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Does the Secular Stagnation hypothesis match with data? Evidence from USA

Andrea Borsato*

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Abstract

The paper adds to the debate around Secular Stagnation in four ways. First, considering US historical data since 1870, the use of the term "Secular Stagnation" in the literature is misleading, since it should concern more long runs. Second, the slow growth in real GDP per capita experienced in more recent times represents a return to what US experienced before 1950. Third, we can speak about Secular Stagnation in terms of labour and multifactor productivity growth: their decline since the 1970s is not comparable to any previous period. In this sense, my findings provide views *à la* Gordon (2015) and Hein (2016) with some support, but less to Summers (2014b) negative natural rate hypothesis, which suffers from theoretical weaknesses. Fourth, despite the several approaches often implemented, we trace out a complementary or even convergence in policy implications.

JEL Code: E20, E43, E50, E60, O11, O30, O40.

Keywords: Secular Stagnation, Negative interest rates, GDP and Productivity slowdown in growth.

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Contents

1 Introduction

The concept of Secular Stagnation has been introduced in the economic field by Hansen (1939) to describe the somber situation in which the US economy fell after the Great Depression in 1929. The author looked at the high unemployment as the principal problem for Americans and the expression of Secular Stagnation stood for "sick recoveries which die in their infancy and depressions which feed on themselves and leave a hard and seemingly immovable core of unemployment" (Hansen, 1939). Since then, the debate around Secular Stagnation tends to be raised whenever a strong recession takes place (Pagano and Sbracia, 2014), albeit the doctrine of Secular Stagnation had generally exited the economic discourse since the late Fifties, and almost disappeared from the macroeconomic research agenda (Backhouse and Boianovsky, 2016). To date, Summers (2014a) re-evoked this expression to depict a circumstance in which changes in the economic fundamentals, after the Great Recession of 2007, might have caused a significant shift in the natural balance between savings and investments, lowering the equilibrium natural interest rate associated with full employment towards negative values. The outcome is a state of affairs in which the achievement of adequate growth, capacity utilisation and financial stability appears increasingly difficult (Summers, 2014a,b, 2015, 2018).

Many economists have dealt with this phenomenon since then, each of them underlining a peculiar aspect. In the present essay, I decide to take a historical perspective in order to see which characteristics associated with Secular Stagnation are found in the data. In particular, I focus my study on US macroeconomic data about real GDP per capita, potential output, productivity measures and population since 1870, when possible. This very simple setting allows me to prove that the slow growth in real GDP per capita as in more recent times should not be interpreted as an evidence of Secular Stagnation. Rather, it represents the return back to the average growth rates performed before the Golden Age period 1950-1972. It is apt to talk about Secular Stagnation in terms of labour and multifactor productivity growth, since their decline is greater than any previous shortfall. My findings cast some doubt on Summers' hypothesis of negative natural rates, which suffers from theoretical inconsistencies as suggested by Di Bucchianico (2020) and Palley (2019). In contrast, a careful analysis of data offers some evidence supporting to Gordon (2014, 2015) and Hein (2015, 2016)'s Secular Stagnation hypotheses, among others. Moreover, this evidence shows that the use of the term "Secular Stagnation" in the literature is somewhat *misleading*, since it should concern to a longer time span, possibly involving *more extended long runs*. Finally, I trace out a complementarity or even convergence to what policy-makers should do to get away from this trap, the great heterogeneity in the perspectives adopted notwithstanding.

The paper is organised as follows: Section II presents my empirical findings that help give a proper definition for Secular Stagnation; Section III looks at Secular Stagnation through the lens of the Great Recession, as in Summers (2014a,b) and Eggertsson et al. (2019); Section IV pins

down to the supply-side determinants of the productivity slowdown in growth while Section V deals with its demand-side causes. Both Section IV and V frame Secular Stagnation in terms of productivity growth. Section VI provides policy implications while the Section concludes.

2 Secular Stagnation since late nineteenth century

The concept of Secular Stagnation, as above, has been introduced in the economic field by Hansen (1939) to describe the somber situation in which the US economy fell after the Great Depression in 1929. The author looked at the high unemployment as the principal problem for Americans. Hansen believed that the events occurred in the first quarter of the twentieth century constituted a profound structural change not smaller than the one provoked by the Industrial Revolution.[1] In this frame, he stressed three main points as the *causae causantes* of this stagnating growth process: a drastic decline in the rate of population growth, changes in the character of technological innovations and the availability of new territories. On the one hand, population growth, an increasing speed of technological innovation and colonial expansion in the past, with the conquest of new territories, the appropriation of the natural resources and the creation of new markets, fueled industrial development in many Western countries. On the other hand, population decline, a slowing down in the rate of technological innovation and the lack of new territories had a negative impact on the economies. Policy-makers should then have prompted a strong public investment in human and natural resources along with a gradual lowering of tax rates in order to soothe households and to strengthen their consumption expenditures. Of course, Hansen wrote the paper before World War II, the Golden Age growth and all the subsequent events the humankind witnessed so far, the evolution undergone by the role of governments in most economic systems included. Moreover, Hansen had claimed since the Sixties that his notion of Secular Stagnation was another name for Keynesian underemployment equilibrium, being both problems about the difficulty from matching savings to investments (Backhouse and Boianovsky, 2016). Nevertheless such changes do not imply that Secular Stagnation is just an old-fashioned and implausible ghost (Summers, 2015).

Since several economists have analysed the phenomenon through a variety of perspectives once Hansen (1939) first used the concept, it is hard to find evidence of Secular Stagnation by simply looking at a unique macroeconomic indicator. For what concerns to my analysis, I here define Secular Stagnation as the tendency to the long-term slowdown in the growth rates of labour and total factor productivities, along with a decreasing potential output growth and a

[1] "He saw the concept as rooted in J. S. Mill's notion of the stationary state, suggesting that the term "mature economy" described Mill's formulation of the stationary state as a low-investment but high-consumption economy. However, unlike Mill's stationary state, Hansen's secular stagnation featured *chronicle unemployment*" (Backhouse and Boianovsky, 2016).

return to pre-1950 average growth rates of actual GDP, which starts in the early Seventies and reaches the trough with the Great Recession in 2007.[2] *Semantics* matters: the term *stagnation* implies the idleness of the economic activity relative to some historical benchmark, usually the preceding years; however, since I consider a very long time horizon – more than a century – the word *secular* does not imply a *single* long run, but *more long runs*. This is a crucial point within the debate around Secular Stagnation. Economic historians, indeed, differentiate between their *long run* concept and the *long run* usually adopted by economists: when the analysis concerns to fifty years, for instance, it corresponds to a *short period* perspective for economic historians and a *long run* one for economists; a study should involve a century at least to be considered as long-run point of view by economic historians.

Economists tend to raise this debate whenever a strong recession takes place. Moreover, a historical perspective suggests that current performance in GDP per capita growth rates are not different from what the capitalistic system experienced in the nineteenth century or in the first half of the twentieth. However, several studies disregard the pattern followed by productivity growth in last 150 years and therefore, looking at Secular Stagnation mostly as a productivity issue, I believe that the following questions deserve attention: is Secular Stagnation a fact? Is the slow growth since the early 1970s just a return to average performances similar to what happened to real GDP per capita after the exception of the Golden Age, or has it got any special feature?

In order to answer such a complex question, it is necessary to clarify why I prefer focusing on labour and multifactor productivity growth and why not solely on real GDP per capita. Neoclassical wisdom in particular believes that labour productivity and TFP are both the key drivers of economic growth, changes in living standards and as a measure of international competitiveness and efficiency. By contrast, real GDP per capita is more volatile and very pro-cyclical, making its analysis less reliable. Such a measure is not indeed very different from labour productivity measured as per person employed. However, the growth rate in GDP per capita can be broken down into the sum of two components, i.e. the growth rate of GDP per hours worked, on the one hand, and the growth of labour utilisation on the other hand, that is hours worked per capita. GDP per capita is a reliable measure for productivity only to the extent that the strong assumption of constant labour utilisation results verified.
I prefer restricting the analysis to the United States using data from 1870 onward, whenever available. The reason is twofold: firstly, the literature on Secular Stagnation focuses mainly on the American economy and, secondly, the USA are one of the remaining superpowers and the economic science has identified them as the world's technology frontier since the early twentieth

[2] Economists define *potential output* as what can be produced if the economy were operating at maximum sustainable employment (Okun, 1963). The concept itself, and the way it is computed, is very debated in the literature. Since I do not enter such a matter, I refer to EU Commission official measure; details in the Appendix.

century (Pagano and Sbracia, 2014). Secular Stagnation began in the early Seventies, which were characterized by a slowing down of productivity growth. In this framework, the slight increase in productivity growth rates which characterized the Nineties was determined by a short-run economic cycle which did not affect the long-run negative trend, but only served to conceal it.
It is worth dividing the analysis of the results in two parts. The first part presents productivity statistics in Tabs. 1 and 2, as well as in Figs. 1 to 4. The second part focuses on output and population statistics, as reported on Tab. 3 and graphed in Figs. 5 and 6.[3]

The slowdown in growth performances during the post-Golden Age period did not simply represent a return back to pre-Golden Age periods. What makes the Secular Stagnation hypothesis consistent with data is the strong negative trend followed by productivity. For simplicity, I shall start by looking at the labour productivity pattern, with the aid of Tab. 1, Figs. 1 and 2. The time trend has a negative sign and is statistically significant, although small in absolute value, from 1889 through 2017. It means that there was a slow and steady decline in labour productivity growth over the period of interest. However, Figs. 1 and 2 show that such decline starts with the end of the Golden Age. If we perform separate regressions using data from 1889 through 1940, and from 1950 to 2017, respectively, we find that the growth in labour productivity is *trendless* and slightly above 2% before World War II (1889-1940), while a consitently negative trend characterizes the second half of the XX^{th} century. Despite the great volatility in actual growth rates, the steady decline in labour productivity begins at the end of the Golden Age. Time only strengthens this trend reversion, as the structural break in 1971 confirms. The rate of growth of labour productivity exhibits a timid recovery in the Nineties with another structural break in 1993, before starting a new and long-lasting collapse in the aftermath of the 2007 crisis.

For what concerns to the multifactor productivity growth, I compare different data, in the line of Gordon (2010). Fig. 3 plots my estimates on total factor productivity based on the accounting exercise which does not consider the composition adjustments concerning to the aggregation of different components of capital and labour inputs.[4] These preliminary estimates refer to the period 1889 – 2018. When it comes to the Post-Word War II period, however, I prefer using adjusted estimates provided by the Bureau of Labor Statistics, which allow for a more detailed analysis.
Considering non-adjusted estimates, the results tend to confirm what Gordon (2010) obtained. In particular, we see that the period 1920-1950 benefits from the highest growth in TFP with

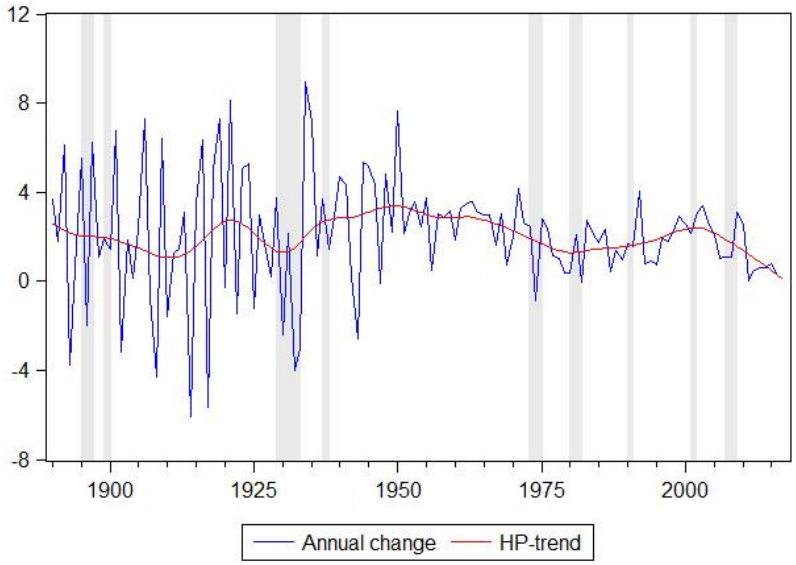
[3]Since data contains both the trend and the cyclical components, I smooth the time series with the Hodrick-Prescott filter in order to capture the trend component and to focus the study on it. Nevertheless, I must recognize that thinking the cyclical and the trend components as *additive* is a very simplifying hypothesis.
[4]In other words, I do not take into account the differences between ICT and non-ICT capital, and between skilled and unskilled workers. I instead computed TFP as the Solow residual from a standard Cobb-Douglas aggregate production function. Further details in the Appendix.

Time	Average growth rates (%)
1889 – 20	0.017
1920 – 50	0.025
1950 – 72	0.028
1972 – 96	0.016
1996 – 07	0.022
2007 – 18	0.010

Trends and Bai-Perron test for labour productivity			
Time	Trend $\hat{\beta}$	Sequential L+1 breaks vs. L	Sequential test all subsets
1889 – 2018	−0.004**	1916, 1935, 1993	1916, 1935, 1971, 1992
1889 – 1940	0.007		
1950 – 2018	−0.029***	1971, 1993, 2008	1973, 1983, 1993, 2008

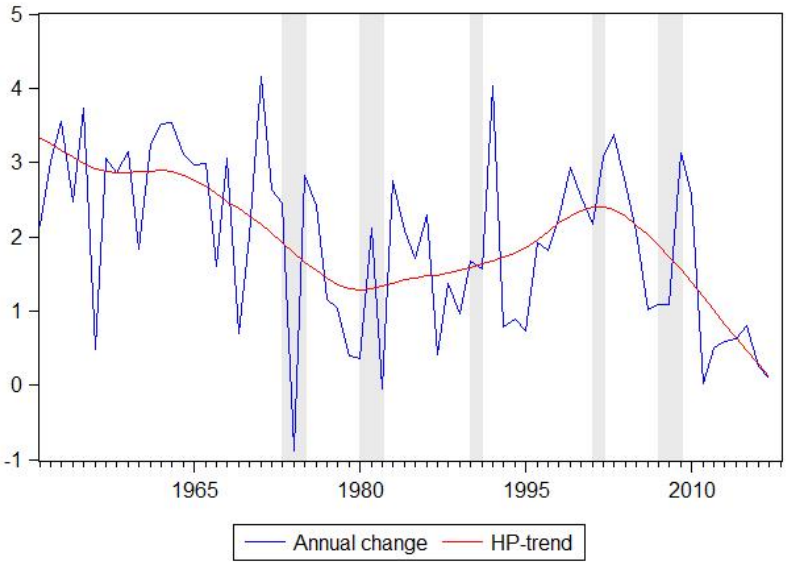
Note: trend $\hat{\beta}$s refer as to a simple OLS regression $y_t = \alpha + \beta trend + u_t$, which traces the evolution over time of our variable of interest. To ascertain information about the different specification of the Bai-Perron test, see Bai (1997) and Bai and Perron (1998). Values are computed over HP-filter trend components of individual time series. Star significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 1. Statistics for labour productivity, 1889 – 2018



Note: labour productivity is measured as real GDP per hours worked; shaded areas refer to major crises. Source: author's own calculations on Kendrick (1961) and Penn World Table 9.1 data.

Figure 1. Labour productivity in the USA, 1889 – 2018



Note: labour productivity is measured as real GDP per hours worked; shaded areas refer to major crises. Source: author's own calculations on Penn World Table 9.1 data.

Figure 2. Labour productivity in the USA, 1950 – 2018

a rate strictly above 2%, as the result of fifty years of continuous growth. In contrast, none of the following years exhibits a growth rate of productivity exceeding 2%. Moreover, structural breaks between 1968 and 1970 lead to further progressively smaller rates of productivity growth. As for the previous measures, the end of the second millennium and the onset of the third represent a temporary relaunch – the growth is 1.8% on average –, but then the long-term decline reaches the bottom in the following years. The pattern is confirmed also by the structural breaks occurred in 1970, 1992 and 2009, respectively. The official BLS measures are in lines with my preliminary results, with the post-Golden Age itself representing a structural break followed by a plunge in TFP (Tab. 2 and Fig. 4). In particular, TFP grows 1.7% on average during 1950-1972, then it collapses to one-third of that value in 1972-96. The growth rate doubles in subsequent years (1.23%) but reaches the bottom in the post-2007 decade, that is 0.53% only.

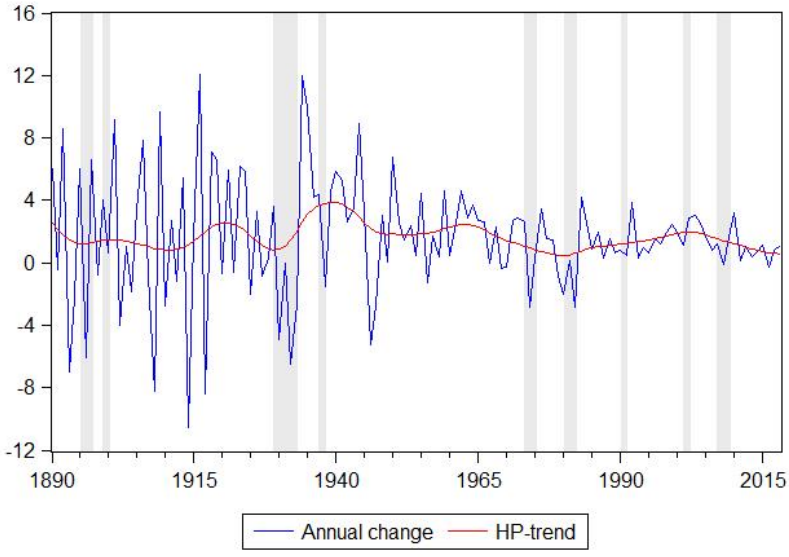
Time	Average growth rates (%)	
	Non-adjusted estimates	BLS adjusted estimates
1889 – 20	0.015	
1920 – 50	0.024	
1950 – 72	0.019	0.018
1972 – 96	0.009	0.006
1996 – 07	0.018	0.012
2007 – 18	0.009	0.005

Trends and Bai-Perron test for non-adjusted TFP			
Time	Trend $\hat{\beta}$	Sequential L+1 breaks vs. L	Sequential test all subsets
1889 – 2018	−0.005***	1914, 1933, 1968, 1990	1914, 1933, 1968, 1991
1889 – 1940	0.029***	1916, 1925, 1934	1916, 1925, 1934
1950 – 2018	−0.013***	1970, 1992, 2009	1960, 1970, 1992

Trends and Bai-Perron test for BLS TFP			
Time	Trend $\hat{\beta}$	Sequential L+1 breaks vs. L	Sequential test all subsets
1948 – 2018	−0.021***	1972, 1994, 2008	1972, 1984, 1994

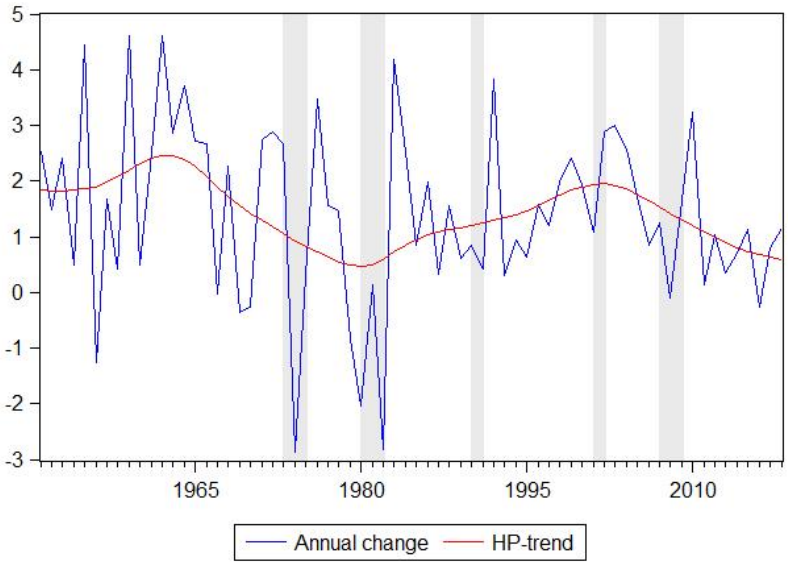
Note: trend $\hat{\beta}$s refer as to a simple OLS regression $y_t = \alpha + \beta trend + u_t$, which traces the evolution over time of our variable of interest. To ascertain information about the different specification of the Bai (1997) and Bai and Perron (1998). Values are computed over HP-filter trend components of individual time series. Star significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 2. Statistics for multifactor productivity, 1889 – 2018



Note: TFP refers to Private Nonfarm Business Sector; shaded areas refer to major crises. Source: author's own calculations on Kendrick (1961) and Bureau of Labor Statistics data.

Figure 3. Total factor productivity in the USA, 1889 – 2018



Note: TFP refers to Private Nonfarm Business Sector; shaded areas refer to major crises. Source: author's own calculations on Bureau of Labor Statistics data.

Figure 4. Total factor productivity in the USA, 1950 – 2018

The second slot concerns to some data about the growth rates in real GDP per capita, potential output and population. We see from Tab. 3 and Fig. 5 as the actual growth path in real GDP per capita is almost trendless since the late nineteenth century. In addition to this, we can interpret its hump and subsequent decrease after the Golden Age period as the return back its average growth before the years represented by the Golden Age of capitalism; in this respect, Golden Age years were somehow peculiar, characterized by a more sustained growth of the social product if compared to either preceding periods or subsequent decades.[5] Concerning potential output, the lack of historical data does enable me to say neither that its continuous decline in growth represents a return back to average pre-Golden Age performances nor that it is a new feature. Hence, it cannot be a support for my claim as well as for GDP per capita. I limit myself to back up a significant decreasing pattern in its growth rates.

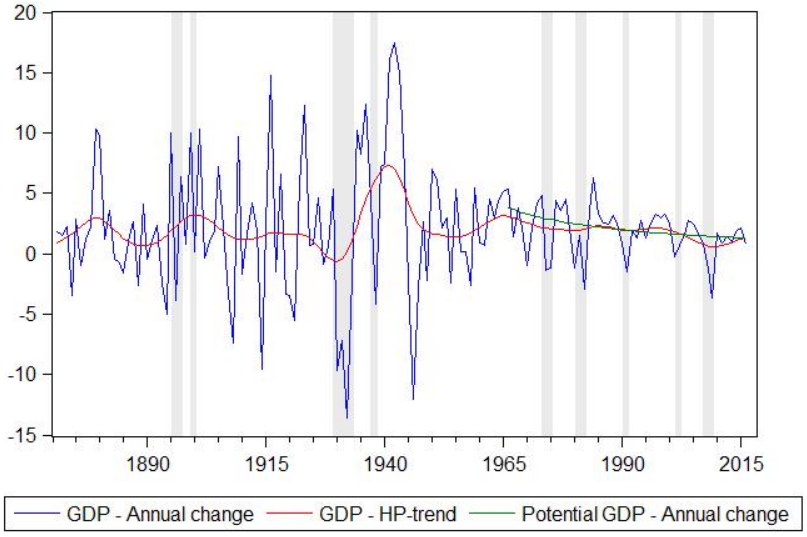
To complete the second slot of statistics, we shall have a glance on some demographic dynamics. Hansen (1939) first, Gordon (2014, 2015) and Summers (2014a,b, 2015) later, believe that declines in US population growth are one of the major determinants for Secular Stagnation. Data on Tab. 3 and the picture drawn in Fig. 6 show a plunge in population growth from 1870 until the end of World War II. The temporary leap in the growth rate of population during the Golden Age – the so-called *baby-boom generation*– was totally offset by the clear-cut decrease in last decades. Some could ask how a trendless growth in GDP per capita can coexist with decreasing productiv-

[5] A full and exhaustive analysis of the rationales behind the Golden Age of capitalism is Armstrong et al. (1991).

Time	Average growth rates (%)		
	Real per capita GDP	Potential output	Population
1870 – 20	0.018		0.021
1920 – 50	0.028		0.012
1950 – 72	0.022	0.034	0.015
1972 – 96	0.021	0.023	0.010
1996 – 07	0.016	0.016	0.011
2007 – 16	0.0086	0.014	0.082
Trends for real per capita GDP			
Time	Trend $\hat{\beta}$		
1870 – 2016	−0.001		
Trends and Bai-Perron test for potential output			
Time	Trend $\hat{\beta}$	Sequential L+1 breaks vs. L	Sequential test all subsets
1966 – 2016	−0.045***	1974, 2006	1974,1981,2006
Trends and Bai-Perron test for population			
Time	Trend $\hat{\beta}$	Sequential L+1 breaks vs. L	Sequential test all subsets
1870 – 2016	−0.01***	1925, 1946, 1967, 1988	1916, 1946, 1967, 1988
1870 – 1940	−0.024***	1890, 1915, 1929	1890, 1915, 1929
1950 – 2016	−0.013***	1964, 1979, 1989	1964, 1979, 1989

Note: trend $\hat{\beta}$s refer as to a simple OLS regression $y_t = \alpha + \beta trend + u_t$, which traces the evolution over time of our variable of interest. To ascertain information about the different specification of the Bai-Perron test, see Bai (1997) and Bai and Perron (1998). Values are computed over HP-filter trend components of individual time series. Star significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3. Statistics for real per capita GDP, potential output and population, 1870 – 2016

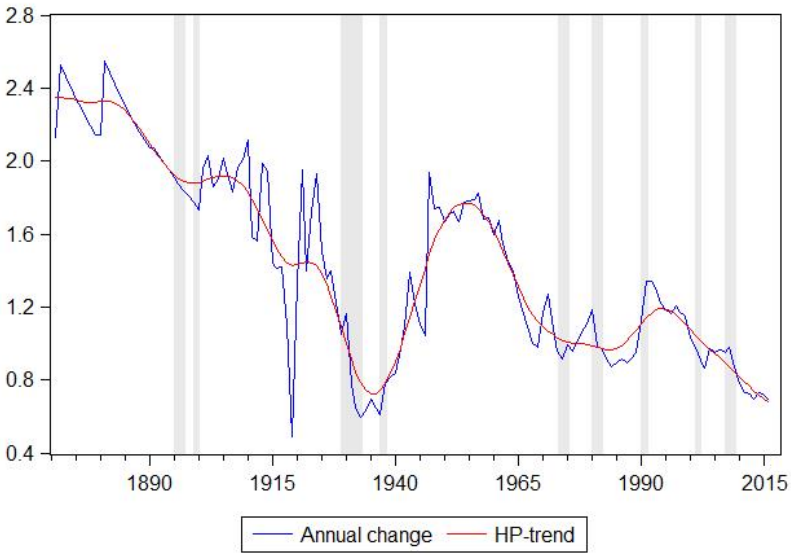


Note: data refer to the whole economy; shaded areas refer to major crises.
Source: author's own calculations on Macrohistory Lab Bonn and Ameco data.

Figure 5. Real GDP per capita and potential output in the USA, 1870 – 2016

ity growth. The decomposition presented in (1) sheds light on that issue. On the left-hand side, we have the growth rate of GDP per capita; on the right-hand side, we see the former as result of changes in labour productivity and per capita hours worked. The increasing number of working women and the entrance of the baby boomers into the labour market from 1965 through 1990 pushed per capita hours upward, but the same years saw a decrease in labour productivity. Ramey (2020) provides robustness to my results above. For what concerns to per capita hours worked, she notices as they rose from 1975 to 2020, owing to the entry of baby boomers into the labour force and rising female participation rates. Moreover, although the employment-population ratio exhibits a decline since the onset of the third millennium because of baby boomers' aging, that series displays a recovery since 2010, though not to the levels of the Nineties. The upward trend in the employment-population ratio since the 1930s looks still in place.

$$\Delta ln\left(\frac{GDP}{Population}\right) = \Delta ln\left(\frac{GDP}{Hours}\right) + \Delta ln\left(\frac{Hours}{Population}\right) \tag{1}$$



Note: shaded areas refer to major crises. Source: author's own calculations on Macrohistory Lab Bonn data.

Figure 6. Population in the USA, 1870 – 2016

It is worth spending a few words on the temporary recovery which marked the second half of the 1990s and lasted until early 2000s.[6] Neoclassical literature widely recognizes that such a

[6]Check Tab. 4, which refers as to Jorgenson et al. (2008). The reader will notice that my computations are somewhat different from Tab. 4, although they exhibit the same qualitative pattern. The reason lies in the different methods implemented to compute TFP growth, especially in the separation between skilled and unskilled workers, ICT and non-ICT capital,

	1959 – 06	1959 – 73	1973 – 95	1995 – 00	2000 – 06
Private output	0.036	0.042	0.031	0.048	0.030
Hours worked	0.014	0.014	0.016	0.021	0.005
Average labour productivity	0.021	0.028	0.015	0.027	0.003
Contribution of capital deepening	0.011	0.014	0.009	0.015	0.013
Information technology	0.004	0.002	0.004	0.010	0.006
Non-information technology	0.007	0.012	0.005	0.005	0.007
Contribution of labour quality	0.003	0.003	0.003	0.002	0.003
Total factor productivity	0.008	0.011	0.004	0.001	0.009
Information technology	0.003	0.001	0.003	0.006	0.004
Non-information technology	0.005	0.011	0.001	0.004	0.005
Share attributed to information technology	0.003	0.001	0.004	0.006	0.004

Source: Jorgenson et al. (2008).

Table 4. Source of Output and Productivity growth in United States, 1959 – 2006

productivity upsurge is due to the expansion and diffusion of information technologies, from computers to software and communications equipment. On the one hand, we can divide TFP between growth in the ICT sector and growth in the non-ICT economy. On the other hand, ICT benefits can be traced out in the way capital deepening consists of more intensive application of ICT capital (Jorgenson et al., 2008). Before 1995 the contribution of ICTs to output and labour productivity growth is small. In particular, labour productivity grows 2.14 percent on average during 1959-2006, with 55% of such growth attributable to factors other than information technologies. On the contrary, in the Nineties important developments in information technologies lead to a substantial increase in the share of productivity growth attributed to the ICT sector, which soars from 43% in the period 1973-95 to 59% between 1995 and 2000. Nevertheless, the beginning of the XXI^{st} century witnesses a decline in the contribution of ICT in productivity growth: the average labour productivity growth is almost constant but productivity growth is attributable in the greater part to capital deepening and TFP than to information technologies. This evidence does not render the contribution of ICT capital to growth negligible anyway.

To recap, since the early Seventies, the most advanced economy has experienced a slowdown in both labour and multifactor productivity growth. Compared to a century ago, the definition of Secular Stagnation does not imply a *simple* or *single* long run, but one more extended long run or even *more long runs*. This evidence represents a crucial point. Such a definition of Secular Stagnation has two implications. Firstly, the years analyzed by Hansen (1939) did not seem periods characterized by Secular Stagnation. The growth in GDP per capita, labour productivity and TFP were in fact *constant* or slightly increasing in the case of total factor productivity. Although population growth has indeed been slowing down, that would soon have changed with the baby-boom generation. Pagano and Sbracia (2014) and Ramey (2020) support my claim. The assertion that the progress in electricity and in the car industry were over well before the late 1930s is indeed false: the electrification of cities took place precisely after World

and the filter adopted to clean the time series from their cyclical components.

War I. Secondly, although the US car industry did experience a crisis, it was not widespread. Such industry spread on the contrary to other countries. Thirdly, the possibility that television broadcasting would have begun to replace radio in nearly all Western countries, whose process started during the early Thirties truly. In short, Hansen underestimated the potential of what technologies were already known in his time. The reason of this mis-interpretation lies in the fact that the arrival of a revolutionary technology may be associated with negative events such as stock market crashes or productivity slowdowns, due to waves of reorganization (Ramey, 2020). Because of these counter-intuitive effects, technological revolutions might not be grasped immediately. These effects probably led Hansen not to recognize that the period he characterized by Secular Stagnation was actually "the most innovative decade of the 20^{th} Century" (Ramey, 2020), whereas the huge unemployment he underscored was due to a heavy but *cyclical* crisis. This last statement explains why the long-run decrease in productivity growth comes to a halt in the late 1990s. The development of information technology emerges as the driving force behind the growth in labour and multifactor productivity in the mid-1990s, while they lose ground after 2000 to the benefit of capital deepening and TFP outside the ICT sector (Jorgenson et al., 2008).[7]

These findings raise a further question: how does our definition of Secular Stagnation contribute to the debate on the topic? The question discussed below is how the Secular Stagnation hypothesis and the related policy implications developed in recent times meet the qualitative and quantitative evidence presented above. I begin with the natural rate view as promoted by Summers (2014a,b, 2015) and Eggertsson et al. (2019), which however considers Secular Stagnation as a trap started with the meltdown in 2007. More coherent approaches on the productivity slowdown in growth follow.

3 Secular Stagnation through the lens of the Great Recession

The stream of literature considering the natural interest rate as the key factor for understanding Secular Stagnation is quite homogeneous and I am going to analyze Summers (2014a,b, 2015) and Eggertsson et al. (2019) as major contributions to the topic. In what follows, the natural rate of interest is the Wicksellian one, defined as the rate "at which *the demand for loan capital and the supply of savings* exactly agree, and which more or less corresponds to the expected yield on the newly created capital" (Wicksell and Claseen, 1935). This framework focuses on persistent gaps between actual and potential growth in GDP. During his famous speech at the NABE Policy

[7] The careful reader will point at this point that the concept of TFP relies on, at least in its original formulation, the notion of *exogenous* technical progress. She would then ask if we can conceive technical progress as exogenous anyway. I reply that no, technical change is not exogenous at all and there is a lot of literature on that (Dosi and Nelson, 2010). The very concept of TFP is controversial and I refer to Shaikh (1974) for further details. I would like to remark that I employ TFP as a descriptive tool, for the reason explained above: it is hard to detect evidence of Secular Stagnation by simply looking at a unique macroeconomic indicator. I have to rely on multiple *instruments*, imperfect and much-disputed as they might be.

Conference in 2013, Larry Summers suggested that changes in the economic fundamentals, as consequences of the Great Recession, might have caused a significant shift in the natural balance between savings and investments, lowering the equilibrium natural rate associated with full employment towards negative values, and triggering a process in which the achievement of adequate growth, capacity utilisation and financial stability would be, at best, hard (Summers, 2014b).[8]

Why did the natural rate become negative? Summers (2014b) traces out different causes through the loanable funds theory and the changes which would have occurred either on the demand or on the supply sides. On the *demand side*, three main factors may have shifted the demand schedule for savings – the investment curve – to the left. Firstly, the deleveraging process which followed the strong leverage antecedent to the financial crisis of 2007. Secondly, a structural change in the economic system due to the progressive rise of technological companies like Google, Amazon or Facebook. These multinationals all achieved very high market values but they need not much capital investment, especially if compared to others. Thirdly, the fall in the growth rate of population reduced the demand for capital stock and housing finance, while at the same time it increased the supply of funds through capital funded pension systems.

On the *supply side*, along with the adverse effects associated with population dynamics, Summers points out that since the Eighties we are witnessing a progressive rise in top incomes and wealth shares at the expense of bottom incomes in nearly all countries, leading to a higher average propensity to save in the economy.[9] Finally, rising retained earnings and tighter regulations for financial firms shifted to the right the supply curve for loanable funds. The upshot may be a *negative* equilibrium natural rate of interest. The presence of a negative natural rate renders the Central Bank's monetary policy ineffective, which explains the Zero Lower Bound on nominal rates and low inflation rates experienced nowadays.[10]

Summers's view is not exempt from criticism, however. Di Bucchianico (2020) and Palley (2019) have challenged the theoretical admissibility of a (negative) natural rate within the neo-classical framework. We can appreciate the former criticism through a simple economy in which a single good is produced by means of capital and labour. For simplicity, I set inter-temporal

[8] The idea of negative Wicksellian natural rate is not new in economics: Klein (1947) already dreaded the possibility in a discussion with Pigou about Hansen's work. More on that in Backhouse and Boianovsky (2016).

[9] Piketty (2014, 2015) raised the debate on the increasing income and wealth inequalities since 1980s, for which he was able to collect a very large historical dataset on national incomes and wealth, covering three centuries across several countries. Fig. 7 and 8 track their evolution in the USA over time. The analysis reported to a positive relation between wealth inequality and the difference between r and g, in which the former is the rate of return on capital while the latter is the economy's growth rate. In other words, "a higher gap between r and g works as an amplifier mechanism for wealth inequality" (Piketty, 2015). In contrast, the same term $r - g$ is not a helpful tool to discuss about the rising inequality of labour incomes: I will come back to this issue as soon as I deal with Gordon's Secular Stagnation.

[10] Summers' analysis helps understand why real rates and actual output dropped in recent times, but not why potential output fell. He advocates on the theory of hysteresis and theorizes an "Inverse Say's Law", according to which lack of demand creates lack of supply. Actually, this expression might be misleading. Basically, the principle of effective demand is at work.

optimizing behaviour aside and assume entrepreneurs maximize their profits. According to Summers, and regardless of any Zero Lower Bound influence, the entrepreneurs adopt very high capital-labour ratio techniques that let economy reach a equilibrium position in correspondence of a negative marginal product for capital. Di Bucchianico (2020) questions the formal existence of a negative marginal product of capital through the adoption of an aggregate production function of the type:

$$y = Ak^{\alpha} \tag{2}$$

$$f_K = A\alpha k^{\alpha-1} \tag{3}$$

in which y is output per unit of labour, A the Solow residual, α the capital share in output, k the capital-labour ratio and f_K the marginal productivity of capital. We notice that as long as the capital-labour ratio increases, the marginal product of capital keeps decreasing without approaching any negative value.[11] The economic intuition behind that and within the neoclassical framework is threefold. First, there always exists a positive rate of interest such that the demand for capital per capita is able to employ all the amount of savings supplied. Second, the very idea of a negative rate contradicts the neoclassical principle of profit maximization: why should rational entrepreneurs employ an amount of capital which gives back a negative marginal product? Clearly, they should not, since they can always use capital such that the marginal product would be, at most, null. And third, a negative rate would clash with the product-exhaustion theorem. Di Bucchianico (2020) shows that the equalisation between natural rate and profit rate entails a labour share greater than the net product. Even if a negative rate were plausible, capitalists would still invest in real capital so to get a negative profit rate. In this setting, capital is *abundant* and not *scarce*; at the same time, labour would be *scarce* and not *abundant*. We can demonstrate this statement by re-calling the product-exhaustion theorem, which claims that, since the means of production are rewarded according to their marginal product, they will exhaust net production:

$$Y = f_K \cdot K + f_L \cdot L = \varrho \cdot K + w \cdot L \tag{4}$$

In the above, Y is net product, K is aggregate capital stock, L is labour input, ϱ the rate of interest and w the wage rate. The latter is equal, by hypothesis, to the marginal product of labour, f_L. If we admitted the existence of a negative equilibrium rate of interest ϱ, we would have $Y < wL$; in other terms, the labour share in income would exceed the net product of the economy. Setting aside any problem of logical consistency, in this setting capital would be abundant while labour scarce: how can therefore Summers apply this theory to explain a persistently high involuntary unemployment?

[11] In this case, the non-existence of a negative rate does depend neither on the functional form of the aggregate production function nor on the lack of capital depreciation.

Drawing upon Summers' insights, Eggertsson et al. (2019) provides a more general setting for the natural rate hypothesis. They develop an analytic overlapping generation model whose steady-state is characterized by a negative full-employment real interest rate.[12] We can split the model in two main parts: the endowment economy and the production economy. For simplicity I focus on the endowment economy, since the same properties and results hold when they introduce the production side in their model. In particular, the authors suppose that each representative household lives for three periods: when the individual is young, she does not receive income but she borrows from adult consumers; the adults receive an income and they consume part of it, while saving the residual for the old age; finally, the old men receive an income and consume all their endowment.

For my purpose, the most important characteristic of the model is its ability to show how the drop in productivity growth rates since the 1970s triggered the process of Secular Stagnation through negative natural rates. The utility maximization and the equilibrium between the demand for and the supply of loans yield indeed the following equilibrium interest rate:

$$1 + r_t = \frac{1+\beta}{\beta} \frac{(1+g_t)\, D_t}{Y_t^m - D_{t-1}} + \frac{1}{\beta} \frac{Y_{t-1}^o}{Y_t^m - D_{t-1}} \tag{5}$$

in which r, β, g, D, Y^m and Y^o represent, respectively, the equilibrium natural rate, the intertemporal discount factor, the population growth rate, the maximum level of debt a household can borrow, and the incomes of middle-aged and elderly people. For an appropriate combination of the parameters, Secular Stagnation arises as a result of a negative natural rate r.[13] Interestingly, setting the income levels as proportional to productivity A, say $Y_t = A_t \tilde{Y}$, a strong reduction in productivity pushes the natural rate further down. In particular, through the lens of the loanable funds theory on which the model builds upon, the decrease in productivity growth increases the supply of savings, since households face lower expected future incomes. On the other hand, lower productivity makes the borrowing constraint more binding for the young, pushing down their demand for savings.

The results from the endowment economy hold after the production side of the economy is introduced. What the authors discern from the complete model is that monetary policy can be ineffective, and they provide a plausible explanation of why actual monetary policies have been relatively ineffective in many contemporary economies: in order to escape from a Secular Stagnation equilibrium, monetary authorities need to increase the inflation target a lot, while for sufficiently negative real rates, a simple increase in the target does not restore the full employment

[12] The formalization involves a closed economy. Anyway, the results hold in the open economy as well. For details, check Eggertsson et al. (2016).

[13] "[I]n contrast to the standard representative agent model, the real interest rate will now, in general, depend on a host of factors in addition to the discount factor: the income profile over the life cycle, the debt limit, and population growth all influence the real interest rate" (Eggertsson et al., 2019). For instance, the strong deleveraging post-2007 helps reduce the first term on the right-hand-side of (5) as in Summers (2014a,b)

equilibrium.[14] In contrast, the fiscal policy might be more effective in bringing the economy back to full employment. Overall, their model suggests that fiscal policy might help restore the economic resources to their full-employment levels.

However, Di Bucchianico's criticism holds in this framework too. The introduction of capital and monopolistic competition gives rise indeed to an economy in which "the return on capital is high enough that it produces returns in excess of investment in the steady state, while the interest rate remains negative" (Eggertsson et al., 2019). The discrepancy arises because the rental rate of capital is the ratio between the corresponding marginal productivity and the mark-up, then with positive mark-ups in equilibrium "there can be *social* returns to capital (even net of depreciation) while the rental rate (net of depreciation) and hence the real interest rate is negative" (Eggertsson et al., 2019). But, if the marginal productivity of capital is nonnegative while the natural rate of interest is, the two values cannot coincide and this is not a steady-state solution at all. The steady-state condition requires in fact each agent be indifferent in yielding bonds and physical capital, since they provide the same rate of return. But in this case households would prefer selling their bonds – whose return is negative – and buying real capital – whose return is null. In the end, the true steady state will exhibit a *non-negative* uniform natural rate.[15]

Before conclusion, it is worth spending a few words on a more general critique on the ZLB economics I have just treated. Palley (2019) develops an interesting criticism that runs as follows: even though negative nominal rates were possible, monetary policy may be unable to remedy demand shortage and restore full employment. The reason lies in the investment unresponsiveness to lower interest rates when the returns on non-reproducible assets – fiat money, land, intellectual property right and so on – dominate the returns to investments. Lower interest rates can add further problems if savings rise in response to negative rates. In this way, there might be no natural rate of interest associated to full employment in a neoclassical framework too.

In conclusion, the Secular Stagnation hypothesis through the lens of the Great Recession offers a framework in which Secular Stagnation arises as due to productivity and GDP slowdown in growth. However, the theoretical and crucial assumption on negative natural rates associated with full employment of labour suffers from serious inconsistencies which undermine the solidity of the overall apparatus. The following sections provide two different but more coherent approaches which find supply-side and demand-side long-run causes of Secular Stagnation

[14] The simulations of the model show that small rises in the inflation target lead to a unique locally determined equilibrium, characterized by Secular Stagnation. In contrast, higher inflation targets give access to two possible locally determined equilibria: as prior, the one with Secular Stagnation and another constituted by full employment of labour.

[15] Last point on Di Bucchianico (2020): the author develops his critique on the theoretical admissibility of a negative natural rate within the Euler equation and the Ramsey model frameworks too; in other terms, his results are not circumscribed to the Wicksellian frame as in Summers (2014b). Additionally, he reminds that the existence of a natural rate of interest is doubtful itself, once the results of the Cambridge capital controversy are taken into account. However, I do not consider the implications of that controversy over the Secular Stagnation hypothesis since it is beyond the scope of the present paper. Moreover, it is interesting to note that Klein (1947) already believed that negative natural rates would have been hard to justify in a Ramsey world.

which are not based on the cyclical after-effects of the Great Recession.

4 Productivity slowdown: supply-side determinants

The contributions I examine in this section develop and analyze the supply-side long-run determinants of economic growth and disregard cyclical influences. The authors claim that the strong slowdown in productivity growth and the GDP return back to average pre-Golden Age growth rates were due to some *headwinds*. In this perspective, the low-growth economy becomes the new normal, until some exogenous event boosts supply-side growth.

Gordon (2012) highlights the first important headwind and calls it "the demographic dividend". It took place in the twenty-five years between 1965 and 1990, which saw an increasing number of women finding employment, together with baby-boom's children. This influx of workers increased the ratio between working hours and population, while raising real GDP per capita more than labour productivity, by definition. However, we are now experiencing the opposite phenomenon, with the progressive retirement of baby-boomers, diminishing population growth rates and the drop in hours per worker. Whenever the participation rate and hours per worker go down, output per capita grows less than productivity, again by definition (Gordon, 2012). However, Acemoglu and Restrepo (2017) find no negative relation between aging and GDP per capita growth; in contrast, countries undergoing more rapid demographic changes are more likely to adopt new automation technologies as robots, so bringing productivity improvements. In addition to this, Ramey (2020) shows that the civilian employment-population ratio has in fact displayed a recovery since 2010.

The second headwind is extensively outlined by Gordon (2010, 2012, 2015, 2017) and Eichengreen (2015), and it concerns to the revolution started by digital electronics, which ran out of steam, with the electronics facing diminishing returns. A scrupulous analysis of data leads Gordon to establish that, since the Seventies, labour productivity and TFP growth has slackened compared to the years from 1920 to 1972. Furthermore, although we observe a slow climb in productivity and for the benefits enjoyed by many economic systems in the Nineties, production methods changed little throughout the period (Gordon, 2015). Gordon points to three main examples supporting his thesis: office, retailing and business dynamics implemented in short time all the innovations from digitalization, but once the transition was completed, productivity improvements stopped. This view results complementary to what Eichengreen (2015) defines the *range of applicability*. The latter pertains to the number of productive sectors into which new innovations might be integrated. From this perspective, the computer revolution of last fifty years had a relatively smaller impact than preceding innovations like electricity during the Second Industrial

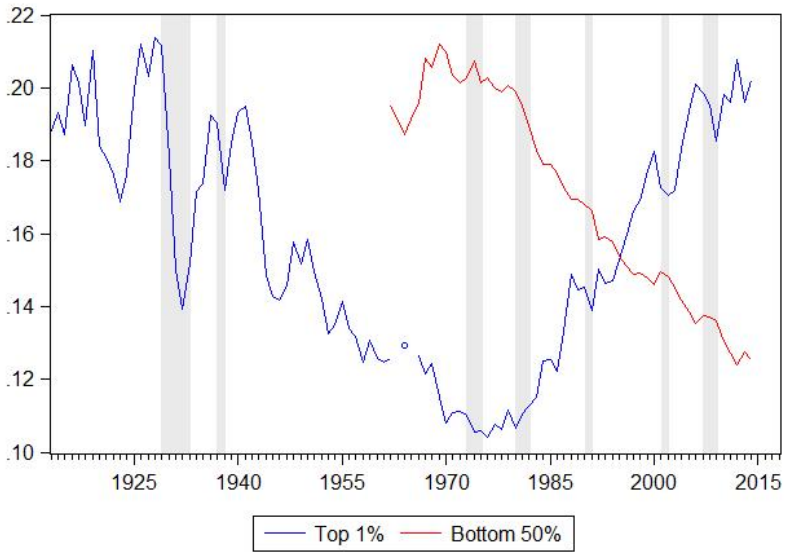
Revolution. Computers found applications mainly in the financial sector, as well as in wholesale and retail trade. In addition to this, Eichengreen (2015) underscores the general decline in the relative price of investment goods. The cheapening of personal computers makes the point: carrying out investment projects in ICT commits ever smaller share of GDP, ending up with the decrease in the investment share across the economy, *ceteris paribus*.

Even though the second headwind might provide a plausible explanation for the decline in productivity growth, criticisms come from Crafts (2002), Eichengreen (2015) himself and Ramey (2020). Crafts (2002) carries out a growth accounting exercise to compare the growth contribution of ICT and the related TFP spillovers to previous breakthroughs such as steam engine and electricity. The study suggests that "even before the mid-1990s, ICT had a much bigger impact on growth than steam and at least a similar impact to that of electricity in a similar early phase" (Crafts, 2002). Therefore, when adopting a historical perspective it would seem quite ambitious to expect a contribution of greater magnitude and whose effects endured for much longer than those of the ICT revolution.[16] Furthermore Eichengreen (2015) himself advances a thesis running counter to Gordon's, called the *range of adaptation*. It concerns to the wide re-organisation of productive processes necessary to introduce innovations and to trigger greater rates of growth for either GDP and productivity: the bigger the range of adaptation, the longer the time to re-organise the productive system. The range of adaptation hypothesis may shed light, for instance, on why some innovations did beget huge impacts in a short time – steam engine – and others – electricity and internal combustion engine – several years after their discovery. The IT revolution needs time to exhibit all of its potential to fueling economic growth. Stagnation could be just *temporary* and not *secular* any more. Finally and while in agreement with Gordon, Ramey (2020) argues that "the nature of technological change naturally leads to medium-run variations in productivity growth, and long periods of sluggish growth are a natural outcome of the process that drives technological change". She therefore calls this period as *technological lull*, so to remark its temporary state. However, this is an old argument by David (2007) that explained the low TFP growth of the 1980s and early 1990s. Whether the same argument still holds today, after almost 40 years of "re-organization", is something to be examined with great care.

The third headwind refers to inequality. Figs. 7 and 8 show that in the Eighties there is a jump in the share of total income and wealth going to the top 1%, accompanied by the corresponding decrease in the share accrued to the bottom 50%. The shares of income and the wealth going to the top 1% of the population are steadily increasing and these trend show no sign of reversing, while the shares going to percentiles below 50 percent are stagnating.[17] According to

[16] I must nonetheless point to as the results obtained by Crafts (2002) should be taken with care, since there are important lacunae in the available information.

[17] The analysis of inequality must consider also the path covered by the wage share, hence the functional distribution of income. Since Gordon did not talk about it, I will deal with this topic below, when I analyze some theories that directly cope with it.



Note: shaded areas refer to major crises. Source: author's own calculations on World Inequality Database data.

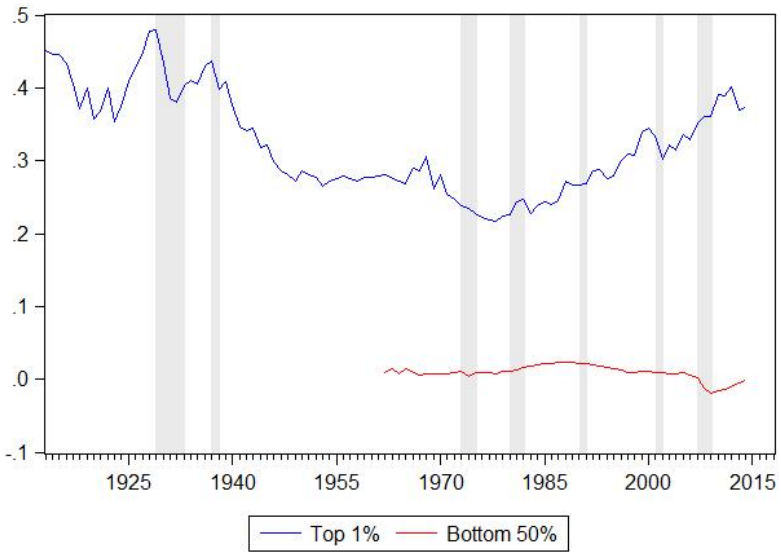
Figure 7. Income inequality in the USA, 1913 – 2014

Gordon, the increasing inequality has a negative impact on the accumulation of human capital. The problem of education is in fact worrisome at college levels, where students are ever more burdened by the loans they make to pay their college tuition.[18]

To conclude with arguments *à la* Gordon, there are some curious sentences in Gordon (2017) book that seem to contradict the main thesis: while discussing the *Great Leap Forward* of the US labour productivity, occurred in the middle-decades of the 1900s, he argued that the main determinants were the New Deal and strong labour unions, that hoisted real wages. Productivity leaped because higher real wages forced firms to introduce labour-saving techniques. As Nikiforos (2020) notices, this explanation contradicts the neoclassical theory of distribution and the main thesis according to which productivity growth is uniquely supply-side driven as above. Always in the same book, Gordon points out that government deficit spending during WWII brought about an increase in financial assets that allowed a permanent surge of consumption patterns after the war. This point contradicts many neoclassical arguments on the relation between economic growth and public deficit spending.

There is actually another important headwind which the literature did not investigate in connection with Secular Stagnation, but only to the Great Recession. It is the progressive

[18] Directly quoting Gordon (2015): "Americans owe $1.2 trillion in college debt, and an increased fraction of the next generation may choose not to complete college as they are priced out of the market for higher education". Note how Piketty (2014, 2015) shares this view, among the others.



Note: shaded areas refer to major crises. Source: author's own calculations on World Inequality Database data.

Figure 8. Wealth inequality in the USA, 1913 – 2014

monopolisation of knowledge. Pagano (2014) helps explain the ephemeral surge in productivity growth occurred in the Nineties. The author focuses on the *intellectual* monopoly capitalism, i.e. the inclusion of knowledge as the most important capital asset of the firm. From a historical view, we can distinguish two stages: the first is denoted by the *roaring nineties*, during which the World Trade Organization is established. The concomitant creation of a legal monopoly of patents and the cheap availability of new technologies opened new ways for investments and, in that moment, the possibility of privatizing knowledge was a strong incentive for the enterprises to carry out further and further investments. This incentive was crucial to the recovery in productivity growth in the mid-1990s. Nevertheless, this phase of technological developments came to an end at the turn of the XXI^{st} century, as my data confirm. The upshot of this process entails either virtuous or vicious cycles: for individuals owning the intellectual property rights, the financialisation provides incentives to develop new knowledge and then new patents, hence the cycle is virtuous; in contrast, the cycle results vicious for many others, because their lack of intellectual property rights discourages the acquisition of skills and the lack of skills discourages the acquisition of intellectual property rights (Pagano, 2014). Moreover, the current monopolisation of knowledge works at a global level, hence the squeeze of investment outlets is not confined.

To summarize, this set of contributions around Secular Stagnation provides a coherent supply-side framework for the slowdown in productivity growth and the return to pre-Golden Age GDP per capita growth rates. However, they look at the supply side of the economy only, with the intriguing exception represented by Gordon (2017). The next section considers the other

side of the coin, i.e. the demand-side dynamics which weakened productivity and GDP per capita growth. Secular Stagnation is set within the framework of Stagnation Policy.

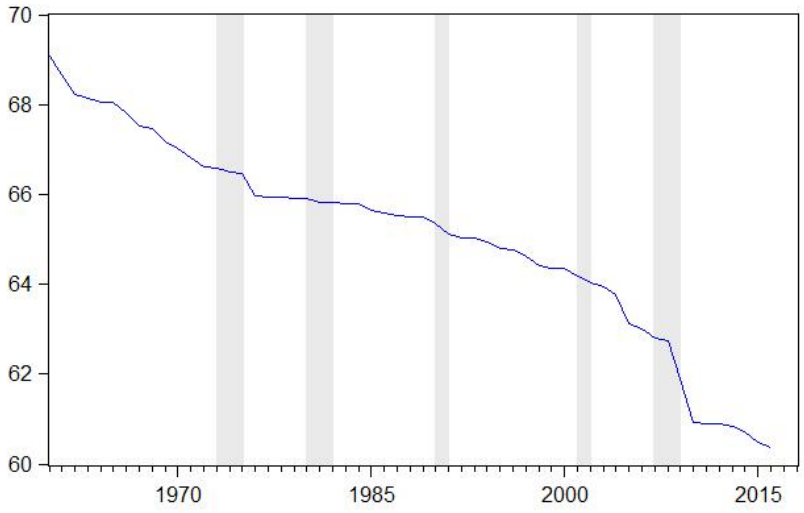
5 Productivity slowdown: demand-side determinants

Every contribution analysed so far, with the possible exception of Summers and Gordon, assumes no influence of aggregate demand in the negative evolution of productivity and GDP per capita growth. Moreover, this literature seems to exclude any influence originating from changes in institutions or power relationships between social classes (Hein, 2016). The weak performances in terms of output and productivity growth in the post-Golden Age era prompted some scholar to suggest that the rise of Secular Stagnation is the outcome of a precise stagnation policy-making.[19] In this framework, it is helpful to analyse the relationship between income distribution, financialisation and accumulation.

During the Golden Age, the full employment of labour was at the centre of most government actions in many Western economies but, since the oil crisis in 1973, there has been a paradigm shift in policymaking towards price stability through restrictive monetary and fiscal policies. The policy shift resulted in reduced shares of income and wealth going to wage-earners and low-income households, as showed in Figs. 7 to 9. Precisely, the adjusted wage share in Fig. 9 keeps decreasing since the late Sixties, when it was 70% almost, to the current minimum 60%. The rise of income inequality and the application of restrictive policies fueled the financialisation of the economy. The rapid structural changes in the post-Golden Age era, marked by a shift to service economies, required more labour flexibility to meet firms needs. In addition to this, corporations' stakeholders started investing more heavily in higher-dividends firms, preferring short-run gains in financial markets to long-run achievements in the real economy. These new goals have been achieved through wage contraction and labour flexibility. However and in order not to jeopardize the consumption capacity for the greatest slice of population, the financialisation of the economy constituted a mean for the *substitution of loans for wages* (Barba and Pivetti, 2009). In this frame, the phenomenon of rising household debt, experienced in many advanced countries, can be viewed as the attempt made by low and middle-income consumers to keep constant or rising their relative standards of consumption, despite the continuous worsening of income distribution in favour of profits and with the approval of political and financial institutions.

The story does not end here: the redistribution of income at the expense of the labour share and

[19] The main references are Hein and Dodig (2014) and Hein (2016); I have to admit as the references of non-neoclassical Secular Stagnation are very few. Additionally, the mentioned authors prefer speaking about Stagnation Policy instead of Secular Stagnation. Engaging in a dispute on proper labeling is beyond my scope; anyway, my focus concerns to Secular Stagnation as a precise *stylized fact*, while Stagnation Policy is about the rationales that led to this fact.



Note: shaded area refer to major crises. Source: author's own calculations on Ameco data.

Figure 9. Adjusted wage share in the USA for total economy, 1960 – 2016

the financialisation of the economy lowered the investments in capital stock, through an accelerator mechanism.[20] Tab. 5 shows the pattern of gross fixed capital formation and investment-to-GDP ratio. We notice as the two decades after the Sixties point to a sharp decrease in fixed investments, with the trend of average growth rate plummeting from 5% to just over 3.5%. The average growth rate reaches a 4.6% peak in the Nineties. However, the third millennium ushers a steady fall in average growth rate, with it going down to 2.8% between 2000 and 2007 and dropping to 1.8% after the crisis. In contrast, the investment-to-GDP ratio is constant throughout the period. The endogeneity of GDP helps us explain the constancy of the ratio: the debt-led consumption allowed for the compensation of the negative effects on consumption expenditure and income multiplier due to the reduction in the wage share, hence enabling the investment-to-GDP ratio to be invariant, the decline in private investments notwithstanding.

This process gave rise to two different but complementary capitalistic regimes (Hein, 2016). The "debt-led private demand" regime, which established mainly in US and UK, and the "export-led mercantilist" one, as in Germany and China. Further falls in the growth rates of investments in capital stock, as well as income inequality and excessive financialization could then explain the sharp decline in labour productivity and TFP growth, which is not comparable to any previous shortfall. This unsustainable state of affairs would have culminated with the meltdown of 2007.

[20] An usual hypothesis in alternative non-neoclassical growth models is the positive influence on investments of the profit share. Although I do not want to enter theoretical issues the alleged influence arises, it is worth noting that the relation seems either not to hold or to be very weak on the empirical ground (Onaran et al., 2011). Furthermore, other *demand-side* factors look more important as determinants for investments (Girardi and Pariboni, 2020).

Years	Gross Fixed Capital Formation	Investment-to-GDP ratio
1960 – 70	0.050	0.20
1970 – 80	0.032	0.20
1980 – 90	0.037	0.20
1990 – 00	0.046	0.21
2000 – 07	0.028	0.22
2007 – 17	0.018	0.20
1960 – 72	0.046	0.20
1972 – 96	0.037	0.20
1996 – 17	0.029	0.21

Note: author's own calculations on Ameco (European Commission) and Macrohistory Lab Bonn data. We use the HP-filter on Gross Fixed Capital Formation growth rates to base our focus on the trend component.

Table 5. Statistics on GFCF average growth rates and Investment-to-GDP ratio.

To sum up, the demand-side view interprets Secular Stagnation as the precise outcome of prolonged stagnating demand policies, which fed negatively back on productivity and output growth. Section VI presents the policy implications of the overall analysis I developed so far. Suggestions on how to reverse Secular Stagnation are in the last section as well.

6 Any convergence in policy implications?

I have showed that current stagnation in the United States can be explained using different, but not mutually exclusive, theoretical frameworks. The compatibility between different studies on Secular Stagnation is particularly marked when I involve policy implications. In particular, I should distinguish between supply-side and demand-side policies, all of which have direct impact on productivity as well as on GDP growth. Broadly speaking, the majority of economists agree that boosting investments behooves in order to circumvent the problem, for instance through innovation policies and a greater efficiency allocation of productive resources.

Gordon, Eichengreen and Ramey – among the others – look mainly at the supply-side perspective of the economy and they provide a setting in which firms are allowed and provided with incentives to undertake the necessary investment projects. In such a framework, contrasting Secular Stagnation requires structural reforms for the improvement of the educational system, the development of more efficient infrastructures and administrative simplification for start-ups along with antitrust policies. Moreover, Glaeser (2014) focuses on individual-targeted policies, the most important of which considers the whole re-organisation of the American schooling system.

While I agree with the policy implications of the supply-side economists concerning to the improvement and the development of more efficient infrastructures and for the overall rethinking of the American schooling system, which should be modeled on the European one, I shall

nonetheless recognise that the aforementioned supply-side policies must be matched with strong demand-side policies. More precisely, Summers (2015) and Hein (2016), among the others, recommend a set of strong fiscal policies based on three pillars, often named Global Keynesian New Deal. The first pillar is the re-organisation of the financial system, in order to increase the transparency and to shift shareholder's interest from short-term gains in the financial markets towards longer-term achievements in the real economy. Such a shift requires a higher profitability in the latter with respect to the former. The second pillar, connected with the first, demands that governments should increase and stabilize public autonomous expenditure growth. On the one hand, the public sector must invest on infrastructure, technology and R&D as it did during the Golden-Age period, thus creating the environment in which firms are willing to carry out new investments. Promoting exports constitutes a complementary policy and it may have a positive impact on the economic system through trade agreements and by prompting neo-mercantilist economies to rise demand for imports, thus benefiting other countries suffering from a lingering deficit in current accounts. Perhaps (not so) surprisingly, Summers (2015) finds that fiscal policies would manage to reduce debt-to-GDP ratio in the medium-long term, hence tackling the sustainability problem. On the other hand, governments should revise income policies: the progressive worsening experienced by personal as well as functional distribution of income should be stopped by wage-led actions as the strengthening of trade unions' bargaining power and through general reductions of shareholders' and rentiers' claims. The overall re-distribution of income must be accompanied by tax policies aimed at extracting more resources from profits and less from low and middle-income households, hence increasing the overall propensity to consume. Third, the wage-led recovery should take into account "the reconstruction of the international macroeconomic and monetary policy coordination and a new financial order so as to prevent export-led mercantilist [...] strategies" (Hein, 2016).

Finally, Pagano (2014) suggests a *communism* of knowledge. Secular Stagnation needs a knowledge produced *in* and *for* the public domain. Each country must invest on it and to dodge free-rider problems and the widespread under-funding of many research institutions, at the expense of the ones which do invest, the international institutions, WTO *in primis*, must establish each country earmarks a GDP fraction for investments in common knowledge. This action requires the Marxian policy of asset redistribution, the liberal pro-market policy against monopolies and the Keynesian policy of public investments (Pagano, 2014). To conclude, Tab. 6 sketches an overview of what said so far on the explanations and policy recommendations on Secular Stagnation found in the literature.

Determinants of Secular Stagnation	Negative Natural Rate Hypothesis	Productivity slowdown: supply side	Productivity slowdown: demand side
Main Concept	Shift in the natural balance between savings and investments lowered natural rate to negative values. Monetary policy is ineffective	*Headwinds* hit the pattern of technological change with a strong reduction in productivity growth	Shift in policy-making from full employment to price stability. Labour share shrinkage and financialization
Policy Prescriptions	Re-organisation of financial system. Expansionary fiscal policy	Improvements of educational system, infrastructures, administrative simplification for start-ups and antitrust policies	Global Keynesian New Deal: strongly expansionary government policies in infrastructure, technology and R&D; redistributive policies
References	Summers (2014a, 2015) Eggertsson et al. (2019)	Gordon (2012, 2015, 2017) Eichengreen (2015)	Hein (2015, 2016)
Criticisms	Di Bucchianico (2020); Palley (2019)	Acemoglu and Restrepo (2017); Crafts (2002); Ramey (2020)	Girardi and Pariboni (2020)

Table 6. Summary table

7 Conclusions

The present essay introduced the concept of Secular Stagnation, as defined by Hansen (1939), and examined its revival in the aftermath of the Great Recession by Prof. Summers and others. Through a very simple analysis on US data since 1870, I showed that the term "Secular Stagnation" is somewhat misleading as used in the literature. On the one hand, it is applied to describe an economic system affected by an overall slowdown in real GDP per capita growth rate, when in fact this phenomenon consists of a return back to pre-Golden Age performances. Moreover, the growth rate in GDP per capita has been trendless since 1870. On the other hand, the Secular Stagnation hypothesis as formulated by Summers (2014a,b) suffers from serious theoretical drawbacks. He limits his analysis to the post-2007 world and the weak economic performances as resulting from the Great Recession. The crisis has persistently affected the economy for sure, but it is reductive to explain every cause in terms of economic cycles. Summers examines only the recent past. Additionally, Di Bucchianico (2020) and Palley (2019) clearly demonstrated that the idea on a negative natural interest rate itself, as promoted by Summers, relies on contradictory hypotheses which undermine its actual admissibility.

The most important contribution of this essay is that we should regard Secular Stagnation as a problem concerning to labour and multifactor productivity growth: their decline in growth since the 1970s cannot be associated with any return back to past performances. In that case we should even speak about a phenomenon that involves not a *single* long period, but possibly *more* long runs. My findings support (Hein, 2015, 2016)'s claim that stagnating-demand policies and the general increase of income inequality depressed investments and productivity growth, as well as more supply-side viewpoints *à la* Gordon (2014, 2015) and Eichengreen (2015). The two authors relate the decrease in productivity growth with the overall decline in population growth and the weakening in the propulsive thrust of the ICT technical change.

These heterogeneous contributions converge to a gradual homogeneity and complementarity when it comes to their policy implications. On the one hand, supply-side economists suggest the improvement of the educational system, the development of more efficient infrastructures

and administrative simplification for start-ups and new businesses. On the other hand, a demand-side view focuses on strong fiscal policies for the stabilization of final demand. Active fiscal policies involve raising public spending to fight deflation and to contain the negative impact of an aggregate-demand crisis too. Furthermore they recommend the implementation of income policies is needed in order to stop the increase of income inequality, either personal or functional.

To conclude, the post-Golden Age era is characterized by slow growth in R&D expenditures and innovation activities. In particular, the slowdown in total and federal US R&D expenditures with respect to the Golden Age period (1950-72) is very remarkable . This evidence pools sectors as aerospace research, health and defense. The debate around Secular Stagnation in the United States paid little attention, if any, to the deep relationship between functional income distribution, firm innovative efforts and productivity growth; there is in particular a lack of a *demand-side* channel. In other terms, I will analyze in future research whether the interactions between income distribution and innovation are able to provide us with further insights to explain the rise of Secular Stagnation in the USA. It would be interesting to show through an evolutionary perspective that innovation gains depend not only on supply-side factors, but it may be a demand story as well as in Caminati and Sordi (2019). Last sentences in Hansen (1939) make the point:

> There are no easy answers to the problems that confront us. And because this is true, economists will not perform their function if they fail to illuminate the rapidly shifting course of economic development, and through such neglect unwittingly contribute to a dangerous lag in adjustments to change. Equally they will not perform their function if they fail to disclose the possible dangers which lurk in the wake of vastly enlarged governments. Choices indeed must be made, and scientific analysis and painstaking research can aid by exploring the probable consequences of alternative choices. The problems which I raised offer a challenge to our profession. The great transition [...] calls for high scientific adventure along all the fronts represented by the social science disciplines.

A Data Appendix

The careful reader that desires to replicate my results is referred to the following sources of data; the author can be contacted for any further doubt.

1. **Real GDP per capita**: The main source is the Jordà-Schularick-Taylor Macrohistory database, provided by the Macrohistory Lab Bonn, Release 4, 2019. In particular, the authors took data from Barro and Ursúa (2008) for the period 1870 – 2004. Data relative to 2005 – 2016 are drawn from World Bank, Category "Economic policy and external debt", Series "GDP per capita constant 2010 US$". For further information, check Jordà (2016); Jordà et al. (2017).

2. **Potential output**: Data are from the Ameco database provided by the European Commission. Data are accessible from https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en. Select Chapter 6 "Domestic Product" and Sub-chapter 6.5 "Potential Gross Domestic Product at Constant Prices".

3. **Population**: Data comes from the Jordà-Schularick-Taylor Macrohistory database, provided by the Macrohistory Lab Bonn, Release 4, 2019. In particular, the authors drew information for 1870 – 2008 from the Angus Maddison Database (2008), Tab. 1 "Population levels, 1AD-2030AD". Estimates for more recent years, 2009 – 2016, have been taken from International Monetary Fund (2017), World Economic Outlook, Subject "People-Population". Further details in Jordà (2016); Jordà et al. (2017).

4. **Labour Productivity**: The variable has been measured as GDP per hours worked. Penn World Table, 9.1 provides data since 1950. For any information, check the website https://www.rug.nl/ggdc/productivity/pwt/pwt-releases/pwt9.1?lang=en. In particular, I multiplied the average annual hours worked with the number of person engaged in order to compute the amount of hours worked. In contrast, I used data from Tab. A-III about GDP and from Tab. A-X about total manhours contained in Kendrick (1961) for the period 1889 – 1949.

5. **Total Factor Productivity**: Standard published measures of TFP concern the private nonfarm business sector (Gordon, 2010). Therefore, I relied on Kendrick (1961) for 1889 to 1949 data, while on BLS data since 1950. In particular, I applied the simplest formula to compute the multifactor productivity:

$$tfp = y - n - b(k - n)$$

in which, $(y-n)$ represents the output growth minus growth in labour input (i.e. labour productivity), b is the capital share equal to 0.3, k is the capital input growth rate while the term $b(k-n)$ can be interpreted as the capital deepening effect. Data on capital input are from the private nonfarm nonresidential real capital stock as in Kendrick (1961), Tabs. A-XV and A-XVI and from private nonfarm business sector capital services as in BLS estimates. For further information, check https://www.bls.gov/mfp/.

6. **Gross Fixed Capital Formation**: the Ameco database of the European Commission provides data since 1960. Data can be obtained at https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en. Select Chapter 3 "Capital Formation and Saving, Total Economy and Sectors", Sub-chapter 3.1 "Gross Fixed Capital Formation, Total Economy".

7. **Investment-to-GDP ratio**: Data are from the Jordà-Schularick-Taylor Macrohistory database, provided by the Macrohistory Lab Bonn, Release 4, 2019. Precisely, the authors drew data on the variable from Mitchell (1998) for what concerns to the period 1870 – 1945. Remaining years, 1946 – 2016, are from International Monetary Fund, International Financial Statistics, Data Report "National Account", Series "Gross Domestic Capital Formation, Nominal". Further details in Jordà (2016); Jordà et al. (2017).

8. **Income Inequality, Bottom** 50% **Share**: Data are from the World Inequality Database. Pre-1962 information is drawn from Fisher-Post et al. (2020); Saez and Zucman (2020), while post-1962 data comes from Piketty et al. (2018). More information at https://wid.world/country/usa/.

9. **Income Inequality, Top** 1% **Share**: Data are from the World Inequality Database. Pre-1962 information is drawn from Fisher-Post et al. (2020); Saez and Zucman (2020), while post-1962 data comes from Piketty et al. (2018). More information at https://wid.world/country/usa/.

10. **Wealth Inequality, Bottom** 50% **Share**: Data are from the World Inequality Database. Pre-1962 information is drawn from Fisher-Post et al. (2020); Saez and Zucman (2020), while post-1962 data comes from Piketty et al. (2018). More information at https://wid.world/country/usa/.

11. **Wealth Inequality, Top** 1% **Share**: Data are from the World Inequality Database. Pre-1962 information is drawn from Fisher-Post et al. (2020); Saez and Zucman (2020), while post-1962 data comes from Piketty et al. (2018). More information at https://wid.world/country/usa/.

12. **Adjusted Wage Share**: The Ameco database of the European Commission provides data of the adjusted wage share as percentage of GDP at factor cost since 1960. Data are accessible from https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/ameco-database_en. Select Chapter 7 "Gross Domestic Product (Income Approach), Labour Costs", Sub-chapter 7.6 "Adjusted Wage Share".

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