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RATE OF PROFIT IN THE UNITED STATES AND IN CHINA (2007-2014): INTRODUCTORY COMPARISON OF TWO TRAJECTORIES

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RATE OF PROFIT IN THE UNITED STATES AND IN CHINA (2007-2014): INTRODUCTORY COMPARISON OF TWO TRAJECTORIES[*]

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SUMÁRIO

ABSTRACT

This paper compares data on rate of profit for the United States and China, exploring a dialogue between investigations on the average and general rates of profit (classical political economy and its modern versions) and inter-industry differences in the rate of profit (industrial economics). The comparative analysis between USA and China (2007-2014) is presented through the trajectories of national average rates of profit, the differences according to firm size, economic and manufacturing sectors. The data show a mismatch between the national average rate of profit (China has higher rates for all years, but 2014) and the rates of profit for manufacturing (USA have higher sectoral rates of profit for all years, but 2009).

Key Words: rate of profit, different national rates of profit, inter-industry differences in profitability

JEL Classification: P16, O33

RESUMO

Este artigo compara a taxa de lucro nos Estados Unidos e na China, explorando um diálogo entre as tradições de investigações sobre taxas médias de lucro (economia política clássica e suas versões modernas) e de diferenças inter-setorias na taxa de lucro (economia industrial). A análise comparativa entre EUA e China (2007-2014) é apresentada através das trajetórias de taxas de lucro médias nacionais, as diferenças em relação ao tamanho da empresa, aos setores econômicos e à indústria de transformação. Os dados indicam um descompasso entre a taxa média nacional de lucro (a China tem taxas mais altas para todos os anos, exceto 2014) e as taxas de lucro para a indústria de transformação (os Estados Unidos têm taxas de lucro setoriais maiores para todos os anos, exceto 2009).

Palavras-chave: taxa de lucro, diferenças em taxas nacionais de lucro, diferenças inter-industriais em taxas de lucro

INTRODUCTION

Under a national average rate of profit there is inter-sectoral, inter-industry and intra-industry differences in firms' rates of profit, an expression of turbulence, continuous entry and exit of firms and movements in their profitability, changes from new commodities, innovations, new general purpose technologies, changes in income distribution that affects profits in old and new economic sectors. Those permanent movements determine the complex nature of capitalist economies and are reflected in the fractal features identified in long term movements of the rate of profit.

This paper compares data on rate of profit for the United States and China, as an initial attempt to evaluate inter-temporal and inter-sectoral differences in profitability. The identification of those differences might contribute to evaluate what happens under a national average rate of profit.

Theoretically, the investigation of inter-sectoral, inter-industry and intra-industry differences in firms' rates of profit under the average rate of profit means a dialogue between two different approaches in economics: on the one hand, the tradition of investigations on the average and general rates of profit, that originates in the classical economy (Smith, 1776; Ricardo, 1821; Mill, 1848 and Marx, 1867 and 1894) and whose recent works and debates may be summarized by Duménil and Lévy (1983), Heinrich (2013), Basu et al (2013) and Callinicos (2016), on the other hand, the tradition of investigation of inter-industry differences in the rate of profit, that originates in the beginnings of the field of industrial economics (Bain, 1951), grows during the 1960s, 1970s and 1980s, summarized by Schmalensee (1989), Scherer and Ross (1990), and more recently by Sutton (2007) and Cohen (2010). An attempt to connect those two theoretical traditions might be a prerequisite for an improved understanding of the capitalist long-term dynamics.

Empirically, this investigation has a challenge: how to find a database that may allow a comparison of data on profit from different countries. Comparability of different countries is a very difficult issue, and in this paper uses a database (ORBIS) as a source for those comparisons. This suggestion may be important for further discussions, because a key research issue today is the understanding of international differences in national rates of profit, as the current international conjuncture may be described by important geopolitical transition, specially the rise of China.

This paper is organized in six sections. The first section reviews our theoretical background. The second section discusses data and methodology. The third section introduces the comparison between USA and China, presenting the movements of their average rates of profit between 2007 and 2014. The fourth section compares the profitability in those countries according to different size of firms. The fifth section compares profitability in the USA and in China according to different economic and manufacturing sectors. The sixth section concludes the paper.

I. THEORETHICAL BACKGROUND

Profit is a key variable in economics, as the driver of capitalist economies. Investigations on its long term behavior are important. As profit is a summary of multiple factors, a multidimensional variable, it may be interpreted as what Marx would identify as "a synthesis of multiple determinants" - reading Marx's *Capital* (1867, 1874, 1894) is an opportunity to evaluate all those determinants, especially in his synthesis of those factors in the third section of Volume III (1894).

Therefore, the rate of profit is a result (an outcome). As a result (an outcome) of those multiple factors, the rate of profit is important to define the short term dynamics of capitalist system. The ups and downs of the rate of profit have systemic effects. This puts forward two questions: first, how is an average rate of profit determined? second, what is the long-term behavior of the rate of profit?

Our interpretation suggests that to understand the determination of the profit rate, it is necessary to investigate the firm as a "locus of accumulation" (Guimarães, 1982, p. 25; Chandler, 1992, p. 79) - and this is the subject of industrial economics (Bain, 1951). It is also necessary to investigate the long-term behavior of the rate of profit (Duménil and Levy, 1983; Basu et al, 2013) - and this is the subject of political economy.

Those two research agendas have lively and open debates. With this open-ended nature in mind, we suggest that a dialogue between those two different approaches is fruitful. Why should we try to connect those different research approaches?[1]

Without investigating what is below the (national) average rate of profit, the political economy agenda misses signals that inter-sectoral, inter-industrial and inter-firm differences in profitability may hint regarding incoming structural transformations in capitalist economies. Indeed, a closer look to what happens at the firm level might be important for Marx's agenda, as the search for super-profits (extra surplus value) was a key piece in his dynamic interpretation of capitalist economies - firms that introduce new production methods would conquer those super-profits, initiating a chain of events that would change the whole economic and industrial structure (Marx, 1867, pp. 429-438). The leading firms reduce their costs of production through increasing mechanization and the scale of production, increasing their market share and their amount of total profits. The followers would react, adopting the new technique. Then, the leading firms would answer with new round of innovations.

Without understanding what is above the movements of firms, industries and sectors, the industrial economics agenda misses insights on the overall dynamics of the system, weakening the ability to grasp the aggregate operation of those firms, industries and sectors. Indeed, an attempt to aggregate the movements of profit at the firm level is a starting point for Schumpeter that evaluates the behavior of firms and attempts to integrate them in global movements of the economy (Schumpeter, 1911 and 1939).

The rate of profit might be a variable that connects those two theoretical approaches.

[1] Semmler (1981) is an effort in this direction, using Marx (1894) and available empirical evidence of profit rate differentials according to Bain and his line of investigation. Semmler (section 3) concludes that "pricing methods developed by large corporations since the 1920s do not contradict the Marxian concept of prices of production. On the contrary, they seem to be quite consistent with it" (p. 49).

The contribution of political economy has focused fundamentally in the long term movements of the rate of profit. There is a large literature on Marx and the long term behavior of the rate of profit, reviewed in a previous work (Ribeiro et al, 2017). There is consensus on the ups and downs of the rate of profit over time (Duménil and Lévy, 2016; Shaikh, 2016, specially section 16.II), with a huge debate in the long term tendency of those movements - a fall, with the predominance of what Marx would call the factors that pull the rate of profit down, or a preservation of the cyclical movement, as a consequence of the interplay between the tendency to the rate of profit to fall and its countertendencies.

This debate has been important, especially by the proliferation of efforts to measure the rate of profit and its long term behavior, which may be summarized by Duménil and Lévy (1993) and Basu et al (2013).

The contribution of industrial economics begins with the definition of the unity of analysis - for profit firms (Chandler, 1992, p. 79 and pp. 85-86). The asymmetrical growth of firms transforms market structures (Schumpeter, 1942, pp. 81-86; Chandler, 1977, pp. 6-12), given rise to the dominant market form in modern industrial economies - oligopolies (Scherer and Ross, 1990, p. 82).

Investigations on market structure and different rates of profit between different industries were pioneered by Bain (1951, 1956) that empirically documented those differences in profitability, that he theoretically connected to barriers to entry - a key concept to understand oligopolies (Possas, 1984, p. 114). Bain's findings were in line with the contributions of Labini (1956) and Steindl (1952), which stressed the importance of differences in the nature of competition and strategies for different firms in different industries. The pioneers of industrial economics put forward an understanding that stressed not only differences in profitability among different industrial sectors but also between firms within specific industries.

From the 1950s to the 1970s, there were important changes in the structure of industrial economies, related to a new technological revolution after the Second World War (Freeeman and Louçã, 2001), that influenced the direction of investigations in the field of industrial economics. Those investigations resulted in a large literature reviewed initially by Schmalensee (1989) and Scherer and Ross (1990).

Schmalensee (1989) organizes his review with a section on profitability (pp. 969-987), and the basic issue is the understanding of differences in profitability. Stylized Facts (SFs) are presented to summarize the literature, showing the persistence of "profitability differences among large firms" (SF 4.2, p. 971), the influence of industry characteristics "for only about 10-25 percent of the cross-section variation in accounting rates of return" at the firm level. Schmalensee (1989) evaluates the relationship between "concentration and profitability", "entry barriers and profitability", "intra-industry differences" and "variability of profit rates".

The influence of innovation on differences in profitability is summarized by two SFs: "advertising intensity is positively related to industry-average accounting profitability" (p. 978) and "research and development intensity is positively related to profitability" (p. 979).

The Chandlerian hypothesis of the first-mover shaping market structures is captured by Schmalensee's SF 4.10: "the profitability of industry leaders in US manufacturing may be positively related to concentration; the profitability of firms with small market shares is not" (p. 983).

Scherer and Ross (1990, pp. 442-444) present a sub-section on "persistence of profitability", a line of research developed by Mueller (1977 and 1986). This line was further developed in Mueller (1990), combining differentiation of profits and their persistence. Geroski and Mueller (1990, p. 189) concluded that "[i]n every country, permanent differences in profitability across firms, and in the United States also across industries, were observed". This persistence of differences in profits has theoretical foundations, according to Chandler (1992, p. 83), on "organizational capabilities".

An important research line improves the concept of "barrier to entry" to involve intra-industry differences in profitability: Caves and Porter (1977) introduce the concept of barriers to mobility, to investigate groups and subgroups within an industry. For them, "[p]rofit rates may differ systematically among the groups making up an industry, the differences stemming from competitive advantages that a group may possess against others (examined below). The industry's profits and (perforce) the average level of its groups' profits depend on the general structural traits of the industry and also the internal heterogeneities that demarcate its groups" (Caves and Porter, 1977, pp. 251-252). For them, "...without intergroup immobility it would be hard to explain persistent differences in profit rates among groups within an industry" (Caves and Porter, 1977, pp. 254).

During the 1990s, an important theoretical development was led by Klepper (1997): industry life cycles that organize how market structures change over time and how profits and their sources shape those changes. This literature is very helpful for our research, because it shows how as time goes by there are changes in the number of firms, in entry and exit, in the market structure and how those changes are related to the ability of firms to generate profit and to be innovative enough to support changing competitive conditions.

Klepper's work influenced the research on barriers of entry, reshaping this concept towards a more dynamic version. According to Caves (1998, p. 1969), "the entry barrier more essentially deters successful entry than it does gross entry". Innovation may be a barrier or a gateway to entry (p. 1969). "Gross entry is substantial in most industries. It is much larger than net entry, due to high rates of infant mortality. Successful entrants grow rapidly so that an entrant cohort's initial market share falls slowly" (p. 1976). In those movements, profits are a key driver: they attract entry in the beginning, later they are generated by R&D investments that not all firms can afford, inability to preserve profits determines the exit of unsuccessful firms, and all those movements change over time, depending on the phase of the life cycle of the industry. Furthermore, insights from Klepper's research shows how new products create new industries and all the consequences of the increase in the set of commodities produced by an economy. According to Caves (1998, p. 1967), "[a] market begins with some major and profitable but not fully appropriable innovation that attracts a queue of potential entrants. Firms that have entered can carry out product and/or process R&D. Product R&D yields modifications that are soon imitated (no enduring vertical differentiation). Process R&D lowers cost toward an (exogenous) attainable minimum and is more profitable for an incumbent, the larger its size. The competitively determined price falls with incumbents' costs. Over time fewer and fewer potential entrants enjoy positive expected profits. Incumbents less successful in lowering costs drop out. The cycle relies on random processes to

determine the capabilities of potential entrants in the queue and the successes of incumbents in product and (especially) process innovation".

Recently, other review articles updated this literature. Sutton (2007) has a contribution in the sections about "shake-out" and "turbulence" - in special dealing with Klepper's contribution. Dosi and Nelson (2010) present a broad review focused on innovation, confirming in that review that exists "considerable variation across firms in measures of economic efficiency and in profitability".

How to connect those two research agendas is an important issue. Marx could be a starting point, as his schemes of transformation of values in production prices involve an exercise that suggests within an industry different firms with different technological conditions, where the most productive would capture super-profits (Marx, 1894, pp. 254-301).[2] Those intra-industrial differences are part of the global dynamics shaping global movements of profits and rates of profit.

II. DATA AND METHODOLOGY

This paper uses a database on firms and institutions: ORBIS, organized by the Bureau van Dijk Electronic Publishing (BvD) (http://www.bvdinfo.com/en-gb/home). Since it organizes information on firms, their structure and financial data for different countries, we can explore some comparability among data for different countries.[3]

This database helps our data processing in two main ways, with information on the Global Ultimate Owner (GUO) and the Statistical Classification of Economic Activities in the European Community, referred to as NACE. The GUO is a key variable that organizes under one name all different units and branches of one firm. The GUO is the entity in the highest level of the ownership chain of a network of entities, i.e., it is the entity that is not a subsidiary of any other one. GUO is the top of a hierarchy, to use Williamson's concept of modern multidivisional firm (Silva, 2014). An entity is considered a subsidiary of another when the owner share in the company is higher than 50.01%. Example: Pfizer US, Pfizer Switzerland, etc, all will be processed under one single GUO. The number of subsidiaries per GUO may be large, as in the case of IBM (336), Johnson & Johnson (446), Procter and Gamble (472) and Pfizer (647) (Silva, 2014, pp. 163-164). And those GUO are classified under NACE sectors, a contribution to understanding different economic and manufacturing sectors. The NACE sector is the classification of economic activities developed by the European Community (European Commission, 2008). This paper uses the first two digits of this classification.

The profit rate is a ratio between a flow variable, profits, and a stock variable, capital. Orbis presents data on return on assets (ROA) using net income, employment and total assets.[4] Our measure of profit is the net income. It is computed as the total revenues less total cost, including depreciation,

[2] Another theoretical dialogue may be with modern theories of the firm such as the "dynamic capabilities" approach, especially as elaborated by Teece (2010), that highlight the relationship between "innovating enterprise" and "above-normal returns" (p. 680). Special attention is given to sources of "'supernormal' profits" as generated by actions of firms building their capabilities (Teece, 2010, p. 691, p. 710, p. 722) .

[3] For a description and discussion of ORBIS database, see Silva (2014) and Kalemli-Özcan et al (2015).

[4] There are other options in the Orbis database: ROA using P/L before tax and Profit Margin. Our option for ROA using Net Income is based on its similarity to the concept used by the literature on rate of profit.

debt service, taxes and other expenses. The total assets at historical costs are our measure of capital stock. The profit rate, r, is measured as return on assets (ROA) using net income.

(1) r = Net Income / Total Assets

As the data set presents the number of employees, N, it is possible to decompose our measure of the profit rate as:

(2) r = (Net Income / N) / (N / Total Assets)

The first ratio informs us about the profit per person, while the second one informs us about the amount of capital per person. The profit rate increases with profit per person and decreases with the amount of capital per person. The cheapening of commodity prices is a central aspect of the competition between firms. It is obtained by increasing labor productivity and the scale of production. The process of competition drives the firms to expand the scale of production raising the total assets per worker in order to increase the profit per worker. The movement of the profit rate depends on the balance between these contradictory forces.

The database covers data from 2007 to 2015. There is information on 18,347 firms for the USA and 629.176 firms for China, reflecting that the US economy is more consolidated than the Chinese economy at this stage. Remember that this paper works with firm's GUO as unit of analysis, and a GUO may have hundreds of subsidiaries, as shown in the examples of IBM and Pfizer - this is the empirical clue for the level of consolidation of those economies.

An indication of how representative is ORBIS vis-à-vis the USA and China's economies may be grasped by two comparisons. In the USA case, data from the Bureau of Economic Activities (2018) show that the total value added for the manufacturing sector in 2014 was US$ 2,111 trillion and its Gross Output was US$ 6.098 trillion, while our data from ORBIS for total revenue of manufacturing sector was US$ 1.585 trillion in 2014. In the case of China, data from the National Bureau of Statistics of China (2018) show for 2014 a total of 377,888 firms in the industrial sector, while our data from ORBIS show 314,120 firms in the manufacturing sector. These comparisons inform how representative our data from ORBIS is, suggesting a reasonable level of coverage, enough for an introductory analysis but demanding caution in preliminary conclusions.

Those general data are the starting points for Appendix Table A1. Orbis database displays differences in the coverage of those firms. Appendix Table A1 shows the percentage of missing data for information related to rate of profit, more specifically, for data on ROA Net Income: the coverage for the USA is broader than for China: 66% x 23% for 2007, and 90% x 52% for 2014. Those differences might again be an expression of the different levels of consolidation of both economies, since it is easier to find data for large consolidated groups than for new small companies. Appendix Table 1 also informs our decision to use data from 2007 and 2014.

III. OVERALL PICTURE: AVERAGE RATE OF PROFIT BETWEEN 2007 AND 2014

The period between 2007 and 2014 (Figure 1) involved structural changes both in the USA and in China. In the USA there was the great crisis of 2007-2008 and the post-crisis consolidation of important changes in economic sectors.

As a signal of those changes, for instance, it was only in 2009 that Google joined the list of Fortune Global 500 (in the 423rd position), and it grew and jumped to the 162nd position in 2014. In the case of China, there were both changes in sectors and changes in size, as in 2007 there were only 28 firms in the Fortune Global 500 and in 2014 there were 94. The differences between the two countries regarding growth are summarized by a comparison between their GDPs (Current US dollars), according to the World Bank: in 2007 China's GDP was US$ 3.55 trillion, growing almost three times to US$ 10.48 trillion in 2014, while the USA show a smaller growth from US$ 14.78 trillion in 2007 to US$ 17.39 trillion in 2014.[5] Those structural changes might be reflected in the movements of their average profit rates and in the growth rates of their GDPs.

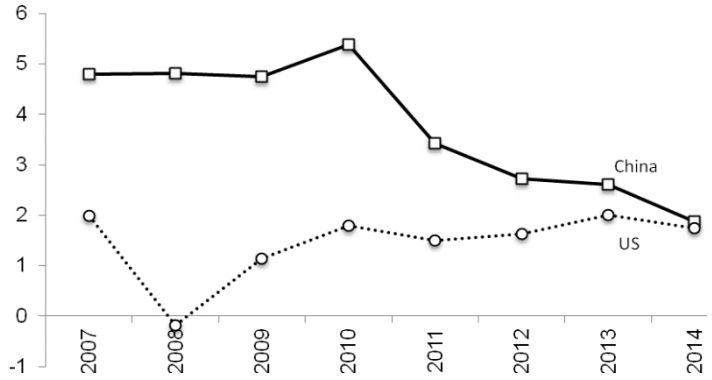
Furthermore, the data on rate of profit are related to the general conditions of those two economies. The differentiation between the rhythms of USA and other advanced economies and China and other emerging economies persists before, during and after the crisis: China and other emerging economies obtained higher growth rates until 2007, the decline in these rates was lower in emerging economies in 2008 and they returned to pre-crisis level more quickly (BIS, 2013, p. 6). China managed the crisis of 2007-2008 in a way that suggest an uneven rhythm between its dynamics and the dynamics in the USA, probably with a delayed effect (BIS, 2014, p. 43; BIS, 2015, p. 45) - those differences might be shown in the data on rate of profit.

The general average rates of profit for USA and China were calculated as a weighted average of the profit rate (as in equation 1) for all firms with available data for the return on assets (ROA) using net income and with available data for total assets in the ORBIS database. The number of firms per year is in Appendix Table A1.

Figure 1 shows the movements of the average rate of profit for China and the USA between 2007 and 2014. The profit rate in China is higher than in the US economy over the period of study. However, there was a decline in profitability of the Chinese firms to a level similar to the US firms in 2014. The profit rate in China in 2014 represented 39.2% of its value in 2007. In the US, the profit rate fell sharply with the 2008 crisis, recuperating to a level close to 2007 in the following years.

[5] Data available at https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=CN-US&view=chart

FIGURE 1
Average Rate of Profit - Return on Assets (ROA) using Net Income -, China and USA (2007-2014)

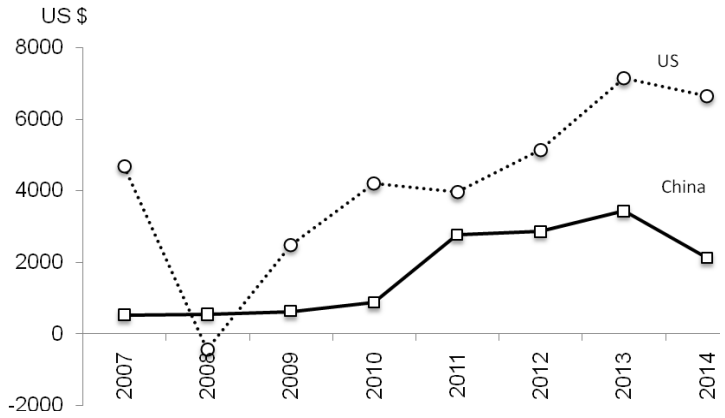


Source: ORBIS, authors' elaboration

An important question is what is driving the decline of profit rate in China in comparison to the US. Our hypothesis is the process of mechanization and the increase in the scale of production in the Chinese firms at much higher velocity than the US enterprises. The increase on scale was due to the rapid mechanization of the Chinese economy, particularly of the large firms. On average, the smaller firms had a higher profitability, they generated a lower amount of profit per worker than the large ones, but they had smaller assets per worker. Another important question is how the rate of profit in China will behave next years: Will it rebound and resume growth? Will the ups and downs of the rate of profit in the USA be replicated in the Chinese case?

Figure 2 displays the profit per employee measured at current dollars for China and the US between 2007 and 2014. While the profits per employee increased 303 per cent in China during this period, in the USA it expanded 42 percent.

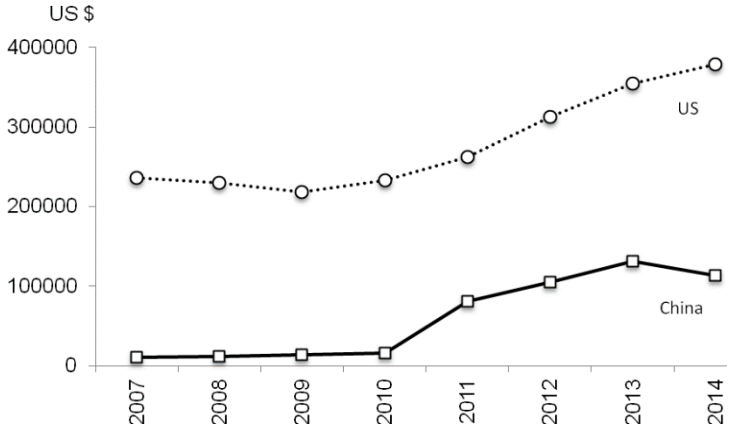
FIGURE 2
Profits per Employee, China and USA
(2007-2014)



Source: ORBIS, authors' elaboration

Figure 3 shows the capital assets by employee for China and US in the period of study. The capital assets per worker in the Chinese firms expanded 927 per cent between 2007 and 2014, while in the USA's firms it increased 61 per cent. This might be related to the growth of Chinese economy between 2007 and 2014, a pattern of growth that is related to the increase in the size of their corporations - Table 1, in the next section shows evidence in this regard.

FIGURE 3:
Capital Assets per Employee, China and USA
(2007-2014)



Source: ORBIS, authors' elaboration

Despite, having similar profitability, the firms in the US were on average bigger than their Chinese counterparts in 2014. It may impose limits in the capacity of Chinese firm to expand. However, the Chinese firms may already be competing successfully with American firms in certain sectors of economic activity. And similar process of consolidation and growth in the size of Chinese firms might be taking place - as data in the Global Fortune 500 may hint.

IV. DISTRIBUTION OF FIRMS AND THEIR PROFITS ACCORDING SIZE

Disaggregating the rate of profit by firm's size, Table 1 provides a first observation on the different rates of profit prevailing under the general average. Table 1 is organized using Scherer and Ross' (1990, p. 112) asset size range.

Table 1 shows that differences regarding rates of profit are systematic and persistent, according to size and time.

TABLE 1
Rate of Profit - Return on Assets (ROA) using Net Income - according to firm size, USA and China (2007-2014)

Year	Firm Size*	Number of Firms - US	Rate of Profit - US	Number of Firms - CN	Rate of Profit - CN	Year	Firm Size*	Number of Firms - US	Rate of Profit - US	Number of Firms - CN	Rate of Profit - CN
2007	A	1871	1.94	596	3.83	2011	A	2630	1.48	1826	2.41
	B	1948	2.84	1805	5.09		B	2640	2.07	4961	4.91
	C	1536	3.05	2822	5.74		C	2144	1.54	8268	6.76
	D	1200	1.82	4191	6.11		D	1589	0.86	12113	7.49
	E	1308	3.72	7592	6.11		E	1705	1.86	20189	8.50
	F	4339	3.30	126421	7.44		F	5127	0.24	192398	12.24
2008	A	1915	-0.16	776	3.93	2012	A	2899	1.63	2258	1.94
	B	2015	-0.88	2275	3.39		B	2839	1.89	5784	4.07
	C	1593	0.00	3801	5.54		C	2291	1.02	9408	5.94
	D	1236	-0.78	6115	6.02		D	1700	0.45	13815	6.72
	E	1333	1.36	10771	6.37		E	1795	2.98	23025	7.80
	F	4370	1.39	180263	8.75		F	5522	-0.50	195045	11.61
2009	A	1995	1.15	872	3.47	2013	A	3012	2.00	2882	1.90
	B	2062	0.98	2497	4.59		B	2804	2.31	6901	4.32
	C	1663	0.43	4095	5.94		C	2217	1.68	11441	5.68
	D	1203	-0.23	6347	6.16		D	1626	0.80	16911	6.34
	E	1368	0.54	11322	6.80		E	1765	3.09	27899	7.58
	F	4407	1.10	170826	9.61		F	5452	-0.37	366971	9.79
2010	A	2078	1.76	1060	4.34	2014	A	3067	1.75	2485	1.69
	B	2091	2.65	2826	5.42		B	2797	2.02	4594	3.60
	C	1663	2.54	4266	6.54		C	2110	1.28	5687	4.62
	D	1218	1.57	6199	6.81		D	1636	1.15	6985	4.81
	E	1344	2.86	10651	7.10		E	1757	5.07	10085	4.39
	F	4356	2.14	146851	10.84		F	5100	0.82	308293	2.20

* Firm Size by Assets Size Range: A: asstes over $1 billion; B: $250 - $1,000 million; C: $100 - $250 million; D: $50 - $100 million; E: $ 25 - 50 million; F: less $ 25 million
Source: ORBIS, authors' elaboration

Table 1 reveals that in the case of US firms, the crisis hit strongly those with higher assets, with only firms with less than $ 50 million in assets, firm sizes E and F, reporting positive profits. However, in the 2010s the smallest firms, those with less than $ 25 million in assets, were not able to obtain profitability similar to 2007. Firms with higher asset sizes reported profit rates close to their pre-crisis levels.

The leading size range in terms of profit rate changed over time: in 2007, the range between US$ 25 and 50 million, in 2008, the smaller range (below US$ 25 million) and in 2009 the larger firms range (above US$ 1 billion). The size range that was more frequent as the leading size was the range between US$ 25 and 50 million, which led in 2007, 2010, 2012, 2013 and 2014. There was no clear pattern between firm size and profit rate in the case of the US.[6]

Table 1 displays also data for China that coherently with data presented in Figure 1, exhibits higher rates of profit than the US firms for all sizes and years before 2014. However, there was a process of convergence in the profit rate, particularly among the largest firms. Probably the uneven rhythms of the crisis in the USA and China (section III) might be an influence in this convergence.

Table 1 shows China as a less consolidated industrial and economic structure, with a large set of small firms (with assets below US$ 25 million) - 126,421 in 2007 and 308,293 in 2014. Structural change in terms of the size of firms is captured by Table 1, as the total of larger firms (with assets above US$ 1 billion) grows from 596 firms in 2007 to 2,485 in 2014.

In the case of China, there was a negative relationship between the size of the firms and their profit rates. Smaller firms displayed higher rates of profit than larger firms. It may suggest a large difference between the total assets per worker among Chinese firms than in the case of the US. The leading sector in terms of rate of profit is the range between US$ 25 and 50 million, which led between 2007 and 2013, while in 2014 the range between US$ 50 and 100 million had the highest average.

V. PROFITS ACCORDING TO SECTORS

Inter-industry and inter-sectoral differences in rates of profit are a regularity found in studies of industrial organization (Schmalensee, 1989, section 4). The ORBIS database allows the investigation to focus in broad economic sectors and to zoom in manufacturing sectors. Since the national average rate of profit depends upon the whole economy, it is worthwhile to look at both levels. The data are disaggregated by NACE Sectors (Tables 2 and 3) and later by NACE Manufacturing Sectors (Tables 4 and 5).

[6] Certainly, the average profit rate by firm size contains great differentiation. One example is Apple, a firm with assets greater than US$ 1 billion: between 2007 and 2014, the smaller rate of profit was in 2008 (13.71%) and the larger in 2012 (23.70%), always larger than the larger firms' average. Those data are useful to an analysis in the next section, as those rates of profit achieved by leading firms such as Apple might be statistical indication of the concrete existence of super-profits, above the general average and above the average rate of profit of specific sectors.

V.1. Inter-Sectoral Differences in the Rate of Profit

The analysis will focus in sectors A to N (NACE sectors) - following to a classification suggested by the International Labor Organization (ILO, 2018a, 2018b), NACE sectors O, P, Q, R, S, T and U are "non-market services", while service sectors G, H, I,, J, K, L, M and N are "market services" - see correspondence table (ILO, 2018b, p. 2). As expected, differences between the sectors are persistent, both for USA (Table 2) and for China (Table 3).

To compare the inter-sectoral behavior of the rate of profit with the national averages shown in Figure 1 it is important to mention that in Tables 2 and 3 the averages are calculated from the sectoral average rate of profit - this explains why the line "mean (M) - all firms" in both tables is not equal to the average rate of profit shown in Figure 1.

Table 2, data for USA firms, shows systematic differences and changes in the rate of profit by sector and over time.

Regarding sectors, Table 2 presents changes in the ranking of profitability. In 2007 the highest rate of profit was "mining and quarrying" (NACE B), a sector that fell to the smallest rate of profit in 2014, a year when "construction" (NACE F) led. The persistence of inter-sectoral differences in rates of profit may be shown by the coefficients of variation - for the USA they have been greater than 1.00 all years, expect for 2013 and 2014.

TABLE 2
United States, Rate of profit - Return on Assets (ROA) using Net Income - by economic sectors (NACE classification), standard deviation, mean and coefficient of variation (2007-2014)

	US - ROA using Net Income								Standard Deviation (SD)	Mean (M)	Coefficient of Variation (SD/M)
	2007	2008	2009	2010	2011	2012	2013	2014			
A - Agriculture, forestry and fishing	4.43	18.18	8.27	6.62	7.11	9.14	4.58	6.61	4.37	6.87	0.64
B - Mining and quarrying	12.08	4.78	8.71	10.10	8.20	2.97	4.05	0.92	3.86	6.49	0.60
C - Manufacturing	6.93	5.15	4.42	7.60	7.34	7.86	7.86	7.72	1.33	7.47	0.18
D - Electricity, gas, steam and air conditioning	3.48	2.22	2.87	2.63	2.67	1.87	2.38	2.11	0.50	2.51	0.20
E - Water supply; sewerage, waste management	2.37	2.88	1.53	1.57	-0.23	2.00	2.02	4.58	1.36	2.01	0.67
F - Construction	5.60	-12.55	-15.63	-1.52	-7.71	8.79	12.13	8.80	10.67	2.04	5.23
G - Wholesale and retail trade; repair of motor	6.22	3.09	4.88	5.89	5.36	5.50	5.80	5.17	0.96	5.43	0.18
H - Transportation and storage	4.64	-2.78	0.21	2.77	2.72	1.13	3.13	5.18	2.57	2.75	0.94
I - Accommodation and food service activities	5.53	1.48	1.00	0.00	9.89	2.84	1.98	2.38	3.17	2.18	1.46
J - Information and communication	0.30	-1.03	3.77	5.09	4.69	5.19	6.01	4.95	2.56	4.82	0.53
K - Financial and insurance activities	1.73	-0.44	0.82	1.39	1.05	1.31	1.66	1.45	0.70	1.35	0.52
L - Real estate activities	6.14	-1.28	-6.35	0.23	2.04	2.00	2.61	3.40	3.71	2.02	1.84
M - Professional, scientific and technical activities	1.47	-2.14	2.46	5.23	5.46	2.72	7.07	5.29	2.94	3.98	0.74
N - Administrative and support service activities	1.88	-4.93	0.08	0.50	1.69	0.87	1.34	0.94	2.19	0.91	2.42
O - Public administration and defence; compulsory	-	-	-	-	-	-	-	-	-	-	-
P - Education	18.7	19.5	15.8	15.4	15.8	10.5	7.1	6.51	5.01	15.56	0.32
Q - Human health and social work activities	1.7	2.1	-0.6	-1.2	-3.3	2.0	5.0	4.02	2.76	1.83	1.51
R - Arts, entertainment and recreation	-1.3	-6.0	-1.6	0.5	1.5	-1.1	1.0	-0.60	2.32	-0.87	-2.67
S - Other service activities	2.4	0.7	-0.8	0.3	1.2	0.9	1.5	1.02	0.92	0.98	0.94
Standard Deviation (SD)	4.64	7.58	6.45	4.41	5.20	3.35	2.96	2.63			
Mean (M)	3.95	1.11	1.26	2.10	2.70	2.36	3.59	4.30			
Coefficient of Variation (SD/M)	1.17	6.82	5.10	2.10	1.93	1.42	0.82	0.61			

Source: ORBIS, authors' elaboration

Regarding inter-temporal differences, Table 2 shows oscillation of all sectoral rates of profit, reflecting changes in the rankings. There are coefficients of variation greater than 1.00 for seven NACE sectors. The larger mean (for sectors between A and N) was for "manufacturing" (NACE C): 7.55%. "Manufacturing", together with "wholesale and retail trade..." (NACE G) had the lowest coefficient of variation (0.17) among all sectors.

Table 3, data for Chinese economic sectors, also shows systematic differences and changes in the rate of profit by sector and over time.

Regarding sectors, Table 3 also displays changes in the ranking of profitability. For NACE Sectors between A and N, in 2007 the highest rate of profit was "mining and quarrying" (NACE B) - as in the USA -, and in 2014 the highest rate of profit was in "professional, scientific and technical activities" (NACE M), followed by "information and communication" (NACE J), and by "manufacturing" (NACE C). Those changes hint the nature of fast growth and structural change in the Chinese economy.

TABLE 3
China, Rate of profit - Return on Assets (ROA) using Net Income - by economic sectors (NACE classification), standard deviation, mean and coefficient of variation (2007-2014)

	CHINA - ROA using Net Income								Standard Deviation (SD)	Mean (M)	Coefficient of Variation (SD/M)
	2007	2008	2009	2010	2011	2012	2013	2014			
A - Agriculture, forestry and fishing	4.11	6.23	3.68	2.76	5.48	5.59	2.71	2.19	1.52	3.90	0.39
B - Mining and quarrying	14.67	14.05	8.17	10.22	10.87	8.30	7.79	4.02	3.49	9.26	0.38
C - Manufacturing	6.17	5.10	6.00	6.79	6.16	5.24	5.51	4.09	0.83	5.76	0.14
D - Electricity, gas, steam and air conditioning	3.36	0.61	1.18	2.02	1.96	2.31	2.78	2.49	0.87	2.16	0.40
E - Water supply; sewerage, waste management	1.60	1.47	1.43	2.12	3.04	2.70	2.62	3.64	0.81	2.37	0.34
F - Construction	2.87	2.23	2.66	2.60	2.66	2.23	2.29	2.16	0.27	2.45	0.11
G - Wholesale and retail trade; repair of motor	3.93	3.15	3.24	4.20	4.61	3.57	4.04	2.74	0.62	3.75	0.17
H - Transportation and storage	7.47	1.93	1.96	5.43	2.83	2.17	1.63	1.84	2.13	2.07	1.03
I - Accommodation and food service activities	4.45	3.17	3.67	4.04	3.53	3.14	1.30	0.50	1.37	3.35	0.41
J - Information and communication	4.48	0.62	3.13	2.49	6.16	4.96	4.33	4.19	1.69	4.26	0.40
K - Financial and insurance activities	2.89	0.82	1.97	1.95	1.19	1.23	1.21	1.19	0.67	1.22	0.55
L - Real estate activities	4.63	3.37	3.55	3.43	3.63	3.62	3.00	2.34	0.64	3.49	0.18
M - Professional, scientific and technical activities	3.10	2.81	2.92	3.62	4.42	3.49	3.20	4.33	0.61	3.34	0.18
N - Administrative and support service activities	5.49	4.84	6.13	6.91	6.61	4.57	3.64	2.18	1.59	5.16	0.31
O - Public administration and defence; compulsory	6.43	7.47	4.95	3.92	2.00	2.14	1.53	0.68	2.46	3.03	0.81
P - Education	0.00	0.00	56.19	7.53	-1.89	0.00	1.35	1.43	19.64	0.68	29.02
Q - Human health and social work activities	-23.40	-12.60	3.23	6.67	6.91	8.08	5.86	3.44	11.46	4.65	2.47
R - Arts, entertainment and recreation	9.43	8.89	7.45	7.26	5.20	4.96	4.46	4.34	2.02	6.23	0.32
S - Other service activities	6.32	6.16	5.06	7.00	4.26	3.78	3.93	4.05	1.26	4.66	0.27
Standard Deviation (SD)	7.25	5.15	12.15	2.39	2.69	2.11	1.75	1.27			
Mean (M)	4.45	3.15	3.55	4.04	4.26	3.57	3.00	2.49			
Coefficient of Variation (SD/M)	1.63	1.64	3.43	0.59	0.63	0.59	0.58	0.51			

Source: ORBIS, authors' elaboration.

Regarding inter-temporal differences, Table 3 shows oscillation of all sectoral rates of profit, reflecting changes in the rankings. Coefficients of variation for those intertemporal changes in China are greater than 0.50 only in three NACE sectors (for sectors between A and N). Important sectors such as "manufacturing" (NACE C) and "information and communication" (NACE J) presented coefficients of variation 0.20 and 0.38, respectively, suggesting relative stability in those sectoral rates of profits over time.

Tables 2 and 3 show important differences, both inter-sectorally and inter-temporally. Focusing in two key sectors - C (Manufacturing) and J (Information and Communication) -, both tables show a common behavior: first, in both countries, Manufacturing have above the average rates of profit in all years between 2007 and 2014; second, in both countries, Information and Communication was not above the general mean in the initial years, but were above it in the last years - the difference in this sector is when it overtook the general mean: 2009 in the USA and 2011 in China.

There is another important point regarding those two sectors - NACE C (Manufacturing) and NACE J (Information and Communication) - that differentiates their behavior from the comparative movements of the national averages. As Figure 1 shows, the Chinese rate of profit was above the rate from USA in all years, becoming the same only in 2014. However, a comparison between Tables 2 and 3 show a different comparative behavior for those two key sectors: for NACE sector C (Manufacturing) the USA have a higher rate of profit in all years except 2009, and for NACE sector J (Information and Communication) the USA have higher rates of profit in all years, except 2007, 2008 and 2011.

The behavior of sectoral rates of profit is affected by specific economic conjunctures. In the years of crisis, the rates of profit go down - in 2008 and 2009 they are lower than before (2007) and after (2010) both in USA and China. However, the intensity of the impact of the crisis 2007-2008 is different, as in 2008 and 2009 the mean for China was between 3.15% and 3.55% and for the USA between 1.11% and 1.26%.

The impact of the crisis in 2008 and 2009 shows other differences. Table 2 (USA) shows sectors with losses (negative profits): "financial services" (NACE K) in 2008, "real estate" (NACE L) in 2008 and 2009, and "construction" (NACE F) between 2008 and 2011. There is not a sector with negative profits in China (Table 3).

The different economic rhythms mentioned in section III are reflected in the movements of the rates of profit. In China, the biggest drop takes place after 2012, reaching 2.49% in 2014 - the lowest in Table 3. The USA present a different pattern, since there was an expansion in the profitability in the early 2013, reaching 4.30% in 2014 - the highest in Table 2. Table 2 also shows for 2014 a mean greater than the mean for 2007, and half of all sectors had in 2014 a profit rate higher or similar to its 2007 level.

The crisis of 2008 and 2009 may be related to another phenomenon: an increase in the inter-sectoral differentiation in rates of profit: both Table 2 (USA) and Table 3 (China) show the larger coefficients of variation in those years - the highest for USA in 2008, the highest for China in 2009.

After 2011, there is a common pattern of reduction in the coefficients of variation both for USA and China. However, the direction of the changes in the rates of profit was different: an increase since 2012 in the USA and a decrease since 2011 in China.

V.2. Intra-Sectoral Differences within Manufacturing

Disaggregating by manufacturing sector (12 NACE subsectors) we may investigate inter-industry differences in the average rate of profit shown in Tables 2 and 3. As mentioned in the previous subsection, the average rate of profit of NACE sector C (Manufacturing) was greater than the general mean in all years between 2007 and 2014.

Table 4, data for USA manufacturing firms, presents systematic differences and changes in the rate of profit by subsector and over time.

Regarding sectors, Table 4 shows changes in the ranking of profitability. In 2007 the highest rates of profit were in "manufacture of rubber and plastics products, and other non-metallic mineral products" (NACE CG), followed by "manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF) and "manufacture of basic metals and fabricated metal products, except machinery and equipment" (NACE CH). In 2014 this ranking was different, with "manufacture of computer, electronic and optical products" (NACE CI) with the highest rate of profit, followed by "manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF) and "manufacture of food products, beverages and tobacco products" (NACE CA). It is noteworthy the position of the subsector "manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF), that achieved rates of profit greater than 10.00% in five out of eight years shown in Table 4.

TABLE 4

United States, Rate of profit - Return on Assets (ROA) using Net Income - by manufacturing sectors (NACE classification), standard deviation, mean and coefficient of variation (2007-2014)

	2007	2008	2009	2010	2011	2012	2013	2014	Standard Deviation (SD)	Mean (M)	Coefficient of Variation (SD/M)
CA - Food products, beverages and tob	8.99	7.18	1.78	-0.06	4.44	5.07	5.72	5.19	2.86	5.13	0.56
CB - Textiles, apparel, leather	6.38	5.91	7.56	8.35	7.67	7.00	8.37	7.70	0.88	7.62	0.12
CD - Coke, and refined petroleum	2.92	4.26	-1.08	-6.14	4.24	18.83	10.83	7.11	7.52	4.25	1.77
CE - Chemicals and chemical products	6.54	3.27	4.09	10.71	10.69	12.20	10.97	10.68	3.48	10.69	0.33
CF - Pharmaceuticals, medicinal chem.	0.17	-1.99	6.56	1.52	2.37	1.49	0.45	1.99	2.44	1.51	1.62
CG - Rubber and plastics products	7.66	7.67	8.35	8.68	10.54	9.63	11.60	8.96	1.39	8.82	0.16
CH - Basic metals and fabricated metal	7.75	7.33	2.81	5.07	6.24	6.35	5.29	6.05	1.53	6.15	0.25
CI - Computer, electronic and optical	10.47	11.29	10.32	10.01	6.80	7.09	8.24	10.16	1.69	10.08	0.17
CJ - Electrical equipment	12.54	3.66	2.33	0.14	-3.10	1.39	2.64	3.36	4.47	2.49	1.80
CK - Machinery and equipment n.e.c.	4.92	4.25	-1.29	5.50	5.40	5.06	9.46	7.32	3.06	5.23	0.59
CL - Transport equipment	4.45	2.31	-6.39	1.84	2.59	4.43	5.48	3.70	3.72	3.14	1.18
CM - Other manufacturing, and repair	5.07	-2.08	-0.40	1.35	0.15	0.98	1.54	2.82	2.14	1.17	1.84
Standard Deviation (SD)	3.34	3.88	4.80	5.02	4.02	5.09	3.80	2.90			
Mean (M)	6.46	4.25	2.57	3.45	4.92	5.71	6.98	6.58			
Coefficient of Variation (SD/M)	0.52	0.91	1.87	1.45	0.82	0.89	0.54	0.44			

Source: ORBIS, authors' elaboration

Table 4 reveals the persistence of inter-industry differences in rates of profit that may be shown by the coefficients of variation - for the USA manufacturing sector it was greater than 0.80 in five years out of eight years. Furthermore, the variability between sectoral average rates of profit increases during crisis, as the figures for 2008, 2009 and 2010 show (0.91, 1.87 and 1. 45, respectively).

Regarding inter-temporal differences, Table 4 shows oscillation in the rates of profit of all manufacturing sectors, reflecting changes in their rankings. There are coefficients of variation greater than 1.00 for five NACE subsectors. The larger mean was for "manufacture of computer, electronic and optical products" (NACE CI) (10.69%), followed by "Manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF) (10.01%). Both means are greater than the mean for "manufacturing" in Table 2 (7.55%), which was the highest between sectors A to N - important evidence on the differences within sectors and industries, hinting directions of structural change within a national economy.

Table 5, data for Chinese manufacturing firms, also reveals systematic differences and changes in the rate of profit by subsector and over time.

TABLE 5
China, Rate of profit - Return on Assets (ROA) using Net Income - by manufacturing sectors (NACE classification), standard deviation, mean and coefficient of variation
(2007-2014)

	2007	2008	2009	2010	2011	2012	2013	2014	Standard Deviation (SD)	Mean (M)	Coefficient of Variation (SD/M)
CA - Food products, beverages and tob	8.85	9.37	10.14	9.90	9.07	7.69	7.36	6.70	1.25	8.96	0.14
CB - Textiles, apparel, leather	5.63	5.77	6.33	6.58	4.27	3.20	3.73	3.59	1.34	4.95	0.27
CD - Coke, and refined petroleum	1.46	-9.44	5.41	5.45	4.06	3.53	1.92	2.10	4.79	2.82	1.70
CE - Chemicals and chemical products	5.77	5.32	5.10	7.00	4.76	2.50	2.25	3.97	1.61	4.93	0.33
CF - Pharmaceuticals, medicinal chem	6.01	7.48	8.77	8.60	6.11	5.77	5.70	6.91	1.24	6.51	0.19
CG - Rubber and plastics products	5.86	5.75	7.22	7.53	5.65	3.06	3.84	3.67	1.65	5.70	0.29
CH - Basic metals and fabricated metal	6.80	4.18	3.55	3.87	1.71	0.39	1.26	1.25	2.12	2.63	0.80
CI - Computer, electronic and optical	5.59	5.29	5.19	5.33	3.88	3.09	4.34	4.63	0.86	4.91	0.18
CJ - Electrical equipment	6.16	6.61	6.73	5.95	3.45	2.30	3.09	4.21	1.75	5.08	0.34
CK - Machinery and equipment n.e.c.	6.31	6.09	6.15	7.01	5.62	3.73	3.17	3.09	1.56	5.86	0.27
CL - Transport equipment	5.95	5.74	7.03	9.14	8.06	7.22	6.75	6.92	1.10	6.97	0.16
CM - Other manufacturing, and repair	6.65	7.41	8.13	8.12	7.57	5.90	5.18	6.28	1.08	7.03	0.15
Standard Deviation (SD)	1.657	4.727	1.793	1.741	2.111	2.166	1.899	1.905			
Mean (M)	5.982	5.760	6.526	7.004	5.192	3.365	3.784	4.089			
Coefficient of Variation (SD/M)	0.277	0.821	0.275	0.249	0.407	0.644	0.502	0.466			

Source: ORBIS, authors' elaboration

Regarding sectors, Table 5 shows changes in the Chinese ranking of profitability. In 2007 the highest rates of profit were in "manufacture of food products, beverages and tobacco products" (NACE CA), followed by "other manufacturing, and repair and installation of machinery and equipment" (NACE CM) and "manufacture of basic metals and fabricated metal products, except machinery and equipment" (NACE CH). In 2014 this ranking was different, with "manufacture of transport equipment" (NACE CL) with the highest rate of profit, followed by "manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF) and "manufacture of food products, beverages and tobacco products" (NACE CA) (the second and third position in 2014 are the same subsectors as in the USA). According to Table 5, there is not a single matrix cell with a rate of profit greater than 10.00% in China, while in the case of USA manufacturing there were 14 cells with rates of profit greater than 10.00%. Table 4 highlights two key leading technological sectors persistently reaching this level: both "manufacture of pharmaceuticals, medicinal chemical and botanical products" (NACE CF) and "manufacture of computer, electronic and optical products" (NACE CI) kept those high averages rates during different five years.[7]

Table 5 reveals the persistence of inter-industry differences in rates of profit that may be shown by the coefficients of variation - for the Chinese manufacturing sector it was greater than 0.40 in five years out of the eight years. The variability within the Chinese manufacturing sector (Table 5) is less than 0.85 for all subsectors.

Regarding inter-temporal differences, Table 5 presents oscillation of all manufacturing sectors' rates of profit, reflecting changes in the rankings. There are coefficients of variation greater than 1.00 for two NACE subsectors. The larger mean was for "manufacture of food products, beverages and tobacco products" (NACE CA) (8.85%), followed by "Manufacture of transport equipment" (NACE CL) (6.92%). Both means are greater than the average for "manufacturing" in Table 3 (5.51%).

VI. CONCLUSION AND AN AGENDA FOR FURTHER RESEARCH

The objective of this paper is to highlight that a combination between the analysis of national averages rate of profit together with disaggregated profit rates by economic and industrial sectors are helpful to understand the dynamics of capitalist economies.

In terms of data and methodology, the paper uses the ORBIS database to compare USA and China. Taking into account the limits of this database, discussed in section II and shown in Appendix Table A1, this paper may present preliminary findings.

First, between 2007 and 2014 the average rates of profit in the USA and China presented different trajectories - see Figure 1. It might be important to signal that international movements of capital may follow those differences, moving from countries with smaller rates of profit towards countries with greater rates of profit. Furthermore, those variances suggest that for an analysis of global dynamics of capital, it is important

[7] Apple has rates of profit above the average of this NACE sector (CI) all years.

to try to capture different national behaviors of rates of profit, as information regarding one single country may not contain all data necessary to investigate the dynamic of a system that is global. The uneven movement of the rate of profit in the USA and in China, shown in Figure 1, specially during the crisis of 2007-2008, may offer a large maneuvering room for the global economy, presenting a more complex dynamics than that shown when analyses focus in just one country, even if it is the leading country in the system. Figure 1 reveals that during very critical times, a fall in the rate of profit in one place may be compensated by a rise elsewhere: between 2007 and 2010, a fall in the USA and a rise in China, between 2011 and 2013, a fall in China and a rise in the USA. Further investigation, trying to capture those different trajectories, may be helpful for a broader framework of analysis for global capitalism.

Second, analyses of national average rates of profit may benefit with an investigation of the movements under that average rates. Inter-sectoral and inter-industrial differences in rates of profit, a systematic, persistent and empirically verifiable phenomenon, fulfill information of changes that might be taking place at other levels. The variability of rates of profit across sectors and industries, that this paper identified both in the USA and in China, contribute to investigation of sectors and industries that are growing, getting larger profits - and therefore able to invest in their growth -, with economic conditions to implement changes in the existing economic and industrial structures. A comparison between national average rates of profit and economic and manufacturing sectors with rates of profit greater than that national average may provide clues about the direction of changes within national economies, as the analysis in section V presented. Those hints are not grasped by focusing only in the national averages.

Third, those inter-sectoral and inter-industrial differences in rates of profit may be part of a more global comparison of national rates of profit, since variability, differences in sectors and industries with above the average rates of profit may signal direction of change very useful to understand the global dynamics of capitalist system.

Fourth, this combination of analysis of national average rates of profit and inter-sectoral and inter-industrial persistent differences in those rates provide a better framework to investigate capitalism as a complex system.

Fifth, the data summarized in the figures and tables presented in this paper are consequence of several different dynamics, that combine themselves in the rates of profit: the capitalist processes of competition and change, the cyclical movements of capitalist economies, and the structural changes that reflect both the transition from a less developed economy towards a richer economy and inter-sectoral changes related to the rise of new sectors given emerging technological revolutions. Differences in the dynamics of national rates of profit and those of key sectors like NACE C (Manufacturing) and NACE J (Information and Communication), as presented in subsection V.1, put forward important questions regarding long term dynamics. As those phenomena affect unequally USA and China, those uneven movements might be reflected in the rates of profits displayed by those economies.

An agenda for further research would basically look for databases with more years and more countries, with more complete coverage of firms, sectors and countries, using ORBIS as a basic source of

information - two lines of investigation. On the one hand, to broaden the number of years would be important to better understand the long term dynamics of the rate of profit in the USA and China: Figure 1 suggests a convergence between the two national rates of profit, but we need to further investigate to see if those rates will converge or will diverge in their ups and downs. Or, in other words, will the Chinese economy behave like the USA after the crisis of 1929, with a strong recuperation in their rate of profit (Duménil and Lévy, 2015)? On the other hand, to deepen the analysis focusing in firms, since there might be more firms like Apple with rates of profits greater than those of their industries that have rates greater than the general average: this would mean investigating leading firms and their ability to earn super profits, a key driver of technological change in the dynamics of capitalism.

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APPENDIX

TABLE A1
Total of firms with information about Return on Assets (ROA) using Net Income and the percentage to the total of firms in the ORBIS database,
China and USA
(2007-2016)

Year	CHINA		USA	
	Firms with ROA Net Income	%	Firms with ROA Net Income	%
2007	143,427	23%	12,189	66%
2008	203,999	32%	12,449	68%
2009	195,929	31%	12,683	69%
2010	171,698	27%	12,744	69%
2011	192,295	31%	15,825	86%
2012	206,613	33%	17,027	93%
2013	387,488	62%	16,851	92%
2014	332,804	53%	16,448	90%
2015	20,373	3%	13,321	73%
2016	2	0%	506	3%

Source: ORBIS, authors' elaboration