopolistic parts of the value chain, thereby enhancing investment demand.

A correlation of desiderata

These policies are usually clustered under the heading of 'structural reform' or supply-side policies, but they also help if the 'lack of effective demand' version of secular decline turns out to be correct. As Jimeno, Smets and Yiangou make the point: "The same policies that will help avoid secular stagnation in the future will help boost demand in the current environment. ... Investment is not only tomorrow's supply, but also today's demand."

4.2 Reforms requiring a policy rethink

Until just a few years ago, macroeconomic policymaking had settled on a clear received wisdom. Monetary policy should be run by politically independent, inflation-targeting central banks, and fiscal policy should be aimed at keeping debt and deficits within prudential limits. The consensus was shaken but not shattered when the US's Subprime Crisis metastasised into the Global Crisis in 2008. The only major amendments to the received wisdom were the addition of macroprudential policies and a firm concern about financial stability.

The dangers of secular stagnation – and the spectre of the US and Europe suffering Japan-like lost decades – lead some of the authors to propose bold challenges to the received wisdom. Perhaps the boldest is also the most logically straightforward (Krugman 2014, Blanchard et al. 2010). Summers explicitly backs this in his chapter.

- If the natural rate will frequently be negative, and policy rates are bound to the positive real line, why not raise the inflation target to, say, 4%?

The dreadful experience of the 1980s and the positive experience of the 1990s have shown that a stable inflation target yields high benefits. However, there are no good economic theories that run against an inflation target of 4% instead of 2%, while there are many good economic arguments in favour of a 4% target. Moving from 2% to 4% seems unlikely to undermine the credibility of the target as such. History has shown that monetary policy can stop inflation.

The main argument against moving the target is the German disgust at its 1923 hyperinflation. Germany's respect for its own history has made the world a better place to live in. It should therefore not be denounced lightly. Reflecting a view strongly held in parts of the Eurozone, Guntram Wolff writes: "I would advise against changing the ECB's inflation target ... for two reasons. For one, such a step would severely undermine trust in a young institution. ... It would constitute a break in the contract under which Germany subscribed to the monetary union. Second, changing the target

in current circumstances would be largely ineffective: already the current target will not be achieved in the relevant time horizon and a higher target would only increase this gap.” Eggertsson and Mehrotra dispute this second observation: “We find that a high enough inflation target can – if credible – always do away with the slump altogether as it accommodates a negative natural interest rate. Importantly, however, an inflation target which is below what is required has no effect in this context.”

Challenging the macroeconomic policymaking consensus is not the only controversial reform suggested by the authors as a redress or insurance against secular stagnation. Others include:

- Raising the retirement age.

The *paradox of ageing societies* is that – other things equal – real interest rates will be low, increasing the risk of bubbles. Hence, other things should not be kept constant. A higher retirement age reduces saving. There simply is a limit to the extent to which we can save today in exchange for leisure and high consumption tomorrow. Somebody has to do the work tomorrow; we cannot all be retired by that time.

- Extending PAYG public pensions and health care insurance systems, or if they are already there, enhancing their credibility.

This is particularly relevant for high-growth emerging economies like China and India. PAYG health care insurance has the additional advantage that it reduces the need for precautionary saving. Hence, it is more effective in reducing excess saving than PAYG pension systems.

- Conducting prolonged countercyclical fiscal policy.

This recommendation extends the previous one. Extending PAYG systems is equivalent to an implicit increase in public debt; fiscal policy is an explicit increase. Obviously, there is a sustainability limit. However, reductions in public debt can only be realised when there is no excess saving. In periods of excess saving, forced sovereign debt

reductions aggravate the problem (see Koo's vivid description of Japan's experience after its financial crisis in 1991).

- Revising the European Fiscal Stability Treaty.

The current version requires countries to reduce their public debt below 60% of GDP in 20 years. In some countries, this would require a massive tightening in a time of excess saving. The target for the structural deficit of 1% of GDP implies a long-run value of public debt between 25% and 33% of GDP, assuming the nominal growth of GDP to be between 3% and 4%. This low level of public debt would aggravate excess saving and lead to an acute shortage of save assets (see the chapter by Caballero and Farhi).

- Reducing policy uncertainty, as uncertainty enhances precautionary saving.

The debate on the debt ceiling in the US or the redenomination risk due to the threat of the break-up of the Eurozone, for example, add to uncertainty. The same applies to unrealistic fiscal rules (see the previous bullet).

- Revising regulations that force institution investors to invest in triple A assets.

This proposal is fleshed out in the chapter by Caballero and Farhi. As an example, the regulation in the US that pension wealth be fully annuitised at the date of retirement (applied likewise in several other countries) is both inefficient for the individual retiree (he would be better off if part of his wealth were invested in risky assets) and it distorts the risk-free rate downwardly (further aggravating the cost for the individual retiree).

- Not using monetary policy to avoid bubbles.

The fall in the real interest rate may well lead to bubbles. However, bubbles are not necessarily irrational. On the contrary, they might be a natural response of capital markets to a low real return on investment when fiscal policy does not respond to it. Hence:

- Addressing the excess saving, not fighting the bubbles.

Fighting bubbles keeps capital markets from balancing the supply and demand for loanable funds.

- Globalising financial markets.

While Japan and the North Atlantic economies may face diminishing returns on profitable investment opportunities, the world's capital-labour is very low compared to those of the G7 nations. Massive international capital flows have often ended in tears, but given that savings-investment imbalances are critical to the SecStag debate, the current account is one obvious solution mechanism.

Economies with excess savings

The final bullets reveal that policymakers in an economy with excess saving face a major dilemma.

- Either they set monetary policy to allow the interest rate to fall until the point at which rational bubbles emerge to absorb the excess saving, or
- they avoid the interest rate from falling that far by using fiscal policy for the absorption of the saving.

There are profound differences in the distributional impacts of the two. Using monetary policy favours the current owners of bubbly assets, predominantly the richer elderly; using fiscal policy allows for a broader spreading of the benefits. But trying to avoid this dilemma by picking neither of the two will lead to a failure of the capital market to clear and hence to a long, dragged-out Keynesian recession, as shown by Japan's experience since 1990.

Richard Koo observes that democracies might not be best equipped to handle this dilemma. "(T)he Chinese government implemented a 4 trillion RMB fiscal stimulus in November 2008 when it was facing a sharp fall in both domestic asset prices and exports. As a percentage of GDP, the stimulus was more than double the size of President Barak

Obama's \$787 billion package unleashed three months later. At that time, western observers were laughing when the Chinese government announced that they were going to maintain 8% growth. China's growth soon reached 12% and nobody was laughing." Handling a balance sheet recession requires centralised political power. Japan struggled for 20 years to find a workable solution. The fragmented decision-making process in Europe might cause even more difficulty in finding a way out.

5 Concluding comments

Is secular stagnation something to worry about, or just another passing fad? Will growth in the next decade or two be much lower than it was in the past? Predictions are hard to make, in particular about the future. However, the market offers a simple tell-tale: the level of the real interest rate. Nobody can reliably predict whether it will stay this low for the next decade. However, its current level is a clear sign of excess saving. For this situation, Eggertsson and Mehrotra have a simple piece of advice: "In line with the literature that emphasises deleveraging shocks that have short-term effects, we find that, in this economy, a long slump is one in which usual economic rules are stood on their head."

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Opening the debate

Reflections on the 'New Secular Stagnation Hypothesis'

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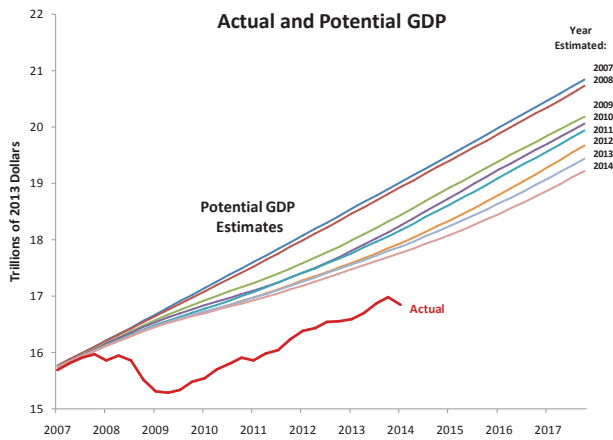
The Great Recession has cast doubt on the idea that, with or without policy intervention, the workings of the market will eventually eliminate output gaps. This chapter explains why a decline in the full-employment real interest rate (FERIR) coupled with low inflation could indefinitely prevent the attainment of full employment. A variety of factors suggest that the FERIR has declined substantially over the last several decades in the industrial world. The chapter concludes by discussing the relationship between secular stagnation and hysteresis, global aspects, and policy implications.

Just seven years ago, all seemed well in the field of macroeconomics. The phrase 'Great Moderation' captured the reality that business cycle volatility seemed way down from levels of the first part of the post-war period. A broad methodological consensus supported the use of DSGE (dynamic stochastic general equilibrium) models to understand macroeconomic fluctuations and to evaluate macroeconomic policies. There was widespread support for the idea that the primary concern of independent central banks should be maintaining appropriate inflation targets and reacting to cyclical developments to minimise the amplitude of fluctuations.

The economic crisis has led to a crisis in the field of macroeconomics. The idea that depressions were a concept of only historic interest has been belied by the Global Crisis and the Great Recession. Figures 1a and 1b depict the gap between actual and potential output estimated as of various dates for both the US and the Eurozone. It is apparent that output is far short of where its potential was expected to be as of 2008. Even more

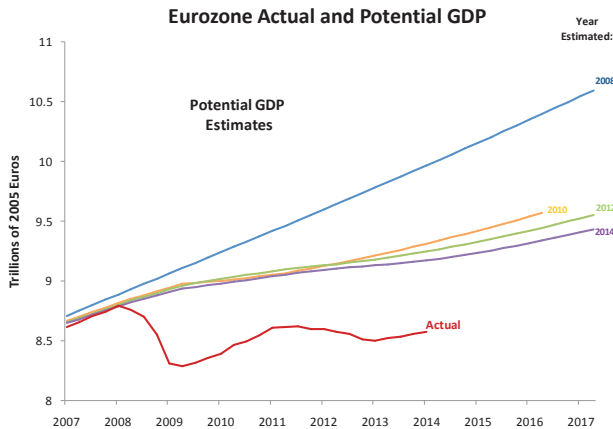
troubling is the observation that most of the gap is expected to represent a permanent loss, as potential output has been revised sharply downwards. For the Eurozone, GDP is almost 15% below its 2008-estimated potential, and potential output has been written down by almost 10%. As Figure 2 illustrates, Europe’s output shortfall is almost identical to the one Japan experienced when the bursting of its ‘bubble economy’ triggered a financial crisis.

Figure 1a Actual and potential GDP in the US

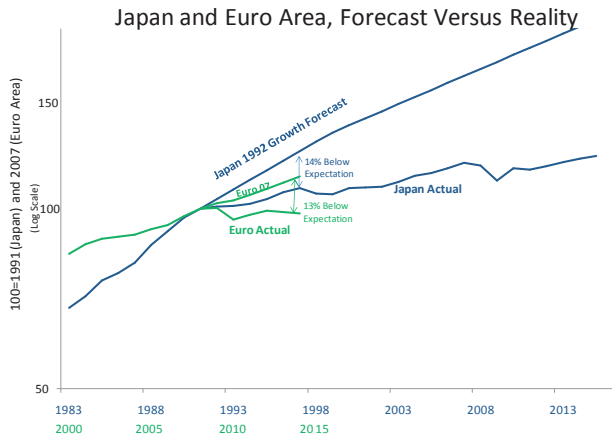


Sources: Congressional Budget Office, Bureau of Economic Analysis.

Figure 1b Actual and potential GDP in the Eurozone



Sources: IMF World Economic Outlook Databases, Bloomberg.

Figure 2 Japan and the Eurozone, forecast vs reality

Sources: OECD 1992 "Long Term Prospects for the World Economy, IMF 2007 & 2014 WEO Database.

The experience of Japan in the 1990s and now that of Europe and the US suggests that – for the purpose of understanding and combating important fluctuations – theories that take the average level of output and employment over a long time period as given are close to useless. Unfortunately, almost all work in both the New Classical and New Keynesian traditions has focused on the second moment (the variance) of output and employment. This thinking presumes that, with or without policy intervention, the workings of the market will eventually restore full employment and eliminate output gaps. The only questions are about the volatility of output and employment around their normal levels. What has happened in the last few years suggests that the second moment is second-order relative to the first moment – the average level of output and employment through time.

The 'new secular stagnation hypothesis' responds to recent experience and the manifest inadequacy of conventional formulations by raising the possibility that it may be impossible for an economy to achieve full employment, satisfactory growth, and financial stability simultaneously simply through the operation of conventional monetary policy. It thus provides a possible explanation for the dismal pace of recovery

in the industrial world, and also for the emergence of financial stability problems as an increasingly salient concern.

Plan of the chapter

The remainder of this chapter focuses on the idea of secular stagnation. After noting the apparent difficulty that industrial economies are having in achieving financially stable growth with full employment, I explain why a decline in the full-employment real interest rate – FERIR, for short – coupled with low inflation could indefinitely prevent the attainment of full employment. I argue that even if it were possible for the FERIR to be attained, this might involve substantial financial instability. Having made the case that a decline in the FERIR would explain much of what we observe, I then adduce a variety of factors suggesting that the FERIR has declined substantially over the last several decades in the industrial world. I conclude by discussing the relationship between secular stagnation and hysteresis, global aspects, and policy implications.

1 The secular stagnation hypothesis and recent events

It has now been more than five years since the US economy reached its trough in the second quarter of 2009, and close to five years since evidence of systemic financial risk – as reflected in LIBOR spreads, the need for government bailouts, or elevated risk premiums on bank debt – has been pervasive. Yet US economic growth has averaged only 2% over the last 5 years, despite having started from a highly depressed state. In a similar vein, credit spreads in Europe have come way down and fears of the dissolution of the Eurozone have been sidelined, yet growth has been glacial over the past several years and is not expected to rapidly accelerate.

Upon reflection, these patterns should be surprising. If a financial crisis represents a kind of power failure, one would expect growth to accelerate after its resolution as those who could not express demand because of a lack of credit were enabled to do so.

Trouble masked by unsustainable finances

Unfortunately, it appears that the difficulty that has arisen in recent years in achieving adequate growth has been present for a long time, but has been masked by unsustainable finances. Here it is instructive to consider the performance of the US and Eurozone economies prior to onset of financial crisis in 2007.

Let us begin with the US. It is certainly fair to say that growth was adequate – perhaps even good – during the 2003–2007 period. It would not be right to say either that growth was spectacular or that the economy was overheating during this period. And yet this was the time of vast erosion of credit standards, the biggest housing bubble in a century, the emergence of substantial budget deficits, and what many criticise as lax monetary and regulatory policies.

Imagine that US credit standards had been maintained, that housing had not turned into a bubble, and that fiscal and monetary policy had not been stimulative. In all likelihood, output growth would have been manifestly inadequate because of an insufficiency of demand. Prior to 2003, the economy was in the throes of the 2001 downturn, and prior to that it was being driven by the internet and stock market bubbles of the late 1990s. So it has been close to 20 years since the American economy grew at a healthy pace supported by sustainable finance.

Making judgements for Europe is more difficult because of the problem of evaluating structural constraints on growth. But in retrospect it is clear that much of the strength of the economies of the periphery prior to 2010 was based on the availability of inappropriately cheap credit, and that much of the strength of the economies of Northern Europe was derived from exports that were financed in unsustainable ways.

Understanding anaemic growth in the absence of unsustainable financing

How might one understand why growth would remain anaemic in the absence of major financial concerns? Suppose that a substantial shock took place – for reasons that I

will describe subsequently – and that this tended to raise private saving propensities and reduce investment propensities. How would growth be affected? The normal answer to this question is that one would expect interest rates to fall (driven either by market forces or policy actions) until the saving and investment rate were equated at the full-employment level of output. That is to say, changes in saving and investment propensities, or for that matter, in government deficits might be expected to impact an economy's FERIR, but not its level of output and employment. But this presupposes full flexibility of interest rates. In fact, in modern economies short-term safe interest rates cannot fall appreciably below zero because of the possibility of currency substitution. So interest rates are not fully flexible in modern economies. Note that interest rates that include term or credit premia will never fall to zero, but only to a level that reflects these premia.

Hence the possibility exists that no attainable interest rate will permit the balancing of saving and investment at full employment. This is the secular stagnation hypothesis first put forward by Alvin Hansen in the 1930s. Notice that as Keynes, Tobin, and subsequently Brad Delong and I have emphasised, wage and price flexibility may well exacerbate the problem. The more flexible wages and prices are, the more they will be expected to fall during an output slowdown, leading to an increase in real interest rates. Indeed, there is the possibility of destabilising deflation, with falling prices leading to higher real interest rates leading to greater output shortfalls leading to more rapidly falling prices, and onwards in a vicious cycle.

Low rates and financial instability

Even if the zero interest rate constraint does not literally bind, there is the possibility that the positive interest rate consistent with full employment is not consistent with financial stability. Low nominal and real interest rates undermine financial stability in various ways. They increase risk-taking as investors reach for yield, promote irresponsible lending as coupon obligations become very low and easy to meet, and make Ponzi

financial structures more attractive as interest rates look low relative to expected growth rates. So it is possible that even if interest rates are not constrained by the zero lower bound, efforts to lower them to the point where cyclical performance is satisfactory will give rise to financial stability problems. Something of this kind was surely at work during the 2003–2007 period.

2 What has happened to the FERIR?

So far I have argued that if the FERIR declined substantially one might expect to see an unfortunate combination of unsatisfactory cyclical performance and financial instability, much like what has been observed recently. Is it reasonable to suppose that FERIR levels have declined in major industrial countries? A variety of structural changes summarised in Summers (2014) suggest that FERIR levels may have declined substantially. These include:

- Slower population and possibly technological growth means a reduction in the demand for new capital goods to equip new or more productive workers.

Throughout the industrial world levels of labour force growth are way down, with labour force shrinkage already underway in Japan and soon to come in large parts of Europe.

- Lower-priced capital goods means that a given level of saving can purchase much more capital than was previously the case.

Information technology continues to decline rapidly in price and to account for a larger share of total capital investment. It is revealing that the iconic cutting-edge companies have traditionally needed to go the market to support expansion. Today, leading-edge companies like Apple and Google are attacked for holding on to huge cash hoards.

- Rising inequality operates to raise the share of income going to those with a lower propensity to spend.

Closely related, a rising profit share operates to transfer income to those with a lower propensity to spend.

- Increasing friction in financial intermediation associated with greater risk-aversion in the wake of the financial crisis and increased regulatory burdens operates to raise the wedge between safe liquid rates and rates charged to borrowers.

In general equilibrium this drives down safe rates. The same effect is present if debt overhangs or increased uncertainty discourages borrowing.

- A rising desire on the part of central banks and governments to accumulate reserves coupled with conservative investment strategies operates to raise the demand for safe assets, driving down safe interest rates.

This effect is reinforced by requirements that encourage pension funds and insurance companies to hold their assets in safe bonds as to best match liabilities.

- Ongoing disinflation which means that at any given real interest rate, real after-tax interest rates are higher.

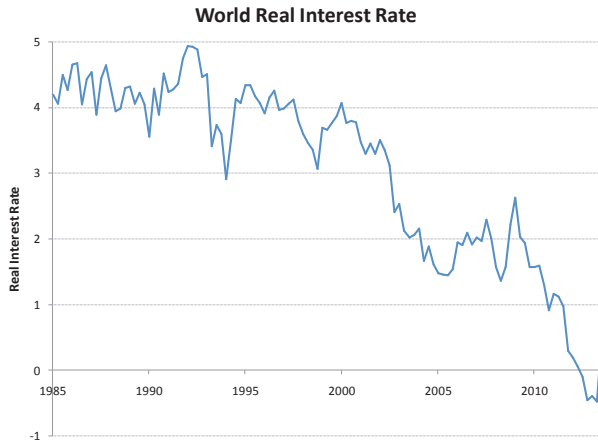
To the extent that it is after-tax real interest rates that matter for investment decisions (as for example with tax-deductible mortgages), this operates to shift investment demand inwards, resulting in a pre-tax real interest rate lower than it was before (see Summers 2014 for details).

Evidence from FERIR estimates

The importance of these considerations is suggested by the available empirical evidence on actual real rates and on estimates of the FERIR. Figure 3 shows trends in indexed bond yields for a number of countries. It is clear that they have trended down over the last 15 years. Even more relevant for the US economists at the Fed, Laubach and Williams (2003) have attempted to estimate the FERIR using data on actual real interest rates and measures of where the economy is relative to its potential. While many issues

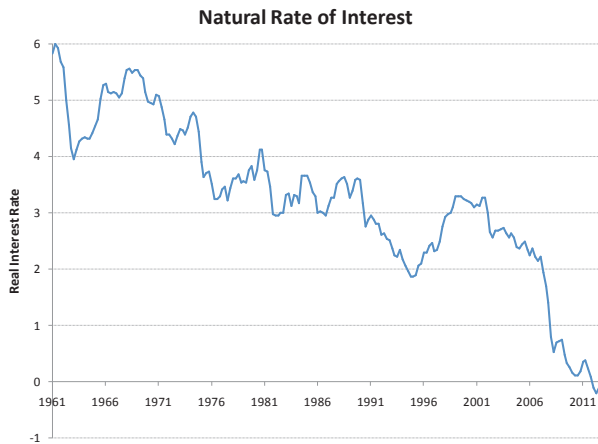
can be raised with respect to their calculations, Figure 4 illustrates their estimate of a substantial long-term decline in the FERIR.

Figure 3 World average real interest rate



Source: Mervyn King, "Measuring the World Interest Rate".

Figure 4 US natural rate of interest



Sources: Thomas Laubach and John Williams, "Measuring the Natural Rate of Interest".

The IMF in its most recent World Economic Outlook has examined trends in real interest rates in industrial countries and has also considered a variety of factors bearing on real rates. It has reached conclusions similar to the ones I have reached here – that

the FERIR has likely declined in recent years. This observation, together with the observation that lower US inflation – and in Europe declining rates of inflation – makes it more difficult than previously to reduce real interest rates. This in turn suggests that the zero lower bound and secular stagnation are likely to be more important issues in the future than in the past. At a minimum the analysis suggests that if full employment is to be maintained in the years ahead, real interest rates in the industrial world will likely be lower than they have been historically – a development that may have important implications for financial stability.

3 Conclusions and implications

The case made here, if valid, is troubling. It suggests that monetary policy as currently structured and operated may have difficulty maintaining a posture of full employment and production at potential, and that if these goals are attained there is likely to be a price paid in terms of financial stability. A number of questions come to mind:

- How great are the risks?

Alvin Hansen proclaimed the risk of secular stagnation at the end of the 1930s, only to see the economy boom during and after World War II. It is certainly possible that some major exogenous event will occur that raises spending or lowers saving in a way that raises the FERIR in the industrial world and renders the concerns I have expressed irrelevant. Short of war, it is not obvious what such events might be. Moreover, most of the reasons adduced for falling FERIRs are likely to continue for at least the next decade. And there is no evidence that potential output forecasts are being increased, even in countries like the US where there is some sign of growth acceleration.

- What about hysteresis?

On their own, secular stagnation ideas do not explain the decline in potential output that has been a major feature of the experience throughout the industrial world. The available evidence though is that potential output has declined almost everywhere, and

in near lockstep with declines in actual output – see Ball (2014) for a summary. This suggests a way in which economies may equilibrate in the face of real rates above the FERIR. As hysteresis theories – which emphasise the adverse effects of recessions on subsequent output – predict, supply potential may eventually decline to the level of demand when enough investment is discouraged in physical capital, work effort, and new product innovation.

Perhaps Say's dubious law has a more legitimate corollary – “Lack of Demand creates Lack of Supply”. In the long run, as the economy's supply potential declines, the FERIR rises, restoring equilibrium – albeit not a very good one.

- What about global aspects?

There is important work to be done elucidating the idea of secular stagnation in an open economy context. The best way to think about the analysis here is to treat it as referring to the aggregate economy of the industrial world where – because of capital mobility – real interest rates tend to converge (though not immediately because of the possibility of expected movements in real exchange rates). If the FERIR for the industrialised economies were low enough one might expect capital outflows to emerging markets, which would be associated with declining real exchange rates for industrial countries, increased competitiveness, and increased export demand. The difficulty is that this is something that emerging markets will accept only to a limited extent. Their response is likely to be either resistance to capital inflows or efforts to manage currency values to maintain competitiveness. In either case the result will be further downward pressure on interest rates in industrial countries.

4 What is to be done?

Broadly, to the extent that secular stagnation is a problem, there are two possible strategies for addressing its pernicious impacts.

- The first is to find ways to further reduce real interest rates.

These might include operating with a higher inflation rate target so that a zero nominal rate corresponds to a lower real rate. Or it might include finding ways such as quantitative easing that operate to reduce credit or term premiums. These strategies have the difficulty of course that even if they increase the level of output, they are also likely to increase financial stability risks, which in turn may have output consequences.

- The alternative is to raise demand by increasing investment and reducing saving.

This operates to raise the FERIR and so to promote financial stability as well as increased output and employment. How can this be accomplished? Appropriate strategies will vary from country to country and situation to situation. But they should include increased public investment, reductions in structural barriers to private investment and measures to promote business confidence, a commitment to maintain basic social protections so as to maintain spending power, and measures to reduce inequality and so redistribute income towards those with a higher propensity to spend.

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Three issues: Potential growth,
effective demand, and sclerosis

Secular stagnation: A review of the issues¹

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Pessimists have been predicting slowing rates of invention and innovation for centuries, and they have been consistently wrong. This chapter argues that if the US does experience secular stagnation over the next decade or two, it will be self-inflicted. The US must address its infrastructure, education, and training needs. Moreover, it must support aggregate demand to repair the damage caused by the Great Recession and bring the long-term unemployed back into the labour market.

When late last year, former US treasury secretary Lawrence Summers suggested that the advanced economies, and the US in particular, might be suffering from “secular stagnation,” his remarks struck a chord. The idea that the US and the other advanced economies might be suffering from more than the handover from a financial crisis resonated with many observers.

But while the term ‘secular stagnation’ was widely repeated, it was not widely understood. Secular stagnation, we have learned, is an economist’s Rorschach Test. It means different things to different people. In weighing the question of whether slow growth in the US and other advanced countries reflects some kind of ongoing stagnation problem, it’s important to be clear on the concept.

A first possible explanation for slow growth is that all the great inventions have been made. The respected Northwestern University macroeconomist Robert Gordon (2012)

¹ Light revision and extension of a piece that originally appeared in *Caixin* and *Caixin Online* (March 2014).

argues that electricity, the internal combustion engine and indoor plumbing were infinitely more important for boosting productivity and enhancing living standards than anything produced by the dot.com boom. Personal electronics may be great for playing games, but they are not so good for raising productivity. And there is no great invention equivalent to electricity or the internal combustion engine on the horizon.

For economic historians, this argument flies in the face of 200 years of experience. Pessimists have now been predicting slowing rates of invention and innovation for centuries, and they have been consistently wrong. Looking ahead, it seems clear that the productive potential of robotics and the human genome, for example, have only begun to be realised. Evidence that we are learning how to use intelligent machines to replace first unskilled and eventually skilled labour suggests that we have a distribution problem, not a growth problem.

Gordon bases his argument on the fact that productivity growth, in the US in particular, has been slower in the four decades since the early 1970s than in the century (or a bit less) that preceded them. Only the decade from 1995 to 2005, when, paraphrasing Robert Solow (1987), “you could see the computer age everywhere.... [including] in the productivity data,” did the rate of total factor productivity growth rival what had been achieved over the prior century.

This conclusion, in my view, ignores the fact that the preceding century, Gordon’s golden age of technical progress, also saw periods of slow productivity growth, notably when new network technologies were being rolled out but the economy had not yet adapted to their availability. (The period of electrification starting in the 1890s stands as a classic case in point.) This is an argument for not making too much of the slowdown prior to 1995, when adaptation to the availability of computers and the internet first got underway, or of slow productivity growth now, when we are potentially on the eve of a robotics and human genome revolution.

A second version of secular stagnation argument holds that we have a problem of stagnant aggregate demand – that households are not spending enough and firms are

not investing enough even at near-zero interest rates. Those with very high incomes have a relatively low propensity to consume, and virtually all the income gains in the US have gone to those with very high incomes. (There's that pesky problem of income distribution again.) The result is a glut of savings that firms are unable to invest at a positive interest rate. The advanced countries therefore find themselves with extraordinarily low interest rates as this glut of savings floods the market, and yet with not enough investment to absorb it or to sustain a respectable rate of growth.

This appears to be the version of the argument that Professor Summers prefers. I have my doubts. What matters for interest rates is not US saving but global saving, since funds in the 21st century can move across borders. And, in fact, global saving has basically held stable for the last decade and a half at 23 to 24% of global GDP. At most, global saving rates have risen only modestly. And looking ahead, with China rebalancing its economy toward consumption, there is every reason to think that the global saving rate will come down.

One can of course argue that the ratio of global savings to global GDP is determined in general equilibrium – that the numerator as well as the denominator is an endogenous variable. But that only reinforces the point. In a situation of near-zero interest rates and deficient demand (the current situation and the one that secular stagnationists foresee for the medium term), an increase in savings will have a negative impact on GDP. That effect will be unusually strong, because interest rates can't fall further and because the global economy is closed to trade, increasing the size of the multiplier.

In this situation, an increase in global savings will have a sharp *negative* impact on global GDP. Imagine, for example, an aggregate-demand multiplier of two. When savings rise by, say, 1% of initial GDP, that GDP then declines by 2%, and the resulting saving rate, as measured, is more than 1% greater than before. But this means that the change in the ex ante savings rate (the shock ostensibly responsible for secular stagnation) is smaller than the change in the ex post savings rate that is actually observed. And the increase

in the savings rate we observe in the data, as already noted, is small (globally, 1-2% of GDP).

Even taking general equilibrium effects into account, then, changes in global savings do not appear to be a major factor in the persistently low level of interest rates and slow rate of economic growth.

A third version of the argument suggests that output and total factor productivity growth are stagnant because of the failure of countries like the US to invest in infrastructure, education and training. I have considerable sympathy for this view, given how nondefence, non-entitlement federal government spending, which is devoted heavily to infrastructure, education and training, has been cut to the bone. The empirical literatures on infrastructure, education and economic growth are less than fully conclusive. Intuitively we know that there is something here; we just don't know how much.

A fourth and final version of the secular stagnation hypothesis argues that the US economy's supply-side potential has been permanently reduced by the Great Recession and the slow recovery that followed. The failure of output growth to recover to the pre-Great Recession trend, instead moving in parallel with this trend at persistently lower levels, is consistent with this view. The mechanism in question is then high unemployment, which has permanently impaired the productive potential of the labour force through forgone on-the-job training and the atrophy of skills.

High long-term unemployment and a large number of discouraged workers are prominent features of the current recovery. The question is whether the damage to human capital accumulation due to being out of work is permanent or temporary – whether the effects are reversed easily or only with difficulty. This debate is raging within the corridors of the Federal Reserve System as we speak. The question there is whether many of the long-term unemployed have become essentially unemployable, in which case their being out of work does little to moderate upward pressure on wages, making the headline unemployment rate the best measure of slack in the labour market.

Here, neither contemporary nor historical evidence is definitive. Nick Crafts' studies of long-term unemployment in Britain in the 1930s (e.g. Crafts 1989) confirm that the long-term unemployed had little impact on the behaviour of wages, as if those out of work for extended periods became effectively detached from the labour market. On the other hand, studies of the US during World War II by none other than Robert Gordon show that a positive labour-demand shock, if sufficiently strong, can draw the long-term unemployed back into work and quickly reduce the natural rate of unemployment to earlier low levels (Gordon and Krenn 2010).

So is there a secular stagnation problem? Yes, there are reasons to worry that the US's growth rate over the next 10 or 20 years will disappoint by the standards of the 20th century. But this is not inevitable. It will not be because all the great inventions have been made or because there is a dearth of attractive investment projects and an overabundance of savings.

If the US experiences secular stagnation, the condition will be self-inflicted. It will reflect the country's failure to address its infrastructure, education and training needs. It will reflect its failure to take steps to repair the damage caused by the Great Recession and support aggregate demand in an effort to bring the long-term unemployed back into the labour market. These are concrete policy problems with concrete policy solutions. It is important not to accept secular stagnation, but instead to take steps to avoid it.

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The turtle's progress: Secular stagnation meets the headwinds¹

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US real GDP has grown at a turtle-like pace of only 2.1% per year in the last four years, despite a rapid decline in the unemployment rate from 10% to 6%. This column argues that US economic growth will continue to be slow for the next 25 to 40 years – not because of a slowdown in technological growth, but rather because of four ‘headwinds’: demographics, education, inequality, and government debt.

1 Distinguishing between secular stagnation and slow long-term growth

No single image captures the present concern about secular stagnation and slowing long-term economic growth better than the *Economist* cover of 19 July 2014, showing a frustrated jockey dressed in the colours of the US flag frantically trying to get some movement from the gigantic turtle that he is riding. US real GDP growth has grown at a turtle-like pace of only 2.1% per year in the last four years, despite a rapid decline in the unemployment rate from 10% to 6%. Almost all of that improvement in the unemployment rate has been offset by an unprecedented decline in labour-force participation, so that the ratio of employment to the working-age population has hardly improved at all since the trough of the recession.

¹ This contribution provides additional perspective on the debate about the future of economic growth in the US and in several dimensions goes beyond the main points of my recent NBER Working Paper (Gordon 2014a). Burke Evans contributed the graph and incisive suggestions about the exposition.

I have recently (Gordon 2014a) restated the case for slow growth over the long run of the next 25 to 40 years. At the same time, Larry Summers (2013) has signalled his alarm about a return of ‘secular stagnation’, a term associated with a famous 1938 Presidential Address to the American Economic Association by the Harvard economist Alvin Hansen (see also Hansen 1939). However, Summers and I are talking about different aspects of the current US growth dilemma. His analysis concerns the demand side, “about how we manage an economy in which the zero nominal interest rate is a chronic and systemic inhibitor of economic activity, holding our economies back below their potential”.² In contrast, my version of slow future growth refers to potential output itself.

As the US unemployment rate declines toward the normal level consistent with steady non-accelerating inflation, by definition actual output catches up to potential output. I have provided (Gordon 2014b) a layman’s guide to the numbers that link the performance of real GDP and the unemployment rate and have concluded that US potential real GDP over the next few years will grow at only 1.4 to 1.6% per year, a much slower rate that is built into current US government economic and budget projections. My analysis suggests that the gap of actual performance below potential that concerns Summers is currently quite narrow and that the slow growth he observes is more a problem of slow potential growth than a remaining gap.

Hansen’s 1938 version of secular stagnation was written prior to the invention of the concept of potential GDP, and indeed of real GDP itself.³ Because there was no comprehensive measure of real economic activity, there was no notion of aggregate productivity or its growth rate. When we look at today’s statistical rendering of the US economy in the late 1930s, we see that Hansen was writing about an economy with

² These are the final words from the transcript of his speech given last autumn at the IMF (see Summers 2013).

³ The term “secular stagnation” was introduced not in Hansen’s Presidential Address, but rather four years earlier in Hansen (1934, p. 19).

healthy potential GDP growth but a large gap of roughly 20% separating the levels of actual and potential GDP.⁴

Some have dismissed Hansen's concerns by pointing to the rapid growth in productivity that was occurring as he wrote during what Alex Field (2003) has called the 20th century's "most technologically progressive decade". Some optimistic writers have pointed to the upsurge in productivity growth that occurred in the 1930s and 1940s as offering the possibility that history might repeat itself and lead to faster productivity growth over the next two decades than even during the productivity heyday of 1996-2004.⁵

The reality of 2014 is far grimmer than faced Hansen's US of 1938, because the US was about to receive a succession of lucky breaks that utterly transformed late 1930s gloom into post-war prosperity. Hitler's invasion of Poland created a doubling of export orders in the winter of 1939-40. After the fall of France, the US government pushed the ignition switch on the Arsenal of Democracy, and before Pearl Harbor the share of total government spending in GDP had doubled. Real GDP grew at an annual rate of 12.8% between 1939:Q4 and 1941:Q4. By 1944, real GDP had doubled from its 1939 level. Most amazingly, the economy did not slide back into depression conditions when this huge dose of fiscal stimulus was removed; labour productivity was actually higher in 1950 than in 1944.

4 Current NIPA data for nominal GDP register \$104.6 billion in 1929, \$57.2 in 1933, and \$87.4 in 1938. Gordon and Krenn (2010) estimate the GDP gap for 1938:Q4 to be 23.1%, implying that nominal potential GDP was \$113 billion in 1938. Potential GDP grew between 1928 and 1941 at 3.1% per year, and labour productivity grew at 2.7% per year, more than double the rate achieved in 2004-14.

5 Syverson (2013, Chart 1) cleverly displays the level of labour productivity with two horizontal axes, one extending from 1890 to 1940 and the other aligned 80 years later to extend from 1970 to 2020. This 80-year displacement implies a parallel between 1932 and 2012 and overtly suggests that productivity growth will speed up radically after 2012, as it did after 1932. He ignores the fact that much of the upsurge of productivity growth after 1932 was cyclical and related to the doubling of real GDP between 1939 and 1944.

2 The demise of growth originates in headwinds, not technology

My forecast of growth over the 25 to 40 years is measured from 2007, not from now. The sources of slow growth do not involve technological change, which I assume will continue at a rate similar to that of the last four decades. Instead, the source of the growth slowdown is a set of four headwinds, already blowing their gale-force to slow economic progress to that of the turtle. These four barriers to growth are demographics, education, inequality, and government debt. These will reduce growth for real GDP per capita from the 2.0% per year that prevailed during 1891-2007 to 0.9% per year from 2007 to 2032. Growth in the real disposable income of the bottom 99% of the income distribution is projected at an even lower 0.2% per year.

While many authors acknowledge the demographic headwind, its long-term quantitative impact on economic growth remains open to debate. By definition growth in output per capita equals growth in labour productivity times growth in hours per capita. The slowdown in productivity growth that began 40 years ago was partly offset between 1972 to 1996 by an increase in the labour-force participation rate of 0.4% per year, as females and baby-boom teenagers entered the labour force. In contrast during 2004-2014 the participation rate has declined at an annual rate of 0.5%, and over the shorter 2007-2014 interval at an annual rate of 0.8%. This transition from a 0.4% *increase* to a 0.8% *decline* accounts for a 1.2% reduction in the growth of per-capita real GDP for any given growth rate of labour productivity.

Recent research (Hall 2014) has shown that about half of the 2007-14 decline in participation is due to the ageing of the population as the baby-boom generation retires. The other half is due to declining participation within age groups, due in part to weak economic conditions. Even if the decline in participation slows from 0.8 to 0.4% per year, the portion attributable to baby-boom retirement, that is still enough to make it impossible for real GDP per capita to match productivity growth.

The second headwind is education. Throughout most of the 20th century, rising high-school completion rates permanently changed the productive capacity of US workers, but this transition was over by 1970. Further increases in high school completion rates are prevented by dropping out, especially of minority students, as the US slides to number 16 in an international league table of secondary school completion among developed countries. Similarly, the US is number 16 in college completion rates and there are new problems – over \$1 trillion in student debt combined with the inability of 40% of college graduates to find jobs requiring a college education, spawning a new generation of indebted baristas and taxi drivers.

The third headwind is income inequality that continues to grow inexorably as salaries for CEOs and celebrities march ever upwards, augmented by the creation of trillions of dollars in stock market wealth. Below the 90th percentile, corporations are working overtime to reduce wages, reduce benefits, convert defined benefit pension plans to defined contribution, and to use Obamacare as an excuse to convert full-time jobs to part-time status.

The fourth headwind is the predicted upward creep in the ratio of federal government debt to GDP. The official CBO data greatly understate the gravity of the problem, because the CBO estimate of future potential GDP growth is out of touch with reality. Because potential real GDP growth is already much slower than the CBO estimates (Gordon 2014b), future tax revenue will grow more slowly, boosting the debt in the numerator of the debt/GDP ratio, while the denominator will grow more slowly, thus further increasing the ratio. The federal debt/GDP ratio could well reach 150% by the late 2030s, and this does not take into account the apparently intractable pension burdens in some of the largest state and local governments.

For the disposable (after tax) incomes of the bottom 99%, it is hard to find any room for growth at all. Indeed official measures of median wage and household income have not grown for several decades. While these measures may understate income growth, my exercise in taking the historical record of growth of real GDP per capita and then

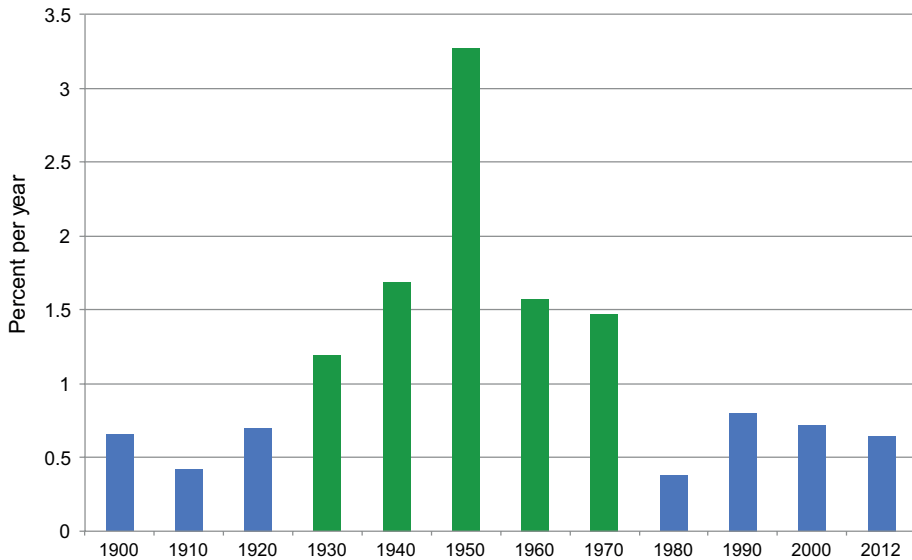
subjecting it to ‘an exercise in subtraction’ avoids the problem that some of the median wage and household income data exclude elements that are included in the data on GDP and personal disposable income.

3 Nobody debates the headwinds, instead they debate technological progress

My forecast of slow future growth after 2007 does not rely on any slowing of future technological change. My ‘exercise in subtraction’ deducts 1.2% from the realised 1891-2007 per-capita output growth rate of 2.0% for the combined impact of the four headwinds. Then I deduct an additional 0.6% for the fact that productivity change slowed markedly from the 80 years before 1972 to the 40+ years since 1972. *In my numbers, there is no forecast of a future technological slowdown – productivity growth adjusted for educational stagnation is predicted to be just as fast during 2007-2032 as during 1972-2007.*

Critics of my growth forecasts have largely ignored the fact that I am not suggesting that the pace of innovation will slow in the future compared to the achievements of 1972-2014. What the *Economist* cover called today’s “loss of oomph” in the US economy occurred after 1972, that is, after the first century of implementing the rainbow of benefits from the inventions of the Second Industrial Revolution. In the early post-war years the spread of air conditioning, commercial air travel, and the interstate highway system represented the final implementation of technologies invented in the 1870s. After 1972 the slowdown was visible in the data and has continued to the present.

Figure 1 Annual growth rate of TFP for ten years preceding years shown, years ending in 1900 to 2012



For decades, macroeconomists struggled to understand the post-1970 productivity growth slowdown. But in fact our entire generation has been asking the wrong question. Instead of wondering why there was a productivity growth slowdown after 1972, we should have asked: “Can we explain the productivity miracle that occurred in the US economy between 1920 and 1970?” While I join most analysts in preferring to compare productivity growth data between years when unemployment and utilisation were ‘normal’, nevertheless it is interesting to look at the raw data for each of the 12 decades since 1890 (Figure 1). Any techno-optimist must look at this history with dismay. The future is not going to be better than the past, because the economy during 1920-70 achieved growth in total factor productivity (TFP) of a different order of magnitude in these ‘green’ decades than during the ‘blue’ decades before 1920 and since 1970.⁶

⁶ Total factor productivity (TFP) is defined as a weighted average of the ratio of output to labour input and the ratio of output to capital input, where both types of input are adjusted for quality changes. The TFP data displayed in Figure 1 are derived from scratch in Chapter 10 of my forthcoming book (Gordon 2015). They combine labour and GDP data from the BEA, BLS, and Kendrick (1961), but they are also revised to change the concept of capital input to allow for variable retirement ages and to include certain types of government-financed capital input.

A debate has raged over the past two years about the future of economic growth – will it speed up or slow down? The case for a revival in growth is made most emphatically by two MIT economists, Erik Brynjolfsson and Andrew McAfee (2013), and by my Northwestern colleague Joel Mokyr (2014). The techno-optimists focus entirely on their hopes and dreams of unprecedented future breakthroughs in technology that centre on the benefits of artificial intelligence, big data, small robots, medical miracles, and driverless cars and trucks. They ignore the headwinds and thereby have nothing to say about the core of my case that future disposable income growth for the bottom 99% will be slower than in the past, a slowdown that already began years ago when the headwinds began to gain momentum.

These techno-optimist forecasts are useful only along one dimension. They give us hope that innovation might proceed at the same pace in the next few decades as in the last four. Yet they are utterly unconvincing that the pace of technological change will be faster over the next 25 years than over the last 40. Consider what they are up against that has happened within the last 40 years since 1972: the mainframe era that eliminated routine clerical jobs of endlessly retyping contracts, bills, and legal briefs; the invention of the personal computer that allowed many professionals to write their papers without the aid of a secretary; the invention of game-changing technologies in the retail sector including the ATM machine, barcode scanning, self checkout, and airline automated check-in kiosks; Amazon and e-commerce; wiki and the availability of free information everywhere; the obsolescence of the hard-copy library catalogue, the auto parts catalogue, the print dictionary and encyclopaedia.

The pessimism in my forecasts of future economic growth is based on the headwinds, not a faltering of technology. I am dubious that the nirvana of artificial intelligence, big data, robots, driverless cars, and so on will match the achievements enumerated above of the last 40 years. By basing my productivity forecast on a continuation of the 1972-2014 pace of innovation, I am deliberately suppressing my skepticism.

The techno-optimists differ in the nature of their concerns. Brynjolfsson and McAfee (2013) are admirable in their social concern that their abundant robots and big data will eliminate millions of jobs. Mokyr is not interested in jobs or headwinds. He predicts hypothetical future breakthroughs without any contact with the historical data, a remarkable position for an economic historian. He does not appear to care about the drama shown in Figure 1 above of the TFP speed-up during the period 1920-70 and its subsequent relentless slowdown.

Mokyr's sole comment about the headwinds (2014, p. 14) is that the unprecedented decline in the labour-force participation rate is partly offset by an increase in leisure. However we have long known that leisure time during the working week experienced by the unemployed or by those who would prefer to work has far less value than leisure time on weekends and during vacations. Labour-force participation has been declining in large part because many people are forced to retire without adequate finances and others give up looking for jobs after a desperate and endless search. He punctuates his dismissal of declining hours per capita with a remarkable quote: "But it may well be that a leisurely life is the best 'monopoly profit'". He forgets his history – from the standpoint of the increasing marginal disutility of work, the real welfare-enhancing transition involving leisure occurred in the first half of the 20th century when the 60-hour manufacturing workweek of 1900 fell to 40 hours per week by 1950.⁷

The optimists, both Brynjolfsson and McAfee and Mokyr, share a common reaction to any display of historical productivity data such as contained in Figure 1. They claim that GDP is fundamentally flawed because it does not include the fact that information is now free due to the growth in internet sources such as Google and Wikipedia. A complementary statement is that numerous items have disappeared from GDP because they are already provided for free with a smart phone – not only the print dictionary or encyclopaedia, but the music-playing capability that makes the separate iPod obsolete,

⁷ Mokyr's claim that valuable leisure time partly or entirely offsets the lost income of the unemployed (and of those out of the labour force who would prefer to work) is sharply contradicted by a recent survey of the emotional well-being of the unemployed during the recent recession and slow recovery (see Krueger and Mueller 2011).

the restaurant locator that makes the printed Zagat guide obsolete, the growth in companies like Uber and Lyft that may make the urban taxi obsolete, and many more.

Two responses are appropriate about the unmeasured GDP made possible by the smart phone. The most obvious is that TFP growth sagged decades before the popularisation of smart phones and the internet. The most important event of the digital age was the marriage of personal computers and communications in the mid-to-late 1990s in the form of the internet, web browsing, and e-mail. Many of the sources of consumer surplus and free information were established more than a decade ago, including Amazon in 1994, Google in 1998, as well as Wikipedia and iTunes in 2001. While progress has continued in the past decade with smart phones, gmail, Google Maps, and other applications, these innovations are second-order inventions compared to the great marriage of computers and communication of the late 1990s, and the slow growth of TFP reflects that.

The much more important response is that GDP has *always* been understated. Henry Ford reduced the price of his Model T from \$900 in 1910 to \$265 in 1923 while improving its quality. Yet autos were not included in the CPI until 1935. Think of what GDP misses: the value of the transition from gas lights, that produced dim light and pollution and were a fire hazard, to much brighter electric lights turned on by the flick of a switch; the elevator that bypassed flights of stairs; the electric subway that could travel at 40mph compared to the 5mph of the horse-drawn streetcar; the replacement of the urban horse by the motor vehicle that emitted no manure; the end of disgusting jobs of human beings required to remove the manure; the networking of the home between 1870 and 1940 by five new types of connections (electricity, telephone, gas, water, and sewer); the invention of mass marketing through the department store and mail order catalogue; and the development of the American South made possible by the invention of air conditioning.

Perhaps the most important omission from real GDP was the conquest of infant mortality, which by one estimate added more unmeasured value to GDP in the 20th

century, particularly in its first half, than all measured consumption (Nordhaus 2003). The list goes on. The invention of air conditioning and commercial air travel may have created more consumer surplus for more people than the provision of free information over the internet.

While Mokyr is not concerned about the destruction of jobs implied by his hypothetical technological revolution, Brynjolfsson and McAfee are overly worried because they are too optimistic about the future reach of robots into the vast US service sector. Retail supermarkets are in stasis – the one-time benefit of the barcode scanner 30 years ago has not changed the need for a human checkout clerk, and supermarket shelves are still restocked by humans, not robots. The higher education sector has vastly inflated its costs by adding layers of administration without changing the nature of instruction. One wonders why the US needs 97,000 bank branches, but the 1977 invention of the ATM machine has apparently not eliminated them.

4 The future of growth in the United States

Larry Summers' "secular stagnation" concern with the inability of policymakers to close the gap between actual and potential real GDP is almost obsolete, because the gap is steadily shrinking. Now is the time to start trying to understand why the future pace of potential real GDP appears to be so slow, and whether anything can be done about the headwinds – particularly demography, inequality, and debt – that drag income growth for the bottom 99% down so far below the slowing rate of overall growth. The techno-optimists are whistling in the dark, ignoring the rise and fall of TFP growth over the past 120 years. The techno-optimists ignore the headwinds, seeming ostrich-like in their refusal to face reality.

The *Economist* of 19 July 2014 got it right. America is riding on a slow-moving turtle. There is little that politicians can do about it. My standard list of policy recommendations includes raising the retirement age in line with life expectancy, drastically raising the quotas for legal immigration, legalising drugs and emptying the prisons of non-violent

offenders, and learning from Canada how to finance higher education. The US would be a much better place with a medical system as a right of citizenship, a value-added tax to pay for it, a massive tax reform to eliminate the omnipresent loopholes, and an increase in the tax rate on dividends and capital gains back to the 1993-97 Clinton levels.

But hypothetical legislation, however politically improbable, has its limits. The headwinds that are slowing the pace of the US's future economic growth have been decades in the making, entrenched in many aspects of our society. The reduction of inequality and the eradication of roadblocks in our educational system defy the cure-all of any legislation signed at the stroke of a pen. Innovation, even at the pace of 1972-2014, cannot overcome the ongoing momentum of the headwinds. Future generations of Americans who by then will have become accustomed to turtle-like growth may marvel in retrospect that there was so much growth in the 200 years before 2007, especially in the core half century between 1920 and 1970 when the US created the modern age.

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Four observations on secular stagnation

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Larry Summers' speech at the IMF's 2013 Annual Research Conference raised the spectre of secular stagnation. This chapter outlines three reasons to take this possibility seriously: recent experience suggests the zero lower bound matters more than previously thought; there had been a secular decline in real interest rates even before the Global Crisis; and deleveraging and demographic trends will weaken future demand. Since even unconventional policies may struggle to deal with secular stagnation, a major rethinking of macroeconomic policy is required.

I was very annoyed when Larry Summers made a big splash talking about secular stagnation at the IMF's 2013 Annual Research Conference – annoyed not at Larry but at myself. You see, I had been groping toward more or less the same idea, and had blogged in that general direction (Krugman 2013) – but it wasn't forceful, and Larry rightly gets credit for making the topic a front-burner issue.

The larger point, of course, is that if you're following events and looking at the data it's actually quite natural to raise once again the concerns Alvin Hansen raised 65 years ago, when he worried that low population growth would produce a situation of persistently inadequate demand. In what follows, I'll lay out four reasons why secular stagnation deserves the buzz it's now getting.

Observation #1: The zero lower bound matters much more than we thought

Secular stagnation is the proposition that periods like the last five-plus years, when even zero policy interest rates aren't enough to restore full employment, are going to be much more common in the future than in the past — that the liquidity trap is becoming the new normal. Why might we think that?

One answer is simply that this episode has gone on for a long time. Even if the Fed raises rates in 2015, which is far from certain, at that point we will have spent seven years — roughly a quarter of the time since we entered a low-inflation era in the 1980s — at the zero lower bound. That's vastly more than the 5% or less probability economists at the Federal Reserve used to consider reasonable for such events.

Suppose that we were to expect the future, on average, to look like the past — specifically, the past since price stability in the modern sense of low stable inflation became the norm. Even then, we would, on current evidence, expect to see a lot of problems with monetary policy at the zero lower bound; that is, we'd expect the world to look a lot more like that envisioned by Hansen than that envisioned by most macroeconomists during the Great Moderation era.

Beyond that, a look at the data suggests that there has been an ongoing trend making ZLB events more likely.

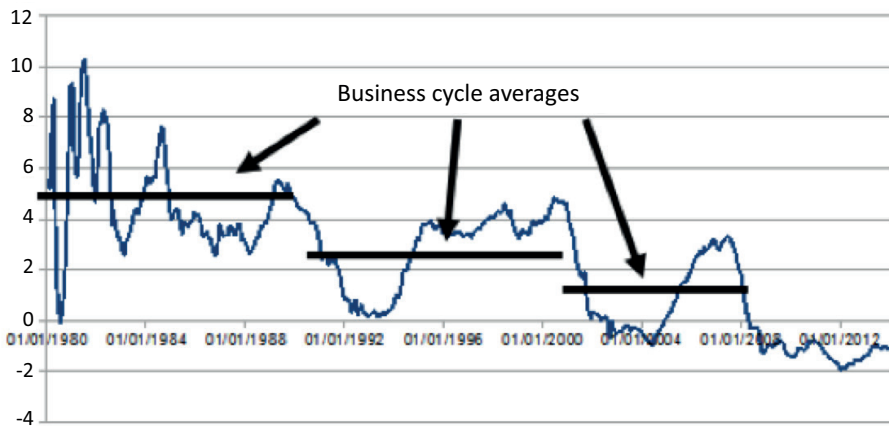
Observation #2: There seems to be a downward trend in real interest rates

It's not widely remembered now, but there was some discussion of a possible liquidity trap during the 1990-1 recession and the jobless recovery that followed, and much more discussion in the slow recovery after the 2001 recession. And there was a reason: a look at the data suggests that it was getting steadily harder to get monetary traction even before the 2008 crisis. The IMF (2014) has shown that there appears to have been

a downward trend in long-term real interest rates over the era of the Great Moderation; the trend is even more visible if you look at short-term rates. Figure 1 shows the Fed funds rate minus core inflation, averaged over business cycles (peak to peak; I treat the double-dip recession of the early 1980s as one cycle). This in turn suggests that my crude calculation above of the odds of hitting the zero lower bound was too optimistic; the downward trend implies that the odds are substantially higher now than they were in the past.

And even that is almost surely too optimistic.

Figure 1 Real interest rate



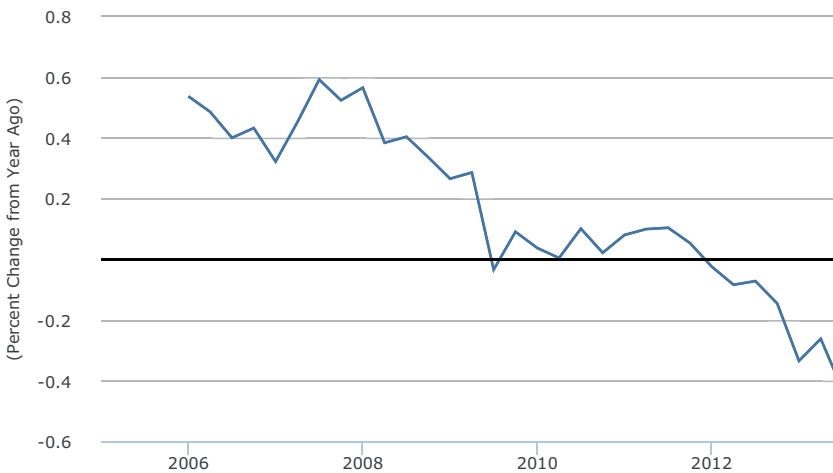
Observation #3: The fundamentals have shifted in a major way since the 2000-7 cycle

As I showed in Figure 1, the average real interest rate over the 2000-7 business cycle was very low by historical standards. Yet the environment of the time was far more favourable for spending than the environment is likely to be looking forward, for at least two reasons.

First, the 2000-7 cycle was marked by a huge and presumably unrepeatable rise in leverage. Household debt rose from 67% of GDP at the 2001 peak to 94% at the 2007 peak, an annual average rise of roughly 4% of GDP. Even if deleveraging comes to an end, we can't expect this level of debt-supported spending to resume, implying a major hit to aggregate demand – in effect, a 4% of GDP anti-stimulus relative to the last cycle – to become a more or less permanent feature of the economy. This in itself would suggest a substantial fall in the natural rate of interest, and hence a liquidity-trap-prone economy.

On top of this, Hansen's old concern – slow population growth – is back. It's not widely recognised just how quickly the demography of growth has changed in western economies. It's most dramatic in the Eurozone – Figure 2 shows the rate of growth of the working-age population, which has moved rapidly into negative, almost Japanese-style territory. But the US has also seen a sharp drop.

Figure 2 Working age population in the Eurozone (% change from year ago)



Source: OECD, "Main Economic Indicators - complete database", Main Economic Indicators (database), <http://dx.doi.org/10.1787/data-00052-en> (accessed on 6 August 2014). Copyright, 2014, OECD. Reprinted with permission.

Why is this a problem? For the same reasons Hansen invoked: slow or negative growth in the working-age population means low demand for new investments, both in housing and in productive capital, and therefore reduces the natural rate of interest still further.

So put these items together:

1. A much higher probability of hitting the zero lower bound than we used to think.
2. A secular downward trend in real interest rates even before the 2008 crisis.
3. Changes in fundamentals – an end to ever-rising leverage and a sharp demographic slowdown – that imply still weaker demand looking forward.

Taken together, these factors don't prove that secular stagnation is here, because other things can happen, but they do make the case for such stagnation alarmingly plausible. And this creates significant problems for policy.

Observation #4: Even unconventional policies have problems dealing with secular stagnation

If you look at the extensive theoretical literature on the zero lower bound since Japan became a source of concern in the 1990s, you find that just about all of it treats liquidity-trap conditions as the result of a temporary shock. Something – most obviously, a burst bubble or deleveraging after a credit boom – leads to a period of very low demand, so low that even zero interest rates aren't enough to restore full employment. Eventually, however, the shock will end.

The idea that the liquidity trap is temporary has shaped the analysis of both monetary and fiscal policy. And that analysis now looks much more problematic.

Start with monetary policy. The most persuasive story about how monetary policy can work at the zero lower bound is that it can gain traction if you can convince the public that there has been a regime change, that the central bank will maintain expansionary monetary policy even after the economy recovers, in order to generate high demand and some inflation. As I put it a long time ago (Krugman 1998), the central bank must “credibly promise to be irresponsible”.

But if we are talking about Japan, exactly when do we imagine that this period of high demand, when the zero lower bound is no longer binding, is going to begin?

And now we are talking seriously about secular stagnation in Europe and the US as well, which means that it could be a very long time before ‘normal’ monetary policy resumes. Now, even in this case you can get traction if you can credibly promise higher inflation, which reduces real interest rates. But what does it take to credibly promise inflation? It has to involve a strong element of self-fulfilling prophecy: people have to believe in higher inflation, which produces an economic boom, which yields the promised inflation. A necessary (though not sufficient) condition for this to work is that the promised inflation be high enough that it will indeed produce an economic boom if people believe the promise will be kept. If it is not high enough, then the actual rate of inflation will fall short of the promise even if people do believe in the promise, which means that they will stop believing after a while, and the whole effort will fail.

Figure 3 A timidity trap?

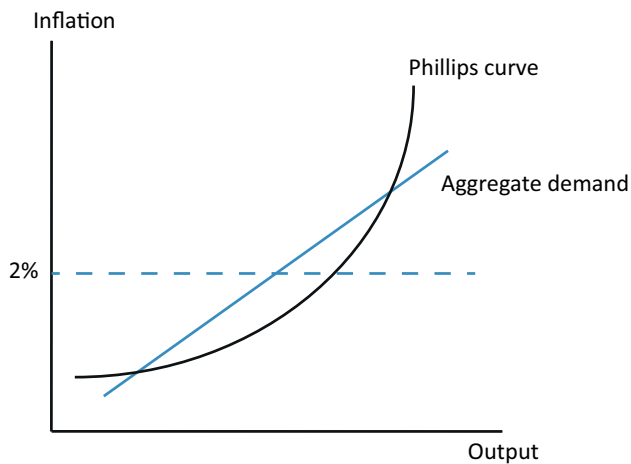


Figure 3 offers a way to illustrate this problem, which I have come to think of as the ‘timidity trap’. Of the two curves shown, one is a hypothetical (but I think realistic) non-accelerationist Phillips curve, in which the rate of inflation depends on output and the relationship gets steep at high levels of utilisation. The other is an aggregate demand curve that depends positively on expected inflation, because this reduces real interest rates at the zero lower bound. I have drawn the graph so that if the central bank

announces a 2% inflation target, the actual rate of inflation will fall short of 2 %, even if everyone believes the bank's promise – which they will not do for very long, in any case.

So you see my concern. Suppose that the economy really needs a 4% inflation target, but the central bank says: “That seems kind of radical, so let's be more cautious and only target 2%”. This sounds prudent, but it may actually guarantee failure. In other words, the problem of getting effective monetary policy, always difficult at the zero lower bound, gets even harder if we have entered an era of secular stagnation.

What about fiscal policy? Here the standard argument is that deficit spending can serve as a bridge across a temporary problem, supporting demand while, for example, households pay down debt and restore the health of their balance sheets, at which point they begin spending normally again. Once that has happened, monetary policy can take over the job of sustaining demand while the government goes about restoring its own balance sheet. But what if a negative real natural rate isn't a temporary phenomenon? Is there a fiscally sustainable way to keep supporting demand?

In this chapter I'll leave these questions hanging. The crucial point, for now, is that the real possibility that we've entered an era of secular stagnation requires a major rethinking of macroeconomic policy.

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Secular joblessness

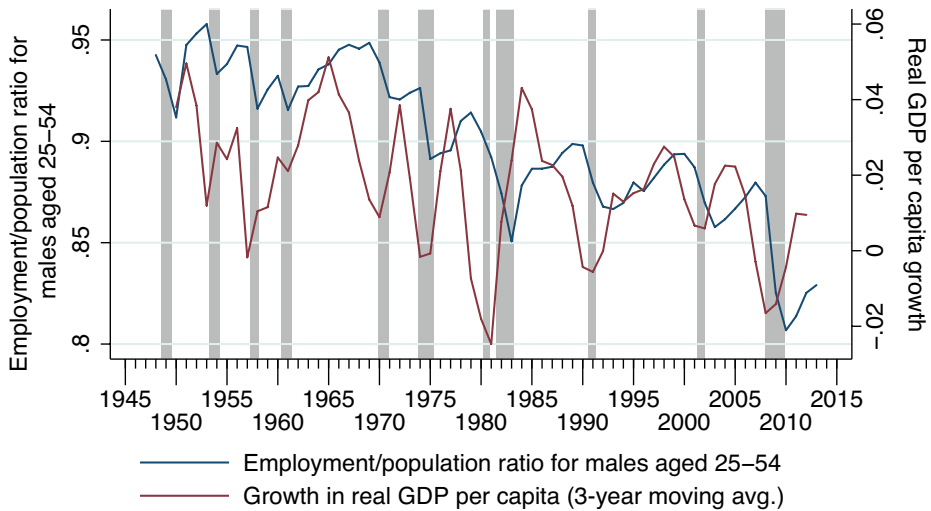
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The wonders of the internet age cast doubt on the idea that technological progress is stagnating. Worryingly, however, some fraction of US job losses has become permanent after almost every recession since 1970. This chapter argues that persistent joblessness is unlikely to be a purely macroeconomic phenomenon. Although the US welfare system remains less generous than many European ones, it has become substantially more generous over time. Alongside targeted investments in education and training, radical structural reforms to America's safety net are needed to ensure it does less to discourage employment.

US investment and innovation – the most standard ingredients in long-run economic growth – are not declining. The technological world that surrounds us is anything but stagnant. Yet we can have little confidence that the continuing flow of new ideas will solve the US's most worrying social trend: the 40-year secular rise in the number and share of jobless adults. Past history suggests that such joblessness will persist, even during the most robust recovery, unless there are serious structural reforms involving the social safety net and the formation of human capital.

Figure 1 GDP growth rates and male employment, 1947-2012



Notes: Shaded areas indicate US recessions.
 Source: Bureau of Economic Analysis, Bureau of Labor Statistics and US Census.

Figure 1 shows the time series of the growth in real GDP per capita and the non-employment rate for males aged 25 to 54. The figure illustrates that GDP growth has indeed been quite sluggish since 2006, which makes the secular stagnation hypothesis credible. The recession was awful and the recovery has been weak. Moreover, the recent decline in growth rates seems to fit a larger downward trend; real per capita growth averaged about 2.5% between 1947 and 1969 and has averaged less than 2% since then.

Yet it is hard to know whether the past painful eight years represent the trend or the cycle. Things looked far worse in 1938 and pretty bleak in 1982, but if you had predicted permanent stagnation at either time, you would have been woefully wrong. I don't mean to suggest that the GDP numbers alone rule out the possibility of permanent stagnation – but rather that the time periods are short and full of confounding forces.

Moreover, when we turn to the ingredients that theoretically determine longer-term growth, including innovation and investment, there seems to be little cause for concern. A decade ago, the US granted 187,000 patents, which was then a historical high. In

2013, the number of patents granted passed 300,000. Perhaps, modern patents are less important. Perhaps, the patent office has become more permissive, but that isn't what the world feels like to me.

During the first ten years of my life (1967-1977), the only major technological innovation that I observed entering our apartment was colour TV, and that TV broadcast roughly the same set of channels over the decade. How can such a world possibly be compared with innovations of the past decade?

The giants of the internet age – Amazon, Facebook and Google – were either far smaller or non-existent in 2004. Apple had introduced the iPod in 2001, but not the iPhone (2007) or the iPad (2010). Skype was first released in 2003. My 2005 Subaru has neither a GPS system, nor Bluetooth, nor any sensors that tell me when I'm about to ding a neighbouring car. Robotics have continued to improve, sometimes with life-saving impacts in surgery.

Indeed, this proliferation of inventions should make us quite nervous about the price indices used to compute GDP figures. The theory of price indices is that an individual should be indifferent between living today and living in the past with the same real income. How many people would really be indifferent between earning \$23,000 in 1984 and earning \$50,000 in 2014? You could surely buy the same amount of most basic commodities in 1984, but you would forgo the use of thousands of significant innovations, some of which improve life expectancy and others which are just fun.

The beneficiaries of innovation

While it seems almost absurd to argue that human inventiveness has stalled, there are serious questions over which inventions bring widespread benefits. For much of human history, per capita incomes were relatively stagnant, despite frequent bursts of imagination. Perhaps, we are just experiencing an era in which innovation benefits the few rather than the many.

Since almost all of us are both consumers and producers, technological change can impact most of us in both capacities, positively or negatively. One can reasonably argue that many of the innovations prior to 1750, and most global trade, was targeted towards Europe's most elite consumers. For example, when the Conquistadors discovered red cochineal dye being used in the Aztec court, this innovation may have brightened the clothes of Europe's aristocracy but it did little for common people (unless they were dyers). Before the printing press, literary innovations necessarily had a small, elite consumer base and employed even fewer writers. Painting may have reached a broader audience, but it still seems unlikely that even monumental artistic innovations, such as Masaccio's use of linear perspective in Renaissance Florence, provided widespread consumption benefits during their own age.

The 17th century Dutch trade empire initially specialised in providing goods demanded by the wealthy, such as spices, yet that innovative empire eventually benefited the people of the Netherlands as producers. According to the Maddison data (Bolt and van Zanden 2013), the Netherlands was the wealthiest nation on the planet during the 1600s. Similarly, innovations in the global luxury goods trade today, like the Hermes Birkin bag, benefit only a modest number of consumers, but if Hermes' press is to be believed, the labour demanded by such items can be considerable.

At its best, the industrial revolution generated innovations that benefitted masses of ordinary people as both consumers and producers. Henry Ford's Model T provided inexpensive transport for millions of ordinary Americans and \$5 a day wages for his workers. The earlier innovations in Lancashire's cotton mills were associated with often horrific working conditions, but eventually demand for English labour appears to have boosted earnings dramatically (Clark 2010)

Figure 2 presents a two-by-two box that categorises the beneficiaries of different forms of innovations. It is hard to think of any innovations before the modern age that increased demand for the most skilled workers while providing consumer benefits for the masses. Indeed, for such a thing to occur, one must imagine a world in which highly

paid elite workers toil for the benefit of services that will be used by the poor. Could such a thing be imaginable in pre-revolutionary France or in Ming China? Yet that is exactly what happens at Google or Facebook. Highly paid workers work constantly to improve a service that is provided freely to hundreds of millions of poorer users.

Figure 2 A Categorisation of the beneficiaries of innovation

	The skilled benefit as producers	Widespread benefit as producers
Elite consumer benefits	Pre-modern artistic innovations Medieval fancy dyes	Dutch Trade Empire Labour-intensive luxury goods
Widespread consumer benefits	Facebook Google	Model T Cars Industrial Revolution generally

This inversion of the traditional nature of innovations represents the rise of superstar-like technologies (Rosen 1981) that enable the highly competent to provide their services as almost a public good, with no congestion in use. The most natural precursor to this modern inversion was well-paid artists, such as writers and movie stars, who entertained the masses. The inversion also happened when Fred Astaire and Ginger Rogers danced for depression-era movie audiences.

The essentially zero marginal cost of providing internet-related services means that they are often monetised through the advertising of goods with a positive marginal cost. It is free to use Google, but their search engine will nudge users towards their advertisers. The free nature of these services has meant a democratisation of access to information; a fact that is rarely considered in attempts to measure inequality.

Innovation seems unrelenting, at least to me, and I believe that such innovation is the stuff of longer-term economic growth (Romer 1986). Therefore, I cannot help but think that stagnation is likely to be temporary. I also believe that the benefits of future innovation will continue to flow to a wide swath of humanity, at least in their capacity

as consumers, because the internet seems to strongly favour free – or low cost – delivery of services and content.

Yet I do not think that all is well. The dysfunction in the labour market is real and serious, and seems unlikely to be solved by any obvious economic trend.

Eurosclerosis in the US

Figure 1 shows the rise in joblessness among males between the ages of 25 and 54, which includes both unemployment and being out of the labour market for other reasons. I focus on men because non-employment for women is more complicated and far more likely to be related to childrearing. I do not mean to suggest that chronic joblessness among women cannot also be a major problem.

Until the end of the 1960s, this figure was relatively steady, averaging approximately 5% in good times and 8% during downturns. There was no trend. After the upward bursts of a recession, joblessness fell back to normal.

After 1970, however, there has been an irregular but strongly positive trend. Joblessness has typically soared during recessions, but unlike the earlier post-war period, those rises were not fully reversed during recoveries. Some fraction of the recessionary joblessness rise has become permanent after almost every post-1970 downturn.

The 2007 recession was particularly severe and at its peak, prime-aged male joblessness rose to almost 20%. Today, the rate has fallen to 16.6%. It seems reasonable to believe that the rate will continue to fall somewhat, but if past recoveries provide any guide, a greater share of prime-aged males will be jobless at the end of the recovery than at the beginning of the recession.

The consequences of so much long-term joblessness seem terrible for both the individuals concerned and society as a whole. Human capital depreciates off-the-job, so talent is lost. For decades, researchers have documented a profound connection

between unhappiness and unemployment (Clark and Oswald 1994), perhaps because of the social isolation and self-doubt associated with joblessness (Hetschko et al. 2014). Extreme joblessness may be only one aspect of increased inequality, but it is among the most troubling features of a more unequal world. If one in five adults is disconnected from the productive side of the economy, what will this mean for their voting behaviour, or their sense of connection with the country's larger economic goals? Can this lead to a self-reinforcing process where this group votes regularly for larger jobless benefits which in turn increase the level of joblessness? We are, unfortunately, just beginning to understand the potential impact of the sea change in American life.

Why did joblessness rise in the US? The explanation that seems to fit the time series best is the interaction between institutions and labour demand shocks proposed by Blanchard and Wolfers (2000). Over time, less skilled American workers have been hit by a series of adverse labour demand shocks, like workers in many other wealthy countries. These shocks may well have increased joblessness even if America's social safety net had not evolved since 1960, but their impact was exacerbated because of institutional changes that made joblessness less painful and increased the incentives to stay out of work.

While the US social welfare system remains less generous than many European safety nets, it has become substantially more generous over time. The US has a bevy of social programmes – including Medicaid, the Supplemental Nutrition Assistance Program (food stamps), Temporary Aid to Needy Family, Section 8 Housing vouchers and insurance for both disability and unemployment – that have generally increased in generosity over time, often for quite laudable reasons. These programmes also sharply reduce the incentives to work, often by directly taxing earnings (both food stamps and Section 8 vouchers carry an independent 30% tax on earnings) and by making joblessness less miserable.

Perhaps the most important programme connected to long-term joblessness is disability insurance. In 2010, 16.6% of Americans between 21 and 64 reported being disabled, and

11.4% reported a severe disability (Brault 2012). In 1970, 1.5 million Americans were receiving Federal disability insurance; in 2013, 8.9 million Americans received such aid (Social Security Administration 2014). This increase in disability is particularly startling given the general increase in US health over the same time period, and surely institutional changes, including those meant to reduce unemployment, have played some role in this dramatic increase (Autor and Duggan 2003).

Another way of looking at the secular rise in joblessness is that it represents a failure of entrepreneurial imagination. Why haven't smart innovators figured out ways to make money by employing the jobless? One explanation is that current technological trends just don't favour products made with less skilled labour. The second explanation is that the safety net has just made this labour too expensive relative to more mechanised alternatives. I now turn to policies that might mitigate the secular rise in joblessness.

Public policy and joblessness

If the problem is perceived as secular stagnation, then policy thoughts move towards macroeconomic interventions aimed at improving the US's overall economic mojo, such as investing in infrastructure or reducing corporate taxes. If the problem is perceived as a vast increase in the share of out-of-work Americans that has persisted through good times and bad, then such macroeconomic interventions seem poorly targeted.

The time series path shows that the jobless rate for prime-aged males has never fallen below 10% during the entire post-1980 time period. Despite the roaring Reagan recovery and the successful Clinton years, joblessness remained stubbornly high. That fact should make us wonder whether any macroeconomic policy can solve the problem of persistently high joblessness. Interventions targeted at less prosperous Americans seem more likely to be successful.

The cross-sectional relationship between education and unemployment is so strong that it is hard not to focus on America's troubled education system. As of June 2014, 72.7%

of college graduates over the age of 25 were employed, while only 39.4% of high school dropouts had a job (Bureau of Labor Statistics 2014). This extraordinary cross-sectional gap doesn't prove causality, but the hundreds of studies attempting to estimate the casual impact of education on earnings and employment have generally confirmed at least some positive effect.

The US's school systems may have once been the best in the world (Goldin and Katz 2009), but at this point, the country's scores are middling. On maths scores, US students perform far below students in European countries like Germany and the Netherlands, which in turn are outperformed by Asian competitors like South Korea and Singapore (Hanushek et al. 2010). Moreover, while US test scores are improving, they are not improving relative to the world's higher performers.

This chapter cannot dwell on the possible approaches to education reform in the US. Charter schools have often been effective, but it is hard to imagine that they can completely replace conventional schools. There is a long literature documenting the importance of teacher quality, but it is hard to hire good teachers or fire bad teachers. Electronic learning may come to play a critical role in teaching the underprivileged. The key point is that improving America's education, especially for the less successful half of the population, seems critical.

It is perhaps also appropriate to do more to emulate the German apprenticeship programmes and to improve vocational training within the US. Grafting foreign institutions into US labour markets is not easy, however, and we surely need more experiments before embracing any system-wide reform.

Education cannot fix the problem single-handedly, especially if we refuse to write off the current generations of adults. One possibility is that targeted demand-side interventions, such as infrastructure investments, can employ these workers and thereby rebuild their human capital. Perhaps this will be the case, but there are reasons to be sceptical. Much infrastructure investment is now capital intensive. America's infrastructure programmes

have often been criticised for waste and inefficiency. Better research and, again, more experiments are surely needed to make the case for such interventions.

Finally, it is surely necessary to rethink the structure of the US's social safety net and to ensure that it does less to discourage work. David Autor and Mark Duggan (2010) have made an interesting proposal suggesting that disabled people be allowed to work. The idea of combining social welfare programmes to eliminate overlapping anti-work incentives also seems sensible.

The Earned Income Tax Credit represents a reasonably successful intervention aimed at making work pay. More can be done in this area. Instead of raising the minimum wage, which risks deterring future job openings, the wage can be boosted by a federal subsidy. Social security taxes can be eliminated for workers at the low end of the earnings distribution. Structural reforms are surely necessary to ensure that the US makes work more attractive for the jobless.

The massive secular trend in joblessness is a terrible social problem for the US, and one that the country must try to address. I do not believe that this is a macroeconomic problem that can be solved with more investment or tax cuts alone. The US needs targeted investments in education and workforce training, and the country needs to radically improve the incentives to work.

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Further on potential growth

Secular stagnation? Not in your life

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In the aftermath of the Great Recession, many economists are persuaded that slow growth is here to stay. This chapter argues that technological progress – particularly in areas such as computing, materials, and genetic engineering – will prove the pessimists wrong. The indirect effects of science on productivity through the tools it provides scientific research may dwarf the direct effects in the long run. Although technological advances may polarise labour markets, they also bring widespread benefits that are not accurately reflected in aggregate statistics.

There is nothing like a recession to throw economists into a despondent mood. Much as happened in the late 1930s, many of my colleagues seem to believe that ‘sad days are here again’. Economic growth as it was experienced by the world through much of the 20th century, they tell us, was a fleeting thing. Our children will be no richer than we are. Some of the best economists of our age, including Larry Summers, Paul Krugman, and my own colleague Robert J. Gordon, are joining the chorus of the doomsayers. It is said that we are faced by headwinds that inevitably will slow down growth and perhaps condemn us to secular stagnation. There is no denying that the population of the world is getting older, and that the fraction of people working (and supporting the aged) is falling everywhere except in Africa. The ‘big pushes’ driven by millions of married women taking jobs and the huge increase in college graduates that drove post 1945 growth were one-off boons, but they are no more. Growing inequality exacerbates demography. Slow growth is here to stay, say the secular stagnationists.

What is wrong with this story? The one word answer is ‘technology’. The responsibility of economic historians is to remind the world what things were like before 1800.

Growth was imperceptibly slow, and the vast bulk of the population was so poor that any disruption in food supply caused by a harvest failure could kill millions. Almost half the babies born died before reaching the age of five, and those who made it to adulthood were often stunted, ill, and illiterate. What changed this world was growth driven by technological progress. Starting in the late 18th century, innovations and advances in what was then called ‘the useful arts’ slowly began improving life, first in Britain, then in the rest of Europe, and eventually in much of the rest of the world. The story has been told many times over, but as Nobelist Robert Lucas once wrote, once you start thinking about it, it’s hard to think of anything else.

Why did it all happen? In brief: science advanced. The exact interaction between science and technology is a subtle and complex one, time-variant, and culture-specific. There can be little doubt that technology *can* advance without a good scientific understanding of why techniques work the way they do, but such progress was halting and slow, and inevitably ran into diminishing returns and fizzled out. After 1750 the epistemic base of technology slowly began to expand. Not only did new products and techniques emerge; it became better understood why and how the old ones worked, and thus they could be refined, debugged, improved, combined with others in novel ways and adapted to new uses. In short: scientific progress led to productivity growth and a sharp increase in economic welfare from the mid-19th century on (Mokyr 2002). It was a protracted process, because many of the natural processes were complex and often contained technical problems that defied solution for a long time. But between 1780 and 1914, huge advances were made in the understanding of how to make steel, what makes us sick, what fertilizers to use, how to make artificial substances and materials, and how to convert heat into motion (that is, use engines) – to name but a few.

The important thing to remember is that the relationship was a two-way street. One of the reasons science advanced so rapidly is that technology itself provided the tools and instruments that allowed ‘natural philosophers’ (as they were known during the Scientific Revolution) to study the physical world. The most famous of those was the telescope, used by Galileo to study the stars – and astronomy would never be the same. A less

hackneyed but technologically more significant example is the barometer; invented by a student of Galileo's named Evangelista Torricelli in 1643, it showed the existence of atmospheric pressure. At about the same time, European instrument builders perfected the vacuum pump, showing that, *contra* Aristotle, a vacuum was indeed possible. Those two scientific insights, as much as anything, spurred the development of the first steam engines early in the 18th century (known appropriately as *atmospheric* engines). In 1800 another Italian named Volta invented the 'pile' – the first battery ever made. In its first decades, this contraption served primarily as a tool for chemical research, allowing chemists to map out the newly discovered world of elements and compounds, which unleashed the chemical industries of the 19th century. Or take the improved microscopes developed in the first half of the 19th century. Advances in optics made it possible to eliminate what was known as spherical aberration and thus to get greatly improved image resolution. Would the germ theory of disease and the subsequent revolution in medical technology have occurred without improved microscopes? In that fashion, technology pulled itself up by its bootstraps: an invention in one area allowed scientific progress to occur and thus created technological progress in what could be quite another field.

Compared to the tools we have today for scientific research, those of Galileo and Pasteur look like stone-age tools. Yes, we build far better microscopes and telescopes and barometers today, but digitalisation has penetrated every aspect of science. It has led to the re-invention of invention. It is not just 'IT' or 'communications'. Huge searchable databanks, quantum chemistry simulation, and highly complex statistical analysis are only some of the tools that the digital age places at science's disposal. Digital technology is everywhere, from molecular genetics to nanoscience to research in medieval poetry. Quantum computers, still quite experimental, promise to increase this power by orders of magnitude. In much recent writings, the importance of ICT on output and productivity has been stressed, and it is clearly of great importance. What needs to be kept in mind, however, is that the *indirect* effects of science on productivity through the tools it provides scientific research may, in the long run, dwarf the direct

effects. A striking example is the growing use of high-powered computers and radically new software in material science.

Materials are the core of our production. The terms Bronze Ages and Iron Age signify their importance; the great era of technological progress between 1870 and 1914 was wholly dependent on cheap and ever-better steel. In many ways, core-materials can be viewed as general-purpose technologies made famous by Bresnahan's and Trajtenberg's (1995) seminal paper on the topic. But what is happening to materials now is nothing short of a sea change, with new resins, ceramics, and entirely new solids designed *in silico*, being developed at the nano-technological level. These promise the development of materials nature never dreamed of and that deliver custom-ordered properties in terms of hardness, resilience, elasticity, and so on. Graphene, the new super-thin wonder material, is another substance that promises to revolutionise production in many lines. The new research tools in material science have revolutionised research. Historically, progress in material science had been always the result of tedious and inefficient 'trial and error' or highly uncertain serendipity. The classic example is William Perkin's discovery of aniline purple in 1856 and Henry Bessemer's invention of the eponymous steel-making process the same year. Compare those with the situation today: researchers can now simulate *in silico* the quantum equations that define the properties of materials, using high-throughput super-computers, and experiment with materials having pre-specified properties.

But not all research tools depend wholly on computational capacity. Of perhaps even more revolutionary importance is the powerful technology developed by Stanley Cohen and Herbert Boyer in the early 1970s, in which they succeeded in creating transgenic organisms through the use of micro-organisms. Genetic selection is an old technology; nature never intended to create poodles. But genetic engineering is to artificial selection what a laser-driven fine-tuned surgical instrument is to a meat axe. The potential economic significance of genetic engineering is simply staggering, as it completely changes the relationship between humans and all other species on the planet. Ever since the emergence of agriculture and husbandry, people have 'played God' and changed

their biological and topographical environment, creating new phenotypes in plants and animals. Genetic engineering means we are just far better at it.

Not all of it will be net progress; much of it is needed to offset the unanticipated costs of previous technological advances, most obviously climate change. But the advance can be seen in less expected areas. In the first half of the 20th century, a vicious fungus imported unintentionally from the Far East wiped out practically the entire population of American chestnuts (around four billion trees). Recent work has transplanted a gene that carries immunity from the by-products produced by the fungus (from wheat genes) into the somatic cells of chestnut trees, and these transgenic trees promise to be immune and may lead to the resurrection of a once-proud American icon and reverse one of the worst ecological disasters that ever befell North America (Rosen 2013).

As science moves into new areas and solves issues that were not even imagined to be solvable, there are inventors, engineers, and entrepreneurs waiting in the wings to use the new knowledge and design new gizmos and processes based on it that mostly will continue to improve our lives. The interplay between science and technology creates a self-reinforcing or 'auto-catalytic' process that seems unbounded.

Speculation on what the new technologies will look like is rife. Robots and the artificial intelligence are front and centre in this debate, at once wished-for (who likes making beds?) and feared as job-killers. ICT remains an area in which we have not seen the half of it, with the much-heralded 'internet of things' touted as the next breakthrough. But perhaps the most unexpected advances may come from less glamorous corners. Combine the new materials mentioned above with three-dimensional 'printing' and you have mass-customisation, a truly revolutionary concept in the history of manufacturing the like of which was not seen since the Industrial Revolution. 'Nanobombs' that physically penetrate bacterial and other cell membranes are the next weapon in mankind's never-ending war on microbes and possibly cancer. An area of progress few anticipated a decade ago is the use of ICT in the utilisation rate of fixed assets such as real estate and cars, as well as human capital. Enterprises such as Airbnb, Uber, Lyft and others

are creating rental markets for assets that were previously lying idle much of the time. Many of these breakthroughs are not ‘on the horizon’ – they are here. The economy may be facing some headwinds, but the technological tailwind is more like a tornado.

So, if everything is so good, why is everything so bad? Why the gloominess of my colleagues? Part of the story is that economists are trained to look at aggregate statistics like GDP per capita and its derivatives such as factor productivity. These measures were designed for a steel-and-wheat economy, not one in which information and data are the most dynamic sector. Many of the new goods and services are expensive to design, but once they work, they can be copied at very low or zero costs. That means they tend to contribute little to measured output even if their impact on consumer welfare is very large. Dealing with altogether new goods and services was not what these numbers were designed for, despite the heroic efforts by BLS statisticians. The aggregative statistics miss much of what is interesting.

Another characteristic of many of these goods is the ‘dumbing-down’ of the user; the ingenuity in a piece of modern technology such as a smartphone is fully frontloaded. A few thousand highly skilled and creative hardware engineers and a few tens of thousand software and application writers design it with incredible technical sophistication, so that hundreds of millions can use it without any. For that reason, there are few jobs in the high-technology sector, but those that are there pay well. Modern technology often leads to winner-take-all outcomes, and the inequality implications in terms of income – though *not* in terms of access to the good itself – are worrisome. What we gain as consumers, citizens, viewers and patients we may lose as workers. The demand for labour ‘hollows out’ and the demand for medium-skilled labour declines unless and until new jobs are created to absorb those replaced by automatons and robots.

It is impossible to know if such jobs will be created at a sufficient pace. Our own time has created occupations that may have sounded incomprehensible or grotesque to our grandparents, from cybersecurity experts to video-game designers to canine psychiatrists. If the past is any guide, the future holds occupations that will look just

as strange to us. This very human shortfall of imagination is largely responsible for much of today's pessimism. In many other respects, too, the labour-market outlook is not wholly bleak. The nature of the labour market is changing, to be sure, but if telecommuting and driverless cars can cut the commuting time for an increasingly urbanised workforce tormented by traffic jams, at least one major (and uncounted) tax on workers will be eliminated. Such an improvement would not be reflected in the aggregate output and productivity statistics.

In short: technology is not our enemy, it is our best hope. It will never be painless, and there will always be those who draw the short straw in the vast lottery of creative destruction. But if you think rapid technological change is undesirable, try secular stagnation.

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Secular stagnation: US hypochondria, European disease?

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After the Great Depression, secular stagnation turned out to be a figment of economists' imaginations. This chapter argues that it is still too soon to tell if this will also be the case after the Great Recession. However, the risks of secular stagnation are much greater in depressed Eurozone economies than in the US, due to less favourable demographics, lower productivity growth, the burden of fiscal consolidation, and the ECB's strict focus on low inflation.

The first time around, 'secular stagnation' was a hypothesis famously articulated by Alvin Hansen in his Presidential Address to the American Economic Association in Detroit in December 1938 (Hansen 1939). Hansen argued that the US economy faced a crisis of underinvestment and deficient aggregate demand, since investment opportunities had significantly diminished in the face of the closing of the frontier for new waves of immigration and declining population growth. It was as if the US was faced with a lower natural rate of growth to which the rate of growth of the capital stock would adjust through a permanently lower rate of investment.

As we all know, these fears were completely without foundation – the delusions of a hypochondriac rather than the insightful diagnosis of a celebrated economist. Trend growth in the US regained or even exceeded its pre-Depression rate in the following decades that were characterised by full employment (Ben-David et al. 2003). The US economy delivered a rapid rate of TFP growth building on the technological prowess that it had established prior to the Depression (see Table 1), and this sustained a high

level of investment while population growth revived under the auspices of the ‘baby boom’. Moreover, the textbook antidote for secular stagnation in a depressed economy at the zero lower bound for nominal interest rates – namely, to cut real interest rates dramatically by credibly committing to higher inflation – had already been shown to work by Roosevelt’s New Deal, which delivered a strong recovery in the years after 1933 (Eggertsson 2008).

Table 1 Contributions to labour productivity growth in US (% per year)

	K/HW growth	HK/HW growth	TFP growth	Y/HW growth
1906-19	0.51	0.26	1.12	1.89
1919-29	0.31	-0.06	2.02	2.27
1929-41	-0.19	0.14	2.97	2.92
1941-48	0.24	0.22	2.08	2.54
1948-73	0.76	0.11	1.88	2.75

Note: Estimates are for private non-farm economy. K/HW = capital per hour worked; HK/HW = human capital per hour worked; Y/HW = real GDP per hour worked.

Source: Derived from Field (2013).

The rediscovery of secular stagnation in the context of a sluggish recovery from the financial crisis of 2008-9 has similar foundations. Forecasts of US economic growth over a medium- to long-term horizon have been revised down in recent times as the growth of labour inputs decreases and questions are raised about the future (post-ICT-revolution) rate of technological progress (Gordon 2014), with the result that investment opportunities are curtailed. Models have been devised in which, faced with shocks of this kind, it would be necessary to find a way to have a lengthy period of negative real interest rates to avoid a prolonged slump (Eggertsson and Mehotra 2014). Aggressive use of fiscal stimulus might be appropriate in this scenario.

It must be said that once again, this could well turn out to be hypochondria rather than far-sighted prediction. Even after downward revisions, mainstream projections for growth over the next ten years or so in the US cluster around 2.1% per year for GDP and 1.6% per year for labour productivity. This productivity growth rate would basically be a continuation of the average performance of the last 40 years (Fernald 2014), with

the main headwind being diminished growth of labour inputs in the face of adverse demographic trends. The future rate of TFP growth is, of course, quite uncertain and techno-optimists such as Brynjolfsson and McAfee (2014) imagine a much rosier future. Be that as it may, it is not obvious why an economy with a steady-state growth rate of more than 2% per year should have a permanent shortfall in demand or a need for a permanent negative real rate of interest.

However, the threat of secular stagnation may be much more real for Europe. Although relatively little attention seems to have been given to this possibility, Europe is surely much more vulnerable, especially in the Eurozone. There are four obvious reasons for this, two stemming from economic performance and two from policy responses:

- European demographics are less favourable
- Productivity growth in Europe will underperform whatever US achieves
- Fiscal consolidation in the context of a high public debt ratio will bear relatively heavily on Europe
- In a depressed economy, the Fed is more likely to take appropriate policy action than the ECB

Table 2 reports OECD growth projections for 2014-2030. In the context of ageing populations, Eurozone employment growth is projected at 0.2% per year compared with 0.5% for the US, and for most European countries the demographics are relatively unhelpful.

It is clear from Table 2 that pre-crisis productivity growth in Europe generally failed to match that in the US, as was widely noted at the time. A major reason for this in many countries was the relatively slow exploitation of the potential of ICT (Oulton 2012). More generally, productivity growth in European countries was frequently held back by weak competition, excessive regulation and shortfalls in human capital that particularly undermined productivity performance in marketed services, where the single market has been ineffective (Crafts 2013a). Europe relies heavily on the US for new technology

and its track record suggests that this will diffuse more slowly in Europe. As Table 2 reports, the OECD (2014) is hopeful that future European productivity growth will generally better the dismal pre-crisis outcome, presumably because supply-side policy will improve. However, this does seem to favour hope over experience, given the protectionist and anti-market responses that the economic history of the 1930s suggests are likely to be nurtured by prolonged stagnation.

Table 2 Pre-crisis growth and OECD long-term growth projections (% per year)

	Real GDP, 1995-2007	Employment, 1995-2007	GDP/worker, 1995-2007	Real GDP, 2014-30	Employment, 2014-30	GDP/worker, 2014-30
Eurozone	2.3	1.3	1.0	1.7	0.2	1.5
USA	3.2	1.2	2.0	2.4	0.5	1.9
France	2.2	1.1	1.1	2.2	0.3	1.9
Germany	1.6	0.4	1.2	1.1	-0.5	1.6
UK	3.3	1.0	2.3	2.6	0.6	2.0
Greece	3.9	1.3	2.6	2.2	0.2	2.0
Ireland	7.2	4.3	2.9	2.3	1.2	1.1
Italy	1.5	1.2	0.3	1.5	0.3	1.2
Portugal	2.4	1.0	1.4	1.4	0.3	1.1
Spain	3.7	3.6	0.1	1.5	0.9	0.6

Sources: 1995-2007: The Conference Board Total Economy Database; 2014-30: OECD (2014, Ch. 4).

In the aftermath of the financial crisis, many European countries have high public debt-to-GDP ratios and for those in the Eurozone extended periods of severe fiscal consolidation lie ahead if they are to comply with the fiscal rules agreed in 2012. For example, the OECD (2013) calculates that for every year from 2014 to 2023, Greece will have to maintain a primary budget surplus of about 9% of GDP, Italy and Portugal about 6% of GDP, and Ireland and Spain about 3.5% of GDP. Dealing with the debt legacy of the crisis in this way will clearly be quite painful and is likely to undermine growth. If fiscal stimulus is required to combat secular stagnation, these countries are not well placed. Moreover, it is noticeable that, at high levels of debt, restoring fiscal sustainability typically entails cuts in both public investment and education spending (Bacchiocchi et al. 2011). The strong likelihood that post-crisis fiscal consolidation will

undermine these expenditures does not bode well for the growth prospects of highly indebted EU countries.

The ECB was designed to be a highly independent central bank mandated to achieve a low inflation target. It has been reluctant to embrace quantitative easing and relatively content with a rate of inflation close to zero. By contrast, the Fed has been far more willing to undertake unconventional monetary policy and has a ‘dual mandate’ that requires weight to be given to employment as well as inflation. It may be that neither central bank is well placed to make a credible commitment to raising inflation to deliver negative real interest rates, but the ECB is surely much the less likely to pursue the monetary policies that the secular stagnation scenario would demand.

If adequate monetary and fiscal responses to a threat of secular stagnation in Europe are not forthcoming, then that leaves supply-side reform, which might crowd in private investment and/or consumer expenditure, as well as increase productivity in the long run, as the only game in town. Such a strategy was successfully pursued in 1980s Britain with the relaxation of credit rationing, and the relaxation of land-use planning rules could play a similar role in Britain now (Crafts 2013b). OECD economists have quantified the possible effects of structural reforms in European economies on productivity and in many cases they are quite sizeable, as can be seen in Table 3. Moreover, such reforms need not be fiscally expensive. Unfortunately, however, in practice this is unlikely to be a feasible way to address a threat of secular stagnation, partly because the impacts are slow to come through, but more importantly because they are politically very difficult to implement effectively.

Table 3 Potential impact on real GDP per person of structural policy reforms (%)

	Labour market	Taxation	Product market regulation	Education	R & D incentives	Total
Moving to OECD average						
USA	0.3	1.4	0.0	2.5	0.0	4.2
France	4.5	10.9	2.2	2.1	1.5	21.2
Germany	6.1	9.9	0.0	0.0	0.0	16.0
UK	1.1	0.0	0.0	4.6	0.0	5.7
Greece	6.0	10.1	22.0	5.8	0.0	43.9
Ireland	6.8	0.9	9.7	0.0	0.0	17.4
Italy	0.3	10.8	0.3	5.4	0.2	17.0
Portugal	7.3	0.7	8.5	21.8	1.3	39.6
Spain	3.5	4.6	0.0	6.3	1.4	15.8

Source: Barnes et al. (2011).

In sum, it is too soon to tell whether secular stagnation is going to materialise in the OECD economies. But it does seem clear that Europeans should be much more afraid than Americans. The depressing effects of slower growth of productive potential will probably be felt more keenly in Europe and economic policies to address such problems will probably be less effective there than in the US.

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Further on effective demand

A prolonged period of low real interest rates?¹

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International Monetary Fund

From a peak of about 5% in 1986, the world real interest rate fell to about 2% before the Global Crisis, and to approximately 0% in 2012. This chapter discusses the major factors behind this decline both before and during the Crisis, and argues that most of them are still relevant. Indeed, the legacies of the Crisis may imply an even lower natural rate in future. This would be bad news for monetary policy, but good news for fiscal policy and debt overhang.

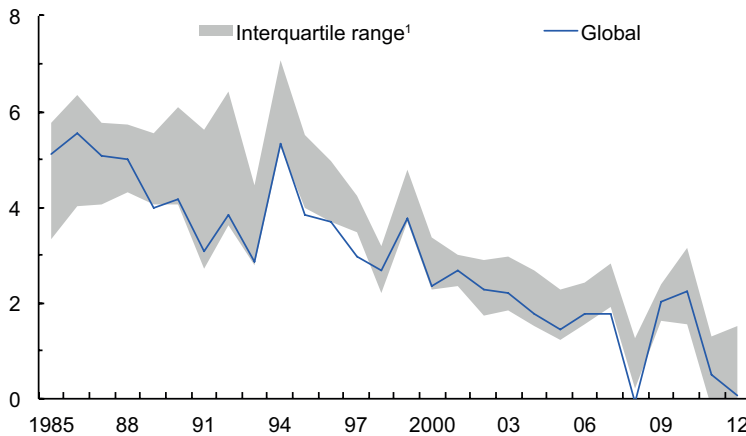
Figure 1 shows the evolution of the world real interest rate over the last 30 years. More specifically, it shows the evolution of the GDP-weighted average of ten-year real interest rates on sovereign bonds across 19 advanced economies since 1985. It has two striking features.

The first is the decline in the rate from a peak of about 5% in 1986 to 2% before the crisis and to approximately zero in 2012. This evolution has led to the worry that the rate needed to maintain output at potential may remain very low in the future, perhaps even negative. Given the combination of the zero lower bound on nominal rates and low inflation, such a negative real rate might be impossible to achieve, leading to insufficient demand – a worry known as the ‘secular stagnation’ hypothesis.

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The second is the degree to which real interest rates have increasingly moved together, as shown by the tight – indeed, increasingly tighter – interquartile range for individual country real interest rates in the figure. This suggests that one can, and actually must, think of a global interest rate, determined in a global market. The factors behind movements in the global real rate are the focus of this chapter.

Figure 1 Short- and long-term global real interest rates (% per year)



Note: 1 The sample consists of: United States, United Kingdom, Austria, Belgium, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Portugal, Spain, Australia, New Zealand. Global based on the GDP-weighted average.

Source: IMF (2014).

Determinants of real rates

To organise the discussion, a short (low-brow) theoretical detour may be useful. One can think of the global real rate as being determined by four factors. The first three determine the ‘natural’ or ‘Wicksellian’ rate, the real interest rate consistent with output at potential, and stable inflation. The fourth, monetary policy, results in temporary deviations from that rate.

The first factor is the supply schedule for loanable funds, namely global saving – assuming output at potential. Shifts in *saving* can be induced by many factors, including changes in current and expected income, changes in uncertainty that affect precautionary saving, demographic changes, financial innovations, and shifts in public saving.

The second factor is the demand schedule for loanable funds, namely global investment –again assuming output at potential. Shifts in investment can be induced by many factors as well, from changes in expected investment profitability, to changes in the relative price of investment goods, to changes in financial intermediation.

The third factor is the *relative demand for safe versus risky assets*. A shift in investors' preferences towards safe assets – be it due to increases in risk, to increases in market risk aversion, or to changes in financial regulation – will lead, other things equal, to a lower rate on safe assets and a higher rate on risky assets.

The first three factors, plus the conditions that the demand and supply of safe assets be equal and output be at potential, determine the *natural rate of interest*. Most of the time, one can think of the goal of monetary policy as to validate this natural rate so as to maintain output at potential. But if, for example, a central bank wants to return output to potential, or to achieve lower inflation, monetary policy will lead to deviations from the natural rate for some time.

Which of the factors discussed above can explain the observed decline in real interest rates?

Looking back, pre-crisis

We believe three of the factors discussed above played a major role: monetary policy in the 1980s and early 1990s, the large increase in emerging market saving rates in the 2000s, and the higher demand for safe assets in the 2000s.

Monetary policy

It is clear that the evolution of real interest rates in the early part of the sample was dominated by the disinflation policies engineered first in the US and the UK, and a bit later in many other advanced countries. While inflation indeed decreased, the result was also a long period of high real rates, in excess of the underlying natural rates. By

the early 1990s, however, the effects of disinflation on the rates were largely gone. Empirical estimates suggest that from 1980 to 1992, about 90% of the variance in US short-term real rates could be explained by monetary policy shocks alone; since then, the percentage of the variance has been much lower. Hence, if monetary policy can explain much of the movement in real interest rates until the 1990s, afterwards, the monetary policy stance of most advanced economies was on average neutral, contributing little to the determination of long-term real interest rates.

Saving

The saving-to-GDP ratio in emerging market economies increased by more than 10 percentage points after 2000. As a result, the global saving rate increased by 1.7 percentage points between 2000 and 2007. Within the emerging market economies, China's saving accounted for an ever-increasing share – approaching half of total emerging market economies' saving in 2013.

What accounted for this increase? Surely many factors played a role, but our empirical work has pointed us to the role of growth. Theory is ambiguous about the effects of growth on saving: higher individual income growth leads people to save less as they expect their income to be higher in the future, thus leading to a negative effect of growth on saving; but higher growth leads to a relatively larger pool of saving by the young (who have relatively more income than the old), leading to a positive effect. Habit persistence implies that consumption lags income, and generates a positive relation between growth and saving. In our econometric work, we have indeed found a strong positive medium-term relation between growth and saving. To the extent that the relation can be interpreted as causal from growth to saving, and using our estimated coefficients, the steady increase in emerging market economy growth in the past decade can explain a shift in saving rates of about 10 percentage points over that period (IMF 2014).

Demand for safe assets

Whether they just reflected the surge in private saving, or were the result of policies aimed at increasing reserves, foreign exchange reserves increased considerably in the 2000s, and were invested mainly in government or government-guaranteed fixed-income liabilities. As a result, foreign holdings of US Treasury securities increased considerably after 2000, and foreign official holdings in China and other emerging market economies accounted for the largest part of this increase (IMF 2014). Empirical evidence suggests that these foreign official purchases of US Treasuries contributed significantly to the decline in real interest rates in the first decade of the 21st century (Bernanke et al. 2004, Warnock and Warnock 2009, Beltran et al. 2013).

Investment

Some observers have focused on the role of the decrease in the relative price of investment goods. We do not believe that this actually played a major role. On theoretical grounds, there are again two effects of such a decrease. The first is that a given volume of investment implies a smaller demand for loanable funds, decreasing the interest rate. But the second is that, as capital is cheaper, the rate of return on investment goes up, leading to a higher volume. Which of the two effects dominates is ambiguous. On empirical grounds, the relative price of investment has not declined meaningfully since the early 2000s.

Looking back. The crisis.

Many factors combined to sharply decrease the natural interest rate during the crisis, from the collapse of financial intermediation to the increase in uncertainty and its effects on precautionary saving and on investment. Increasing risk, together with increasing market risk aversion, decreased the safe rate relative to the rate on risky assets. Monetary policy played a role, although involuntarily: by most estimates, the

zero lower bound on nominal rates and low inflation prevented the actual rate from declining as much as the natural rate.

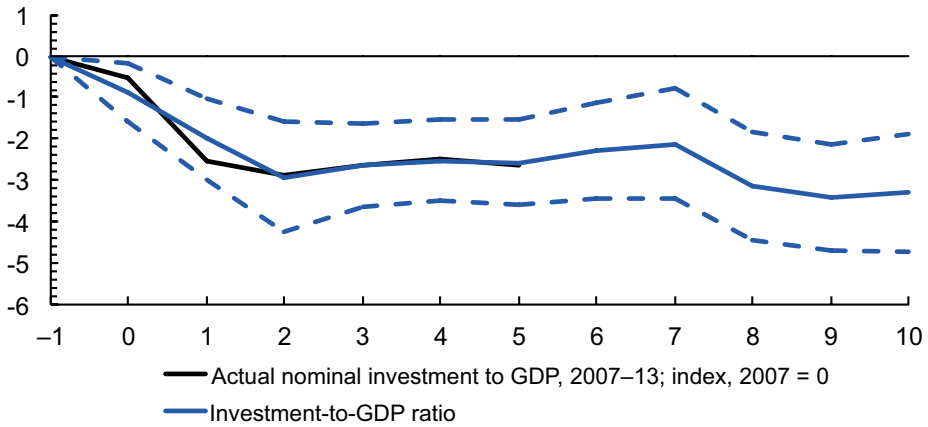
Analysing the role of each factor would go far beyond what we can do in this chapter. And many of these effects, which dominated the early part of the crisis, have either disappeared or at least receded. What matters for our purposes is what legacies the crisis will leave, and for how long. With this, we turn to the future.

Looking forward

Given the complexity of the issues, the global nature of the determination of the rate, and the number of potential factors in play, any attempt to forecast the future global rate must be taken with more than a grain of salt. This being said, we believe that the world real interest rate is likely to remain low, perhaps even lower than before the crisis. Most of the factors that led to low rates pre-crisis are still present. And the legacies of the crisis imply, if anything, a lower natural rate than before the crisis.

Investment

We argued that shifts in investment did not play a major role before the crisis. However, they are likely to be more relevant looking forward. The evidence from previous financial crises suggests that the investment-to-GDP ratio typically takes a long time to recover to pre-crisis levels, if it ever does so. Our econometric estimates, shown in Figure 2, imply that financial crises lead to a significant and long-lasting decline in the investment-to-GDP ratio. Financial crises have typically reduced this ratio by about 1 percentage point in the short term (one year after the occurrence of the crisis), with a peak effect of 3 to 3.5 percentage points three years after the crisis. So far, the actual evolution of investment in advanced economies points in the same direction: the estimated effect matches the 2.5 percentage point decline in the investment-to-GDP ratio between 2008 and 2013 remarkably well.

Figure 2 The effect of financial crises on investment-to-GDP ratios (% of GDP)

Note: X-axis denotes years, t=0 year of the financial crisis.

Source: IMF (2014).

Demand for safe assets

A reversal of the portfolio shifts favouring safe assets observed in the 2000s is unlikely. Indeed, one of the legacies of the crisis is tighter financial regulation, ranging from higher capital ratios to liquidity ratios. The Basel Committee estimates that the effect may be an additional demand for safe assets by financial institutions of about \$3 trillion (for comparison's sake, China's reserves stand at about \$4 trillion). Will this be compensated by a slower pace of reserve accumulation by central banks than in the early 2000s? This depends partly on developments in the provision of international liquidity, an issue we discuss below.

Saving

Another legacy of the crisis is higher levels of debt, both public and private, especially in advanced economies. Other things equal, higher debt requires higher saving in order to either stabilise the debt or return it to a lower level. This is clearly the case for public saving where, in most advanced economies and many emerging markets, fiscal

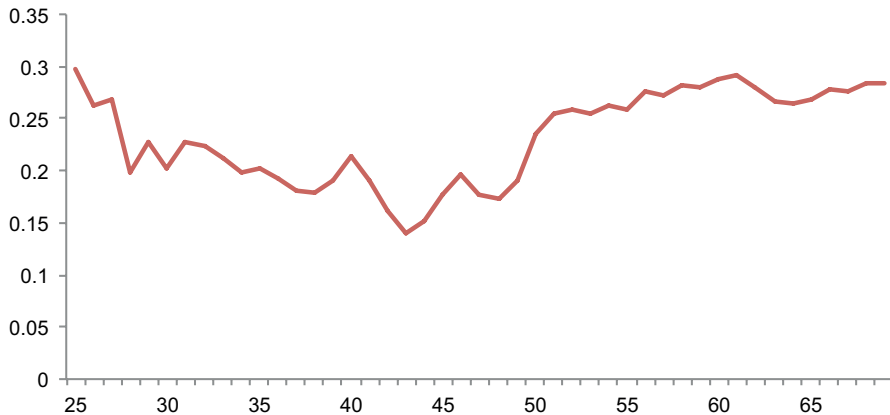
consolidation will remain a priority. But this is also the case for corporate and household saving. Higher debt leads firms to invest less, and consumers to consume less. Given low growth in advanced economies, such deleveraging may go on for a long time.

Much of what happens to saving, however, will depend on what happens to saving in emerging markets. If the relation between saving and growth we have estimated remains stable, the projected reduction in GDP growth in emerging market economies would lead to a large medium-term negative shift in emerging market economy saving rates. Based on our projections and our estimated coefficients, the decrease could reach 3.5% of emerging markets' GDP.

Other factors, from ageing to financial liberalisation, are obviously important. One strikes us as particularly relevant, and introduces a major source of uncertainty for our predictions – namely, the evolution of precautionary saving, which plays a central role in emerging market saving. This is shown for example in Figure 3, which plots the age profile of saving in China as of 2005. What is striking is that the profile is the mirror image of what would be predicted by the life-cycle hypothesis, with high saving very early in life, and then very late in life. The explanation for the second peak is poor social insurance against medical and other age-related expenses. Provision of better social insurance would likely have a large effect on the Chinese saving rate. Precautionary saving is also highly relevant at the country level. Much of the motivation for the accumulation of reserves by emerging markets in the past has been self-insurance against capital flow withdrawals. Better provision of international liquidity, be it through swap lines or IMF programmes, could also lead emerging markets to decrease their reliance on self insurance. Again, this could have a major effect on emerging markets saving.

Figure 3 The age profile of saving in China

Average saving rates by age of head household (2005)



Source: Chamon and Prasad (2010).

Conclusions and implications

The factors that led to low real interest rates pre-crisis are unlikely to be reversed. Indeed, they may be reinforced by some of the legacies of the crisis. Our best guess, with all the proper caveats, is that the natural rate may remain as low as or lower than before the crisis.

If rates indeed turn out to be low, this has important implications for both monetary and fiscal policy. Low rates are bad news for monetary policy, as they make it more likely that countries will hit the zero lower bound. We have learned that even if unconventional monetary policy can help, the effectiveness of monetary policy is dramatically reduced when the zero lower bound is reached. Low rates are good news for fiscal policy and for debt overhang in general. Other things equal, lower interest rates make it easier to sustain or decrease debt, and require a more limited fiscal consolidation. Indeed, in this case, increases in debt-financed government spending, especially public investment, may not lead to increases in public debt in the medium term (DeLong and Summers 2012).

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On the role of safe asset shortages in secular stagnation

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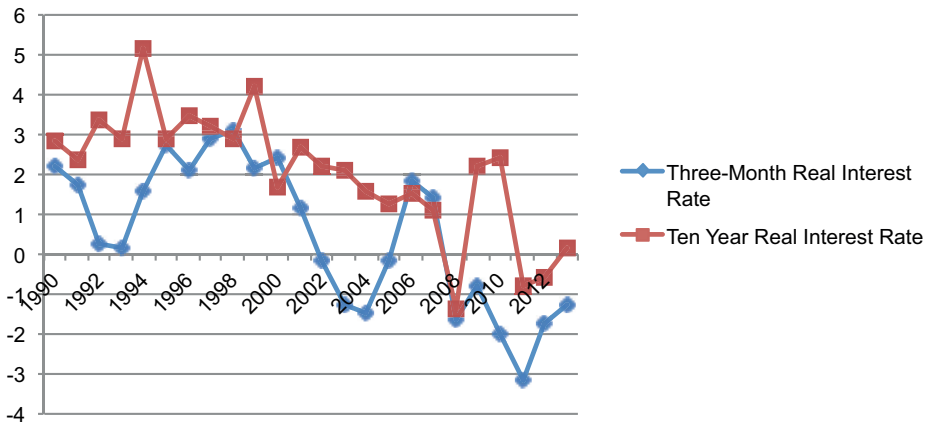
MIT; Harvard University and CEPR

The secular decline in real interest rates over the last two decades indicates a growing shortage of safe assets – a shortage that became acute during the Global Crisis. Given the still-depressed levels of real rates and the sluggish investment recovery, this chapter conjectures that the shortage of safe assets will remain a structural drag on the economy, undermining financial stability and straining monetary policy during contractions. Under these conditions, an additional important aspect of public infrastructure investment is the government’s ability to issue safe debt against such projects.

Introduction

In recent years a confluence of factors – ranging from the rise of international reserve holdings to institutional mandates, regulation, and demographic factors – has led to a steady rise in the demand for safe assets. The supply of safe assets has not been able to keep pace. The unmistakable signature of the growing shortage of safe assets at any given (safe) real interest rate is the secular downward trend in equilibrium real interest rates for more than two decades (see Figure 1).

Figure 1 US real interest rates



Source: IMF (2014).

The steady rise in the demand for safe assets over this period was behind a wide variety of macroeconomic phenomena such as the global savings glut, the so-called Greenspan conundrum of the mid-2000s, and their contemporaneous global imbalances.¹ It was also a powerful macroeconomic force driving the financial engineering required to create safe asset tranches from subprime mortgages before the Global Crisis (e.g. Caballero 2009).

What was already a significant phenomenon before the Subprime Crisis turned into an acute shortage at the onset of the Global Crisis, pushing real interest rates down to new lows. While it is difficult to pin down a specific definition of safe assets, there have been several recent attempts to measure the impact of the crisis on the supply of safe assets. For instance, a 2012 study by Barclays concludes that the world supply of safe assets collapsed from 37% of world GDP in 2007 to about 18% by 2011. This contraction was primarily driven by the sudden reassessment of the riskiness of US residential mortgages and European periphery sovereign debt (see Table 1).²

¹ We developed some of these arguments in Caballero et al. (2006, 2008).

² See also IMF (2014).

Table 1 Strong decline of safe assets from 2007 to 2011

	USD bn		% of world GDP	
	2007	2011	2007	2011
US Federal government debt held by the public	5,136	10,692	9.2%	15.8%
Held by the Federal Reserve	736	1,700	1.3%	2.5%
Held by private investors	4,401	8,992	7.9%	13.3%
GSE obligations	2,910	2,023	5.2%	3.0%
Agency- and GSE-backed mortgage pools	4,464	6,283	8.0%	9.3%
Private-issue ABS	3,901	1,277	7.0%	1.9%
German and French government debt	2,492	3,270	4.5%	4.8%
Italian and Spanish government debt	2,380	3,143	4.3%	4.7%
Safe assets	20,548	12,262	36.9%	18.1%

Note: Numbers are struck through as they are believed to have lost their ‘safe-haven’ status after 2007

Source: 2012 Barclays Equity Gilt Study.

As the economy recovered, the safe asset shortage and some of its consequences abated. However, it is our conjecture, partly based on the still depressed levels of real interest rates among the major economies and the sluggish investment recovery, that this shortage remains a latent factor that could re-emerge in full force during the next severe downturn. It is in this sense that our discussion connects to the ‘secular stagnation’ theme of this eBook.

There is a benign view of safe asset shortages. Increases in the demand for safe assets and decreases in the supply of safe assets push down the natural real interest rate. This virtuous mechanism equilibrates the safe asset market as long as central banks accommodate this decline in natural real interest rates by lowering nominal interest rates. But this adjustment breaks down when nominal interest rates hit the zero lower bound. At this tipping point, perverse mechanisms swing into action, resulting in economic recessions.

Safety traps

In a recent paper (Caballero and Farhi 2014), we take the view that a safe asset is one that is expected to preserve its economic value following bad macroeconomic shocks. We provide a simple model to illustrate how a chronic shortage of safe assets can push the economy up against the zero lower bound and weaken the effectiveness of some of the standard market mechanisms and policy responses that could stimulate a depressed economy. We refer to this situation as a ‘safety trap’, to emphasise both its similarity and its difference with conventional liquidity trap analyses.

Both safety and liquidity traps involve severe asset shortages, zero nominal interest rates, wealth destruction, deficits in aggregate demand, and recessions. But the distinguishing feature of safety traps is that they are shortages of a particular kind of assets: *safe assets*.

This distinction is important because the corresponding financial bottleneck is harder to fix. It is extremely difficult for the corporate and financial sector of a shell-shocked economy to produce such assets. Moreover, as we will discuss below, policies aimed at stimulating aggregate demand by boosting generic wealth, such as forward guidance, have less traction than in conventional liquidity traps. By the same token, potential market mediated solutions, such as the emergence of speculative bubbles, are also less effective.

Safe public debt and unconventional monetary policy

Safe public debt (and ‘helicopter’ money) plays a central role in a safe asset shortage episode, as typically the government owns a disproportionate share of the capacity to create safe assets. As long as the economy is at the zero lower bound, public debt can be increased at no fiscal cost. However, taxes are eventually needed to pay down the debt

when interest rates become positive again.³ One way or another, safe assets created by the government are backed by taxes. These taxes might crowd out private safe assets – a Ricardian equivalence of sorts – but this full offset is unlikely to occur in the aftermath of a financial crisis when the securitisation capacities of the economy (understood to be the physical, institutional, legal, and reputational resources that are required to isolate safe financial assets from risky real assets) have been impaired.⁴

The key concept then is that of fiscal capacity *during future times of distress*. How much public debt can the government credibly commit to honouring *should a major macroeconomic shock take place in the future*? As long as the government has the spare fiscal capacity (in this extreme event sense) to back safe asset production, it can increase the supply of safe assets by issuing public debt. This reduces the root imbalance in financial markets and stimulates the economy.

The proceeds of the extra public debt issuance can be rebated to consumers. An attractive alternative is for the government (through the treasury or the central bank) to buy risky assets, which, for a given fiscal capacity, allows the government to issue more safe public debt. QE1 in the US, LTRO and TLTRO in Europe, as well as many other lender-of-last-resort central bank interventions, can be broadly characterised as swapping private risky assets for safe public debt. These unconventional monetary policies alleviate the shortage of safe assets and stimulate the economy.

Another popular unconventional monetary policy tool at the zero lower bound is forward guidance, which is most commonly understood as a commitment to low interest rates in the future *when the economy has recovered*.⁵ It turns out that forward guidance is of limited effectiveness during safety traps. While low interest rates do increase asset values, wealth, and hence aggregate demand and output *once the economy recovers*,

3 The same argument applies for helicopter money. The government needs to raise taxes to buy back part of the money stock when nominal interest rates become positive in order to stabilise the economy.

4 In fact, an intriguing post-crisis development is that the money multiplier $M2/M0$ has declined substantially. Part of this decline is probably due to increased banking regulation and capital requirements, raising the possibility that the post-crisis equilibrium will require a higher amount of $M0$ (Chatterjee and Wynne 2014).

5 An alternative strategy at the zero lower bound is ‘unconventional fiscal policy’, which uses time-varying taxes to reduce real interest rates (Correia et al. 2013).

the anticipation of a potential upward effect of low future interest rates on asset values has no effect on asset prices today, and therefore fails to increase the value of risky assets, wealth, aggregate demand and output in a safety trap, simply because it does not increase the value of safe assets. The reason stems from our working definition of a safe asset as an asset that preserves its value during future distress, not just during a potential recovery. Any future increase in the value of risky assets in a state of recovery that is not accompanied by an equivalent increase in a state of distress is mostly dissipated in a rise in risk premia.⁶

In practice, the dividing line between safe and risky assets is of course not as stark. As a result, forward guidance always increases the value of some assets and provides some stimulus. During the most severe phase of a crisis, the safe category is reduced to the absolute safest assets. All excluded assets decrease in value, and forward guidance is least effective. Asset values recover as the flight to safety eases, and forward guidance regains some kick.⁷

Bubbles

Low interest rate environments are known to be prone to speculative episodes and the emergence of financial bubbles. In a conventional liquidity trap environment, financial bubbles increase wealth and asset values, alleviate the shortage of assets, and stimulate the economy. Financial bubbles that are large enough can even increase the natural interest rate above zero and altogether eliminate the liquidity trap. But the stimulus is

6 In a liquidity trap, forward guidance stimulates aggregate demand through the combination of a wealth effect and a substitution effect via inflation and lower real interest rates (e.g. Krugman 1998, Eggertsson and Woodford 2003, Werning 2012). The strength of the substitution effect increases with the slope of the Phillips curve – which lately appears to be very flat – and hence with the flexibility of prices or wages. At the limit where inflation is independent of the output gap (when prices or wages are entirely rigid), the substitution effect disappears and only the wealth effect remains. Comparing a safety trap to a liquidity trap, we have argued in the main text that the wealth effect is muted. For this reason and because of the reduced incentive for forward-looking agents to increase their prices or wages in anticipation of higher output when the economy recovers (because these states are more heavily discounted), the substitution effect is also weakened.

7 Following this logic, one can account for the rise in risky financial assets (equity, in particular) during the US recovery from the crisis. Importantly, Hall (2014) argues that risk premia applicable to capital formation have remained high, contributing to the sluggish recovery.

temporary: the economy returns to the zero lower bound as soon as the bubble bursts, echoing some arguments in Summers' (2013) rekindling of the 'secular stagnation' concept. A financial bubble can therefore arise as an imperfect market solution to a shortage of financial assets. The solution is no panacea because it is temporary and comes with risks to financial stability.⁸

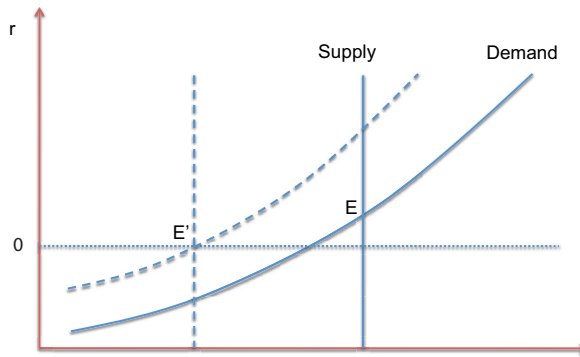
The cost-benefit ratio of financial bubbles worsens in safety traps, as the expansionary effects of financial bubbles are weakened. Because bubbles are risky, they do little to increase the supply of safe assets and, hence, to alleviate the shortage of safe assets that plagues the economy. They mostly end up crowding out other private risky assets, leaving wealth, demand, and output largely unchanged.

The mechanism

To gain a better understanding of the basic mechanics of safety traps, it is useful to think about an economy with two types of agents: *neutrals* and *Knightians*. Neutrals are risk-neutral; Knightians are infinitely risk-averse. Real assets come in the form of Lucas trees, which are claims to a risky dividend that can increase or decrease with some probability. The securitisation capacity of the economy determines the fraction of these real assets that can be securitised into risky and safe financial assets (financial assets that stay constant in value when the economy is hit by a shock). In equilibrium, Knightians hold the safe assets, while neutrals hold the risky assets.

⁸ In Caballero et al. (2006), we outline how 'speculative growth' paths that look like temporary bubbles associated with investment booms could arise endogenously and take the economy to a different equilibrium with a higher capital stock and higher output. Along these paths, potential output increases but natural interest rates decrease, which could eventually trigger liquidity-trap- and safety-trap-like mechanisms and result in output below its increased potential level.

Figure 2 Supply and demand for safe assets as a function of the real interest rate



Notes: The initial equilibrium is at point E. The dashed lines illustrate how an exogenous reduction in the supply of safe assets pushes the economy against the zero lower bound. Equilibrium is restored at point E' by an endogenous reduction in the demand for safe assets associated with a recession.

Figure 2 represents equilibrium in the safe asset market. The demand for safe assets (Knightian wealth) increases with the real interest rate because a high real interest rate increases the growth rate of safe wealth. Higher precautionary savings, mandates and regulation forcing higher holding of safe assets, and increased demand for reserves from emerging markets would shift this curve to the right. For simplicity, the supply of safe assets is assumed to be independent of the real interest rate (this is not essential to the argument). Heightened perceptions of macroeconomic risk, impairments to the securitisation capacity of the economy, and tighter regulation restricting the private creation of safe assets would shift this curve to the left. The initial equilibrium is at point E with a positive real interest rate.

Now consider a decrease in the supply of safe assets (the argument is similar for an increase in the demand for safe assets), captured by an *exogenous* leftward shift in the supply curve. Equilibrium in the safe asset market is restored by a reduction in real interest rates. With strong price or wage rigidities, this adjustment can only occur through a reduction in nominal interest rates.⁹ When nominal interest rates reach the zero lower bound, further reductions cannot take place. At zero nominal interest

⁹ This remains true if prices or wages are sticky but not entirely rigid as long as the central bank adheres to a constant inflation target.

rates, there is excess demand for safe assets and excess supply of goods (insufficient aggregate demand). Because of the deficit in aggregate demand, output and income decrease, further reducing aggregate demand, and so on, generating a recession. The recession lowers Knightian wealth at any given real interest rate, *endogenously* shifting the demand curve for safe assets to the left. Equilibrium in the safe asset market is restored when the reduction in Knightian wealth matches the initial reduction in the supply of safe assets at point E'.¹⁰ In parallel, risk premia adjust to clear the market for risky assets at a lower level of neutral wealth and a lower value of risky assets. This perverse equilibrating mechanism is the essence of a safety trap.

In this simple model, when the economy falls into a safety trap, output is entirely determined by equilibrium in the safe asset market. Output can only be stimulated by reducing the demand for safe assets or by increasing their supply. This is exactly what issuing safe public debt or swapping private risky assets for safe public debt accomplishes. By contrast, forward guidance and financial bubbles have no effect on the supply of or demand for safe assets. Hence they have no effect on output, and even no effect on the value of neutral wealth or the value of risky assets. Instead, they move risk premia. Obviously, these stark results are unlikely to hold in such extreme form in practice. But they provide a sharp illustration of some important limits to the effectiveness of the corresponding mechanisms.

Implications for the supply side of the economy and for financial market incentives

In the core of this chapter, we focused on the aggregate demand-side problem caused by a chronic shortage of safe assets, but surely there are important supply-side implications of this deficit as well.

10 To the extent that prices and wages are sticky but not entirely rigid, inflation might decline, increasing real interest rates, requiring a further endogenous decline in the demand for safe assets, and creating a deeper recession. This logic applies as long as the central bank is unwilling or unable to increase its inflation target above the opposite of the (negative) natural real interest rate – a solution that, if feasible, would altogether eliminate the safety trap but would come with its own side-effects and limitations.

On one hand, safe asset shortages shape corporations' capital costs and create incentives to cut back on risky investment and to either accumulate cash, return money to investors through equity buybacks and dividend payments, or substitute towards safer or easier-to-securitise forms of investment, sacrificing output for safe asset production.

On the other hand, safe asset shortages also create strong incentives for the financial system to engage in subprime-like forms of financial engineering, which can be thought as the process of extracting a 'safe' tranche from inherently risky loans backed by systemically exposed real estate collateral. And as the recent crisis demonstrated, this process can go to extremes, leading to waves of 'fake' safe asset creation, followed by sudden and violent episodes of collective realisation of their actual riskiness.

Conclusion

Absent major financial innovations or changes in economic agents' and institutions' preferences and mandates, the shortage of safe assets is likely to worsen over time, perhaps as a latent factor during booms only to re-emerge in full force during contractions. It is our conjecture that the shortage of safe assets will remain a structural drag, pushing down real interest rates, putting pressure on the financial system, and straining monetary policy during contractions.

Absent these changes, there is a significant need for policy intervention. Other chapters in this eBook will surely address the potential role of public infrastructure investment. From our point of view, an additional important aspect of such policy is the government's ability to issue safe debt against such projects.¹¹

¹¹ In this sense one could imagine a situation where the real investment could in part be undertaken by the private sector, catalysed by public support in the creation of the debt associated to such investment. See Caballero and Kurlat (2009) for a proposal of public private partnerships in financial asset creation.

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A model of secular stagnation

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Japan's two-decade-long malaise and the Great Recession have renewed interest in the secular stagnation hypothesis, but until recently this theory has not been explicitly formalised. This chapter explains the core logic of a new model that does just that. In the model, an increase in inequality, a slowdown in population growth, and a tightening of borrowing limits all reduce the equilibrium real interest rate. Unlike in other recent models, a period of deleveraging puts even more downward pressure on the real interest rate so that it becomes permanently negative.

During the closing phase of the Great Depression in 1938, the President of the American Economic Association, Alvin Hansen, delivered a disturbing message in his Presidential Address to the Association (Hansen 1939). He suggested that the Great Depression might be the start of a new era of ongoing unemployment and economic stagnation without any natural force pushing the economy towards full employment. This idea was termed the 'secular stagnation' hypothesis. One of the main driving forces of secular stagnation, according to Hansen, was a decline in the birth rate and an oversupply of savings that was suppressing aggregate demand. Hansen's fears of secular stagnation turned out to be unwarranted. World War II led to a massive increase in government spending, ending any concern of insufficient demand. And the subsequent baby boom drastically changed the population dynamics in the US, erasing the problem of excess savings driven by an ageing population.

The return of the secular stagnation hypothesis

Recently, Hansen's secular stagnation hypothesis has gained renewed attention. One obvious motivation is the Japanese malaise that has by now lasted two decades and shares many of the same symptoms as the Great Depression in the US – namely, decreasing population growth, a nominal interest rate stuck at zero, and subpar GDP growth. Another reason for renewed interest is that, even if the financial panic of 2008 was contained, growth remains weak in the US and employment growth remains sluggish. Most prominently, Lawrence Summers raised the prospect that the crisis of 2008 may have ushered in the beginning of secular stagnation in the US in much the same way as suggested by Alvin Hansen in 1938. In the words of Summers, we may have found ourselves in a situation in which the natural rate of interest – the short-term real interest rate consistent with full employment – is permanently negative (Summers (2013)).

Lack of a formal model

Despite the prominence of Summers' discussion of the secular stagnation hypothesis and the flurry of commentary that followed it, there has not been an attempt to formally model this idea – to write down an explicit model in which unemployment is high for an indefinite amount of time due to a permanent drop in the natural rate of interest. Our recent work (Eggertsson and Mehrotra 2014, on which this chapter is based) seeks to fill this gap. It may seem somewhat surprising that the idea of secular stagnation has not already been studied in detail in the recent literature on the liquidity trap, which concerns itself with policy options once the central bank cannot lower the nominal interest rate beyond zero. This literature already invites the possibility that the zero bound on the nominal interest rate is binding for some period of time due to a drop in the natural rate of interest.

However, secular stagnation does not emerge naturally from the current vintage of models in use in the literature. Most analyses of zero lower bound episodes take

place within models with a representative agent (e.g. Krugman 1998, Eggertsson and Woodford 2003). In these models, the long-run real interest rate is directly determined by the discount factor of the representative agent, which is fixed. The natural rate of interest can then only temporarily deviate from this fixed state of affairs due to preference shocks or some similar alternatives. And changing the discount rate permanently (or assuming a permanent preference shock) is of no help either, since this leads the intertemporal budget constraint of the representative household to ‘blow up’ and the maximisation problem of the household to no longer be well defined. Moreover, even in models with some heterogeneity in borrowing and lending, it remains the case in most of those settings that a representative saver’s discount factor pins down a positive steady-state interest rate. But, as our paper shows, moving away from a representative savers framework to one in which households transition from borrowing to saving over their lifecycle will have a major effect on the steady-state interest rate and can open up the possibility of secular stagnation.

The logic of a secular stagnation model

In our work, we consider a simple overlapping generation (OLG) model (in the spirit of Samuelson 1958) where households go through three stages of life: young, middle aged and old. Income is largely concentrated within the middle generation. This gives rise to demand for borrowing by the young, and gives the middle aged an incentive to save part of their endowment for old age by lending it to the young. We assume that borrowing by the young is constrained by an exogenous debt limit. In this environment, we show that the steady-state real interest rate is no longer determined solely by households’ discount factor. Instead, it depends on the relative supply of savings and demand for loans, and the equilibrium real interest rate may easily be permanently negative. Forces that work in this direction include a slowdown in population growth, which increases the relative supply of savings, along with a tighter debt limit, which directly reduces demand for loans. An increase in income inequality, either across or within generations, may also generate a negative real interest rate. Interestingly enough, all three factors – an

increase in inequality, a slowdown in population growth, and a tightening of borrowing limits – have been at work in several economies that have experienced low interest rates and subpar growth in recent years. We also show that a fall in the relative price of investment works in the same direction.

Permanent deleveraging when there is no representative saver

One interesting result emerges when we consider a debt deleveraging shock of the kind common in the literature (e.g. Eggertsson and Krugman 2012 for a theoretical analysis). In that work, a deleveraging shock leads to a temporary reduction in the real interest rate as debtors pay down their debt. If prices are fully flexible, then this reduction in the real interest rate leads savers to increase their spending, fully compensating for the lower spending by borrowers. (This effect is complicated when prices are not fully flexible by a zero lower bound in nominal rates). Once the deleveraging process is complete (debt is back to a new debt limit), the economy returns to a steady state with a positive interest rate. In our model of secular stagnation, however, no such return to normal occurs. Instead, a period of deleveraging puts even more downward pressure on the real interest rate so that it becomes permanently negative. The key here is that households shift from borrowing to saving over their lifecycle. If a borrower takes on less debt today (due to the deleveraging shock), then tomorrow he has greater savings capacity since he has less debt to repay. This implies that deleveraging – rather than facilitating the transition to a new steady state with a positive interest rate – will instead reduce the real rate even further by increasing the supply of savings in the future.

Thinking about prices

Consider now how inflation behaves when the zero bound on the nominal rate is taken into account. A key result that emerges is that, under flexible prices, the zero bound on the nominal interest rate implies the existence of a lower bound on steady state

inflation, which can be no lower than the negative of the natural rate of interest. Thus, for example, if the natural rate of interest is -4% , then there is no equilibrium that is consistent with inflation below 4% in steady state. The secular stagnation hypothesis implies that long-run price stability is impossible when prices are flexible. We show that this has profound implications for an economy with realistic pricing frictions. If a central bank can force inflation below this ‘natural’ lower bound, it does so at the expense of generating a permanent recession.

To formalise a permanent recession explicitly, we assume in our model that wages are downwardly rigid (this particular theory of downward nominal rigidity is not central to our result, and other alternatives are very well possible). In this economy, we show that if the central bank is unwilling to tolerate high enough inflation, output falls permanently below the full-employment level. In line with the literature that emphasises deleveraging shocks that have short-term effects, we find that, in this economy, a long slump is one in which usual economic rules are stood on their head. The old Keynesian paradox of thrift is in full force, as well as the more recent ‘paradox of toil’ (Eggertsson 2010), where an increase in potential output decreases actual output, as well as the proposition that increasing wage flexibility only worsens the shortfall in output (Eggertsson and Krugman 2012).

Monetary and fiscal policy

Secular stagnation leaves important roles for both monetary and fiscal policy. We find that a high enough inflation target can – if credible – always do away with the slump altogether as it accommodates a negative natural interest rate. Importantly, however, an inflation target that is below what is required has no effect in this context. This result formalises what Krugman (2014) has referred to as the ‘timidity trap’ – an inflation target that is too low will have no effect in an economy experiencing secular stagnation. We show this trap explicitly in the context of our model, which only arises if the shock is permanent. Similarly, we illustrate that, in a secular stagnation environment, there are

strong limitations of forward guidance with nominal interest rates. Forward guidance relies on manipulating expectations after the zero lower bound shock has subsided; as the shock in our model is permanent, manipulating these types of expectations is of more limited value. Moving to fiscal policy, we show that either an increase in government spending or a redistribution of income from savers to borrowers can eliminate the output gap, although this latter result depends on the details of the distribution of income.

Takeaway

The main takeaway from our analysis is not a prediction that the world as we see it today will remain mired in a recession forever. Instead, the purpose is to establish conditions under which a permanent recession can take hold, or more to the point, provide a formalisation of the secular stagnation hypothesis. An important conclusion from our analysis is not just that a permanent recession is possible, but instead that a liquidity trap can be of arbitrary duration and last as long as the particular shocks that give rise to it (such as a deleveraging shock and/or a rise in inequality and/or population growth slowdown). This is particularly relevant when considering the Great Depression in the US (where the short-term interest rate started to drop in 1929, only to finally start rising again in 1947) or current-day Japan (where interest rates started falling in 1994 and remain at zero). It highlights that a passive attitude towards a recession of the kind experienced by the world today is not appropriate. Our model of secular stagnation instead provides, in our view, a strong case for aggressive policy interventions that are aimed at increasing aggregate demand.

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Balance sheet recession is the reason for secular stagnation

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The Great Recession is often compared to Japan's stagnation since 1990 and the Great Depression of the 1930s. This chapter argues that the key feature of these episodes is the bursting of a debt-financed asset bubble, and that such 'balance sheet recessions' take a long time to recover from. There is no need to suffer secular stagnation if the government offsets private sector deleveraging with fiscal stimulus. However, until the general public understands the fallacy of composition, democracies will struggle to implement such policies during balance sheet recessions.

With the developed economies failing to regain forward momentum after six years of zero interest rates, people are beginning to worry that they may be facing secular stagnation. Although this is an understandable reaction, a large part of the stagnation may be due to the balance sheet recession that these economies are all facing after the bursting of their debt-financed asset price bubbles. And this type of recession takes a long time to overcome, for both economic and political reasons.

The mechanics of balance sheet recession

On the economic front, when a debt-financed bubble bursts, a large number of businesses and households realise that the liabilities they incurred during the bubble days are still on their books, while the assets they bought with borrowed funds have collapsed in value, leaving their balance sheets deep underwater. In order to climb out of their negative equity territory, they have no choice but to pay down debt with their

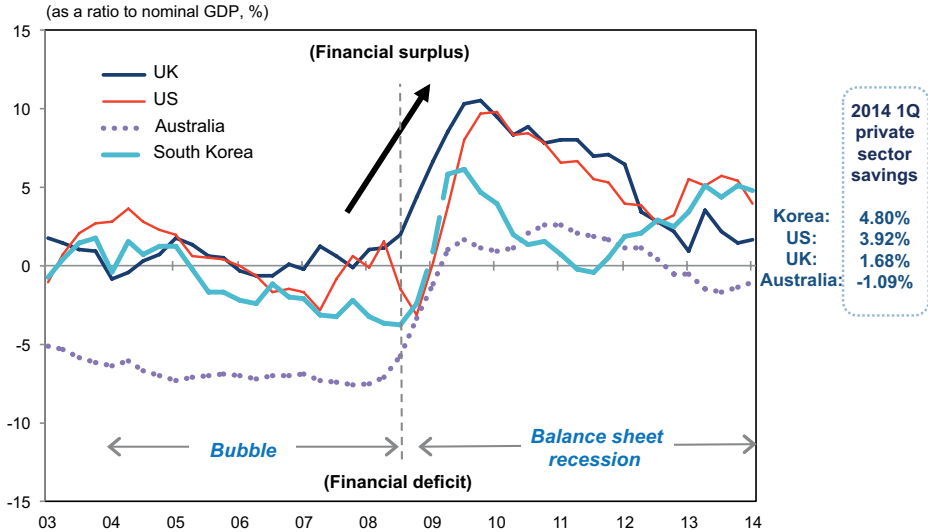
cash flow as quickly and quietly as possible. In other words, they are minimising debt instead of maximising profits.

Although this is the right thing to do for individual businesses and households, when everybody does it at the same time the economy falls into a massive fallacy of composition problems. This is because in a national economy, if someone is saving money or paying down debt, someone else must be borrowing and spending the same amount for the economy to move forward.

In the usual economy that task is borne by the financial sector, which has the incentive to lend or invest all the funds entrusted to it in order to maximise profits. And the usual mechanism to make sure that all saved funds are borrowed and spent is the interest rate; when there are too many borrowers, interest rates are raised and when there are too few rates are lowered.

But after the bursting of a nationwide asset price bubble, those with balance sheets under water are not interested in increasing borrowing at any interest rate. There will not be many lenders either, especially when the lenders themselves have balance sheet problems. The lack of borrowers means a significant portion of the newly saved and deleveraged funds that are entrusted to the financial sector are unable to re-enter the real economy. This in turn means that those unborrowed savings become a leakage in the income stream and a deflationary gap for the economy. If left unattended, this deflationary gap will push the economy ever deeper into balance sheet recession, a highly unusual recession that happens only after the bursting of a nationwide asset price bubble.

Figure 1 The US, UK, South Korean & Australian private sectors are deleveraging after the bubble^{1,2}

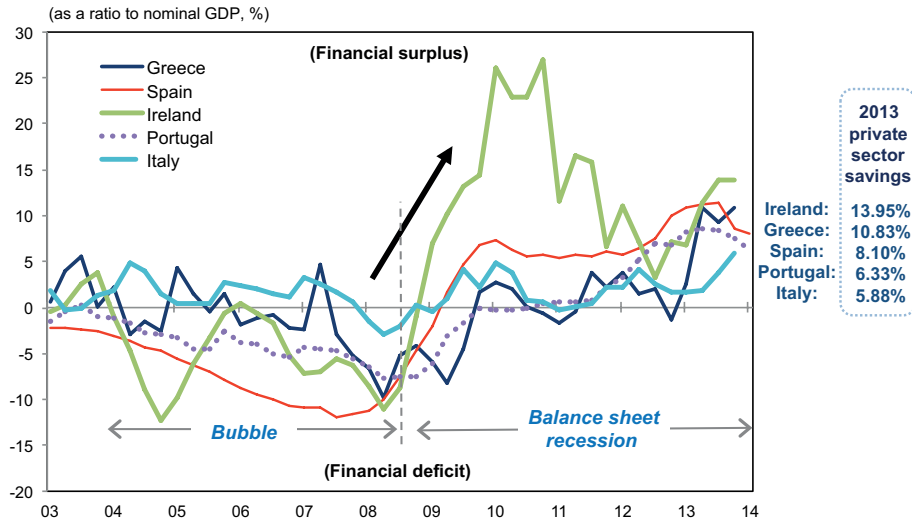


Notes: 1. Private Sector = Household Sector + Non-Financial Corporate Sector + Financial Sector. 2. All entries are four-quarter moving averages. For the latest figures, four-quarter averages ending in 1Q/14 are used.

Sources: Office for National Statistics, UK, FRB, Australian Bureau of Statistics and Bank of Korea.

The flow of funds data for the developed countries that experienced housing bubbles until 2008 indicate that, except for Australia, their private sectors are all in financial surplus, i.e. they are either saving money or paying down debt (Figures 1 and 2). The fact that they are saving money or paying down debt instead of borrowing at zero interest rates means the private sectors of all of these countries are facing severe balance sheet challenges. The same pattern is observed in the private sectors in Japan after the bursting of its massive real estate and equity bubbles in 1990 and in Germany after the bursting of its telecom bubble in 2000 (Figure 3).

Figure 2 Eurozone private sectors are deleveraging massively after the bubble^{1,2}



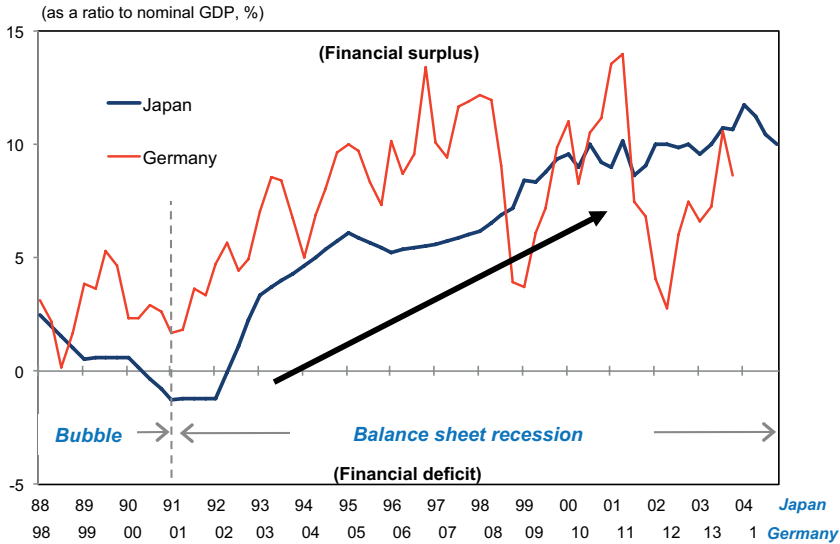
Notes: 1. Private Sector = Household Sector + Non-Financial Corporate Sector + Financial Sector. 2. All entries are four-quarter moving averages. For the latest figures, four-quarter averages ending in 4Q/13 are used for Ireland, Greece and Italy, and those ending in 1Q/14 are used for Spain and Portugal.

Sources: Bank of Greece, Banco de España, National Statistics Institute, Spain, The Central Bank of Ireland, Central Statistics Office Ireland, Banco de Portugal, Banca d'Italia and Italian National Institute of Statistics.

During this type of recession, monetary policy is largely ineffective because, as stated earlier, those with balance sheets under water will not increase borrowing at any interest rate, and financial institutions are also not allowed to lend to those borrowers with balance sheets under water. In addition, the government cannot tell the private sector not to repair its balance sheets because the private sector has no choice but to put its financial houses in order.

This means the only thing the government can do to offset the deflationary forces coming from private sector deleveraging is to do the opposite of the private sector, i.e. borrow and spend the unborrowed savings in the private sector. In other words, fiscal stimulus becomes absolutely essential during this type of recession.

Figure 3 The Japanese and German private sectors also deleveraged after their bubbles^{1,2}



Notes: 1. Private Sector = Household Sector + Non-Financial Corporate Sector + Financial Sector. 2. All entries are four-quarter moving averages. The latest figure for Germany is four-quarter moving average ending in 4Q/13.

Sources: Bank of Japan, Cabinet Office, Japan, Bundesbank and Eurostat.

If the government promptly borrowed and spent the unborrowed savings in the private sector, there would be no leakage in the income stream and the GDP level will be maintained. If the GDP level is maintained, the private sector will have the income to pay down debt. Since asset prices will not fall below zero, as long as the private sector has the income to pay down debt, the balance sheet problem will eventually be resolved.

This also means the government must *sustain* the fiscal stimulus for years until the private sector has finished repairing its balance sheets and has become ready to borrow again. Any premature withdrawal of fiscal stimulus would unleash the deflationary forces, as unborrowed savings are allowed to become a leakage in the economy's income stream. Indeed, the US in 1937, Japan in 1997 and the UK and Eurozone in 2010 all experienced serious double-dip recessions when their governments pursued fiscal consolidation while their private sectors were still in the process of repairing balance sheets.

The forward momentum of economies during this period is necessarily weak because a large part of corporate cash flow is directed towards paying down debt instead of towards research and new product development. Even if corporate research departments are coming up with new ideas and products, their management may be unable to put them into production because of the need to first repair their balance sheets. Many Japanese companies lost their lead to foreign competitors during the last 20 years due to this reason.

Many households will also be rebuilding the savings they thought they had prior to the bubble bursting. That means they will be cutting down on purchases of all kinds, but especially those on credit. The fact that the household sectors of virtually all developed countries have become huge net savers after 2008, in spite of record low interest rates, made even those businesses with clean balance sheets extremely cautious to invest in new capacity.

Recovery from balance sheet recession takes time

When the economy is confronting a fallacy of composition problem affecting a large part of society, the burden cannot be easily shifted to another group. If the government decides to waive all debt for insolvent businesses and households, for example, the problem merely shifts to the entities that lent them the money, i.e. banks and depositors. This means the only option is to wait for the whole of society to get better, a process that takes time.

In a balance sheet recession, the affected businesses and households must use fresh *flows* of savings to slowly repair their balance sheets burdened by the *stock* of excessive debt. The greater the damage to balance sheets, the more time it takes to clean them up. For example, if a company has a \$10 million hole in its balance sheet and can generate \$2 million a year in cash flow that can be used to pay down debt, the repair process will take five years.

But as more firms embark on this process and start to use a large part of their free cash flows to pay down debt, the recession worsens, squeezing cash flow and leading to further declines in the asset prices that triggered the recession in the first place. That is why the government – which is outside the fallacy-of-composition problems – has to proactively take the other side of the bet, so to speak, from the private sector and prevent a vicious cycle. If the government makes the mistake of opting for fiscal consolidation too soon, a recession that people expected would end in two or three years – like Japan’s in 1997 – may persist for seven years, or even ten.

Even after the balance sheets are repaired, people who were forced to deleverage for an extended period of time tend to experience a kind of debt-related trauma that acts as a psychological block to borrowing, even after they have cleaned up their balance sheets. The Americans who had to pay down debt during the Great Depression – the balance sheet recession par excellence – never borrowed money until they died. Even after US private sector balance sheets were repaired thanks to the astronomical government spending of World War II, it still took until 1959 (i.e. full three decades) for US interest rates to return to the average level of 1920s.

The Japanese finished repairing their corporate balance sheets by 2005, but there is no sign that they are resuming their borrowing in spite of the lowest interest rates in human history and the most willing bankers. And that is true even after one full year of Abenomics, which included massive monetary easing.

Democracies are ill-equipped to deal with balance sheet recessions

On the political front, the unfortunate fact is that democracies are ill-equipped to handle such recessions. For a democracy to function properly, people must act based on a strong sense of personal responsibility and self-reliance. But this principle runs counter to the use of fiscal stimulus, which involves depending on ‘big government’ and waiting for a recovery. During a balance sheet recession, people with good incomes and sound

balance sheets will vociferously object to fiscal stimulus and with it the implications of big government, especially once they learn that the stimulus will help rescue people and institutions that participated in the bubble.

Moreover, most people are not aware that this kind of recession is triggered by fallacy-of-composition problems that occur when individual businesses and households begin doing the right and responsible thing by repairing their balance sheets. When the government tries to administer fiscal stimulus, the media, pundits and ordinary citizens who do not understand balance sheet recessions are quick to argue that politicians are wasting taxpayers' money on useless projects to win re-election.

For the past 20 years, the Japanese media and orthodox academics have self-righteously and almost reflexively equated fiscal stimulus with pork-barrel politics. In the US, members of the Tea Party, the Republican Party splinter group that has become so influential, have effectively staked their political careers on preventing the federal government from undertaking fiscal stimulus. German Chancellor Angela Merkel's decision to force through a fiscal compact calling on all Eurozone countries to follow Germany's example and pursue fiscal consolidation was based on a similar philosophy. Since these people were never exposed to the concept of balance sheet recession at university, it is difficult to convince them of the need for fiscal stimulus to cure a disease they have never heard of.

The point is that it is almost impossible to maintain fiscal stimulus in a democracy during peacetime. It is difficult in a democracy because such policies cannot be implemented and maintained during peacetime unless millions of people are persuaded of the need for fiscal stimulus. In contrast, in an autocratic state, only one person – the dictator – needs to be persuaded in order to both administer and maintain fiscal stimulus.

It is difficult in peacetime because during war, when a nation's survival is at stake, no one complains about government spending on armaments or air-raid shelters. There is no danger of getting bogged down in endless debates over how to spend the money, because the answer to that question during wartime is clear to all involved.

Adolf Hitler and Franklin Roosevelt were both elected in 1933 when Germany and the US were in severe balance sheet recessions. The German unemployment rate reached 28% that year and US rate was not far behind at 25%. Although both started with fiscal stimulus, Roosevelt, worried about the criticisms from deficit hawks, reversed course in 1937, resulting in a serious double-dip recession and the unemployment rate increasing to nearly 20% again. Hitler, on the other hand, stayed the course and by 1938, German unemployment had fallen to 2%. And nothing is worse than a dictator with a wrong agenda having the right economic policy, especially when the democracies around him are held hostage to the orthodoxy and remain unable to adopt correct policies.

More recently, the Chinese government implemented a 4 trillion renminbi fiscal stimulus in November 2008 when it was facing a sharp fall in both domestic asset prices and exports. As a percentage of GDP, the stimulus was more than double the size of President Obama's \$787 billion package unleashed three months later. At the time, western observers were laughing when the Chinese government announced that they are going to maintain 8% growth. China's growth soon reached 12%, and nobody was laughing.

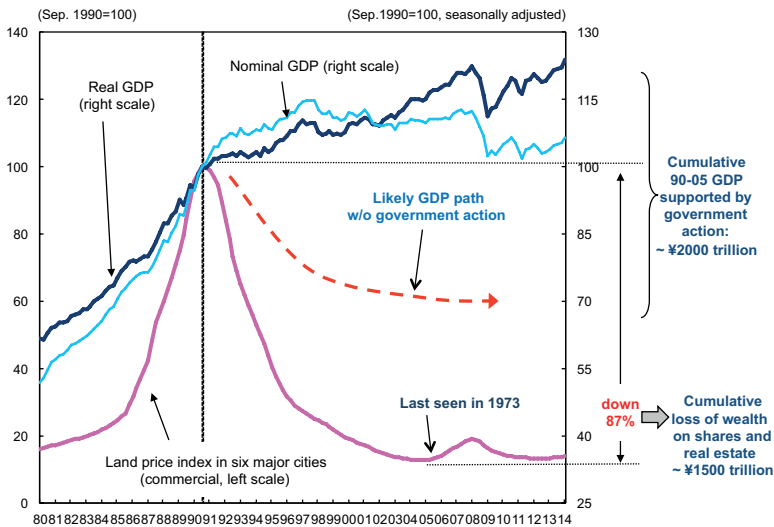
The US government, on the other hand, was extremely cautious with its fiscal stimulus because of the fear that the stimulus package might be criticised for wasting money. As a result, it could not offer the kind of positive jolt its designers have hoped for. The Obama Administration's inability to renew the fiscal stimulus package due to Republican opposition slowed down the subsequent US recovery in no small way.

It is actually not difficult to implement fiscal stimulus when a country experiences a major shock (like the Lehman failure and the Global Crisis). The challenge is whether it can be kept in place long enough for the private sector to finish repairing balance sheets.

At the emergency G20 meeting held in Washington two months after Lehman Brothers collapsed, the 20 nations agreed to administer a dose of fiscal stimulus – a decision attributable in no small part to the efforts of Japanese Prime Minister Taro Aso. Formerly

a corporate executive, Aso was one of the few Japanese politicians who understood that fiscal stimulus was the key to maintaining Japanese GDP when the private sector was saving 8% of GDP at zero interest rates. And at the G20 meeting, he used Figure 4 to tell the leaders of the other 19 countries that Japan was able to maintain its GDP at above the bubble peak for the entire post-bubble period with fiscal stimulus, in spite of commercial real estate prices falling 87% from the peak to the level of 1973.

Figure 4 Japan's GDP grew despite major loss of wealth and private sector deleveraging



Sources: Cabinet Office, Japan Real Estate Institute

The G20 ultimately agreed to administer fiscal stimulus in 2009, and the global economy staged a V-shaped recovery instead of falling into a depression, as had been feared. But as soon as the economy started to show signs of life, deficit hawks took over the policy debate.

Those who prevent crises never become heroes

It is often said that people who prevent crises never become heroes. Hollywood teaches us that for there to be a hero there must first be a crisis, and the experience of Prime Ministers Taro Aso and Gordon Brown bears that out.

The Japanese media, for example, completely missed the significance of Aso's contribution at G20 in November 2009. Instead, they tried to portray his administration as a care-taker government ahead of the general election scheduled for 2009, and devoted a great deal of coverage to the prime minister's misreading of a single Chinese character in one speech. Partly as a result of such publicity, the LDP was defeated in the election held in August 2009. The UK Prime Minister Gordon Brown, another leader who understood what a balance sheet recession was and used fiscal stimulus to address it, was also defeated in his quest for re-election.

At the Toronto Summit in 2010 – with both Aso and Brown, who had *prevented* crises, out of the picture – the G20 leaders agreed on a plan to halve their fiscal deficits in three years. This in spite of the fact that the private sectors in these countries continued to save massively despite near zero interest rates.

The resulting fiscal retrenchment sent the developed economies into reverse, with the UK and many parts of the Eurozone falling into double-dip recessions. Japan, under the new DPJ government that understood nothing of balance sheet recessions, also stagnated.

In the US, however, Federal Reserve Chairman Ben Bernanke and others soon realised that the Toronto agreement had been a mistake. They kept the US from pursuing premature fiscal consolidation by issuing the warning with the expression 'fiscal cliff', thereby making it the first country to renege on the agreement. Consequently, the US – alone among the developed economies – continued to post modest economic growth, while Japan, the UK, and continental Europe faced severe economic weakness.

Partly because of subsequent reflection on this error, the pendulum had swung back towards the recognition of the importance of fiscal stimulus by the time the St. Petersburg G20 Summit was held in 2013. Although the three years following the Toronto Summit were completely wasted from a global economic perspective, at least there has been some recognition among policymakers that fiscal stimulus is important in this type of recessions. The risk remains, however, that this will turn out to be just another phase in an on/off cycle of fiscal stimulus in democracies during peace time.

The above examples show that there is no need to suffer ‘secular stagnation’ if proper policies are put in place, but that democracies are very bad at implementing such policies during balance sheet recessions. This predicament will stay with democracies until the general public (the millions) is made aware of the disease called balance sheet recession and how to cure it. Until then, the far-from-ideal on/off cycle of fiscal stimulus and the resultant delayed recovery will make people feel like they are in secular stagnation.

Monetary policy cannot solve secular stagnation alone

Guntram B Wolff

Bruegel

The persistence of low Eurozone inflation undermines private and public debt sustainability – especially in the periphery where the overhang is greatest. However, since bubbles and unsustainable borrowing supported demand before the Global Crisis, this chapter argues that higher inflation cannot be a permanent cure for secular stagnation. Instead, a targeted quantitative easing programme and increased public investment would help rebalance Eurozone demand. At the global level, population growth in Asia and Africa will provide ample investment opportunities if they can be fully integrated into the world economy.

Larry Summers crystallised an important development and question in a recent speech given at the IMF research conference: Has the world economy entered a period of ‘secular stagnation’? The slow recovery in the US since the Global Crisis is his starting point and he argues that secular stagnation could also retrospectively explain features of previous decades such as low inflation. Summers thereby picked up an old term from Alvin Hansen (1939), who used it in the Presidential Address of the American Economic Association in 1938. Back then, Hansen focused on the importance of (public) investment expenditure to achieve full employment. His argument was that for such investment to happen, the economy needs new inventions, the discovery of new territory and new resources, and finally population growth.

Summers’ argument is centred on the fact that inflation rates have been falling in the past two decades and have been mostly lower than expected. Has there been a permanent

fall in the equilibrium real interest rates? Do our economies need real interest rates of -2% or -3% to generate enough demand to achieve full employment? Is the fact that inflation rates were so low and even falling over the last decades really a sign that the global economy was suffering from a permanent demand weakness? Was there really no demand excess?

Olivier Blanchard (2013) has written a VoxEU column summarising and drawing lessons from the recent IMF conference at which Larry Summers spoke. One lesson is that it paid off to have kept one's fiscal house in order prior to the crisis. He then focuses on how to macro-manage a liquidity trap. In fact, if one agrees with his assessment that the effects of unconventional monetary policy are "very limited and uncertain", then one can come rapidly to his conclusion that it would be advisable to have higher inflation rates in normal times, which makes it possible to drive down nominal interest rates more in a crisis so that real interest rates fall even further. Krugman (2013a) goes one step further, even arguing that the new normal may be a permanent liquidity trap, and it would therefore not be advisable to have low inflation rates in the Eurozone (Krugman 2013b)

Three central policy measures to deal with secular stagnation

While I see the merits of the arguments of Krugman, Blanchard and Summers, I am worried that too little thinking is being put into the actual real economic drivers of secular stagnation and what could be done about them. Let me organise my thinking around three central points.

First, prior to the crisis, the global economy generated just enough demand to achieve reasonable employment rates thanks to significant bubbles in a number of major economies, excess borrowing by low-income households, high corporate borrowing, and/or unsustainable fiscal policies to balance the large amount of global savings. With the erupting crisis, high household, corporate and government borrowing and the house-

price bubbles became visible as unsustainable sources of global demand. So would the answer to secular stagnation really have been more demand? Or put differently, how could one have achieved higher inflation rates prior to the crisis, as Blanchard suggested, without creating even more bubble-like phenomena? Isn't the suggestion to solve the liquidity trap problem by running higher inflation rates prior to the crisis an attempt to cure the problem with the problem itself? If there is an insufficiency of demand even in normal times, this problem would need to be addressed with structural policies. The answer can hardly be more bubbles so that inflation rates go up. Using monetary policy to drive the real interest rate permanently to low, or perhaps even negative, rates is difficult and can create significant distortions in the economy.

This point can be illustrated by the US example. While monetary policy has been very supportive and has helped avoid a slide into deflation during the crisis, arguably before the crisis it contributed to the build-up of many of the problems in the US economy. The massive bubbles that resulted from the combination of lax monetary policy and an inadequate financial regulatory system should certainly be considered a problem, not a solution. A perhaps more important part of the solution to the current problem has been the acceptance of structural policies that are more conducive to a recovery; the US recovery has been helped by very significant debt reductions in the household sector thanks to non-recourse mortgages and the like. More importantly, the banking system has been cleaned up relatively quickly, which also helped the recovery.

Turning to the Eurozone, I would advise against changing the ECB's inflation target of close to, but below, 2% for two reasons. First, such a step would severely undermine trust in a young institution whose actions are still criticised in some countries of the EU's young monetary union. It would constitute a breach of the contract under which Germany subscribed to the monetary union. Second, changing the target under current circumstances would be largely ineffective; the current target will not be achieved in the relevant time horizon, and a higher target would only increase this gap.

Second, like Hansen, I believe in the importance of the structural factors that actually provide investment opportunities. The overall lesson of secular stagnation, as outlined by Larry Summers, seems to go in a different direction from monetary policy that, in normal times, can hardly help address an equilibrium negative real interest rate without risking major bubbles and unsustainable borrowing, as the European and US experiences suggest. The fundamental question is why has the equilibrium interest rate been falling globally and the global economy entered 'secular stagnation'. Is it global demographics? Is it the lack of good investment opportunities? Is it the fact that we lack new places that can be 'conquered'?

Certainly, population growth is starting to fall in many countries, especially in the more advanced economies. Yet, the global population is still increasing. This would suggest that globally, there should still be ample investment opportunities if framework conditions are put right. This is where the role of the integration of Asian and African economies into the global economy becomes central. More than half of the world's population is concentrated in a small circle in Asia, including China and India. The more they are integrated into the global economy, the more they should increase global demand, and the more opportunities for profitable investment should exist. To achieve this, a well-functioning financial system is critical. It would need to prevent excessive risk-taking while channelling savings to the right countries and deployments. Clearly, critical questions are if and how saving and investment patterns will change in Asia. How sustainably capital accounts are opened up will also be critical.

The Eurozone also provides important evidence that structural policies that allow for capital to be channelled into productive uses, that allow new innovations to emerge, and that allow for new inventions are critical. Prior to the crisis, many thought that the Eurozone had solved the secular stagnation problem and had actually provided the right framework conditions for more investment. The capital flows in the European periphery were praised for proving that capital would flow 'downhill', where its marginal productivity is still highest. Unfortunately, the reality turned out to be much less rosy. Instead of being used productively, much of the capital flows went into consumption

spending, including on housing. As in the US and UK, increasing house prices initiated a financial accelerator model in which more and more borrowing followed, thereby driving a consumption boom.

The European experience underlines the importance of structural reforms that allow for proper business opportunities and innovation. The downhill capital flows are welcome in principle, but they only contribute to sustainable growth if they flow into an environment in which they can drive investment, as outlined by Hansen. In the European case, part of the problem was that the financial system did not properly steer capital flows into those productive uses. The regulatory and supervisory system of Europe's monetary union was not properly developed, risk became too concentrated and moral hazard was prevalent. The creation of Europe's banking union, while incomplete, is certainly a step in the right direction to solve this problem. But I am also convinced that Europe should be able to create much better investment opportunities to solve its stagnation. For this, reforms that reduce administrative burdens, improve education systems and create better conditions for R&D are central.

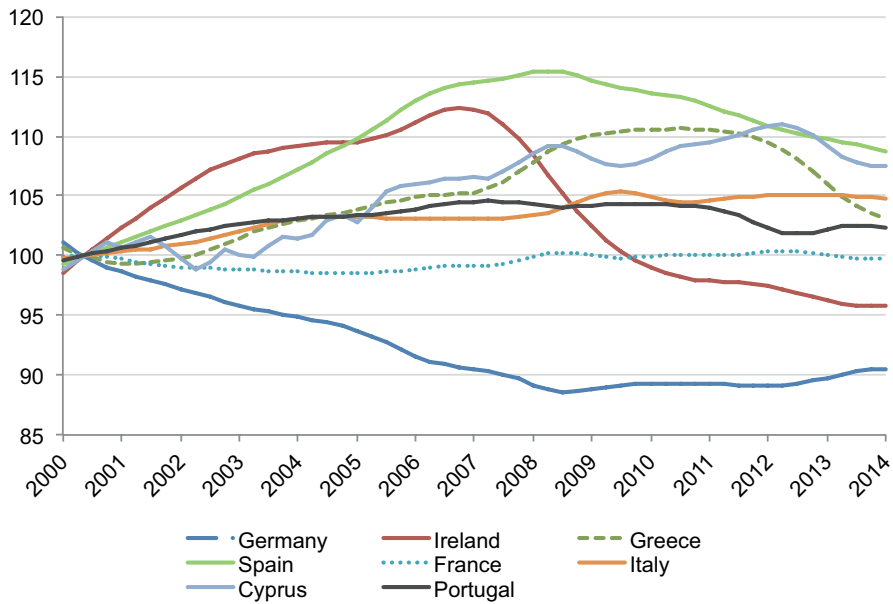
Turning to Japan, the importance of structural reforms also becomes apparent. Since the election of Shinzo Abe as prime minister, Japan has embarked on a QE programme on an unprecedented scale. The effect has been a much weaker yen, together with an increase in inflation. This was a welcome policy development. Yet, one year later, it also becomes clear that a strategy based on a weaker yen to increase exports as the only anti-deflation strategy cannot work forever. To return to growth and inflation, the third arrow of Abenomics matters equally: improving investment conditions, creating new business opportunities, increasing competition in the economy, and deepening trade integration.

Third, how shall macroeconomic policies deal with the liquidity trap, low inflation and insufficient demand problem in the Eurozone of today? Six years on from the beginning of the crisis, growth remains sluggish and inflation rates are low or falling. The Eurozone is still at risk of falling into deflation. Eurozone core inflation rates, i.e. inflation rates excluding volatile energy and food prices, have been falling since late 2011. Inflation

expectations two years ahead are hardly above 1%, and even at the five-year horizon the market-determined inflation forecast is 1.19%. This has consequences. Lower-than-expected inflation redistributes wealth from debtors to creditors and increases the burden of the debtors. Thus, disinflation in the Eurozone undermines private and public debt sustainability, in particular in the periphery where the debt overhang is greatest. It is therefore a real risk for the Eurozone as a whole and should be addressed.

I see a role for both monetary and fiscal policy in helping to overcome this low growth-low inflation environment. Turning first to monetary policy, it has to deal with two central problems in the Eurozone. The first is that monetary policy should not undermine the ongoing relative price adjustment process between the Eurozone periphery and core (see Figure 1). A monetary policy measure that would increase inflation in the periphery would only undermine the restoration to health of the Eurozone economy. Instead, the policy measure should ensure inflation rates are increased in Germany as well as in the periphery. Ideally, the German inflation rate should move well above the 2% target that the ECB has set for the Eurozone as a whole. The second concern in the Eurozone right now is that the process of the banking sector clean-up is unfinished. The ECB would certainly like to avoid preventing a bank restructuring with monetary policy measures that would overly distort prices.

Figure 1 Real effective exchange rate versus EZ18



Note: The real effective exchange rate vs EZ18 aims to assess a country's price or cost competitiveness relative to the currency area as a whole. It corresponds to the nominal effective exchange rate deflated by the GDP deflator.

Source: DG ECFIN – E4.

In Claeys et al. (2014), we have argued that a quantitative easing (QE) programme focused on the purchase of ESM/EFSF/EIB/EC bonds, corporate bonds and ABS would overcome those constraints and help to increase inflation via a portfolio-rebalancing effect and a weaker exchange rate. The recent decision by the ECB (2014) – while a welcome form of monetary and credit easing – is unlikely to be enough to push demand and inflation upwards. I am thus not quite as negative on QE as Olivier Blanchard and also believe that the Japanese experience shows that a large monetary policy measure can be part of the solution, even if the nominal interest rate is already at the zero lower bound.

But fiscal policy will also have to play a larger role. One of the big problems in the Eurozone has been the weakness in public investment in recent years, in contrast to the US where public investment actually increased. Much the weakness in public investment needs to be solved by more public investment in Germany. More European-

level investment in European public goods, such as new and better energy and digital networks, should also be undertaken. This brings us back to the work by Hansen: public investment and new investment opportunities are needed to address secular stagnation.

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Further on sclerosis

Secular stagnation: A view from the Eurozone¹

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Banco de España and CEPR; ECB and CEPR; ECB

In the Eurozone, rising dependency ratios, tougher financial regulation, debt overhang, and poor productivity growth are exerting downward pressure on equilibrium real interest rates. A key question is whether these trends are truly ‘secular’, or whether policy can improve matters. This chapter argues that there is significant scope to increase the efficiency of financial intermediation in the Eurozone, and that the potential for structural reforms remains much greater than in other advanced economies. Reforms that could help avoid secular stagnation in the long run would also boost demand today.

Seven years on since financial market turmoil signalled the start of the Great Recession, output in the Eurozone remains below pre-crisis levels, and unemployment stubbornly high. Potential growth looks little better: recent estimations from the European Commission suggest a medium-term potential of only around 1% (2014-2023) (European Commission 2013). And despite accommodative monetary policy, inflation is still below target. Against this background, it is not surprising that the Eurozone has been identified as one of the regions where secular stagnation is most likely to become reality (e.g. Buiter et al. 2014).

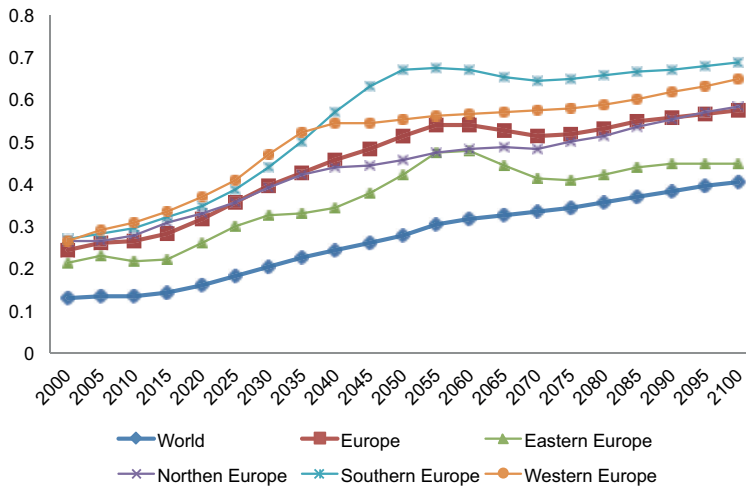
¹ The views expressed are our own and do not necessarily reflect those of the Banco de España or ECB. We would like to thank Eric Persson for his research assistance and Arnaud Marès for his input and for many insightful discussions that helped produce this contribution.

Is the threat of secular stagnation in the Eurozone real?

Secular stagnation usually refers to a situation in which saving can only equal investment at a negative real interest rate – an equilibrium that cannot be achieved because of the zero lower bound (ZLB) constraint on interest rates and low inflation. We can certainly see trends in the Eurozone that suggest this could be a possibility.

On the savings side, Europe’s demographic prospects point towards rising savings rates. As seen in Figure 1, the ratio of the retired population (over 65 years of age) to the working age population (between 20 and 64) in Europe is projected to increase from 24.3% in 2000 to 35.4% in 2025, and to 57.5% by 2100. Even with public debt to GDP ratios much lower than they currently are (92.6% in 2013 for the Eurozone), this would render most social security systems incapable of providing pension benefits at the current replacement rates.

Figure 1 Population over 65 years of age/Population 20-64 years of age



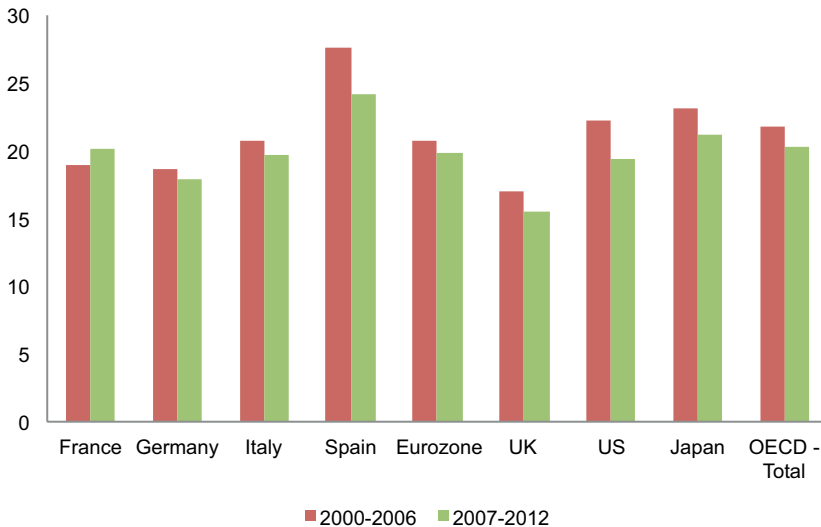
Source: The 2012 Revision of the World Population Prospects, United Nations.

The rise of life expectancy, combined with uncertainty about future pension benefits, can be expected to lead to a significant increase in savings per capita, both of workers and of the retired population. Even with the change in population composition towards

a higher weight of cohorts with lower savings rates, aggregate savings would increase (Backus et al. 2013, Carvalho and Ferrero 2014).

On the investment side, demand is currently weak. Figure 2 shows investment as a share of GDP in the Eurozone and the UK, US and Japan. In the Eurozone during the period 2007-2012, this share was almost one percentage point lower than the average for the period 2000-2006. Even taking into account cyclical factors, it seems unlikely that investment shares will return to their pre-crisis levels, which in several countries (such as Spain and Ireland) were exceptionally high because of huge residential investment.

Figure 2 Gross fixed capital formation (as a percentage of GDP)

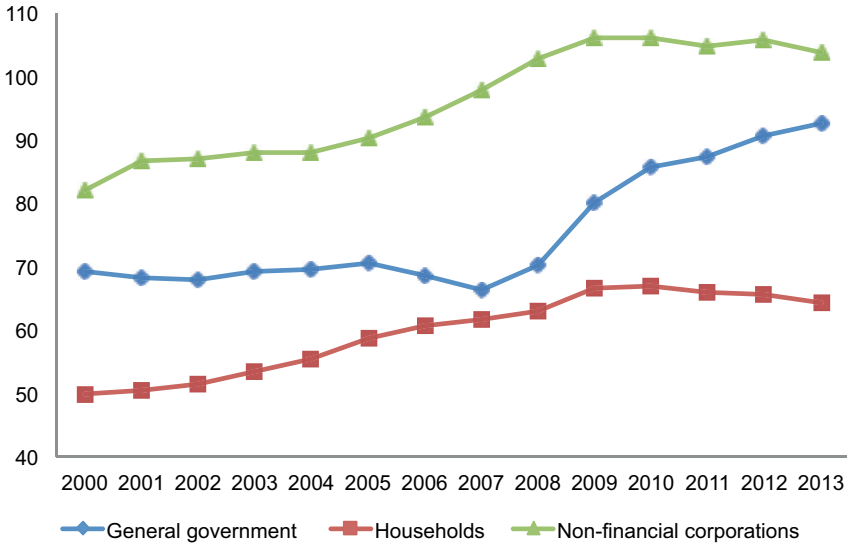


Source: OECD.

There are some reasons to be concerned that this trend might become structural. One is the rising cost of capital resulting from tougher financial regulation, which cannot be offset by interest rates constrained by the ZLB. Another is the debt overhang confronting both banks and firms in the Eurozone that implies a long deleveraging process – a process which, so far, has started only gradually (see Figure 3). Indeed, evidence from Eurozone firms suggests that deleveraging pressures are strongly affecting investment

behaviour. The effect is both on the supply side – higher bank lending rates – and the demand side – the inability of firms to take on new credit (ECB 2013).

Figure 3 Debt-to-GDP ratios (%)

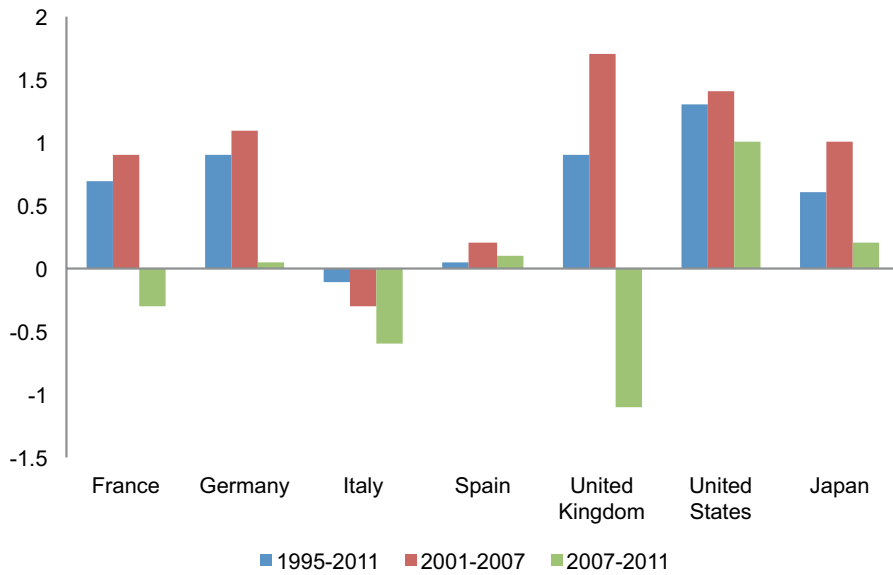


Source: ECB.

Low investment demand could also become persistent due to the Eurozone’s weak productivity performance. Figure 4 shows an international comparison of recent total factor productivity (TFP) developments. Although there are differences among Eurozone economies, in general the Eurozone has lagged other advanced economies in productivity growth – and not just since the crisis.

Were TFP growth in the Eurozone to remain at such low levels, the set of profitable investment projects, even at very low long-run real rates, would not expand significantly. Together with the secular reduction in the relative price of capital, this would generate a decreasing trend in investment per capita.

Figure 4 Total factor productivity (growth rates in percentage, annual average)



Source: OECD.

Can secular stagnation in the Eurozone be avoided?

When thinking about secular stagnation, in our view the key point is not so much whether such trends exist, but whether they are truly ‘secular’. Put differently, how much potential is there for policy to reverse the downward drift in the equilibrium real rate?

Some of the long-run trends appear largely irreversible. Demographic patterns in particular are characterised by significant inertia. Even with some recovery in the fertility rate, increases in retirement age, and higher immigration flows from outside Europe, the ratio of the retired population to the working age population will continue rising strongly.

The outlook for investment demand, however, is in our view not so set in stone. There are two factors that could materially alter the investment environment in the Eurozone – and that are in fact largely unique to the region.

These are, first, the potential to lower the cost of capital by rebooting the financial sector and completing the single market in capital, and second, the potential to unleash productivity gains from structural reforms – a potential which remains much greater than in other advanced economies. While progress has been made in both areas in recent years, these challenges deserve to remain at the top of policymakers' agendas.²

Lowering the cost of capital

A lower cost of capital helps mitigate the constraint of the ZLB while, more generally, improving the risk-return profile for a given investment project. There are two reasons why we might expect to see this in the Eurozone.

First, through the ECB's comprehensive assessment of bank balance sheets, the deleveraging process in the Eurozone is starting to gather speed. The assessment seems already to have frontloaded the deleveraging of the banking sector. Bank balance sheets declined by around 20 percentage points of GDP in 2013 alone. As result, financial frictions that raise the cost of intermediation are expected to wane.

At the same time, this process creates the conditions for a gradual workout of the private debt overhang (Draghi 2014b). Acknowledging losses and raising capital is a pre-requisite for banks to restructure loans to distressed borrowers. This may in turn increase incentives to invest, as firms will not raise new finance to invest if the profits generated by that investment will be absorbed by servicing existing debt.

Second, deleveraging is initiating a broader and ultimately more important development, which is a shift in the structure of financial intermediation in the Eurozone. The Eurozone is in the process of transitioning towards a permanently smaller and more streamlined banking sector. This is leading naturally to the deepening of capital markets – if intermediation between savings and investment is taking place less through banks, then it must take place more elsewhere.

² See Draghi (2014a) for an in-depth exposition of a sustainable recovery strategy for the Eurozone.

This is a welcome development as it provides the impetus not only for a more diversified financing mix in Europe, but for the development of a genuine single capital market – something that has long been identified as key to lowering the cost of capital for European firms (European Commission 2001).

In particular, there is clearly a large untapped potential in Europe to reap economies of scale from financial integration. This is true especially for risk capital: venture capital investment in Europe is consistently much lower than in the US and rates of returns are worse (Veugelers 2011). This reflects the fact that the industry is fragmented across Europe: successful venture capital depends on a large deal flow to cover the majority of investments that will fail.

But it is also true for more established European companies, for whom the cost of raising capital is higher than in the US. The additional cost comes from the complexity of cross-border capital raising within the EU where, among other structural impediments, there is no single legal regime for rights in securities, insolvency or corporate governance. Thus, markets are generally less efficient and less contestable.

In other words, unlike in many advanced economies where financial markets are already highly efficient, there is significant scope in Europe to increase the efficiency of intermediation – and so to lower the cost of capital.

Boosting productivity

A lower cost of capital, however, is necessary but not sufficient to achieve higher investment. Put simply, it makes little difference unless there are productive projects to invest in. The important point about the Eurozone, however, is that its weak productivity performance is also an opportunity. Since many member states are far from the frontier of best practice in terms of structural reforms, productivity gains are easier to achieve and the potential magnitude of such gains is greater.

The link between structural reforms and productivity is not primarily via greater flexibility in the formation of wages and prices. This is certainly relevant for smooth macroeconomic adjustment, but perhaps more important for productivity is ‘horizontal’ flexibility – the ability of resources to reallocate within and across sectors to firms where they are used most productively.

Indeed, new micro-level research from the Eurosystem’s Competitiveness Network suggests that reallocation within the Eurozone could yield significant productivity gains. It finds that the distribution between the most and least productive firms within Eurozone countries is very large and skewed, with a few highly productive firms and many which have low productivity (CompNet Task Force 2014).

This is one of the main reasons why increasing labour market flexibility could produce major benefits. Flexible labour markets not only help limit unwarranted wage differentials between sectors, they also facilitate mobility between firms and, importantly, across countries. Eurozone countries have much potential to advance in this area: on the OECD’s Strictness of Employment Protection Legislation (EPL) indicator, only four Eurozone countries currently score below the OECD average (i.e. have higher-than-average labour market flexibility).

At the same time, there needs to be a balance between mobility and stability, and in certain countries labour market reforms could actually help boost productivity by improving the latter – especially for young workers. Of particular relevance here is reducing the dual nature of EPL in several southern European countries that contributes to inefficient worker turnover and lowers incentives to invest in job-specific skills.

Allocation of production factors is also why European policymakers are increasingly drawing attention to the ‘softer’ type of structural reforms linked to the business environment, as these are crucial for the productivity-enhancing process of firm birth, expansion and death (‘churning’). A few examples from the World Bank’s Ease of Business index illustrate the scope for Eurozone countries to make improvements (Figure 5):

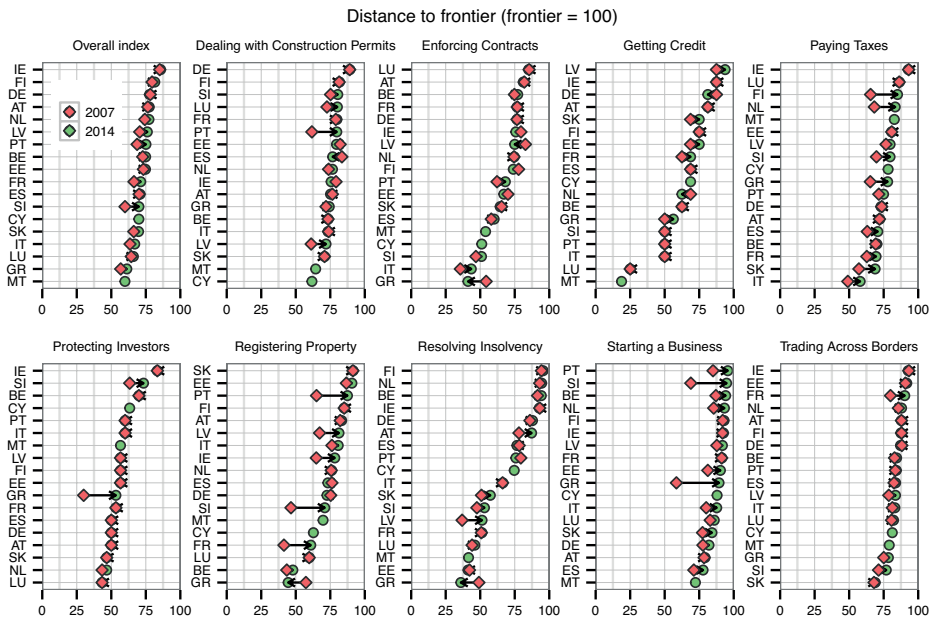
- If an entrepreneur wants to start a new business in Spain she has to go through ten separate procedures, while doing so in Slovenia requires only two. Similarly, for that business to be resolved and the resources reallocated takes less than six months in Ireland, while in Slovakia it takes about four years.
- If a successful firm wants to expand and invest in new capital, it would have to wait 200 calendar days in Ireland before a new warehouse gets electricity; in Germany it would only have to wait 17 days. That is not to mention regulatory distortions that discourage growth above a certain number of employees.
- If firms are in dispute over a contract, enforcing it in Italy requires 37 different procedures, and takes on average over three years. By contrast, an identical dispute in France or Germany would be resolved through about 30 procedures and would take a little more than a year.

While quantifying the benefits of these and other structural reform measures involves some uncertainty, simulations by researchers at the OECD suggest that a broad package of labour, product, tax and pension reforms would raise GDP per capita by about 11% after ten years for the average EU country under relatively quick reform implementation. The equivalent for the US is under 5% (Bouis and Duval 2011). Other empirical studies confirm that among the advanced economies the Eurozone, along with Japan, has the most to gain from structural reforms.

In short, one should not underestimate the power of structural reforms in Europe.³

³ For a formal model of how these reforms may contribute to faster deleveraging and, hence, short-term gains in employment, see Andrés et al. (2014).

Figure 5 World Bank Ease of Doing Business Index



Conclusion

Some observers may see the policy agenda we have laid out today as focused entirely on supply conditions. They may reasonably ask: “What about demand?” – for the longer demand remains weak, the greater the risk of labour and capital hysteresis, and then policymakers may find themselves running simply to stand still.

In our view, however, there is no contradiction. The same policies that will help avoid secular stagnation in the future will help boost demand in the current environment. The purpose of lowering the cost of finance and creating a more dynamic business environment is to raise investment – and investment is not only tomorrow’s supply, but today’s demand.

Figure 6 Expected real interest rates in the Eurozone

Moreover, rebooting the banking sector and deepening financial integration will reinforce the transmission of the ECB’s monetary policy across the Eurozone. Monetary policy is very accommodative: as Figure 6 shows, riskless real rates are negative and expected to remain so for a long time. The more this accommodative stance feeds through to the real economy, the more the ECB will regain grip over demand conditions.

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Six years after the Global Crisis, the recovery is still anaemic despite years of near-zero interest rates and extraordinary central bank manoeuvres. Is 'secular stagnation' to blame?

This eBook gathers the thinking of leading economists including Larry Summers, Paul Krugman, Robert Gordon, Olivier Blanchard, Richard Koo, Barry Eichengreen, Ricardo Caballero, Ed Glaeser and a dozen others. A fairly strong consensus emerged on four points.

- Secular stagnation (SecStag) means that negative real interest rates are needed to equate saving and investment at full-employment output levels.
- The key worry is that SecStag will make it hard to achieve full employment with low inflation and financial stability using macroeconomic policy as it is currently structured and operated.
- It is too early to tell whether secular stagnation is to blame, but uncertainty is not an excuse for inaction. Policymakers should start thinking about solutions; if secular stagnation sets in, today's toolkit will be inadequate.
- Europe has more to fear from the possibility of secular stagnation than the US, given its slower overall growth and its lack of pro-growth reforms and more constrained policy framework.

The authors point to two classes of solutions: 'Prevention' (raising long-run growth potentials) and 'symptomatic treatment' (raising the inflation target to alleviate the zero lower bound problem, and using fiscal policy to address balance-sheet recessions).

