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Secular Stagnation Revisited

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Abstract: The paper focuses on the resurfacing of the question of stagnation in the debate on the crisis. It examines the rejuvenation of the "secular stagnation" hypothesis that had fallen largely out of sight. Its history helps to frame the question of stagnation tendencies today. The paper argues that we need to look at the peculiar pattern of transformation dictated by the ongoing development of ICTs within the larger question of the reasons underpinning the structural lack of aggregate demand. The Internet has "developed" the market of higher order needs such as access and interactivity in a unique way. But ICTs have become the enabling tool for a restructuring of many of the industries serving these needs. Precisely this pervasive transformation is an important factor in the possible renewal of stagnation tendencies. Higher order needs are no longer developed into large markets in the way needs were "industrialized" in the "golden age" of advanced industrial economies. If one considers social distancing and smart work, it appears that the role ICTs is likely to be pushed forward by the Covid-19 pandemics.

Keywords: Crisis, stagnation, macrodynamics, ICTs, industrial restructuring

JEL classification: E2, O4, B5.

INTRODUCTION

The emergency caused by covid-19 epidemics has for a time pushed aside the discussion on the long-term prospects of growth and development in advanced industrial economies. It is rapidly returning to the fore precisely because national economies are coping with the disruption created by the new global health hazard. In fact, the dominance of ICT-driven structural transformation discussed in the paper is, all evidence indicates, likely to be accelerated and deepened by the epidemics. That could become a new step into a phase that most recently began with the less than spectacular recovery after the financial crisis and the 2007-2009 recession.

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Despite differences between the US and Europe (and between national economies within Europe) this new crisis has reignited the discussion on stagnation tendencies within advanced industrial economies. This is one of the great controversies in economics, going back to the debate between Ricardo and Malthus over the possibility of "general gluts", and then finding expression in various theories of under-consumption (Bleaney, 1976). Prominent economists such as Baran and Sweezy (1966), and Joseph Steindl (1952) discussed the problem in the post-war period. Recently two Nobel prize winners, Joseph Stiglitz and Paul Krugman, have addressed concerns that are closely related to the issue.

The paper makes no attempt to deal with the controversy. It examines instead the recent debate and in particular the re-emergence of the question of "secular stagnation" in the debate on the crisis. The new secular stagnation hypothesis, with its emphasis on the rate of interest, overlooks a number of hints that one can find in Hansen's secular stagnation hypothesis. Although he was writing at the end of the 1930s, Hansen's focus on technical change and new industries is worth re-examining to understand the causes of stagnation tendencies today.

Quite clearly those tendencies have no single cause and are the result of several factors. The paper therefore does not aim to present a drastically novel explanation, but rather to explore the underlying processes of structural transformation. Such an investigation can complement the interpretations that more broadly refer to the structural lack of aggregate demand. Indeed, the hypothesis concerning stagnation in today's technological landscape could (and actually should) be seen in the framework of critical assessment of long cycles and contemporary capitalism (Tsoulfidis and Tsaliki, 2019).

The paper follows a route that may appear at odds with the more established framework originating in the classical controversy mentioned above. Without apologizing for this, I wish to note that: a) it is in the interest of research to have a fresh look at such a fundamental question; b) that my approach is based on important contributions in the line of Post-Keynesian theory; c) and that a novel approach is by definition more tentative than established theories.

In this spirit the paper proceeds as follows. The basic logic of economic expansion is elaborated together with the notion of need and the link to market creation (the second Section below). It then highlights ICT's technological trajectory since the Internet age with an eye to its contribution to the development of markets. This leads to a reconsideration of the role of information in the last two decades (the fourth Section below) and then

to a discussion of the dramatic effects of ICTs on industrial restructuring. Often hailed as a way out of the growth difficulties of advanced economies, these technologies have more recently taken a turn that is arguably incubating a new tendency towards stagnation. That is briefly considered in the last section in relation to other phenomena that contribute to the structural lack of aggregate demand that restraints the world economy.

The specificity of ICTs calls attention to the problems inherent to the potentially virtuous circle driven by technology advances and higher order needs. Consequently, the focus on the demand side does not concern short-run deficiencies of aggregate demand but the long-run changes in demand structure that must combine with sustained growth. This underlies what Palley calls "the demand-generating" process, therefore the question of effective demand in the long run.

THE CRISIS AND STAGNATION TENDENCIES

The flawed neoliberal growth model

In his 2012 book "From Financial Crisis to Stagnation", Thomas Palley argues that long-term stagnation is the inevitable consequence of the 'faulty US macroeconomic paradigm that has its roots in Neoliberalism which has been the dominant intellectual paradigm' (Palley, 2012: p.4).[1] Neoliberalism rests on a combination of a neoclassical growth model with the conventional free-trade model of engagement with the global economy. That dictated policy since the 1980s. The crisis in the last part of the 2000s was the manifestation of the model's structural limitations.

The abandonment of the Keynesian model was replaced by an exclusive focus on controlling inflation, which severed the link between productivity growth and real wage growth. 'In place of wage growth as the engine of demand growth, the new model substituted borrowing and assets inflation' (Palley, 2012: p.34). The downward pressure on wages was combined with weak recovery of employment in the upswing of the business cycle, giving rise to jobless recoveries.

The negative effects on wages and employment depend considerably on the kind of engagement of US capitalism with the world economy. It entailed three forms of 'leakages': a loss of spending going to imports, a loss of jobs driven by corporate globalization, and a loss of new investment. That undermined the generation of demand, and the prospects for shared prosperity in favor of a 'bubble economy' (Palley, 2012: p. 40). And yet it did work for a number of years. But 'the policy triumph of corporate

globalization accelerated this process and transformed it into a financial crash' (idem, p.44).

In sum: for Structural Keynesianism the erosion of the "demand-generating process" in Neo-liberalism drives the tendency towards stagnation.

The new secular stagnation hypothesis

It was however an "architect of Neoliberalism", as Palley labels Lawrence H. Summers, who brought stagnation back into the debate. Since he first raised the question at an IMF conference (Summers, 2015b) the topic has attracted enough attention among mainstream economists to be the subject of a panel at the 2015 conference of the American Economic Association, with contributions by Robert Gordon (2015), Barry Eichengreen (2015) and Summers (2015c).[2]

Summers (2015b) evokes and then dismisses the phantom of the Great Depression, recalling that 'a remarkable job was done in containing the 2007–2008 crisis.' But the problem is no longer one of excessive volatility. We therefore need to revisit 'a set of older and much more radical ideas … that went under the phrase *secular stagnation* … and [that] may not be without relevance to America's experience today' (Italics added).

The point is that monetary policy becomes ineffective when 'natural and equilibrium interest rates have fallen significantly below zero.' Therefore, the policy agenda concerns managing 'an economy in which the zero nominal interest rate is a chronic and systemic inhibitor of economic activity holding our economies back below their potential' (Summers, 2015b). What to do about it is less clear. On the one hand there is the ineffectiveness of monetary policy; on the other the "fallacious pre-Keynesian economic logic that asserts interest rate adjustment can ensure full employment" (Palley, 2016: p. 1).

In a speech delivered at Princeton University in February 2015, Summers (2015a) reiterates these views and explicitly refers to Alvin Hansen. His reflections concern the "profound macroeconomic challenge of the next 20 years in the industrial world, and that is a problem of what I like to call secular stagnation, following Alvin Hansen. … I'm going to talk about the secular stagnation hypothesis, as Hansen framed it. Talk about what's the central element in that, the low level of real interest rates." According to Summers (2015a): "Alvin Hansen prophesied, or addressed, this kind of problem in the 1930s…" Underneath is the excess of saving over investment. That is happening again now.[3]

Hansen was obviously wrong in the sense that what followed was not secular stagnation. However, argues Summers the US economy has been on the verge of stagnation for a long time. It was kept going by a series of bubbles that supported demand.[4]

"Hansen's idea was that there was a shortage of impetus to invest such that there would not be adequate demand to absorb all of the saving" (Summers, 2015c: p. 61). Today the same situation applies. The factors reducing investment demand and those that are likely to increase the supply of savings account for lower equilibrium real interest rates. Therefore, and this is the crucial step, "lower equilibrium real interest rates coupled with low rates of inflation means that the zero-lower bound is likely to be a constraint on achieving adequate aggregate demand much more in the future than in the past. This is the essence of the secular stagnation hypothesis" (Summers, 2015c: p.62).

It is open to question whether this accurately represents the argument put forward by Alvin Hansen.[5] But one thing is clear: Summer argues that a profound change in the understanding of the crisis and in policy is necessary. The central issue is the stimulus to investment. This point, as we will see, does indeed reflect Hansen's main concern.

In any event today there seems to be a consensus that an equilibrium negative real interest rate is the defining trait of secular stagnation (Teulings and Baldwin, 2014). That is what Backhouse and Boianosky (2016) call the "new secular stagnation hypothesis."

Secular stagnation: A 'heresy' in macroeconomics

Hansen's secular stagnation hypothesis, they argue, rests on historian Frederick Jackson Turner's idea that 'the existence of an area of free land, its continuous recession and the advance of American Settlement westward, explain American development' (Turner, 1921: p. 1). Hansen's early work centered on 'fluctuations in investment, driven by population changes and waves of innovation, as the cause of the cycle' (Backhouse and Boianovsky, 2016: p. 949). But the main concern was later with the obstacles to private investment.

In the 1920s when the opportunities for expansion offered by the Western frontier had been fully exploited, the rise of technology in the form of motor vehicles and electricity had sustained demand. 'The Great Crash of 1929,' write Backhouse and Boianovsky (2016, p. 950), 'may have originated in finance and the collapse of speculation, but its consequences were severe because the stimulus from these industries was at an end.'

It was during the 1940s that the idea of stagnation was incorporated into Keynesian Economics and associated with a negative equilibrium full-employment rate of interest. It was Pigou (1943) who first argued that Hansen's stationary state with unemployment featured a negative equilibrium full-employment rate of interest. Later Klein (1947) 'picked up the negative (Wicksellian) natural rate of interest from Pigou and turned it into a main feature of Keynesian economics' (Backhouse and Boianovsky, 2016: p. 956).

The 'heresy in macroeconomics' is back because of the exceptional character of the crisis, but its revival occurs in a "Keynesian" framework married to a negative equilibrium interest rate.

Hansen argued that lower population growth and capital-saving inventions were negatively affecting capital formation and hence the opportunities for private investment. Without the "frontier" such opportunities had to be sought in the exploitation of new technologies. "What proportion of new capital formation …went each year into the western frontier we do not know, but it must have been very considerable. … the outlets for new investment are rapidly narrowing down to those created by the progress of technology" (Hansen, 1939: p.9).

Therefore, more than before, technology was the key to the investment opportunities capable of maintaining full employment. More specifically: "Of first-rate importance is the development of new industries." For we cannot take for granted "the rapid emergence of new industries as rich as investment opportunities as the railroad, or more recently the automobile…" (Hansen, 1939: p.10).

It seems fair to say that this part of the original argument has disappeared from today's debate. And therefore also the question: How do new industries develop? Aside from the reference to technology, nothing it is said on this fundamental aspect. Nor does the "new" secular stagnation hypothesis add anything in this respect.

THE FRONTIER OF ECONOMIC DEVELOPMENT

The hierarchy of needs and the development of needs

It can be argued that because of the end of the stimulus represented by the frontier Hansen moved to consider the alternative represented by technology advances. There is however a frontier that is internal to economic development rather than determined by exogenous circumstances. It lies in the development of higher order needs into new markets.

The focus then shifts the changing structure of production and demand associated with long-term economic development. That is the essence and distinctive feature of Pasinetti's model of growth and structural change (1981,1993). In Pasinetti's model the long-run dynamics of demand is based on the hierarchy of needs. Basic needs will be saturated first and, while they can be satisfied by better quality goods, this will lead to higher level needs, so that new commodities will be added to the consumption basket. Learning on the part of consumers is the force driving consumption into new territory in which higher order needs become the areas of expansion of consumer demand.

Economists have dealt with wants and with the separability of wants, but hardly with needs as such.[6]

Maslow (1943, 1954) presents a hierarchical pyramid of human needs and lists five categories of need: Physiological, Safety, Belonging/love, Esteem, Self-actualization. While the first one includes food and shelter, Safety includes financial as well as personal safety, the others include non-material goods like friendship and intimacy. There is a bottom-up ordering, from basic needs, such as those relating to survival, to "higher order" needs, leading to the realization of personality.

Walsh (1990) argues that Pasinetti, too, assumes that "human nature reveals the presence of an extreme hierarchy of needs", way beyond those of survival to the creative needs of a great artist.[7] However in a market economy the fulfillment of needs is largely entrusted to the commodities that economic progress creates, i.e., an evolving set of produced commodities. That is the material basis for needs fulfillment.[8] It highlights that in a market economy needs are not simply fulfilled: innovation and new commodities develop them. Eating with a fork and knife at the dinner table is not the same thing than eating with your hands sitting on a log.

Within the broad regularity of a hierarchical arrangement the forms taken by the satisfaction of needs (together with their effects on the volume of spending and the evolving structure of demand) largely depend on product innovation. That is why we ought to focus on need development, not purely on the ranking of needs. We are interested in a notion of needs that can explain the growth of markets and industries.

In his reconsideration of economic theory Levine (1981) argues that the notion of needs relevant for the analysis of economic development is that of socially determined needs.[9] Levine draws a distinction between needs that are imposed on the individual as a necessity of nature and needs that are requirements of social life and are manifestations of personal identity.

Not simply attributes of human nature, or of an abstract individual, socially determined needs reflect the specifics of the constitution of individuals within a system of persons and market relations. For this reason, they are inherently subject to development. This implies: a) change and variety in the ways needs are satisfied, and therefore in consumption; b) no a priori determination of needs, but instead the recognition that they are shaped in conjunction with the systems of commodities and social practices of consumption.

The development of needs, latent in the idea of their social determination, is the potential exploited by investment and the source of market creation. The rate of growth of the market in the aggregate depends on total net investment, but investment directed at developing the market is more important than investment determined by the current rate of market expansion, for it requires establishing a product within the structure of consumption and creating the income to buy it.[10]

The market-creating effect of investment depends on the exploitation of what Levine calls "the latent structure of the market", i.e. the potential implicit in the development of socially necessary needs. That potential motivates what we might call development at the edge.

Development at the edge and autonomous investment

Development at the edge concerns the possibility of developing needs, and therefore exploiting new opportunities that can counteract market saturation. We are therefore concerned with the development of needs consistent with market expansion and private accumulation; and the relationship between investment and market development, i.e. the demand-creating effects of autonomous investment.[11]

In its initial stage, investment, rather than serving the existing market, is aimed at defining and establishing a new product in the consumption structure, as a novelty and a market niche. In that sense investment drives the development of the market. We can also envisage a sort of pre-development phase, in which R&D endogenizes science and technical progress into firms' strategies of market development, in light of a still broad speculation on what the potential market can be. When that is more clearly defined the first phase of market development begins.

When the initial investment is validated by the final specification of the product and the rise of a new market, albeit conceivably small and still not fully formed, we can envisage a second phase. Investment responds to the observed evolution of the market. In this second stage we can say that change in consumption feeds back on investment and structural change. In

a third phase of maturity this feedback is then complicated by the different course that product innovation and market development can take, with the pressures of market saturation setting limits and providing incentives to both.

In the stage of market development, investment establishes an innovation as a viable consumption alternative. Then the market expansion stage responds to the evolution of consumption. The process culminates in the maturity phase. In a sentence: investment first "creates" the market, and then responds to its expansion. In the aggregate, market expansion will depend on the innovation introduced, the pace of diffusion and the depth of the transformation it entails. This development process creates income that in principle could be spent to buy the new products, transforming potential market into actual market.

Development at the edge has a definite Schumpeterian flavor. It focuses on the basic mechanism of expansion in the abstract, as Schumpeter does in *The Theory of Economic Development* (1934). However, the focus is on the demand-creating effects of autonomous investment, not on any notion of entrepreneurship as such, even less on the saving role of innovation and the "free market".

The focus is on the investment that expands the market at the frontier of need development. Innovation and the development of technology, often regarded as purely supply-side factors, are incorporated into firms' growth strategies in a sequence controlled by the effort to expand their market. In this sense they are demand-driven. The development of the market and the rise of new markets determine in the aggregate the long-run growth of demand (Nell, 1998).

Net investment is the driving force of market expansion; it implies and requires the evolution of consumption. Development at the edge is therefore the fist step for transforming consumption patterns in ways consistent with market expansion validating investment and innovation. The ultimate purpose of the scheme above is therefore contributing to a long-run theory of effective demand.

The same interest for the long-run theory of effective demand has led some authors (Cesaratto, Serrano, and Stirati, 2003) to argue that "all investment is induced". Should we then forsake the notion of autonomous investment altogether? These authors insist on the Neo-Schumpeterian character of the notion. I would argue that in the theoretical scheme above that is not the case. Neo-Schumpeterian theory has no demand side based on effective demand.[12]

Finally: the above does not imply in any way that private investment alone is capable of preventing stagnation. There is indeed a very considerable role for public investment. But that needs to be considered separately.

Stagnation within the core

Our hypothesis is that it has become increasingly difficult to transform needs into markets following the pattern outlined above. By and large, it characterized the expansion of industrial economies after WWII, or the "Golden age". The Golden age largely coincides with the maturity stage (1960-74) of the fourth Kondradiev wave, associated with oil, automobiles and mass production (Perez, 2003).

The difficulties of that type of development emerged in the 1970s: "the expansion policy generated inflation and over-investment in particular sectors of the economy" (Van Der Wee, 1991: p.161). Our focus is on the sectoral composition of aggregate growth. However as pointed out by Marglin and Schor (1991), a number of social and economic factors contributed to the end of this particular phase of capitalist development. In particular one should recall the pressure created by social conflict, inside and outside the factory, and the rising militancy of the working class.[13]

Since the 1970s a profound change has set in. In particular, the stimulus to investment and market expansion had to come from other sectors-than those that dominated the Golden age.

The expansion of the 1980s was weak by post-war standards (The reference is to the US economy and in particular to peak- to-peak cycles of 1958-66 and 1966-73, see Gualerzi, 2001). It was followed by the boom and bust of the new economy in the 1990s. The recovery after the burst of the Internet bubble in 2000 incubated the financial crisis of 2008 and the recession. And now, a bit over a decade later, we have the troubling comments by Larry Summers on the necessity to look for the roots of the crisis in a structural tendency to stagnation.

In searching for causes of a regime of modest growth rates bordering on stagnation it seems appropriate to look at the long-term changes in the structure of demand. That involves the increasing importance of higher order needs and the particular way in which they are developed by market forces.

We are going to rely on an admittedly simplified definition of higher order needs (customarily associated with goods and services with a high income elasticity of demand): higher order needs are those beyond basic needs such as food, clothing and shelter. These include health, education,

entertainment, travel and tourism, transportation and communication. We are therefore dealing with needs underlying broad categories of spending.

In this exploration we will focus first on a set of higher order needs that came to the fore precisely because of the development of ICTs; we will then examine how especially after the flop of Internet boom of the second part of the 1990s these technologies are now driving a massive process of restructuring of many industries serving higher order needs.

INFORMATION AND THE DEVELOPMENT OF ICTS

The trajectory of the ICTs sector and the Internet boom

With the Internet, ICTs reached in the 1990s a new stage of maturity. The dramatic improvements of computing capacity were now linked in a network. From the notion of distributed computing capacity, we moved into a different scenario, that of a technological infrastructure supporting a new development of services and products. It had been from the beginning a development driven by the private sector (Samuelson and Varian, 2002).

ICT-related private investment was one of the driving forces of the expansion of the second part of the 1990s.[14] The investment boom was combined with (admittedly overblown) expectations of new markets.

But the Internet was the latest development of a long-term technological trajectory. According to Dosi (1982) a technological trajectory depends on the interplay between scientific advances, economic factors and institutional variables. It is marked by innovations in a given field. In much of the literature the focus is on the position of a firm within a technology trajectory. If we extend that view to consider the effects of innovations on promoting need development we can work with a "market augmented" view of technological trajectories.

The Internet made actual the development potential of higher order needs such as information, communication, and interactivity. "Access" by means of the Internet became the channel by which these needs were brought to an entirely new level of development. A tremendous market opened up, making actual an aspect of needs crucial to an understanding of modern society, with huge implication for choices in terms of consumption options, lifestyles, mobility and location.[15] In this perspective the anticipation of structural changes in demand, i.e. new markets developing at a very rapid pace, is the ultimate reason for the dot-com bubble, "irrational exuberance" and "over-investment" (Stiglitz, 2003). According to Carlota Perez (2003) that is the "frenzy" phase (1987-2001) of the age of information

and telecommunication. The "frenzy" was over when the New Economy bubble burst in 2000.

The Internet research-industrial complex: consolidation and the rise of the Internet Giants

We can observe that the Internet boom was a relatively short phase of the development trajectory of the ICTs. After the burst of the "new economy" bubble, the recovery was rather quick.[16] The real estate bubble that led right into the financial crisis in 2008 appears to have worked as the substitute for the failed technology-driven boom. But the diffusion of the Internet and its impact on economic and social life continued.

The development process however took a different direction. It increasingly concerned the massive penetration of ICTs into markets involving higher order needs. That encompasses major phenomena of industrial restructuring of information intensive industries (culture, media), but also entertainment, travel, and tourism. Favored by rising computer literacy and the presence of computers in the home, the same forces of computerization and access continued affecting lifestyles and consumption activities. Information, communication and interactivity became truly mass consumption phenomena. That was reinforced by new consumers' durables (smart phones) and software applications. We observed a continuation of the technological trajectory and a consolidation of the ICT sector in a powerful new research-industrial complex.

The technological trajectory was marked by the rise of on-line services and auctions, the importance achieved by search engines and web services attracting advertising money. New ICT products such as the Ipod and the Ipad and the newer generations of cell phones (with Apple's Iphone in the lead) further enlarged the options for consumption and communication. A novelty was the evolution of the network culture within a pervasive change of social life. We can note in particular the move towards social media and social networking, and the diffusion of blogs, interactive websites operating as channels of communication, debate and aggregation.[17] Social media further established access and communication as key aspects of network culture and social life.[18] The market they helped to create is a by-product of the "need" of "being in contact" combined with the business model centered on "free service". Their business has become profiling and data mining, i.e. extracting and selling information to clients, often other Internet companies, for marketing and production purposes.

Consolidation of the ICT sector meant more solid companies operating

online and also a new phase of outsourcing, by both technology firms and major users.[19] It meant especially the rise of a few major companies that increasingly dominate technology development, applications and markets evolution.

Indeed, the incessant march of ICTs is marked by the rise of the new Internet giants (Schiller 2007, 2014). Aside from manufacturers such as Cisco (networks routers) and Intel (the world leader in semiconductors) the well-known names are Apple, Google, and Amazon, all now major global companies.

Apple has linked its name to some of the most successful and innovative consumer durables. Its leadership in smart phones immensely enlarged the very notion of service associated with cell phones. Only in that sense is it a newcomer, since it was a major company since the start of the PC age. In 2018 it celebrated its achievement of one trillion dollars in market value.

Google, now part of the parent-company brand Alphabet, established itself as the leader in search engines shortly after it was founded in 1998. It became the portal to everything available on the web, from specialized knowledge to video, from maps to libraries of all kinds.[20] It became an unbeatable channel for advertising and data-mining that are essential sources of revenues. It is now a leader in research and services: Gmail is the most common free e-mail service and Android the operating system of the great majority of smart phones.

Amazon, founded in 1994 by Jeff Bezos, has brought E-Commerce – one of the first commercial uses of the Internet- to a mature stage. Combining Internet, automation and work organization, the company moved from the delivery of books to the delivery of virtually everything, giving a boost to online sales. In 2018 it became a trillion dollar company, managing a large workforce deployed in several hubs worldwide.

Not all the giants are newcomers. Microsoft, the world leader in operating systems and software, successfully accomplished under the CEO Satya Nadella the transition to the Web by means of acquisitions (Nokia, Linkedin) and a new orientation to software and applications.

And in the latest phase of development of the ICT sector, some social media companies have also risen to the status of giants. Here the most familiar names are Facebook, Twitter, and Istagram.

INFORMATION AND DIGITAL CAPITALISM

The study of information remains a rather esoteric field. Economists are usually content with identifying ICTs as the drivers of productivity growth

(Stiglitz, 2003). It is here sufficient to recall that ICTs are concerned with the production and distribution of information, indeed with the "commodification" of information in digital form. That includes the commercialization of what had once been public goods.

Schiller (Schiller, 2007, Chapter 1) argues that the commodification of information is at the heart of modern capitalism. Baran and Sweezy dismissed the economic role of information, but the evidence is that modern capitalism has massively invested in ICTs, the growth pole of digital capitalism.[21]

The "vectors of commodification" are the industries that rely on information as a primary input or component of output. These are being transformed by the pervasive presence of ICTs and the Internet. Commodification has become visible "in sectors wherein previously it played only a limited or indirect role…. Capitalism has been sustained by ceaseless enlargement of markets, and that continues today in information and culture" (Schiller, 2007: p.23).

The telecommunication and the culture industries, including media (and advertisement), are possibly the most paradigmatic examples of such a restructuring. In each case the penetration of ICTs and the Internet led to the crisis of the industry and to a profound restructuring.

The crisis of traditional telecommunications began with local computers networks. It went all the way down to the domination of mobile phones over landlines. The process sped up when the Internet took off, sustained by the massive investment of the business sector (Shiller, 2007: p.79). A good example is the displacement of phone companies by the VOIP (voice over Internet providers) and Skype in particular.

For the culture and entertainment industry, convergence is the key word. Although the potential of digital signal coding, processing and transmission were known, the process of change could not become a massive phenomenon "until technological convergence within functioning digital networks and services could be actualized" (Schiller, 2007: p.108).

The story has in fact two sides: on the one hand the decline of media-products (VCRs and DVD players, CD and MP3 players, game consoles); on the other the development of distribution networks. New transmission media, such as satellites, optical fiber and especially wireless systems enabled voices, images and data to be carried, rather than only one of these modes. As a result, "communication infrastructures are becoming multifunctional as they assimilate versatile digital electronics" (Shiller, 2007: p.103). The most recent result is "platforms", that is, "multipurpose

distribution systems" (idem, p.109).[22]

What we observed is therefore the erosion of the mass market of conventional radio, television, newspapers, and magazines. Since the 1990s, starting in the US, the largest and most dynamic domestic market, "convergence steamrolled across the world." The evolution of the movie-making industry, exemplified by Hollywood, indicates that culture and entertainment conglomerates are assimilating digital technology as the fundamental tool of their business.

More recently wireless technology (WIFI, mobile telephones and other wireless devices) has undermined previous new products (notebook computers, IPOD). The fierce competition over price, but also quality and service between top of the line I-phone and imitators mirrors the new standard: Smart phones have become a multimedia screen thanks to the proliferation of apps and cloud computing is making the unconnected PCs obsolete.

INFORMATION AND INDUSTRIAL RESTRUCTURING

Putting these phenomena in perspective we reach into the fundamental development question, which is not the commercialization of information, nor the development of the new market related to the need for information, communication and interaction. What comes to the fore is the reshaping of the industries serving a broad category of higher order needs. The ICT-Internet complex now dominated by some large companies - the backbone of digital capitalism – attains a new role as it drives the restructuring.

First on line are of course the industries in which information is in a broad sense the very content of the output. These are in information-intensive industries whose outputs are cultural products (books, music, videos and movies), therefore the culture, media and entertaining industries. Second are those industries, typically consumer services, such as banking, travel, tourism, in which the production of services crucially depends on information routines (inputs), thus the information-manipulating industries.

Indeed, the commodification process highlights that information is at times a final product, at times an intermediate input, a means rather than an end (Schiller, 2007, p.140). All the same, the reorganizing of these industries is driven by the technology sector managing information. It has reached a level that was simply unconceivable only a few years ago and it is proceeding along new directions.

An even more far-reaching phenomenon is maturing. It concerns industries that in principle are not information-intensive (such as trade,

distribution and other consumer services). Here digitalization and the Internet are precisely what make these industries "information-intensive" in so far as the redesigning of business activities reflects the possibilities uncovered by information technology.

Food chains are a good example. After transforming the retail sector, Amazon is now moving into the entire sector of mass distribution. In 2017 it took over one of the largest organic food chains in the US, Whole Foods. In the same way the virtual bookstore displaced the traditional bookstore, supermarkets are threatened on their own turf by an aggressive strategy that combines pricing, digital payment and consumers profiling. All of which by means of a private company digital platform.

The latest turn in industrial restructuring is indeed marked by the rise of digital platforms. While fundamental to "convergence" in the media industry, more recently they have been moved into labour intensive, low-skill services and the so-called "gig-economy". An example is the food delivery industry.[23] UBER is another striking example. Its stellar performance in the stock market in 2019 reminds us of the expected move into the urban transportation sector, private and public (Mass Transit).[24]

THE ICT COMPLEX AND INDUSTRIAL RESTRUCTURING

If these are the admittedly general lines of the development of the ICTs-Internet complex, in the US in particular, what matters here is the change in its macroeconomic role. In two decades the new frontier of need development has turned into a formidable enabling tool for the restructuring of industries and redesigning production processes.

It is well on its way and will conceivably reach a new peak in the years to come. Investment in technology and by the technology sector therefore has a different macroeconomic relevance: it does not expand market and industries in the aggregate; it drives instead an ongoing process of restructuring that redefines industries and markets. That affects primarily but not exclusively the industries in which information is a fundamental primary input or an important aspect of output. This is a huge market for the ICT companies, not necessarily for the economy as a whole.

There are a few admittedly very general reasons for that. ICT products reached the stage of mass production and diffusion. That however does not require the massive investment in plant and equipment typically associated with the expansion phase of market development. Hence the mass market of consumer electronics and Internet access are not comparable to the mass consumption that marked the success story of the Post-war

period.

Listing the factors reducing investment demand, Summers speaks of the slowdown of population growth, the decline of the relative price of capital goods that reduces "the amount of savings that are absorbed to satisfy a given real investment" and the "excess cash" of technology companies like Apple and Google. He notes: "Fifteen years ago it took $5-$10 million to start a Silicon Valley start-up. Today it takes $500,000-$ 1 million. The capital cost of giving everybody a telephone in the cellular era is much lower than it was in the land-line era, where wires had to be constructed into each home." (Summers, 2015b: p. 62) He argued along the same lines in 2014 adding: "Whatsapp has greater market value than Sony, with next to no capital investment to achieve it" (Summers, 2014: p.69).

However, that is only one of the problems. Although they require more modest demand for capital equipment, ICTs are nevertheless driving dramatic structural changes. This goes beyond the reasoning around the interest rate. It opens another kind of investigation. Structural change can generate growth only if combined with new market creation. But ICT–driven structural transformation is instead predominantly redefining the satisfaction of needs and markets in a way consistent with the growth of the ICT-Internet complex only. This is precisely the case of non-expansive "transformation". It does not activate other industries and markets. Indeed, it typically "cannibalizes" existing industries and destroys their previous market.

In these circumstances autonomous investment fails to deliver its most important effect: the positive feedback effect on aggregate investment and growth. Investment is primarily an ICT phenomenon with the new giants playing a dominant role. At least this seems the dominating process in advanced industrial economies.

To be true the international reorganization of production does imply that investment demand, typically creating productive capacity and employment, may be visible in other countries involved in the manufacture of ICT products (Van Neuss, 2018). This means that the ICTs' industrial lines of production can create expansion in the "old-fashioned" way, although not in the core economies.

In the advanced industrial economies what appears most relevant is the fundamental ambiguity of need development in the information age and the digital landscape. A very large process of change it is no longer combined with a robust stimulus to growth. Indeed, in the last two decades the ICTs' trajectory has shown a fundamental change. Increasingly ICTs' massive

impact runs through a dramatic process of restructuring involving many industries serving higher order needs. This latest phase sets ICTs' development apart from other new products and epoch-making innovations. The ICT-Internet complex internalizes into its own growth the restructuring of industries. Can it more than compensate for the shrinking-displacement effects on the structures, plant and equipment of many industries? Familiar places tend to disappear: fewer bookstores, movie theaters, travel agencies, printing and publishing facilities.

We have found a good correspondence between this transformation and the phases identified by Carlota Perez (2003) in the discussion of Kontradiev cycles. Referring once again to that periodization, it could be argued that the deployment phase of the fifth Kondradiev cycle encounters a problem that is hardly considered when perceived at all.

STAGNATION TENDENCIES RECONSIDERED

All the above should be seen within the larger question of the causes of the resurfacing of stagnation tendencies. The paper focuses on one major phenomenon of structural transformation in industrialized economies.[25] It certainly speaks to the erosion of the demand generating process pointed out by Palley and more broadly to the structural lack of aggregate demand that restraints the world economy.

To better understand its role, it should be stressed that aggregate demand is undermined by a number of factors: A long-term trend towards an increasingly uneven income distribution, the stagnation of wages, and the rising burden of debt. All of which is happening while there is no fundamental change in the way finance dictates macro policy. These questions are the topic of the debate on inequality and its negative effects on growth prospects. Quite outspoken on this is Joseph Stiglitz (2012), while another Nobel laureate, Paul Krugman (2009), has forcefully argued against the turn taken by macroeconomic theory and policy. Dealing with stagnation and its possible causes Barba and Pivetti (2012) maintain that, since the 1980s, worsening income distribution has caused aggregate demand (and investment) growth to wane.

But aggregate demand is also negatively affected by employment and compensation trends.

The technology sector and the Internet giants do create highly qualified professional jobs, but also many jobs with low compensation, harsh working conditions and little bargaining power of workers, as most clearly seen in platform capitalism. In any case the creation of jobs by ICT companies

clashes with the displacement of workers in the industries being restructured and the colossal process of disintermediation made possible by digital platforms that affects primarily distribution and retail.[26]

The prospects of employment look even more dramatic considering other ICT-related developments that more comprehensively describe the evolution of industrial systems, such as automation and robotics, Artificial Intelligence and "The Internet of Things". There are for indeed many indications that robotics and automation might lead to a massive displacement of workers. As one can easily see that employment trends bears a close relationship to structural transformation and industrial restructuring. It depends which viewpoint one takes, but certainly the negative effects on employment (and compensation) feedback on the possibility of stagnation.

But among the causes of stagnation tendencies is also a misdirected economic policy. Here it is necessary to recall the insistence especially in Europe on balancing the budget and cutting deficits as a way to reabsorb public debt. In other words, the turn of macro policy towards austerity and fiscal restraint is the first candidate to explain the tendencies towards stagnation. Summers recalls that Europe "is now likely approaching its third recession" (2015b, p.63). It certainly helps explaining the differences between the US and the Euro-zone in the pace and strength of the recuperation after the 2007-2009 recession. Affecting aggregate demand fiscal restraint reinforces stagnation tendencies.

CONCLUDING REMARKS

The question of stagnation tendencies is too broad to admit a single explanation. To those briefly recalled above the hypothesis about ICT-driven restructuring adds a structural transformation dimension. The hypothesis argued in the paper descends from the focus the long-run changes in the demand structure and the pattern of economic development

It highlights a problem internal to the relationship between ICTs development and higher order needs. Higher order needs, such as information, communication, and interaction were brought to an unanticipated new level of development by these technologies. They no longer act as a driver of aggregate market expansion because the control over the production and distribution of information has become the enabling tool for a massive process of industrial restructuring, the only certain expansive effects being the growth of the ICT complex.

The deployment of the technological trajectory of the one technology sector often hailed as a way out of the growth difficulties undermines the

"old fashioned" logic of market expansion. Digital capitalism might not be the answer after all, at least not in the form we have seen in the last two decades. In particular the development higher order needs may require public intervention and policies.[27]

Roubini (2020) argues that a Greater Depression will follow later in this decade because of "ten ominous and risky trends." Some of them are directly related to technology, in particular the acceleration in the pace of automation and the increasing integration of the "US private tech sector into the national-security-industrial complex." These are reasons for an even more pivotal role for ICTs and the Internet Giants. The changes imposed by the epidemics such as "social distancing" and smart work are likely to work in the same direction, reinforcing the kind of structural transformation examined in this paper.

If the dominance of ICTs results even only in part in the kind of industrial restructuring discussed in the paper, there is a serious problem indeed for technology-driven growth and any policy that does not contemplate fundamental economic and institutional changes. It is similarly reasonable to argue that it contributes to maintaining a low-growth regime punctuated by brief accelerations and short-lived recoveries, i.e. what Alvin Hansen called secular stagnation.

To be sure, it is hard to establish firm conclusions, but we are not dealing with an already discredited prophesy, but with a fundamental issue for contemporary Capitalism. Much debated phenomena such as unemployment and inequality are linked to it and it is likely to exacerbate them.

NOTES

1. Palley argues that a fundamental role is played by "bad ideas", which are located in political philosophy as much as in economic theory. The turn in economic theory and policy was part of a change of intellectual orientation that had its roots in the work of F. A. Hayek and Milton Friedman on individual freedom and the free market.
2. Summers consistently argues from a demand side perspective. Robert Gordon insists instead on supply factors: demography, education, inequality and debt, following up on his assessment of the "headwinds" contrasting economic growth (Gordon, 2012).
3. "there has been a pronounced increase in private savings, suggesting an increase in the savings propensity, at the expense of a diminution in the investment, and also an increase in private savings, and a decrease in the level of investments" (Summers, 2015a).

4. "How long has it been since the American economy enjoyed reasonable growth, from a reasonable unemployment rate, in a financially sustainable way? The answer is that is has been really quite a long time, certainly more than half a generation" (Summers, 2015a).
5. The shortcomings of the current debate on secular stagnation are examined by Hein (2015) who suggests going back to Steindl approach.
6. Ironmonger (1992) argues that Marshall's reference to satiable wants and diminishing marginal utility resulted in the loss of the original distinction between wants and utility. Wants arise from physiological and psychological needs. They are the object of satisfaction, rather than "a single desire, happiness or utility." Marshall distinguishes for instance between wants and activities, as recalled by Steedman (2001, p. 142) and discussed in Parsons (1931).
7. Needs that are basic today might have not been such in the past. Indeed, structural dynamics implies a basket of necessaries and conveniences of an improved and more cultivated life (Walsh, 1990: p.375).
8. It should be noted that assuming an extreme hierarchy of needs implies that not all needs can be satisfied or developed by means of commodities.
9. See similarities and differences with respect to the discussion of social needs in Lavoie (1994).
10. Levine argues that the rate of growth of the market in the aggregate depends on "the structure of expansion". The latter combines the idea of structure with that of investment as the moving force of transformation. "It is as if the putting up of a house, rather than living in it, were the purpose of a house (which is, appropriately enough, the case so far as the contractor is concerned" (Levine, 1981, vol.II: p. 184) The structure of expansion is substantiated in the process of uneven industrial development, the transformation of consumption patterns and the creation of uncommitted income, that is, income that is not tied to a given structure of consumption. While the wage bargain may have an effect, the generation of uncommitted income "is always the work of competition and accumulation."(idem, 1981, vol. II: p.224), that is, the creation of uncommitted income is primarily part of the effort to develop the market.
11. The notion of "innovative investment" has been introduced to explain this particular kind of autonomous investment (Gualerzi, 2010: p. 29-30)
12. Some years ago Christopher Freeman (Freeman et al., 1982) argued that the Neo-Schumpeterian theory was missing a demand side and noted that the only attempt to integrate demand into the analysis of growth was that of Pasinetti. In the last twenty years Neo-Schumpeterian/Evolutionist theory attempted to address the question of demand. That has brought into focus the question of satiation and wants (Witt, 2001). However this has not led to a full discussion of the demand side of long-run growth. Evangelista (2018) argues that Neo-Schumpeterian theory remains dominated by the supply side. More recently Dosi et al. (2010) have elaborated on the relationship between

aggregate demand dynamics (in a Keynesian fashion) and technical progress (in a Schumpeterian fashion). The analysis is based on the agent-based methodology. It is not immediately clear what that contributes to a theoretical treatment of effective demand.

13. There is large literature on these concurring factors. For an interesting macro analysis see Setterfield and Cornwall (2002).
14. There is considerable debate on the causes of the expansion of the 1990s and in particular opinions differ on the importance of new technologies (Stiglitz, 2003; Pollin, 2003). Admittedly it was caused by a series of concurring factors.
15. It can be argued that the new technological infrastructure has similar and actually broader effects than of the development of transportations networks.
16. Data on fixed gross capital formation in the US show a clear slowdown and recuperation in the 2000-2006 interval, and then a collapse after 2006. A very modest recuperation begins in 2010 (World Bank, 2019)
17. Lovink (2007) has pointed out the ambiguity of these social trends. They appear to be alternatives to market determined models of life styles and cultural consumption, but they are also resources for new products and new business models.
18. In 1995 Nicholas Negroponte argued that a bit "is a state of being: on or off, true or false up or down, in or out, black or white (Negroponte, 1995: p. 14). The spread of Internet access would create a new, global social fabric. "The true value of a network is less about information and more about community" (idem, p.183).
19. The demand of additional computing capacity came from the financial sector, increasingly dealing with sophisticated products, such as futures and derivatives. Similarly the expanding energy desks of major financial companies required more and more sophisticated tools to manage the growing complexity of energy markets.
20. Within an overall strategy of acquisitions it took control in 2008 of YouTube.
21. Post-industrial or information society are therefore all but misleading notions, emphasizing "the transcendence of industrial society for what in fact has been a historically continuing process of commodification" (Schiller, 2007: p.35).
22. Following the distinction between atoms and bits Nicholas Negroponte (1995) anticipated much of the current industrial transformation. Bits could easily carry data, voice, music and videos, "sounds and picture".
23. Well known names in the food delivery industry are Deliveroo, Foodora (DeliveryHero), but also Foodracers, Moovenda, Prestofood, Glovo, Just Eat, Ubereats (UBER). In 2018 UBER moved to acquire Deliveroo. The industry has been in the headlines for labour conflicts, concerning in particular whether the riders are subordinated or independent workers. The same issue was raised with respect to the UBER drivers.

24. On UBER see the recent book by Mike Isaac, *Super Pumped: The Battle for Uber*, The New York Times, 2019.
25. A separate analysis is necessary for developing economies.
26. Amazon CEO Jeff Bezos argued that the company was creating many new jobs. Citing independent reports Deliveroo claimed it created 13,000 jobs in 2017. Not surprisingly the companies are not concerned with the net effects in the aggregate. Not to mention the fact that the newly created jobs are often unskilled, poorly paid, highly insecure.
27. This is another angle from which to look at the now widespread call for a rethinking the role government (Mazzucato, 2013).

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