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**HERE, THERE AND EVERYWHERE:**  
evidences of tectonic changes and transition to a new phase of capitalism<sup>(\*\*\*)</sup>

**ABSTRACT**

This paper conjectures that there are tectonic changes taking place in the global economy, but that these changes are not being confronted by institutional reforms to match them. The identification of those tectonic changes is an introduction to a qualification of current institutional mismatches. This paper is organized to capture features of the current tectonic changes, trying to read them in the post-crisis global conjuncture. First, quantitatively, the global economy has recovered from the fall during and after the crisis of 2007-2008. In general, indicators have returned to the levels before the crisis, and some eventually are higher than before. However, qualitatively, the post-recovery situation is not the same as the pre-crisis framework: some sectors leapfrogged others and some regions performed better during and after the recovery - a movement towards Asia. Those changes, however, have not pushed institutional reforms to accommodate them. There is, therefore, a contradiction between change and continuity in the global economy.

**KEY WORDS:** crisis; metamorphoses of capitalism; systemic turbulence

**JEL:** P16, P51

(Preliminary Draft Version)

Rio de Janeiro, London  
(23 May 2015)

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<sup>(\*\*\*)</sup> This working-in-progress paper is prepared to be presented at the Workshop on *Crises and Transformation of Capitalism: Marx's investigations and contemporary analysis* (King's College, London, 27-28 May 2015). This manuscript is part of two Research Projects: a project coordinated by Leonardo Ribeiro and funded by CNPq (Edital Universal, Processo 459627/2014-7), and a project coordinated by Eduardo Albuquerque and funded by CAPES (BEX 1669/14-1). This version did benefit from Professor Alex Callinicos' (King's College, London) helpful comments, suggestions and criticisms on other manuscripts related to this research project. The usual disclaimer holds.

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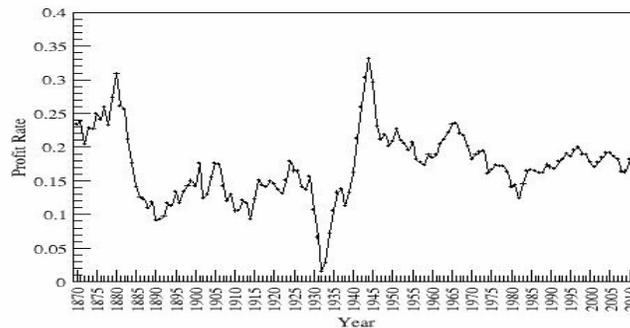
## INTRODUCTION: POST-CRISIS ENVIRONMENT AND THE RETURN OF SECULAR STAGNATION

This paper conjectures that there are tectonic changes taking place in the global economy, but that these changes are not being confronted by institutional reforms to match them. Therefore, the identification of those tectonic changes is an introduction to a qualification of current institutional mismatches.

This introduction presents four preliminary points that inform one preliminary discussion on the prospects of the return of the so-called "secular stagnation" (Summers, 2014).

First preliminary point: flexibility in capitalism long-term dynamics. An investigation on the behavior of the rate of profit in the USA from 1869 to 2011 (see Figure 1) shows how the "interplay between tendency and countertendencies" to the fall of the rate of profit (Callinicos, 2014, p. 270) is a source of strong flexibility. In the last 150 years, the capacity of capitalism to create countertendencies to the fall of the rate of profit has been a strong underlying force to this flexibility (Ribeiro, Loureiro et al, 2015).

FIGURE 1  
Rate of profit in the United States  
(1869-2011)



SOURCE: Duménil and Levy (2015)

Second, crises are moments of adjustment for capitalism. Crises are part of the capitalist dynamics, again as a result of the "interplay between tendency and countertendencies" to the fall of the rate of profit (Callinicos, 2014, p. 270): they grow out of the inner system's logic as a rebalancing tool. A costly rebalancing tool, in social, human and economic terms, but a very effective restructuring tool. The creation of institutional

mismatches is part of capitalist dynamics - mismatches that grow out of its technological dynamics, source of unequal development with other dimensions of the system such as finance, state, and geopolitical arrangements. Crises are at the pinnacle of those institutional mismatches. As such, they trigger institutional responses (Ribeiro et al, 2015a).

Third, the nature of last crises and the rescue operation: the multicausal nature of the 2007-2008 crisis may be grasped by the special number of the *Cambridge Journal of Economics* (2009) - analyses focusing the financial, the technological, the institutional and the international dimensions are presented. BIS (2009) describes the crisis spiral, which ends reaching the global financial system: "from August 2007 the stress in the financial system increased in waves. By March 2008, Bear Stearns had to be rescued; six months later, on 15 September, Lehman Brothers went bankrupt; and by the end of September, the global financial system itself was on the verge of collapse" (BIS, 2009, p. 4). This global financial crisis has been contained, according to the BIS because "in response, governments conducted successive rounds of intervention on an unprecedented scale" (BIS, 2009, p. 16). Beyond this quantitative element - the scale of this unprecedented intervention - there is a crucial qualitative novelty in this rescue operation: a cross-border coordinated rescue operation (BIS, 2009, p. 30).

Fourth, the post-crisis conjuncture and the lack of structural reforms. Seven years after the beginning of the crisis, it is possible to summarize the main evaluations as pointing to a conjuncture in which the crisis has been contained but not yet overcome. As the BIS puts forward, "the overall impression is that the global economy is healing but remains unbalanced" (BIS, 2014, p. 10), the "longer-term outlook is far from bright" (p. 8) and the global economy is still in "search of a new compass" - the title of the first chapter of the 2014 Annual Report (p. 7). Reports, prepared by the specialized press and by mainstream institutions and organizations, have been focusing in post-crisis problems, and they seem to concur in identifying a future that is "bleak" - an adjective used by a *The Economist* in a review of Kissinger's book (*The Economist*, 6 September 2014, p. 80). Martin Wolf (2014, p. 325) writes that "[i]t is easy to believe that the scale of current rescue operation might lead to bigger crises down the road, as critics argue". Lawrence Summers may also help to form a diagnosis of the predominant feeling among important institutions, as he has resurrected the concept of "secular stagnation", according to him "in response to

the observation that five years after financial hemorrhaging had been staunched, the business cycle was beneath what was thought as normal levels of output" (*Financial Times*, 8 September 2014, p. 11).

Those four preliminary points put forward an initial question: is capitalism heading towards a secular stagnation?

The return of the ghost of a "secular stagnation" is part of post-crisis debates (BIS, 2014, p. 7). To support or debate views on this "secular stagnation", the elaboration of Robert Gordon (2012, 2014) has been widely used - see Wolf (2014), Summers (2014), and Streeck (2014). Gordon's innovation slowdown is articulated with the return of a "secular stagnation" - BIS (2014, p. 58) cites Gordon's position as a "pessimistic view".

To start an evaluation the innovation slowdown, it is important to stress a point reiterated by R. Gordon: his discussion is about the US case. Gordon (2014) answers critics and disentangles many subjects that he had put together in his first paper. Regarding the past, it is very clear that R. Gordon's papers are not about innovation in the capitalist dynamics, but a more limited discussion of the phase that was led by US. What R. Gordon calls First Industrial Revolution (IR#1), based on steam energy, was UK-based - in the first paper, R. Gordon (2012, p. 4) presents data showing UK as the leading nation until 1906, "when the US caught up". But IR#1 is not the focus of his analysis, that concentrate in IR#2 (related to electricity, combustion engine and wireless communication, US-based) and in IR#3 (computers and internet, US-based). His evaluation of the "faltering innovation" in the US is supported by comparisons of growth data between four different phases of US growth: 1891-1972, 1972-1996, 1996-2014, and 2004-2013 (2014, p. 5). In his analyses, he combines general evaluation of the nature of technological change of IR#2 (identified as "multi-dimensional") and IR#3 ("uni-dimensional") - without any references to neo-Schumpeterian literature. Probably, R. Gordon (2012, 2014) underestimates the changes caused by the technological revolution of the ICTs (Freeman and Louçã, 2001), but this is a topic for other discussion (see topic III, below). But, his major point are the "headwinds" that "slow future growth" - demographics shifts, education, inequality, and debt, with two additional headwinds mentioned in the previous paper, globalization and energy. R. Gordon stresses that all four headwinds are very specific to the US case - in other words, more appropriate to this manuscript, one may think that they are very specific of the US "variety

of capitalism". The problems with demography - this could be a more general important structural change in capitalist societies, advanced and emerging - are not interpreted as challenges to the current innovation system, which could be reoriented under a new determinant of technological progress: expansion of life expectancy. But, as the two other headwinds - education and inequality - they are directly associated to the institutional arrangements related to the US welfare system (Esping-Andersen, 1990). The downgrading of educational attainment and the rise in inequality - connected with a very fine observation from R. Gordon (2014, p. 17) related to how the US structure of health system negatively affects growth - are not problems of innovation as such, but are consequence of a very specific social and economic structure. This evaluation is the finest point in R. Gordon analysis.

Regarding the future of innovation as such, probably this is one weak point is his evaluation. Although he is correct in his criticism of "techno-optimists" (such as Brynjolfsson and McAfee, 2014), his overall evaluation could be more carefully organized. R. Gordon forecasts "medical and pharmaceutical advances", "small robots, artificial intelligence, and 3D printing", "big data", and "driverless cars" (pp. 31-34). The list may be biased by the lists prepared by "techno-optimists" (it is noteworthy to point the lack of nanotechnology and the underestimation of energy-related innovations)<sup>1</sup> and by the frustrations related to high (and misleading) expectations from the biotechnological revolution. This topic of R. Gordon's analysis, however, may be embedded in his underestimation of the impact of current ICT revolution, which is deeply related to future technological changes. But, in this topic, uncertainty matters - sometimes it is ignorance, given the level of uncertainty (see Rosenberg, 1996). Regarding the future of US growth, this may be one strong point in his analysis - R. Gordon might be suggesting that the US specific variety of capitalism is faltering, not because innovation is slowing down by itself, but because other social and economic factors block or contain the previous innovative push of US economy. This variety of capitalism might have reached its limits, one could conclude from his papers, like the UK in the late 19th Century. In the conclusion of his last

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<sup>1</sup> R. Gordon (2014, p. 17) suggests that innovations "that has the sole purpose of improving energy efficiency and fuel economy" might not be "true innovations". To avoid climate change a real and deep technology revolution will necessary to generate a low-carbon economy (see Klein, 2014, pp. 452-453). Therefore, climate change and demographic shifts may become key to new "focusing devices for technological change" - but whether or not this may be achieved within capitalism could be the subject of other discussions.

paper, it is stressed that other varieties of capitalism (R. Gordon mentions Nordic countries) "suffer less from the headwinds than does the US" (p. 38) and that "slower growth" in America might result in a "passing lane in which one country after another exceeds real GDP per capita of the United States" - this passing lane could include "one or more nations from Europe, East Asia, or our neighbor to the north" (2014, p. 39). Therefore, R. Gordon's analysis could be read not as being about global capitalism, but about the US case. And this interpretation brings the discussion, once more, to the subject of the stage of current hegemonic transition - a transition in which the US might be overcome by other countries.

The current discussion focused on the prospects of a "secular stagnation" misses two main points, as the discussion of Gordon's papers suggests: first, it underestimates tectonic changes related to current technological changes, specially the consolidation of the ICTs and its overall effects on economic dynamics; second, it focuses on the US and therefore misses tectonic changes related to geopolitical changes. And, a basic conjecture of this paper is the contradiction between ongoing structural changes and the lack of structural reforms.

This paper is organized to capture features of the current tectonic changes, trying to read them in the post-crisis global conjuncture. First, quantitatively, the global economy has recovered from the fall during and after the crisis of 2007-2008. In general, indicators have returned to the levels before the crisis, and some eventually are higher than before.<sup>2</sup> However, qualitatively, the post-recovery situation is not the same as the pre-crisis framework. Some sectors leapfrogged others - a movement towards new sectors such as software and pharmaceuticals - and some regions performed better during and after the recovery - a movement towards Asia.

Those changes, however, have not pushed institutional reforms to accommodate them (Wolf, 2014; Kissinger, 2014). There is, therefore, a contradiction between change and continuity in the global economy: on the one hand, changes in technology, internationalization of economy, geopolitical powers; on the other hand continuity, given the lack of structural reforms. This contradiction might be the defining feature of the present conjuncture.

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<sup>2</sup> The nature of the recovery needs qualification: according to BIS (2014, p. 58): "Since 2010, labor productivity growth has been below pre-crisis averages in most advanced economies and has so far risen much more slowly than in previous business cycle recoveries."

This paper organizes evidences of post-crisis changes. The first section deals with fictitious capital and its new heights. The second section takes a look at the rate of profit in the USA. The third evaluates the consolidation of the ICT revolution and the emergence of new sectors. The fourth section deals with the internationalization of capital. The fifth section describes an economy more dependent upon science. The sixth section reviews academic discussions on the role of intangible assets in capitalist dynamics. The seventh section summarizes current geopolitical dislocations.

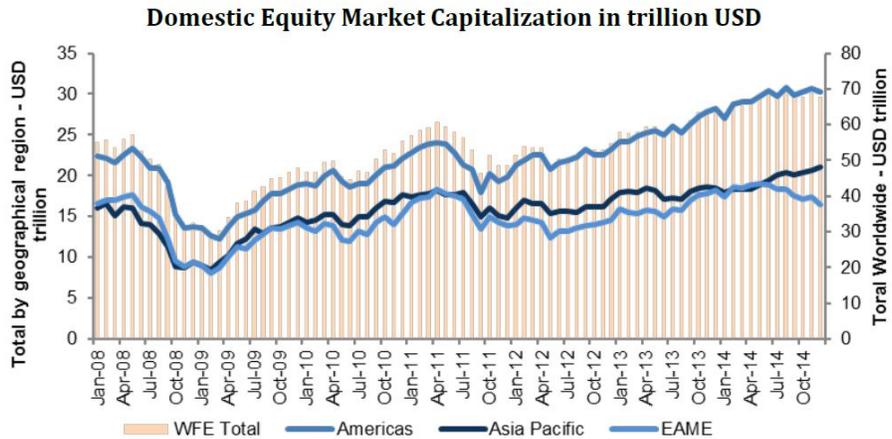
## I- RESUMING THE GROWTH OF FICTICIOUS CAPITAL COMBINED WITH QUALITATIVE CHANGES IN LEADING SECTORS

A key component of the present institutional nature of capitalism is the equity market. To sustain the wealth accumulated in the form of stocks, a broad set of institutions is in place - what Brenner (2002) identify as "stock-market Keynesianism": central banks and a set of public policies (interest rates, exchange rates) regarding the banking system operate to sustain the indices of stock markets.<sup>3</sup> Remember that the fall in the price of stocks in October 2008 was one of the factors that triggered the joint intervention of central banks then (BIS, 2009, p. 4). The data presented in Figure 2 shows that those policies have been successful: the market capitalization has achieved new highs, a steady recuperation from the fall of 2008.

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<sup>3</sup> A precondition to the understanding of the dynamics of capitalism is a theoretical framework of "reciprocal effects" (*Wechselwirkungen*, from Hegel's *Logic*) between finance and industry/innovation. This is clear from the start of *Das Kapital* - it is money that is transformed in capital (Volume I), and this mode of production presupposes banks and credit system (Volume III). Therefore, each development in the industrial/innovative dimension is related to a corresponding advance in the financial development - the last of them might have been the reciprocal effects between the daily activities of transnational corporations and derivatives (xxx). The complex system to support industry/innovation, involving credit system, stock markets and international capital flows, is only one new step in this long lasting mutual reinforcing two-way relationship between finance and industry/innovation. Of course, this evolving complex relationship opens new rooms for crises and a specific dynamics of institutional mismatching (see Marx, 1894, chapter 27, and Freeman and Perez, 1988).

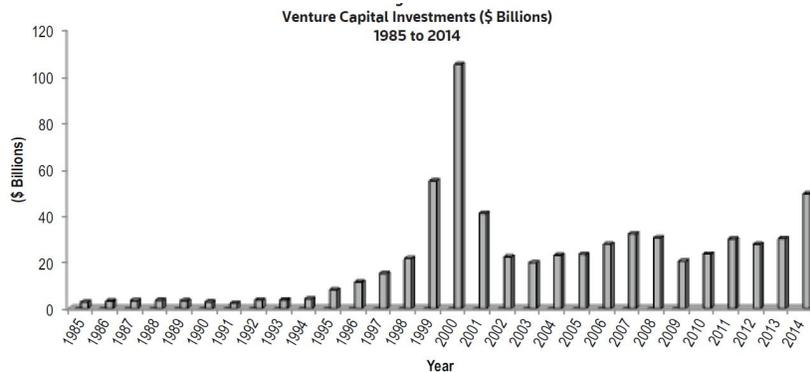
FIGURE 2:  
NEW HEIGHTS FOR EQUITY MARKETS



SOURCE: WFE (2015, p. 2)

Those data - a reference of the return of business as usual - instead of major structural reforms - are related to another return: venture capital investments. In fact, those two sets of data seem to be strongly correlated: the opulence of fictitious capital feeds venture capital. Data from the NVCA (2015) show that in 2014 VC investments in the US have reached the higher point after 2000, as Figure 3 presents.

FIGURE 3  
Venture Capital investments in the US



SOURCE: NVCA (2015, p. 12)

Those investments have two main targets: information technologies and health-related industries (NVCA, 2015, p. 12) - the nature of those investments is important, since they focus the consolidation of technological revolutions and not the emergence of new ones (see section III.2 for a list of emerging sectors).

Data shown in Figure are reflected in typical indicators for stock market operations, such as DOW Jones Industrial and Nasdaq Composite, for the USA: both indexes are now (1 April 2015) above the heights of 2000 or 2007.<sup>4</sup>

This recuperation of those levels of market capitalization vis-à-vis the year 2008 takes place combined with two qualitative changes that may indicate two important structural transformations operating before the crisis - new technological sectors and new geographical dislocations.

Regarding the technological dimension, the data for market capitalization show important changes in the ranking of sectors in USA. According to data from the *Financial Times* Global 500 rankings<sup>5</sup>, between 2006 and 2014, there was a change in the five leading sectors. In 2006, the five leading sectors according to market capitalization were: 1) banks; 2) technology hardware and equipment; 3) pharmaceuticals and biotechnology; 4) oil and gas producers; 5) software and computer services. In 2014 two emerging technologies took the two first positions, and the ranking is as follows: 1) pharmaceuticals and biotechnology; 2) software and computer services; 3) technology hardware and equipment; 4) oil and gas producers; 5) banks. Of course that the fall in the market capitalization of banks is strongly related to the crisis and its aftermath. Those combined changes may be grasped by a look at the NASDAQ, which focuses on information-related and health-related firms (*The New York Times*, 5 March 2015: "NASDAQ changed in its climb to 5,000")<sup>6</sup>. This article is an interesting description of "creative destruction" in operation: only three firms among the top 10 in March 2000 (Microsoft, Cisco and Intel) are among the top 10 in March 2015, and Microsoft, the first in the 2000 ranking is at third place in 2015, leapfrogged by Apple and Google (see sub-section III.1, below - Google's IPO was in August 2004).

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<sup>4</sup> See, for Dow Jones: <http://stockcharts.com/freecharts/historical/marketindexes.html>; and for NASDAQ <http://www.nytimes.com/2015/03/06/business/a-changed-nasdaq-makes-the-long-climb-back-to-5000.html>.

<sup>5</sup> see <http://www.ft.com/intl/cms/s/0/988051be-fdee-11e3-bd0e-00144feab7de.html#axzz3W54znuD8>

<sup>6</sup> See: <http://www.nytimes.com/2015/03/06/business/a-changed-nasdaq-makes-the-long-climb-back-to-5000.html>

Regarding geographical changes, the same data (FT Global 500) captures the continuing emergence of China - China was not among the countries listed in its countries' ranking in 2006 but in 2014 it is already in the fifth position, with 18 firms. This change may also be grasped by the data from the World Federation of Exchanges (Figure 1), that show how the region Asia-Pacific is ahead of where the region Europe-Middle East-Africa in 2015, after being below in 2005.

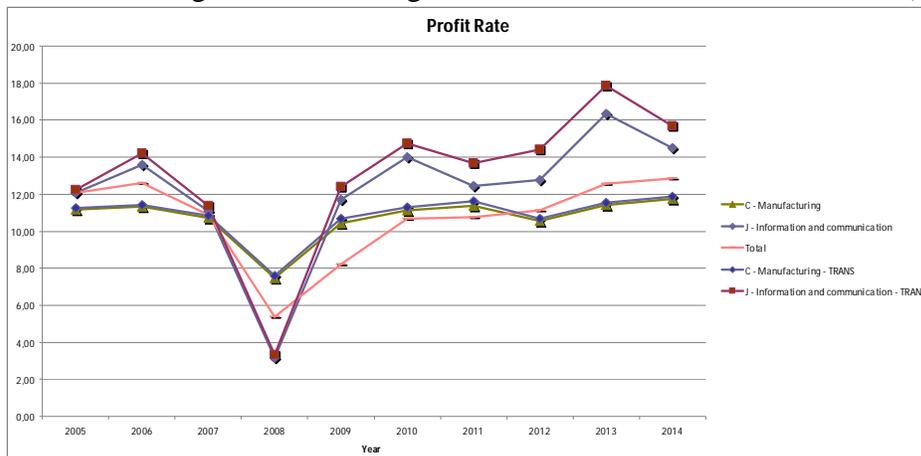
The combination of the data on the recuperation of market capitalization and the changes in relation to sectors and regions put forward a question: are those changes enough to sustain this recuperation, given the lack of structural reforms?

## II- A LOOK AT THE RATE OF PROFIT IN THE USA

Other evidence related to changes in leading sectors may be grasped from data on rate of profit of US corporations.

Resuming the reflections put forward previously (Ribeiro, Loureiro et al, 2015), Figure 4 shows how the average rate of profit (here measured as "profit margins", according to ORBIS database) has resumed its growth after 2009. Data presented in Figure 3 also show that as the USA economy resumes its previous levels of rate of profit, it does it in a changed way. Figure 4 shows that broad changes may be seen: both in different sectors and in the degree of transnationality.

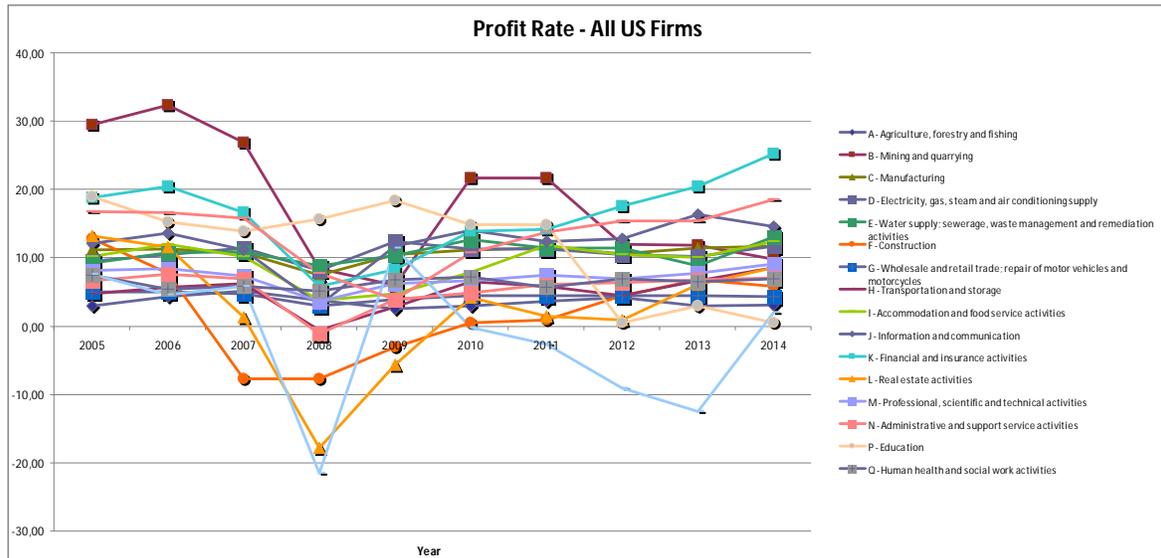
FIGURE 4:  
Rate of profit in the USA ("profit margin", according to ORBIS),  
average, manufacturing and information and communication (2005-2014)



SOURCE: ORBIS, authors' elaboration (see Appendix for methodology)

Figure 5 further disaggregate the average rate of profit by different economic sectors, following Orbis' NACE sectors.

FIGURE 5:  
Rate of profit in the USA ("profit margin", according to ORBIS), by economic sector (2005-2014)



SOURCE: ORBIS, authors' elaboration

Figures 4 and 5 show how under the average rate of profit there is a process of deep intersectoral differentiation. Ribeiro et al (2015b) disaggregate data for the US between 2005 and 2014, using ORBIS' database, and shows that in 2014, there were 14 NACE main sectors with profit margins below the average and 4 NACE main sectors above that average. The same differentiation would be repeated within intra-manufacturing sectors (in 2013, 42 out of 160 NACE subsectors were above the NACE C average) and intra-information-and-communication sectors (in 2014, 6 out of 17 NACE subsectors were above the NACE J average). Firms such as Pfizer, Apple, Google, Cisco, Amgen and IBM have profit margins above the general average, above their respective main NACE sector average and above their NACE four digit subsectors - firms that get super profits based upon innovative capabilities (see Appendix's Figures A.1, A.2, A.3 and A.4).

Those data make sense of changes shown in section I, using data from stock markets capitalization.

What those data may show is both a change in the nature of leading sectors and indication (hint, clue) of a decisive feature of a new phase of capitalism in the making - a new technological basis.

### III- CONSOLIDATION OF THE ICT REVOLUTION AND THE EMERGENCE OF NEW SECTORS

As presented in section I, changes in the ranking of market capitalization are clues to which sectors on-going transformations are directing: software and computer services and pharmaceuticals and biotechnology are the two leading sectors now.

Those changes may signal broader structural - and new questions. The major question here being on a specific dynamics related to the rise of the ICT sector.

The rise of ICT sector has been a long lasting rise (Chandler, 1997; Gillies and Cailliau, 2000; OECD, 2013c). Since it is possible to see radical beginnings of the ICT revolution in the ENIAC computer (1946), Intel's microprocessor (1971), internet and www (1991). Is there a dynamics that the ICT sector may push the whole economy - the central sector of economic activities? With a lot of positive feedbacks between the production, search and use of information as key economic activities, supported by a large set of firms producing them (new information, search and use) and providing the necessary infrastructure to their operation? The conjecture of this paper is that ICT sector has achieved this position in advanced economies - although the demonstration of this is a fascinating and broad research agenda. However, evidence may be mentioned to support this conjecture.

#### III.1 - A NOTE OF THE ECONOMICS OF GOOGLE

Systems of innovation are behind the generation of new technologies - they are the institutional cradle of technological revolutions. There is a technological revolution taking place today, and it may be illustrated by the emergence and growth of Google.

What does Google presuppose?

First, the World Wide Web: a creation of the world of science in 1991, proposed in 1989 by a computer scientist (Tim Berners-Lee) working at a leading international and internationalized research center (CERN, Switzerland), well connected in an international

network of research on particle physics.<sup>7</sup> Gillies and Cailliau (2000, p. 49) describe CERN, established in 1952, as a transnational research institute focusing particle physics, very basic science. As a textbook example of the unpredicted products of basic research (see Rosenberg, 1996), CERN has generated very concrete technological products - "medical imaging", "computer chip manufacture". As Gillies and Cailliau (2000, p. 49) stress, "[n]evertheless, the technologies that the laboratory's physicists demand have generated many spin-offs of which the World Wide Web is just one". Other technologies such as "medical imaging", "computer chip manufacture" and "even the techniques used to paint soft-drink cans have their origins in particle physics research" (p. 49).

Two routes to unveil the connection between Tim Berners-Lee and Google. First, from the The International WWW Conferences (for a list of International Conferences: <http://www.iw3c2.org/conferences/>): Gillies and Cailliau (2000) describe the emergence of world.wide.web. In 1994 an evidence of its consolidation was the First WWW International Conference, at CERN, Switzerland (Gillies and Cailliau, 2000, pp. 279-280; see <http://www94.web.cern.ch/WWW94/>). Somewhere between 1994 and 1998, Larry Page "got this crazy idea that I was going to download the entire web onto my computer" (Vise, 2005, p. 11 - see also p. 36). In 1998, a paper presented at the Seventh WWW International Conference (Brin and Page, 1998) contained the Google's algorithm (see <http://wwwconference.org/www7/00/index.htm>). Second route: tracking citations: Brin and Page (1998) cites McBryan (1994) - a paper presented in the First WWW International Conference. McBryan's references 1 and 2 are Berners-Lee.<sup>8</sup>

Second, in USA a well-established graduate university system and public funding to research initiatives - in 1998, L. Page and S. Brin were at Stanford University involved in a NSF research project on the world.wide.web: they presented a paper in the Seventh

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<sup>7</sup> One way to capture the influence of T. Berners-Lee, a computer scientist working at CERN, is to search citations in USPTO patents: Berners-Lee is cited in 1,147 patents (search by Other References, 11 May 2015), from firms such as Google, Cisco, Microsoft, Apple, IBM, Intel, Samsung - an indication of international knowledge flows and global interactions between firms and research institutions - another feature of current structural changes in global capitalism.

<sup>8</sup> The references are:

[1] T. Berners-Lee, <a href="http://info.cern.ch/hypertext/DataSources/bySubject/Overview.html"> "The WWW Virtual Library" </a>; and

[2] T. Berners-Lee <a href="http://info.cern.ch/hypertext/DataSources/ByAccess.html"> "Resources Classified by Service" </a>

International World-Wide Web Conference on an algorithm that is at the root of a new search technique (Brin and Page, 1998).<sup>9</sup>

Third, a well-established innovation-friendly financial system: Google got money from a co-founder of Sun Microsystems in August 1998, from venture capital firms in 1999, and had its IPO in 19 August 2004.<sup>10</sup>

Fourth, an economic system in which advertising is a stable and large source of income (in 1998, 2.4% of USA's GDP, today global advertising market is more than US\$ 500 billion - NYT, 14 May 2015). Fifth, a large information infrastructure (in itself a precondition for the world.wide.web) that opens room for a huge commodification of information - since information (search for information and/or generation of new information) is the source of value creation by labor within Google. Finally, an internationalized economy: Google is global since its inception, since its cradle is the world.wide.web with its global reach.

The origin, initial growth and later dynamics of Google may be an excellent illustration of changes (both those that already took place and those that are yet to come) towards a global knowledge economy. What does Google illustrate? The global economy is now in a new phase, since after the expansion of capital has involved almost all continents, it creates a new region for accumulation: the digital world, with the world.wide.web as a new continent to give new room for capital accumulation. How can this be empirically verified? A look of the growth and the size of Google may be a strong evidence of the potential of this new continent for capital accumulation. Another way to empirically verify this is a look at the profits generated by Google and their impact on its market capitalization.

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<sup>9</sup> In the acknowledgments of their 1998 paper (The Anatomy of a Large-Scale Hypertextual Web Search Engine) Brin and Page write that "[t]he research described here was conducted as part of the Stanford Integrated Digital Library Project, supported by the National Science Foundation under Cooperative Agreement IRI-9411306. Funding for this cooperative agreement is also provided by DARPA and NASA, and by Interval Research, and the industrial partners of the Stanford Digital Libraries Project." (see <http://ilpubs.stanford.edu:8090/361/1/1998-8.pdf>). For the NSF, see (see [http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=100660&org=NSF](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=100660&org=NSF)).

<sup>10</sup> Andy Bechtolsheim, vice-president of Cisco Systems (Vise, 2005, p. 45). It would be interesting to trace the connections between the growth of www and internet use and the industry of servers - an important connection between the search for information and important branches of electronic industry. Cisco is classified in NACE C (2630: Manufacture of communication equipment). A positive feedback typical of those new dynamic sectors. See Cisco's profit margins at Appendix Figure A.3.

Google is just an illustration of current changes. They are much broader. And they push new steps in the process of labor repositioning - information and the process of information-generation a source of value production assumes a new position in the global dynamics of capitalism. This new position, by its turn, pushes the pole of intellectual labor to a more central role.

The origin, initial growth and later dynamics of Google may be an excellent illustration of changes (both that already took place and that yet might come) towards a global knowledge economy.

### III.2- NEW SECTORS EMERGING

Other indicators may point to other emerging sectors.

Analyzing patents, OECD (2014, p. 59) defines "areas of acceleration" - they are "new technologies related to: 1) climate change mitigation (e.g. lighting, electric power, electric and hybrid vehicles, energy generation, batteries, motors and engines); 2) ageing, health and food security (e.g. chemistry and biotechnology); 3) information and communication management (including infrastructures for "big data" and virtual payments); 4) new manufacturing processes (e.g. chemistry, nanotechnology, composite materials, new materials, 3D printing and laser technology)."

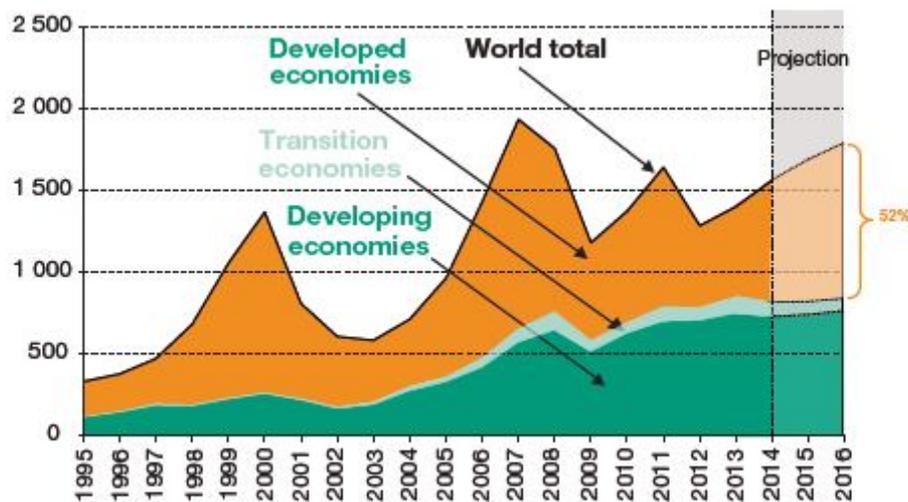
Newspapers such as *The Economist* (2014), sometimes under slightly impressionist descriptions - useful to capture a sense of expectations that might be being formed - and discussing the impacts current digital technologies on productivity (Gordon) and inequality (Piketty). That report explores topics such as "global eclipse of labor" (p. 2), "dematerialization of economic activities" (p. 12), and "premature non-industrialization" (p. 11). Resuming a topic discussed in a previous Special Report (*The Economist*, 2014a), the "falling cost of automation" would make robots "attractive even in India" (p. 12). The development of robotics is related to other changes taking place in China - "fast-rising wages" (*The Economist*, 2015b, p. 75): "China became the biggest market for robots in 2013" (p. 75). Another development that *The Economist* (2015a, p. 23) is suggesting is the diffusion of smartphones: the newspaper informs that there are 2 billion people today using smartphones - a number that will double until the end of this decade, the newspaper forecasts. The firms that lead the production of those smartphones are Samsung, Apple,

Lenovo, Huawei, LG Electronics, Xiaomi, Sony, Microsoft (Nokia), and HTC - again a combination between the direction of capital towards new sectors and new regions.

#### IV- FDI, GLOBAL VALUE CHAINS AND INTERNATIONAL FRAGMENTATION OF PRODUCTION

Data on FDI may be hint for two combined processes that might be shaping a new phase of capitalism: first, the continuity of internationalization of capital; second, the impact of ICTs in this internationalization process (this, by its turn, has to do both with transnationals - see Cantwel, 2009 - TICs and the growth of GVCs - OECD, 2013, p. 19 - and smaller firms that may become more internationalized -

FIGURE 6:  
NEW HEIGHTS FOR FDI



SOURCE: UNCTAD (2014, p. 2)

A trend of expansion in the "international fragmentation of production", identified by Timmer et al (2014), using data for 1995 and 2008, seems to be resuming in the post-crisis period, as Los et al (2015, p. 68) put forward "We do not find evidence that the global financial crisis caused a structural break in the pace of increasing fragmentation" - Los et al (2014, pp. 78-79) describe a major dip in a variable called "foreign value-added" (FVA) during the crisis, but "[t]he FVA shares rebounded and were back at the level of 2007 in 2011, showing no signs of faltering" (p. 78).

Those changes in the internationalization of production, spread of GCVs and internationalization of R&D take place under the impact of the ICT technological revolution (Cantwell, 2009). There are diverse mutual influences taking place simultaneously - another indication of the current structural changes.

As a document from the OECD (2013a) puts forward: "[t]he fragmentation of production together with advances in ICTs is also creating new entrepreneurial possibilities for SMEs to access markets abroad, giving rise to a new category of so-called micro-multinationals, small firms that develop global activities from their inception. The Internet and new business models make it possible for these smaller – often service-driven – companies to enter foreign markets at minimum costs" (OECD, 2013a, p. 22). Regarding GVCs, on the one hand, internet contributed to their spread, on the other hand, "GVCs are changing the international division of labor and the greater mobility of talent has accelerated the internationalization of R&D" (OECD, 2014, p. 42).

#### V- GROWTH OF SCIENCE AND TECHNOLOGY INPUTS AND PRODUCTS - AN ECONOMY MORE DEPENDENT UPON SCIENCE

Globally, the number of students attending higher education (*The Economist*, 2015c, p. 4): tertiary enrollments grew from an index 100 in 1995 to around 260 in 2012, after a short stop around 180 in 2005 and 2006 - higher education is an important source of a knowledge-based economy.

Regarding R&D, the post-crisis scenario shows a recuperation of pre-crisis expenditures: "On a constant dollar basis, U.S. total R&D in 2010 was below the 2008 level (table 4-1). Furthermore, the 2011 level only barely returns to the 2008 level" (NSB, 2014, p. 4-6). This growth in U.S. R&D expenditures in 2011 followed a 2-year period of stagnation (2009 and 2010). (NSB, 2014, p. 4-4). For 2012, however, "Preliminary data for 2012, available too late to incorporate in this chapter's charts and tables, put the U.S. R&D total at \$452.6 billion that year, an increase of 5.7% over the prior year, well ahead of the 4.0% pace of GDP growth, and mainly again the result of increased business R&D. This continuation in 2012 of the strong pace of R&D growth in 2011 suggests a return to the longer-term trend of R&D expansion in the wake of the 2008–09 domestic and international economic downturns" (NSB, 2014, pp. 4-7/4-8).

However, there are geographical changes in those data. This paragraph from NSF's report combines the change towards knowledge-intensive economy and towards Asia: "[t]he generally vigorous pace at which total global R&D continues to grow is certainly one of the prominent developments, a reflection of the growing knowledge-intensiveness of the economic competition among the world's nations. The other major trend is the particularly rapid expansion of R&D performance in the regions of East/Southeast and South Asia, including economies such as China, India, Japan, Malaysia, Singapore, South Korea, Taiwan, and Thailand. The R&D performed in these two Asian regions represented only 25% of total global R&D in 2001 but increased to 34% in 2011, including China (15%) and Japan (10%)" (NSB, 2014, p. 4-17). The global participation of USA's R&D reduced from 37% in 2001 to 30% in 2011 (NSB, 2014, p. 4-17). This combined movement (growth of R&D expenditures and geographical redistribution is described by the OECD (2014, p. 54): on the one hand, "[i]n spite of the economic downturn, world investment in R&D has increased steadily since 2007", on the other hand, "[t]he 2008 crisis has reinforced on-going shifts in the global research landscape".

According to OECD, "[t]he crisis has slowed scientific and technological output worldwide. While scientific production, as measured by scientific publications, was less adversely affected and has been accelerating since 2010, technological production, as measured by patenting activities, has decreased significantly, and is still slow to recover. This reflects to some extent the different impacts of the downturn on parts of the R&D system, in particular public research and business R&D" (OECD, 2014, p. 56). Since this OECD's report evaluates triadic patents (2014, p. 57), the data may have specific problems with those statistics. The data for the USPTO show an almost steady increase in patent applications. Almost steady increase because between 2007 and 2009 there was a stagnation in the total of utility patents applications (456,154 in 2007, 456,321 in 2008 and 456,101 in 2009). Here again, a change in the ranking after 2009: between 2009 and 2012, foreign patenting was greater than domestic patenting. But, in 2013, domestic patents overtook foreign patents again (USPTO, 2014).

Global R&D expenditures: US\$ 1,400 billion (PPP, 2005 US\$) in 2012 (OECD, 2014, p. 55). Or, according to NSF, USA, with US\$ 452.6 is 30% of the world - global R&D would be US\$ 1,508.67 in 2012. Global scientific production increased

systematically between 2001(629,386 articles) and 2011 (827,705 articles) (NSB, 2014, p. 5-38). International collaboration in science has grown also: 16% of scientific papers were had co-authors from different countries, a percentage that grew to 25% in 2012 (NSB, 2014, p. 5-40).

## VI- ACADEMIC DISCUSSIONS ON THE ROLE OF INTANGIBLE ASSETS IN CAPITALIST DYNAMICS

This may be more a topic for further investigation, but it is noteworthy that institutions such as NBER (2005) and OECD (2013b) are investigating what they call "knowledge-based capital". The topics discussed in previous sections (the continuity of ICT revolution, emergence of new sectors, the role of R&D) support the rearrangement suggested by OECD on the changing sources of economic growth. Based on the works of Corrado and Hulten (2010) and Hulten (2010), those discussions on "knowledge-based capital" try to include software, R&D and advertisement as assets that feed economic growth.

**TABLE 1**  
**Types of "knowledge-based capital"**  
**Table 0.1. Classification of the forms of KBC and their effects on output growth**

Type of KBC asset	Mechanisms of output growth for the investor in the asset
<b>Computerised information</b>	
Software	Improved process efficiency, ability to spread process innovation more quickly, and improved vertical and horizontal integration.
Databases	Better understanding of consumer needs and increased ability to tailor products and services to meet them. Optimised vertical and horizontal integration.
<b>Innovative property</b>	
Research & Development	New products, services and processes, and quality improvements to existing ones. New technologies.
Mineral explorations	Information to locate and access new resource inputs - possibly at lower cost - for future exploitation.
Copyright and creative assets	Artistic originals, designs and other creative assets for future licensing, reproduction or performance. Diffusion of inventions and innovative methods.
New product development in financial services	More accessible capital markets. Reduced information asymmetry and monitoring costs.
New architectural and engineering designs	New designs leading to output in future periods. Product and service quality improvements, novel designs and enhanced processes.
<b>Economic competencies</b>	
Brand-building advertisement	Improved consumer trust, enabling innovation, price premia, increased market share and communication of quality.
Market research	Better understanding of specific consumer needs and ability to tailor products and services.
Worker training	Improved production capability and skill levels.
Management consulting	Externally acquired improvement in decision making and business processes.
Own organisational investment	Internal improvement in decision making and business processes.

*Source:* left column, Corrado, C.A, Hulten, C.R and Sichel, D. (2005), *Measuring Capital and Technology: An Expanded Framework*. in C. Corrado, Haltiwanger, J. and Sichel, D. (eds), *Measuring Capital in a New Economy*, National Bureau of Economic Research and University of Chicago Press.

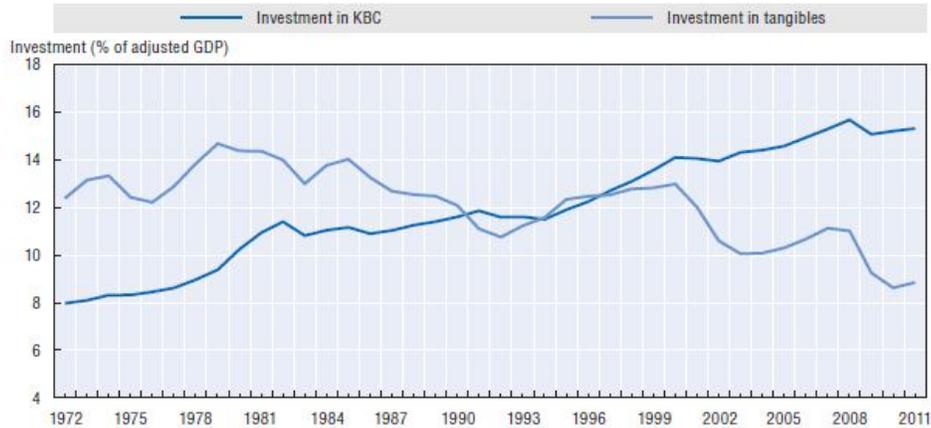
SOURCE: OECD (2013b, p. 23)

Their definition of "knowledge-based capital" is show in Table 1.

Those definitions organize Figure 7 that shows how, according to the methodology proposed by Corrado et al (2010), investment in "knowledge-based capital" overtook investment in "tangible" capital by 1996.

FIGURE 7  
"Tangible" and "intangible capital" in the US  
(1972-2011)

Figure 0.1. Business investment in KBC and tangible capital, United States, 1972-2011 (% of adjusted GDP)



Note: Estimates are for private industries excluding real estate, health and education.

Source: Unpublished update on Corrado, C.A. and C.R. Hulten (2010), "How do you Measure a 'Technological Revolution?'", *American Economic Review: Papers & Proceedings* 100 (May 2010): 99-104.

SOURCE: OECD (2013b, p. 24)

The NBER (2005) and OECD (2013b) investigations, are more than anything indications of deep changes in capitalist dynamics, that must be later subject of specific scrutiny. But, they are an important effort to deal with tectonic changes in capitalist dynamics, of new forms of capital: this may not be a problem for an elaboration inspired by Marx, since in the transformation of money into capital, what is the key element is labor and the generation of surplus-value. Money invested in R&D will employ labor to generate new ideas to generate new products. Those ideas have value that may be larger than the money invested to generate them. But this line of elaboration may be a topic for further research. What matters here is the insights provided by Corrado et al (2010) contribute to point to a broad change in capitalist dynamics. That triggers new mismatches and the need for institutional changes - changes in patents' and copyrights' laws may be an indication of the changes already implemented. On the other hand, given the specific economic nature of

information (Arrow, 1962), new contradictions might be arising given the weight of information (production, search and transmission) in the present economic dynamics.

## VII- GEOPOLITICAL DISLOCATION

The evaluation of US hegemony is not a simple question. Probably, since 1945, this hegemony may be divided between a reconstruction phase - a phase when the US led an advanced capitalist world destructed by the Second WW (Europe and Japan), related to the fourth long wave of capitalist development (Freeman and Louçã, 2001) - and a post-reconstruction phase - when the advanced capitalist economies had catch up with US and decolonization (almost) completed in Asia and Africa, a phase that the US led a new technological revolution, the fifth long wave, based on ICTs during the 1990s (Freeman and Louçã, 2001). Indeed, the nature of the leadership should be different in each of those phases.

Angus Maddison contributes to a chronology of previous hegemonic systemic transition. It might be difficult to define its starting point - using GDP as a criterion. One option could be 1872, when the United States overtook the United Kingdom - (Maddison, 2003, p. 49 and p. 84). Other option would be a comparison between USA and UK plus its dominions and/or plus India - being an Empire matters (Darwin, 2009). If this is the correct comparison, it would be only a little earlier than 1880 that the USA had overtaken UK + Canada + Australia + NZ and only between 1900 and 1913 that the USA had overtaken UK + those 3 dominions + India. In 1913 the comparison is: USA's GDP \$ 517.38 billion; UK + 3 dominions + India GDP 497.11 billion.

Probably, for monetary issues related to hegemonic transitions, this might be the correct information - the role of sterling in the international scenario would take as reference the British Empire as a whole. The US dollar as an alternative and emerging "world money" would have to take into consideration this broad scenario (sterling and the British Empire in 1913) and not the other scenario (sterling and UK as an isolated economic entity).

The end point of this transition is easier to demarcate - the definition of the dollar as world money (Bretton Woods in 1944 and the end of Second World War in 1945). This transition unfolded during 73 years (and involved two world wars). This can be a simple

indicator - which of course must be taken with all caution - for an assessment of how far the global capitalism may be from the end of the current transition of hegemony. It is important to remember that according to *The Economist* (2011c, p. 2), only in 2020 China's GDP would overtake the United States' GDP (in current dollars).<sup>11</sup> B. Adams (1900) might be a good example of a reflection before the last hegemonic transition. His evaluation identifies long-term changes in "the economic center of civilization" (pp. 63-64). For Adams, between 1815 and 1890 Great Britain had the "seat of empire", but this "period of preponderance lasted until 1890". The international conjuncture in 1900 was defined by "an impression (that) has gained ground that England is relatively losing vitality" and "therefore a period of instability is impending" (Adams, 1900, p. 135). This period, of course, is "momentous to America" (p. 135).<sup>12</sup>

An indication of current problems in this regard is the discussion of world money and their transformations - an indicator of systemic transition. Helleiner & Kirshner (2009) and Eichengreen (2011) indicate the long journey that the Chinese currency should pursue to eventually replace the dollar as world money. Eichengreen (2011), although less emphatic than Arrighi in relation to the declining hegemony of the United States, points to an important change underway - "no more monopoly" is the title of his Chapter 5, where he explains the relationship between global money and global power (2011, p. 133). His analysis suggests that the 2008 crisis has accelerated the transition of an international system dominated by the dollar to a more multipolar successor (2011, p. 150). Other indications of changes in the previous hegemonic position of the United States are discussions on the costs of dollar as an international reserve currency - a burden and not a privilege, according to Pettis (2011) - and the concrete problems on an eventual ride of renminbi (*Financial Times*, 30 September 2014 - The future of renminbi).

One important structural change related to the new role of China's economy, movements seen before the crisis but accelerated in the post-crisis period - "two-speed

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<sup>11</sup> According to Maddison (2003, p. 61 and p. 87), in 1872, when the USA overtook UK's GDP, their GDP per capita was 73% of UK's. Only in 1905 the USA overtook UK's GDP per capita (p. 61 and p. 87). To present a comparison with the current hegemonic transition, in 2013 the Chinese GDP per capita was 13% of the USA's (World Bank, 2014).

<sup>12</sup> This book - *America's economic supremacy* - deserves a careful analysis, but this is beyond the subject of this manuscript. The reference to this book is interesting here, just to have a clue about how contemporary analysts could have been identifying and analyzing previous transition while they were taking place. This might be our position now.

recovery" (BIS, 2012, p. 1) can be seen in the rankings of the largest global companies. Before the crisis in 2005, in the *Global Fortune 500* data, the United States led with 176 companies, followed by Japan with 81, France with 39 and Germany with 37 companies, and China had 16 companies. In 2013, the United States keep the leading role, but with 132 companies, followed now by China with 89 companies, Japan with 62 and Germany with 29 companies. In the *Global Fortune 500* for 2014, 128 firms from the USA and 95 from China.

A document prepared by the *National Intelligence Council* (2012, p. iv) can be taken as evidence of these changes on the world scene: "[t]he diffusion of power among countries will have a dramatic impact by 2030. Asia will have surpassed North America and Europe combined in terms of global power, based upon GDP, population size, military spending, and technological investment. China alone will probably have the largest economy, surpassing that of the United States a few years before 2030. In a tectonic shift, the health of the global economy increasingly will be linked to how well the developing world does—more so than the traditional West". This tectonic shift involves not only China, but also other peripheral countries in general - the "rise of the South", according a UNDP (2013) analysis.

Those global movements may be contrasted with a framework of political impasses and deadlocks everywhere in developed world: USA, Germany, UK, European Union, Japan - a sign of our times? Those political impasses block institutional reforms to deal with new features of capitalist dynamics.

## CONCLUSION: TECTONIC CHANGES VERSUS INSTITUTIONAL CONTINUITY

The central features of present conjuncture:

- a) post-crisis without structural reforms (CONTINUITY);
- b) unintended effects of post-crisis rescue operation (CHANGES);
- c) resuming of pre-crisis dynamics (rate of profit up again, technology, FDI, stock markets: new sectors and new regions) (STRUCTURAL CHANGES);
- d) aside those minor post-crisis changes (b), business as usual (a +b = CONTINUITY).

RESULT: changes related to (c), in a framework define by continuity (d), will they lead to new crisis? OR: changes related to (c), in a framework define by (d), will they be enough for a new growth phase, which might postpone the next crisis - and the related institutional reforms?

Contradiction between continuity and change: structural changes take place under a conjuncture of institutional continuity - no structural reforms to accommodate those structural changes here, there and everywhere. Therefore, a specific transition towards a new phase might be unfolding.

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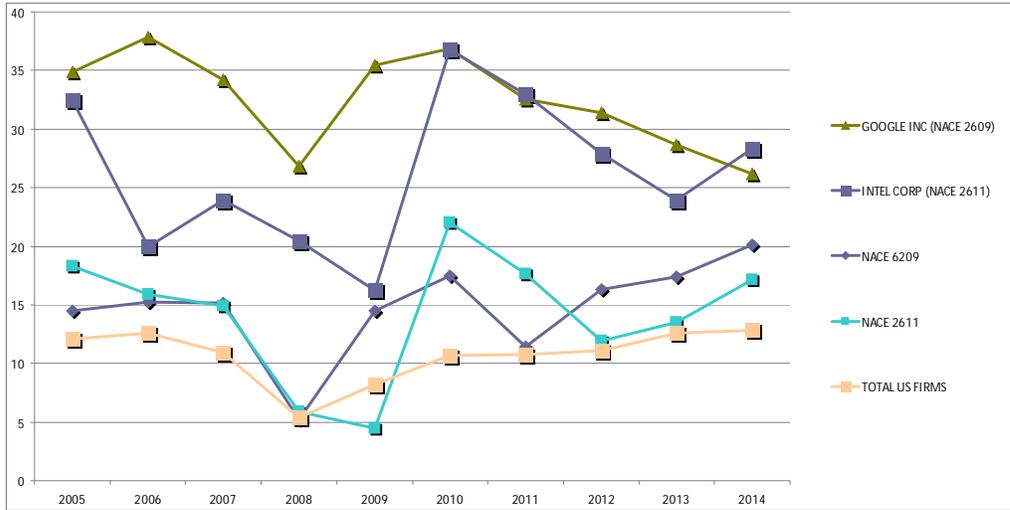
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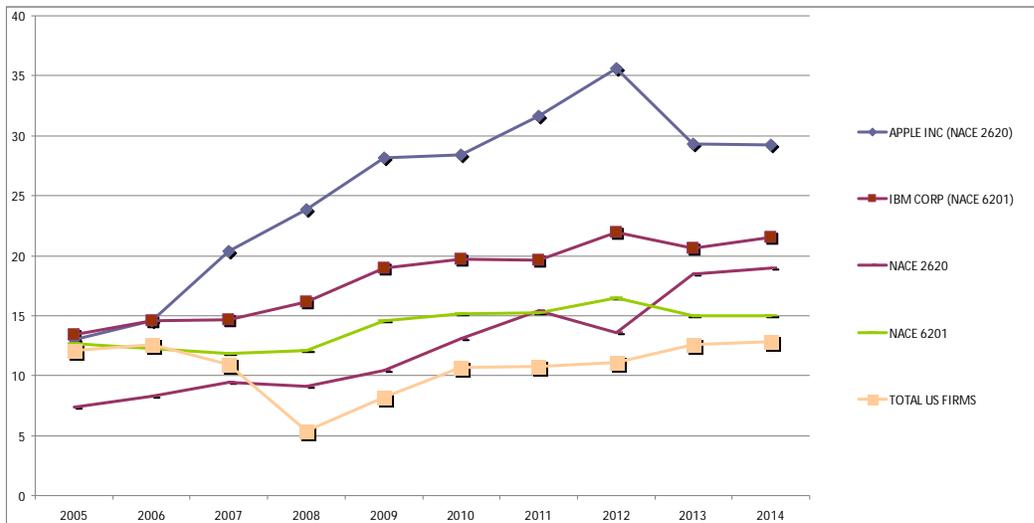
APPENDIX

FIGURE A.1  
 Profit margins (ORBIS):  
 US average, Google (and NACE 2609) and Intel (and NACE 2611)  
 (2005-2014)



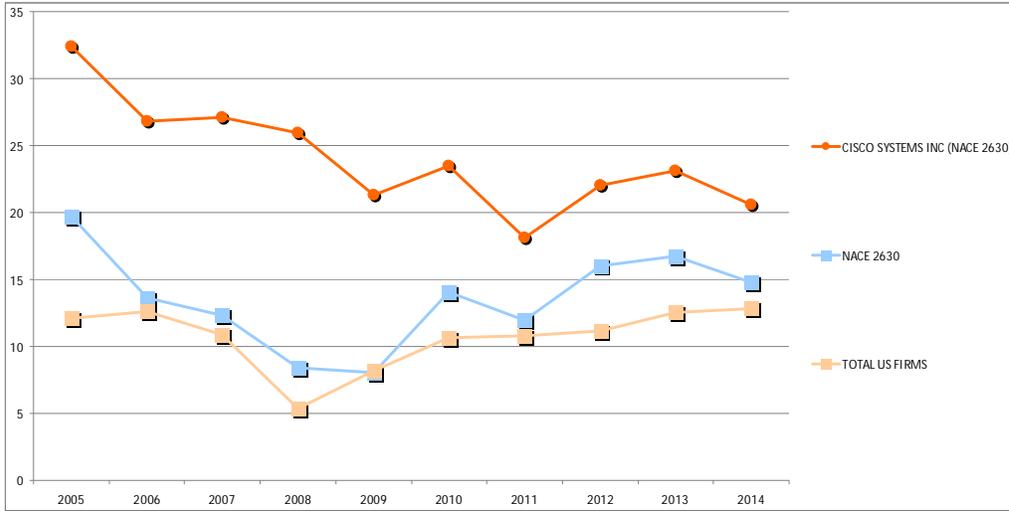
SOURCE: ORBIS, authors' elaboration

FIGURE A.2  
 Profit margins (ORBIS):  
 US average, Apple (and NACE 2620) and IBM (and NACE 6201)  
 (2005-2014)



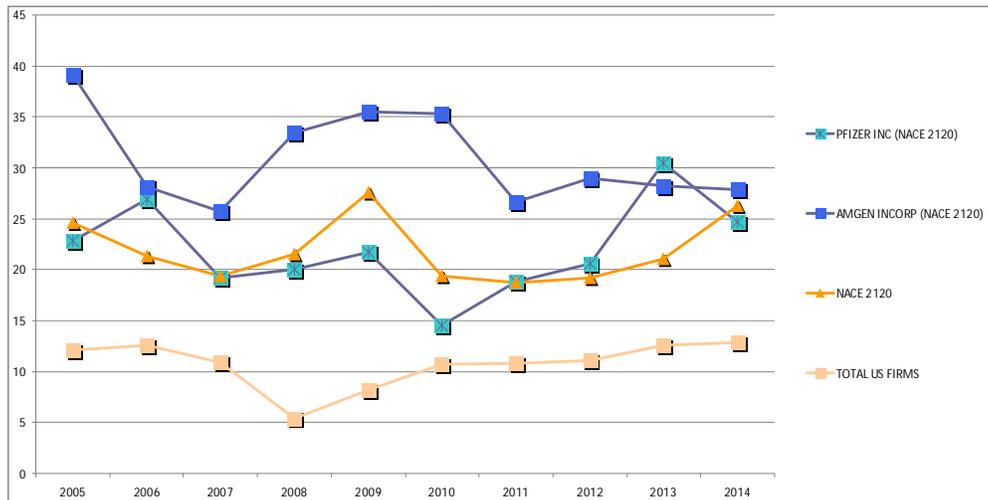
SOURCE: ORBIS, authors' elaboration

FIGURE A.3  
 Profit margins (ORBIS):  
 US average, Cisco (and NACE 2630)  
 (2005-2014)



SOURCE: ORBIS, authors' elaboration

FIGURE A.4  
 Profit margins (ORBIS):  
 US average, Pfizer (and NACE 2120) and Amgen (and NACE 2120)  
 (2005-2014)



SOURCE: ORBIS, authors' elaboration