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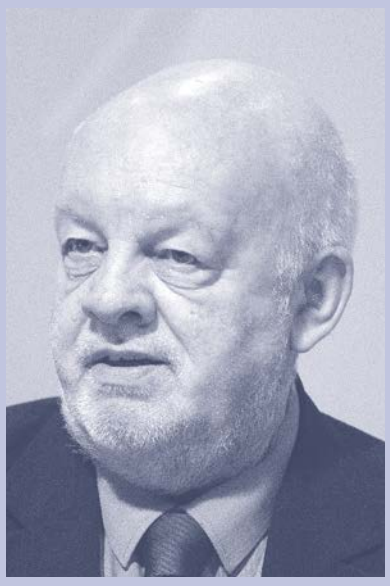

The threat of secular stagnation in Europe: an historical perspective

Long-term secular stagnation is usually seen as an issue of slow trend growth but, in the tradition of Alvin Hansen, it can be regarded as primarily a problem of persistent high unemployment. Trend productivity growth appears to have slowed markedly in Europe recently but this may not be a guide to the future, if robot technology comes through strongly. In that case, however, unemployment of low-skill workers may be a serious secular-stagnation challenge. An adequate response to secular stagnation through fiscal stimulus is infeasible but improved supply-side policies in product and labour markets could provide an answer.

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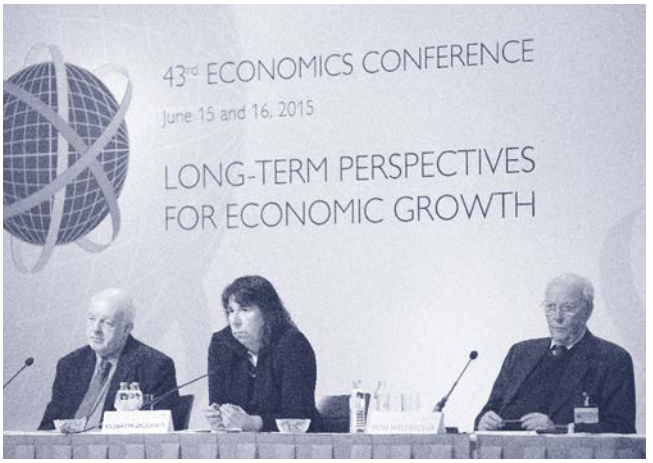
1 Introduction

The concept of *secular stagnation*, which dates back to the 1930s, has been revived and was recently the topic of a recent e-book (Teulings and Baldwin, 2014). The idea of *secular stagnation* as put forward by Summers (2014) is one of a tendency to deficient aggregate demand such that negative real interest rates are necessary to generate enough investment to stabilize the economy at the NAIRU. This might be a consequence of deleveraging after the financial crisis or a savings glut. If these tendencies are persistent, the economy might face a situation where being in a liquidity trap is the new normal (Krugman, 2014). Serious as these issues may be, they are not the focus of this paper which takes a longer-term perspective as more relevant to the conference theme.

The modern concern with secular stagnation also has a long-term version which relates to a fear that growth prospects in Europe over the medium term are significantly worse than anyone would have thought before the financial crisis. A decline in long-term trend growth of real GDP and, especially, of labour productivity could underlie recent weakness in the European economy and Gordon (2014) sees adverse demography and an absence of new technologies with the impact of the one big wave of the 20th century as reasons to be pessimistic. This could, of course, hold down both investment demand and the neutral real rate of interest.

In contrast, the idea of *secular stagnation* as understood by Alvin Hansen and his followers in the 1930s and 1940s was a tendency to high, persistent and perhaps increasing unemployment over the long-run (Higgins, 1950). As was the case with other contemporaries, Hansen saw prolonged stagnation as giving rise to a hard core of long-term unemployment (1941) or in modern jargon hysteresis effects in the labour market.[1] Hansen's diagnosis



[1] *Observers of the British labour market in the 1930s stressed that prolonged unemployment reduced employability through loss of skills, adverse changes in worker attitudes and unfavourable perceptions of employers (Crafts, 1987).*

of the problem evolved over time. In the early 1930s, in the context of a controversy over *technological unemployment,* he saw the problem as one of insufficient price and wage flexibility to allow adjustment to labour-saving technological change (Hansen, 1932). In the late 1930s, in his best-known discussion of secular stagnation, he argued that the American economy faced a crisis of under investment and deficient aggregate demand since investment opportunities had significantly diminished with the closing of the frontier, declining population growth and a slowdown in technological progress (Hansen, 1939). It was as if the United States 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. In the early 1950s, he endorsed the analysis of Harrod (1948) which saw the possibility of a dynamic equilibrium in which the actual rate of growth was equal to the warranted rate but below the natural rate and unemployment was increasing as demand failed to keep up with technological progress (Hansen, 1951).

Thus, whereas in 1939 the fear was technological progress was too slow by 1951 the problem might be that it was too fast! In any event, once the persistent unemployment problem was thought of as primarily a result of inadequate aggregate demand, a possible response was to use deficit finance to provide fiscal stimulus but then over time secular stagnation would see a steadily increasing stock of public debt (Samuelson, 1970). This potentially raised issues of fiscal sustainability as the public debt to GDP ratio increased, a topic which was explored by Domar (1944).

This paper explores the relevance of these two long-term notions of secular stagnation to post-crisis Europe. The diagnosis of secular stagnation promulgated 75 years ago turned out to be completely wrong but a similar outcome this time may be less likely. Nevertheless, there are some reasons to believe that future trend growth can be stronger than recent performance seems to suggest. However, even if this is the case, the basis may be technological progress which has a strong skill bias and which undermines the employment prospects of low-skill workers. This would be a serious challenge to European labour markets and is unlikely to be amenable to a solution based on increasing government budget deficits. Some policy implications of this analysis are suggested.

2 Secular stagnation first time around: Why was Alvin Hansen wrong?

Alvin Hansen was spectacularly wrong. The United States achieved a strong recovery from the Great Depression post-1933 and in the following decades enjoyed its strongest ever growth performance. The quarter century after World War II was a period of full employment. Neither type of long-run secular stagnation was experienced.

American growth was underpinned by strong total factor productivity (TFP) growth, both in the 1930s and

after World War II; TFP growth in the private non-farm economy was 2.3% per year in the years 1929 to 1941 and 1.9% per year during 1948 to 1973 (Field, 2011). Gordon (2000) described these years as the crest of the *big wave* in long-term productivity growth centred on advances in technologies such as chemicals, electricity, and the internal combustion engine. Field (2011) stressed that technological progress was broadly based and facilitated productivity growth not just in manufacturing but transport, communications, distribution, public utilities etc. while the TFP growth of the 1950s and 1960s was set in train by the national innovation system that had been established during the interwar period. This was based on investments in corporate laboratories and modern universities and delivered a significant fall in the costs of research as experimental science improved and the supply of specialized human capital expanded rapidly (Abramovitz and David, 2001). Private investment as a share of GDP averaged 15.6% during 1948–66 – roughly the level of the 1929 peak – as business responded to the opportunities created by this dynamic economy.[2]

Unemployment in the American economy averaged 4.4% of the labour force during the 1950s and 1960s, perhaps slightly below the NAIRU (Gordon, 1997), and on average only 9.9% of the unemployed were out of work for more than 6 months. One reason for this was that the positive shock of World War II reversed the adverse hysteresis effects of the 1930s Great Depression and the Beveridge Curve relationship between unemployment and vacancies in the 1950s once again looked like that of the 1920s (Mathy, 2015). Another key feature of the period was the ease with which the American labour market accommodated technological progress. If this is viewed through the lens of a macroeconomic production function, then a combination of rising wages, capital deepening, and constant factor shares can be seen as the result of labour-augmenting technological change with an elasticity of substitution between labour and capital less than 1 (Klump et al., 2007). In the race between relative demand and relative supply of college-educated workers, from 1915 through 1980 a very rapid increase in supply was almost matched by high-skill-augmenting technological change which raised the demand for these workers so that the college wage premium decreased slowly (Goldin and Katz, 2008). In terms of occupations, the proportion of low skill employment fell gradually from 40.8% in 1950 to 36.0% in 1970 while high-skill white collar jobs rose from 17.9% to 23.4% in those same years (Katz and Margo, 2013).

By the 1950s, the successful productivity performance of the United States as the leading economy had by the 1950s created a great opportunity for rapid catch-up growth in Western Europe which experienced a Golden Age of growth through the early 1970s (Crafts and Toniolo, 2008). This was based on the rapid diffusion of American technology together with big improvements in supply-side policies including, notably, moves to greater European economic integration stimulated initially by the conditionality of the Marshall Plan and consolidated by the formation of the European Economic Community.[3] The productivity

[2] *In addition, demographic pessimism was confounded and (for reasons that are not entirely understood) the baby boom began in the late 1940s.*

gap between Europe and the United States was rapidly reduced.[4]

In this Golden Age period there was no need for deficit-financed government expenditure to fill a deflationary gap so this Keynesian response to secular stagnation was in abeyance. As Matthews (1968) pointed out with regard to the United Kingdom, a country which was not unsympathetic to such a strategy, the strength of private investment demand rendered such policy actions quite superfluous. Ironically, however, this was a period when, under conditions of financial repression, real interest rates were very low and generally well below the growth rate (Allsopp and Glyn, 1999) and significant primary budget deficits were consistent with a stable public debt to GDP ratio. For example, in the UK case, it would have been possible to run a primary budget deficit of 3.6% of GDP on average throughout the 1950s and 1960s (Crafts, 2015a).

3 European medium-term growth prospects

One way to predict future medium-term growth is to assume that recent trend growth will continue. The trend can be estimated using quite sophisticated time-series econometrics but the analysis is essentially backward-looking. Since recent European growth performance both pre- and post-crisis has generally been disappointing, approaches of this kind are pessimistic about future growth. This is not only true for Europe but also to some extent for the United States where productivity growth slowed down after the information and communications technology (ICT) boom of the late 1990s.

Two methods of trend extrapolation in current use are dynamic factor models which use high-frequency data to try to identify trend and cyclical components in time series of real GDP or real GDP per worker (Antolin-Diaz et al., 2014) and production-function models which infer potential growth by estimating trends in the supply-side sources of growth including capital and labour inputs and TFP growth (Havik et al., 2014). Using the former methodology, Antolin-Diaz et al. (2014) conclude that trend growth both in the United States and also in the euro area has gradually declined since the end of the 20th century very largely as a result of a fall in the trend rate of growth of labour productivity.[5] They find that trend labour productivity growth and labour input in the euro area has fallen to below 1% per year and about 0% per year, respectively, while trend growth of real GDP in the United States has fallen by about 1 percentage point to about 2% per year based on roughly equal contributions from labour inputs and labour productivity growth.

Using the production-function approach, Havik et al. (2014) also conclude that trend growth is now much lower than pre-crisis, as is reported in table 1. The halving of European trend GDP growth which they report is mainly driven by reduced labour productivity growth which in turn reflects weaker trend TFP growth.[6] The results

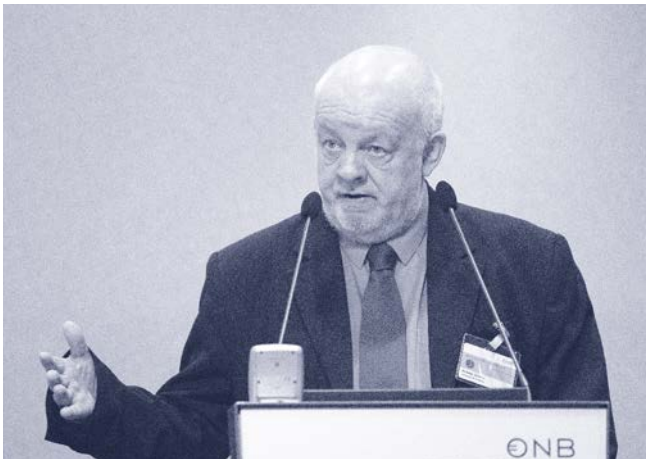
[3] *Badinger (2005) estimated that economic integration had raised European income levels by nearly 20% by the mid-1970s.*

[4] *Real GDP per hour worked in the EU-15 rose from 38.1% of the United States level in 1950 to 62.9% by 1973 (Crafts, 2013).*

[5] *The "euro area" in this analysis is a weighted average of France, Germany and Italy.*

for Europe are actually quite similar to those of the dynamic factor model analysis but, while accepting a growth slowdown, the trends inferred for the United States are rather more optimistic with trend labour productivity growth at 1.5% per year. This is in line with other similar analyses (Fernald, 2014). The striking implication in table 1 is that, rather than catching up as they did for most of the postwar period, in the "new normal" European countries will continue to fall behind the United States in terms of productivity levels. Moreover, Europe appears to be at greater risk of secular stagnation than the United States.

What might a more forward-looking approach say? The best starting point for a discussion of potential long-run trend growth for the euro area is to ask whether the United States is heading for secular stagnation in the long run based on an exhaustion of technological progress (Cowen, 2011) with the implication that future European TFP growth, which relies heavily on the diffusion of new American technology, will be undermined. Mainstream opinion among American economists rejects this secular stagnation thesis. Future technological progress is notoriously hard to predict – 1980s' pessimism was, of course, derailed by ICT – but even Gordon (2014), often cited as a notorious pessimist, expects labour productivity growth at 1.3% per year based on TFP growth around the average of the last 40 years. He argues that the slowdown in technological progress has already happened and came after the end of *the one big wave* of the 2nd industrial revolution in the early 1970s although he is sceptical of a future acceleration and believes that ICT has mostly run its course. Notwithstanding this claim, an obvious factor underpinning American TFP growth is likely to be continuing progress in ICT. A careful review of developments in ICT stresses that semiconductor technology continues to advance rapidly and that (quality-adjusted) prices of microprocessor chips continue to fall steeply such that a baseline projection is that ICT-producing sectors alone will contribute about 0.4 percentage points of TFP growth over the next decade (Byrne et al., 2013). Moreover, since a major result of the ICT revolution will be the ease of analysis of massive amounts of data, there could be a significant acceleration in TFP growth as R & D becomes cheaper and more productive (Mokyr, 2014).



An alternative approach is to project future American TFP growth using a growth model based on endogenous innovation. If the naive models of 25 years ago were invoked, then it might be assumed that TFP growth depended simply on R & D expenditures a share of GDP and since these have not fallen, neither will future TFP growth. Unfortunately, the evidence suggests the

[6] *Growth of the capital stock (and thus the capital-deepening contribution to labour productivity growth) adjusts to TFP growth in this model.*

constant-returns assumption embodied in these models is not valid (Klenow and Rodriguez-Clare, 2005). A more realistic approach may be the semi-endogenous growth model in Jones (2002) in which increases in human capital and in research intensity generate transitory rather than permanent effects on growth. This possibly has the quite pessimistic implication that past TFP growth in the United States has largely come from increases in educational attainment of the population and expansion of the R & D sector which cannot be expected to continue so that future TFP growth may be much slower (Fernald and Jones, 2014). However, even in this model, there may be countervailing tendencies; for example, world research intensity surely still has the scope to rise considerably as new nations, most obviously China, become major players.[7]

On balance, this review does not give strong support to the hypothesis that there will be secular stagnation in the United States based on a dramatic decline in technological progress. This is clearly the view of OECD (2014a), as reported in table 2, which uses a catch-up growth model in which growth in the leading economy (United States) depends on demography and technological progress while long-term TFP growth in (follower) European countries is based on TFP growth in the leader and a component based on reducing the productivity gap with the leader. The OECD projections for European countries in table 2 are based on the assumptions that the crisis significantly reduced the level of potential output in the short term (Ollivaud and Turner, 2014) but has had no adverse effect on long-run trend growth and gradual conditional convergence towards the leading economy depending on institutions and policies.[8] In fact, there is also more scope for catch-up growth in most euro area economies than before the crisis. Real GDP per hour worked for the euro area as a whole as a percentage of the U.S. level has fallen from 88.7 in 1995 to 79.9 in 2007 and 76.0 in 2013.

It is certainly possible to believe that the OECD projections are too optimistic for two main reasons. First, it is striking that this framework leads OECD to expect much better TFP growth in the euro area as a whole and in its troubled economies compared with pre-crisis outcomes. In particular, this will require a much better performance in TFP growth in market services of which there is no sign as yet (van Ark et al., 2013) and which has been the Achilles Heel of the euro area economies in the context of excessive regulation and weak competition (table 3) and which has also retarded the diffusion of ICT (Cette and Lopez, 2012)

[7] *China accounted for 16.2% of world R & D in 2012 compared with 2.3% in 1996 (UNESCO Institute for Statistics, 2014).*

[8] *So the very low growth in Europe of late reflects a levels-effect adjustment resulting from the financial crisis playing out over several years rather than lower long-term trend growth.*

which has been notably slow in some countries (table 3).

Second, the crisis and subsequent weak recovery may well have weakened the political support for market friendly supply-side policies and strengthened forces of populism or even extremism. Across Europe in the 1930s, prolonged stagnation significantly increased the electoral prospects of right-wing extremist parties (de Bromhead et al., 2013) which were not market-friendly. In this context, not only might it be reasonable to worry about recent election results but it should also be recognised that opinion polls show disappointingly low support for the market economy in many countries which have been hit hard by the crisis.[9] It is also well-known that the Great Depression saw big increases in protectionism. Eichengreen and Irwin (2010) showed that, on average, countries which devalued had lower tariffs. They argued that protectionism in the 1930s is best seen as a second-best policy which was used when the conventional macroeconomic tools, fiscal and monetary policy, were unavailable, as they are for euro area economies today. A recent empirical analysis confirms that weak domestic growth and losses in competitiveness continue to be conducive to protectionism (Georgiadis and Gräb, 2013) so it is not surprising that EU Member States have been prominent in imposing such measures according to Global Trade Alert (Evenett, 2014). This does not bode well for the implementation of the Single Market in services which is an obvious antidote to Europe's productivity problem in market services. Nevertheless, prima facie, it seems that with good supply-side policies medium-term growth prospects in the euro area are better than the secular stagnation scenario might seem to suggest.

4 Technological progress and unemployment: Is this the real secular stagnation threat?

The major concern of the original writers on secular stagnation was a future of high and persistent unemployment. This has not been the focal point of current debate but it deserves to be taken seriously. The long hiatus in economic growth in the euro area during the crisis and its aftermath may have significant hysteresis effects and the impact of technological progress may be less benign than was the case during the early postwar decades.

The estimates in table 4 project that in several countries the cumulative output gap by 2016 will be over 30% of GDP. In each of these countries a large fraction of the unemployed are long-term. Past experience suggests that this is a situation in which the employability of those on the margins of the labour force declines and, as a result, the NAIRU increases. IMF (2012) estimates that an additional 1% increase in the cumulative output gap raises the NAIRU by 0.14 percentage points. On this basis, table 4 reports the post-crisis NAIRU will have risen by over 4 percentage points in Greece, Ireland, Italy, Portugal and Spain. Moreover, the likelihood of a "positive shock" similar in magnitude to World War II to negate this hysteresis effect is quite small.

Since about 1980, it appears that the implications of technological progress have become more challenging for the labour market in OECD countries.

[9] *In response to the question "Are people better off in a free market economy?" in 2014 only 47% in Greece, 45% in Spain and 57% in Italy agreed (Pew Research, 2014). In 2007, 67% in Spain and 73% in Italy had agreed (no data for Greece).*

It seems likely that in the ICT era technological progress has become capital-augmenting and the elasticity of substitution between labour and capital has become greater than 1 and this has reduced labour's share of national income by around 5% (Karabarbounis and Neiman, 2014). Job polarization has been a striking feature of employment patterns in advanced economies in the last 30 years or so with the percentages of high-skilled (professional, managerial etc.) and low-skilled (labourers, low-education service sector workers) employment rising while middle-skilled (clerical, blue-collar) employment has been falling. Estimates for an aggregate of 16 European countries show a fall of 9.27 percentage points in the share of their *middling occupations* between 1993 and 2010 against rises for *high-paying* and *low-paying*. This pattern is observed in most countries with 14 of the 16 having experienced a decline in the share of middling occupations (Goos et al., 2014). The model estimated by these authors suggests that this has been almost entirely due to the factor-saving bias of technological change rather than to offshoring with the declining occupations being those which entail tasks which are routine and codifiable and thus are most amenable to computerization (Autor, 2014).

Since the early 1990s, however, there have also been significant developments in the use of robots, a technology which raises labour productivity substantially but also exhibits a strong skill bias, in this case at the expense of the low-skilled. The implication seems to be that, thus far at least, robotics has significantly reduced employment for this category of worker as the substitution of workers by robots has only been partially offset by increased demand for output of robot-intensive production (Graetz and Michaels, 2015). A fall in real price of robots of about 80% led to a big increase in robots per hour worked in OECD manufacturing and added about 0.4% per year to the growth of real GDP per worker.

It seems very likely that the impact of computerisation through robotics will intensify in the near future. Frey and Osborne (2013) estimate that 47% of 2010 employment in the United States has at least a 70% chance of being computerised by 2035 (table 5) with these probabilities being strongly negatively correlated with wages and educational attainment of workers. Tasks which will not be susceptible to computerization are those involving perception and manipulation, creative intelligence, or social intelligence.

If these estimates are correct, the upside is that this technology alone could deliver labour productivity gains equivalent to, say, 1.5% per year over the next 20 years. Future advances will come in machine learning which will be applied in mobile robotics as hitherto non-routine tasks are turned into well-defined problems, in particular using big data which will allow substitution of (much cheaper) robots for labour in a wide range of low-wage service occupations. It seems quite possible therefore that the issue that Europe really confronts is actually not so much slow technological progress but that the skill-bias of new technologies has a big downside in terms of a serious adjustment problem in the labour market.

If we consider the implications of the future computerization of employment as equivalent to a an increase in the dispersion of worker productivities, then in an equilibrium search and matching labour market model, the increase in equilibrium unemployment will be greater in a setting with relatively high unemployment benefit rates and employment protection since these

are labour market policies which increase the convexity of the relationship between the unemployment rate and skill. In a calibrated model, Mortensen and Pissarides (1999) estimate that a common ICT technology shock which would raise unemployment in the United States by about 0.4 percentage points during 1975–1995 would have increased unemployment by 4.8 percentage points with European Union labour market policies.

The data reported in table 6 suggest that many, if not all, European countries are more vulnerable to the technology shocks associated with ICT and robotics than the United States. The symptoms are relatively high proportions of workers with less than upper-secondary education, more generous replacement rates, and higher levels of employment protection. The implication is that the problem foreseen by Hansen (1932), namely, that technological progress might create unemployment because the economy is too inflexible, may actually be a bigger threat to Europe rather than the spectre of the drying up of technological change proposed by Hansen (1939).

5 Fiscal sustainability and secular stagnation

The Keynesian solution to a secular-stagnation unemployment problem was fiscal stimulus using deficit finance, fiscal sustainability permitting. Obviously, this would not be a solution to a problem of high equilibrium unemployment resulting from skill-bias in technological progress which would require a supply-side policy response. It might help, however, to counteract hysteresis.

The fiscal sustainability issue can be considered in two (related) ways. First, in steady state to prevent an increasing public debt to GDP ratio (d) the required primary budget surplus as a share of GDP (b) has to meet the formula $b \geq d(r - g)$ where r is the real rate of interest on government debt and g is the growth rate of real GDP. Second, in the face of an increase in the public debt ratio, the government has to be willing to raise b (Bohn, 1998) by enough to stabilize d. Prima facie, on the basis of the projections in table 7, on at least one and possibly both of these criteria, most European countries have some scope to use this policy approach, especially since, on these OECD projections, real interest rates are below growth rates for several countries. The exceptions, unfortunately, are countries which are among the most exposed to the hysteresis problem such as Greece, Italy and Portugal.

Unfortunately, there is much less fiscal space than this since euro area countries are committed to the *fiscal compact* which requires them to return to a gross government debt ratio no greater than 60% and to eliminate 1/20th of the excess over this level each year. OECD (2013) calculated that to stay within this rule 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 and most

euro area economies will have to pursue fiscal consolidation. Moreover, if recent trend growth is taken as a guide to future growth rates (table 1), the required primary budget surpluses will be considerably higher and fiscal sustainability may come into question in some countries as the political feasibility of running adequate primary budget surpluses becomes doubtful (Buiter and Rahbari, 2013). Rather than fiscal stimulus being a potential antidote to secular stagnation it seems more likely that secular stagnation will undermine the euro area's fiscal rules.

6 Policy implications

Although Hansen and his followers of 70 years ago thought in terms of stimulating aggregate demand through Keynesian deficit finance, the appropriate response to long-term secular stagnation of whatever type is to improve supply-side policies.

If secular stagnation in the guise of slow growth is a danger, long-run growth prospects can be improved by pro-market reforms that raise future TFP growth and investment as happened through European economic integration from the 1950s through the 1990s (Crafts, 2015b). It is possible to emulate the success of these decades through completion of the Single Market in particular with regard to services where barriers remain high and have not been significantly reduced in recent years (Fournier, 2014). Estimates from a dynamic general equilibrium suggest that the impact could be considerable adding perhaps 1% to the growth rate of large euro area economies over ten years (Aussilloux et al., 2011).[10]

A key focal point of policies to improve productivity growth should be to facilitate the diffusion of technology from the frontier, as the experience of relatively slow adoption of ICT in some European countries in the pre-crisis period underlines. Recent research into the ability of follower countries to capitalize on innovations made by the leader suggests that investments in knowledge-based capital (both managerial and R & D), innovation policies that enhance the absorptive capacity of firms, and a policy framework that supports the efficient reallocation of resources in response to new opportunities are all important in underpinning diffusion (Saia et al., 2015).

In this context, it is important to note that the process of creative destruction clearly works much less well in many European countries than in the United States as is witnessed by processes of entry and exit of firms and the much stronger growth rate of successful American start-ups (Encaoua, 2009). A corollary of this is that, on average, countries in the European Union, especially in Southern Europe, are much inferior to the United States in shifting employment away from less productive towards more productive firms and this may account for as much

[10] *These are, in fact, likely to be significant underestimates of the possible gains because the model does not capture the productivity implications of greater competition.*

as 20 percentage points of the labour productivity gap between the EU and the USA. Barriers to entry and strict employment protection legislation disproportionately reduce the efficiency of labour allocation in high turnover and more innovative sectors (Andrews and Cingano, 2014).

In this context, it would be most unfortunate if in the face of lobbying by vested interests, policymakers' response to new technologies is to try to slow down their diffusion, as the example of Uber might lead us to fear. Rather, if secular stagnation in terms of persistent high unemployment is identified as a major threat, then labour-market reforms will have a central role especially in terms of mitigating the impact of skill-bias in new technologies. The prospect of substantial displacement of low wage labour in the service sector creates a new challenge which is likely to require well-designed active labour market policies together with stricter unemployment benefit rules (Martin, 2014). Given the prospect of a major disruptive new technology, it is important that regulations which impede the reallocation of labour are not strengthened (Haltiwanger et al., 2014).

7 Conclusions

Long-term secular stagnation is generally interpreted these days as very weak trend growth but, in the spirit of Alvin Hansen and his followers, it might better be conceptualised as a problem of high and persistent unemployment. Trend productivity growth appears to have fallen significantly since the turn of the century but future technological change might easily surprise on the upside. If this does transpire, however, it could imply a serious risk of higher unemployment as computerisation leads to job losses in low skilled occupations.

While the Keynesians who pioneered the idea of secular stagnation saw demand – side policies based on fiscal stimulus as the policy response of choice, the right call is to improve supply-side policies in both labour and product markets. Indeed, at present it seems more likely that secular stagnation in terms of slow long-term growth will undermine the euro area's fiscal compact than that fiscal stimulus is a plausible solution to secular stagnation.

Key priorities in supply-side policy include moves to improve labour market flexibility and reduce the vulnerability of Europe to skill-bias in technological progress. This will entail improving the skills of the labour force and also reducing employment protection and unemployment benefits. It would be a Pyrrhic victory to "solve" this potential labour market problem by obstructing the adoption of new technology. To address problems of slow productivity growth a key focal point is to facilitate the diffusion of new technology in particular by increasing investments in knowledge-based capital and by reducing obstacles to creative destruction.

It is far too soon to tell whether secular stagnation is the future for Europe but the risk is surely higher than in the 1930s and 1940s. It does seem clear, however, that European countries generally are much more exposed to risks of secular stagnation than is the United States even though it is the Americans who raised the alarm.

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Table 1

Growth of potential output and its sources

	Real GDP	Hours worked	GDP/hour worked	TFP
	% per year			
1995–2007				
EA-12	2.0	0.6	1.4	0.8
EU-15	2.2	0.6	1.6	1.0
USA	3.0	0.8	2.2	1.4
2014–2023				
EA-12	1.1	0.3	0.8	0.5
EU-15	1.1	0.3	0.8	0.5
USA	2.4	0.9	1.5	1.0

Source: Derived from Havik et al. (2014).

Table 2

OECD future growth projections 2014–2030

	Real GDP	Employ-ment	GDP/ worker	TFP
	% per year			
United States	2.4	0.5	1.9	1.6
Euro area	1.7	0.2	1.5	1.2
Austria	1.9	0.2	1.7	1.5
Belgium	2.0	0.4	1.6	1.1
Denmark	1.6	0.1	1.5	1.0
Finland	2.0	–0.1	2.1	1.9
France	2.2	0.3	1.9	1.2
Germany	1.1	–0.5	1.6	1.5
Greece	2.2	0.2	2.0	1.8
Ireland	2.3	1.2	1.1	0.8
Italy	1.5	0.3	1.2	0.7
Netherlands	2.1	0.2	1.9	1.6
Portugal	1.4	0.3	1.1	0.9
Spain	1.5	0.9	0.6	0.4
Sweden	2.6	0.5	2.1	1.8
UK	2.6	0.6	2.0	1.5

Source: OECD (2014a).

Table 3

Aspects of labour productivity growth in the market sector, 1995–2007

a) Growth accounting

	Labour Quality	Non ICT K/HW	ICT K/HW	TFP	Y/HW
	% per year				
Austria	0.1	0.0	0.5	1.5	2.2
Belgium	0.2	0.4	0.9	0.1	1.7
Denmark	0.1	0.1	1.0	–0.1	1.0
Finland	0.1	–0.1	0.5	2.8	3.3
France	0.3	0.4	0.3	0.9	2.0
Germany	0.0	0.5	0.5	0.7	1.7
Italy	0.1	0.4	0.2	–0.4	0.4
Netherlands	0.4	0.0	0.5	1.1	2.1
Spain	0.4	0.5	0.4	–0.6	0.6
United Kingdom	0.4	0.4	0.8	1.0	2.6
EU-10	0.2	0.4	0.5	0.6	1.6
USA	0.3	0.3	0.9	1.2	2.6

b) Sectoral contributions

	ICT produc-tion	Goods produc-tion	Market services	Real-location	Y/HW
	% per year				
Austria	0.3	1.7	0.2	–0.1	2.2
Belgium	0.3	0.9	0.6	–0.1	1.7
Denmark	0.3	0.4	0.4	–0.1	1.0
Finland	1.7	1.3	0.5	–0.1	3.3
France	0.4	0.8	0.7	0.0	2.0
Germany	0.5	0.9	0.4	0.0	1.7
Italy	0.2	0.2	0.0	–0.1	0.4
Netherlands	0.4	0.6	1.2	–0.2	2.1
Spain	0.1	0.2	0.3	–0.1	0.6
United Kingdom	0.5	0.7	1.6	–0.2	2.6
EU–10	0.4	0.7	0.6	–0.2	1.6
USA	0.8	0.3	1.8	–0.2	2.6

Source: van Ark (2011).

Table 4

Estimates of hysteresis effect of crisis on NAIRU

	Cumulative output gap , 2009–2016	Predicted change in NAIRU
	% of GDP	*Percentage points*
Austria	9.4	1.32
Belgium	6.0	0.84
Denmark	14.9	2.09
Finland	15.5	2.17
France	13.1	1.83
Germany	9.5	1.33
Greece	63.7	8.92
Ireland	37.7	5.28
Italy	34.4	4.82
Netherlands	8.7	1.22
Portugal	32.1	4.49
Spain	32.9	4.61
Sweden	14.2	1.99
UK	13.4	1.88
Euro area	18.7	2.62
USA	25.1	3.51

Source: Author's calculations.

Note: Change in NAIRU estimated based on cumulative output gap from OECD (2015) using method in IMF (2012).

Table 5

Estimates of computerisation probabilities by 2035

	% of 2010 employment in USA
≤ 0.3	33
>0.3 but < 0.7	19
≥ 0.7	47

Source: Frey and Osborne (2013).

Table 6

Exposure to skill-bias of technological change

	Low educational attainment	Unemployment rate of low educated	Employment protection	Net replacement rate
	% of labour force	*%*	*0–6*	*%*
Austria	17	7.7	2.37	72
Belgium	28	12.1	1.81	82
Denmark	22	9.6	2.20	87
Finland	16	11.6	2.17	69
France	28	13.8	2.38	68
Germany	13	12.8	2.87	83
Greece	32	25.3	2.12	46
Ireland	25	23.3	1.40	75
Italy	43	12.2	2.51	78
Netherlands	27	6.6	2.82	81
Portugal	63	16.0	3.18	78
Spain	46	31.2	2.05	74
Sweden	13	12.3	2.61	67
UK	22	10.5	1.03	56
USA	11	14.3	0.26	51

Source: OECD (2014b), OECD Benefits and Wages database and OECD Employment Protection database.

Notes: Low educational attainment is defined as less than upper secondary for ages 25–64 in 2012; employment protection is for permanent workers in 2013; net replacement rate is for household with 1 earner and 2 children on 67% average wage at initial unemployment in 2013.

Table 7

Aspects of future fiscal sustainability

	2014 d	2020 r	2030 r	2014–2030 g	Max b	Limit of d
Austria	0.868	1.2	1.8	1.9	2.0	1.873
Belgium	1.056	1.4	1.8	2.0	6.3	1.684
Denmark	0.426	1.1	1.8	1.6	9.2	2.087
Finland	0.596	1.4	2.2	2.0	6.5	1.845
France	0.951	2.2	2.3	2.2	1.0	1.761
Germany	0.731	1.0	1.8	1.1	1.6	1.758
Greece	1.772	6.9	3.2	2.2	3.9	<1.586
Ireland	1.095	3.1	1.8	2.3	5.4	1.497
Italy	1.321	3.1	2.3	1.5	5.3	<1.247
Netherlands	0.683	1.4	1.8	2.1	4.2	1.901
Portugal	1.302	5.4	2.4	1.4	2.4	<0.984
Spain	0.977	4.2	2.0	1.5	2.9	1.539
Sweden	0.415	2.3	2.6	2.6	5.0	2.049
UK	0.895	3.7	3.7	2.6	3.5	1.665

Sources:
2013 d is public debt to GDP ratio in 2013 (IMF, 2015).
2020 r and 2030 r are projected real interest rates on 10-year government bonds in 2020 and 2030, respectively (OECD, 2014a).
2014–2030 g is the projected average rate of growth of real GDP between 2014 and 2030 (OECD, 2014a).
Max b is the largest average primary budget surplus as a percentage of GDP over a 5-year period since 1980 (IMF, 2013).
Limit of d is the projected public debt to GDP ratio at which past experience indicates that the response of the primary surplus would no longer satisfy a fiscal-sustainability criterion (Ghosh et al., 2013).