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Changes in Food Chains in the Context of Globalization

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Abstract. This article highlighting the political and ideological conditions necessary for globalization and the role of the technologies associated with this process is an attempt to explain the nature and dynamics of change in food chains. In this text, a political-economic perspective is employed, relying on well-known theoretical and empirical examples that abound in the literature about globalization of food, and on the underlying theoretical explanation of the structural changes brought about or intensified by the globalization process.

It seeks to understand the logic and dynamic that explains why the corporate retailers became the main economic motors of deep and rapid changes in food chains and after a short appraisal of the effects of the changes it seeks to identify the winners and losers of the process.

Introduction

Since the beginning of the 1990s, a substantial body of literature has addressed the theme of the globalization of the agri-food system. After the seminal publication edited by Bonanno et al. (1994a) focusing on the role of transnational corporations (TNCs) in the global agri-food system, a broader perspective of TNCs as actors in global governance emerged. More recently, aiming at examining 'the *political* role that corporations play in efforts to *govern* the global *food* system', Clapp and Fuchs (2009, p. 2, emphases in original) edited their book seeking 'cross-referencing between these two literatures'.

This article results from an attempt to build up a pedagogical narrative inspired by the commodity systems methodology,[1] about a perspective that, to my knowledge, did not receive enough attention from the above-mentioned literature. That is, I will try to highlight the political and ideological conditions necessary for globalization. Also, I will stress the role of those pieces of technology associated with this process in order to explain the nature and dynamics of change in food chains.[2] I am aware that a detailed argumentation about all the issues involved could not be satisfactorily provided in a single article with page limitation; however, I feel that the

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main argument and other minor findings should be discussed by a broad audience of agri-food researchers.

This attempt follows a political-economic perspective, meaning that, besides seeking to understand the nature and dynamics of changes, an effort will be made to assess the importance and effects of those changes and to identify the winners and the losers in the process.

The article starts with a very short description of the overall globalization context, stressing the political/ideological conditions that, during the last decades of the twentieth century, paved the way for the emergence of intermediation-driven global capital[3] as the dominant forms of capital, relegating most of producer-driven capital to a secondary place. Then, the main drivers are identified that explain why the great distributors/retailers became the leading economic driving force of the food chains, and it intends to show relevant technological features involved in those changes.[4]

This approach relies on well-known theoretical developments and on empirical examples that abound in the globalization literature and, particularly, in that of the globalization of food.[5] Seeking an explanation for the processes of change it also appeals to the concept of the technological treadmill (Cochrane, 1979). This helps to clarify the dynamics of change and illustrates the structural effects of the adoption of technological innovations.

The text is organized as follows: the second section aims to link the changes in food chains to the context of globalization, highlighting the technological and the politically driven changes. In the third section, the structural impacts resulting from the changes in food chains are addressed, followed by some conclusive remarks that attempt to identify the winners and losers.

The Context of Globalization

It is assumed that the reader is familiar with the literature about globalization in general and particularly that involving food issues.[6] Nevertheless and taking the risk of being too schematic, I think that it is important to focus on the concept (see Box 1, where the most relevant features of the process are displayed). The current globalization phase of the capitalist system emerged in the 1970s as a result of the political will and actions of a new generation of governments, pioneered by Thatcher in the UK. Political action inspired on the neo-liberal ideology that had become hegemonic after a relatively long process of gestation; a process that resulted from the ideological and political project to shape the future of capitalist development. This process, financed by very wealthy people, started before World War II and succeeded in enrolling leading people from the academic orthodoxy, namely economists from the Chicago and Austrian schools, in networks of think-tanks in association with opinion makers, business men and politicians (Busch, 2010).

My understanding of the process is the following: probably the most remarkable feature of this globalization period is the shift of power between the types of capital, highly associated with the revolutions in information technologies (IT), transport and logistics, as well as with state-led decisions that make possible worldwide trade liberalization, and the other features involved in the Washington Consensus.[7] That is, corporations involved in intermediation – either financial or commercial – are the winners of the process due to their ability to better take advantage of the emerging technologies that represent a prerequisite of globalization, as well as from the change of the nature of the state induced by the neo-liberal ideology.

Box 1. Globalization determinants and consequences.

- Technological change as a prerequisite. Revolution in transport, information technologies (IT) and logistics (generalization of containers).
- Neo-liberal policies, starting with Thatcher in UK and Reagan in the US and then followed voluntarily by other countries, while being imposed by the IMF on indebted developing countries. Policies that became known as the Washington Consensus, particularly the following recommendations (impositions):
  - Privatization aimed at expanding the reach of private capital under the ideological claim that this is a more efficient way to assure the provision of public goods.
  - Liberalization of trade: GATT is transformed into WTO, including agricultural trade. Regional agreements such as NAFTA in North America or the expanding Common Market in Europe. Countries such China or India become huge commercial players. Offshoring of services and of productive operations resulting in international outsourcing becoming common practice. Fordism came to an end and new methods of flexible management emerged, such as just-in-time.
  - Deregulation (re-regulation Bonanno et al. (1994b) or neo-regulation (Otero and Pechlaner, 2010). From a state regulator to a state facilitator (McMichael and Myhre, 1991) and a shift from TNCs adapting to the state regulations to imposing conditions on the state, either in developed or in developing countries (Moreira, 1994).
- Empowerment of finance capital: financial tyranny (Fitoussi, 1997) and the capture of the state by the financial system (Johnson, 2009).
- Financial speculation recently aimed at food commodities, as a source of huge price volatility, affecting essentially the developing poor (Ghosh, 2009).
- Change in the balance of power between labour and capital. Capital gained more freedom of movement and in many countries public perception gives a more benevolent look at the inequalities of wealth, while labour lost most of its influence over the state apparatus and unions lost much of their attractiveness. Furthermore, labour had to deal with the fear of unemployment, due to the generalization of outsourcing and offshoring, an efficient way to self-restrain wage and other benefits claims as well as to force labour to accept the flexibility so praised by market fundamentalists.

Concerning food chains, some technologies that will be mentioned below have been instrumental in granting a decisive competitive advantage to the corporations able to take full profit through them, meaning that the well-managed adopters were able to gain competitive advantages that constitute a remarkable leverage for a self-reinforcing process, favoring the constitution of oligopolies. I refer particularly, but not exclusively, to the corporations involved in distribution and retailing in the area of the food chain in which the effective power and control is located (Dixon, 2002).

Even rejecting technological determinism, one must acknowledge that technologically driven innovations have been determinant to allow large corporations to take advantage of their position along the agri-food chains at the global level, to gain market power and capacity to enter a reinforcing process, while small players on the chain are frequently the subject of a squeeze between giants located at the upstream and at the downstream of the chain.

Evidence supporting the argument is illustrated by the growing importance of the finance sector due to liberalization and deregulation to grant free rein to capital, coupled with IT paving the way to the emergence of the virtual economy, based firmly in speculation,[8] and by the sudden entrance of a few distribution or retail agents directly into the top rankings of the most important corporations, such as Wal-Mart, Carrefour, Tesco, Metro, Kroeger and Ahold, all of them involved in food supply (Hughes, 1996).

The Dynamics of Change of Food Chains[9]

In order to understand the logic and dynamics of change, it is worthwhile to regard the changing process as the result of a system of forces entailing dialectic relations

from which I will underline those involving issues related with: (i) capital accumulation; (ii) consumer behaviour; (iii) state regulations; and, particularly, (iv) technology-driven innovation.

Capital Accumulation

The logic of capital accumulation appears not to need any particular explanation if one does not forget that its prime goal is the incessant quest for profits. Therefore, due to the overall pressure to build up a state facilitator of the requisites of capital, the concerns about, or the opposition to, the logic of capital accumulation are left only to the struggles driven by workers, consumers movements, radical alternative movements and/or people involved in grass-roots protests. These movements involve very different actors, focusing usually on particular issues that express the changing and frequently limited concerns of the civil society.[10]

During this process, strong competition among capitalists was intensified and geographically extended, even when collaborations such as strategic alliances are formed. Furthermore, it should be stressed that an articulation between different types of capitalists and between them and non-capitalist forms of production/distribution/retail[11] is perfectly compatible with the logic of capital accumulation.

Since the 1980s, we have seen the emergence of new large transnational corporations gaining disproportionate market power while many old giants lost ground.

At this point a clarification must be made. A particularly well-informed observer, Robert Reich (2007, p. 10), states that large corporations lost much of their importance in the economy compared to the period that ends at the beginning of the 1970s. It seems that the positions are not contradictory and could be easily reconciled.

In fact, old giants dominated most of the US market, when this country absorbed the lion's share of the industrial production of the globe, indeed loses its relative importance due to the expanding reach of competition, as Reich argues. Nevertheless, with globalization new large players emerged: not only oligopolies involved in information technologies such as Microsoft, Google, Intel, Oracle, Cisco, etc., but also large corporations that took advantage of the technologically and politically driven changes to increase their market power. This happened in the financial sector[12] and with the large retailers, of whom many were of a transnational character.

In short, successful oligopolies, while keeping fierce competition amongst them, place themselves in the most profitable segments of global chains leaving the less profitable to smaller actors.[13] These most profitable segments are the result of the use of their own technologies protected by patents,[14] or from a mix of new technologies (logistics and centralized purchasing centres) coupled with successful management, such as TNC retailers. Those corporations get enough competitive advantage to raise barriers to new competitors that might wish to enter the market.[15] And, finally, this growing power is also favoured by mergers and acquisitions that characterize global businesses, taking advantage of the financial leverage made possible by innovations in finance.

The Behaviour of Consumers

Undeniably, consumers benefited from the globalization that made exotic and out-of-season products affordable for mass consumption, opening up new possibilities

to adopt new types of diet, such as ethnic-driven cuisines (Appadurai, 1986). However, the other face of this coin is the emergence of concerns about the globalization of food. Concerns originated essentially through fear about food safety (Allard, BSE, nitrofurans, dioxins, *E. coli*, *Salmonellas*, etc.) that, being amplified by the media, paved the way to the quest for the traceability of the most perishable foods and favoured the establishment of private regulatory standards.

But consumer behaviour also involves a number of movements opposing globalization that need to be taken into account even if not explored here (Lowe et al., 2008). Ranging from the ones that radically contest the system, to others ethically or environmentally concerned that focus their actions on the functioning of the agrifood productive systems (extensive versus intensive, organic production, etc.) or on support to the survival of local producers (fair trade) or local markets or demand guarantees about animal well-being.

State Regulations

When looking at state regulations, one must bear in mind that globalization brought deep changes to regulation (Marsden, 1999; Busch and Bain, 2004). In certain cases, existing regulations were circumvented through processes such as the replacement by others more favorable to capital accumulation or by a less effective enforcement of existing laws.[16] Furthermore, as Busch (2010, p. 334) put it, 'strategies of supply chain management (SCM) and the tripartite standard regime (TSR)[17] have provided large firms with new ways of acting in a neoliberal world'.

This does not mean that state intervention disappeared, but only that it changed the intervention focus from direct economic intervention to other types of regulation, such as TSR or planning regulations (Griffith and Harmgart, 2008), as well as measures aimed at facing sanitary, health and animal well-being concerns, approved by the European Union and more or less enforced by member states.

Technology-driven Innovations

Addressing innovation and new technologies, it is worth mentioning that while they are made available by the technoscience system, the moment and pace of its adoption is determined by the logic of capital accumulation.

As already mentioned, transport and IT were a precondition for globalization since they have an enormous potential to reduce costs, to promote trade, and to improve efficiency in global chains. Higher velocity and more tons of freight per unit of transport, as well as the less known gains obtained from the generalization of the container,[18] substantially increased productivity, diminished costs of long distance trade, and facilitated logistical gains. The recent possibility to transfer all relevant information in real time, using Intranet and/or the public Internet, only costs a small fraction of the past costs. Indeed, the use of IT has been crucial to achieve new levels of efficiency in logistics and in long distance management and control, measured either in terms of gains of time and/or quality of service.

These technologies were instrumental in the emergence of the most important innovation within the supply chain. I refer here to the implementation of highly centralized forms of acquisitions, through giant purchase centres able to supply several sales points of a particular group within a strategically defined geographical area,

which, as often happens in the European Union, frequently have a transnational character.

Other technologies contribute to the success of these purchase centres, adding to gains in efficiency and reduction of functioning cost. Especially among them, the electronically enabled supply chains that radically transformed the velocity, quantity and quality of information between the actors that participate in supply chains.[19]

It is worth noting that these technologies constitute a threat to some intermediate agents in supply chains facilitating direct access between producers and retailers, and therefore constituting an obvious means of permanent pressure to contain prices at the intermediate level. And even if it could serve, in certain market segments, to by-pass the retailer when there is direct access between producer and final consumer (Yao et al., 2007), it has been particularly important to the large distributors/retailers.

Furthermore, IT allows the monitoring of trade and quality parameters, particularly important to food chains, which are no longer a solely internal business requirement necessary to obtain efficient logistics. In fact, in 2004, the monitoring process became subject to EU regulation (Jedermann et al., 2006). These regulations go in parallel with innovations concerning the conditions of transport of live animals and transport and stocking of fresh produce, under rigorous control of temperature and atmospheric conditions.

Complementary to this is the expected generalization of radio frequency identification (RFID),[20] which, besides its further gains of efficiency, can be associated with sophisticated systems based on software improvements to allow the use of autonomous sensors to check the state of maturation of produce. There are already working prototypes to assure this form of traceability (Jedermann et al., 2006).

Concluding, even for arms-length trade, IT is decisive in making trading points more efficient and less dependent on the labour force. Large retailers pioneered these innovations but many of these technologies are spreading even to small retailers. This movement started with the generalization of the bar-code system that not only made possible the profitable use of the electronic points of sale, replacing the old register machine with visible speed gains, but also allowed automatic transmission of data necessary for a better management of the retail unit. The afore-mentioned RFID will increase the advantage of electronic points of sale, respond to concerns about the traceability of products, and contribute to a more efficient connection between retailers and suppliers. Moreover, those innovations not only serve to increase the productivity at the lower end of the supply chain, but also contribute to the establishment of partnerships replacing certain forms of competition.

Fast and cheaper transportation, coupled with more efficient logistics, means that distance and/or long distance trade gained importance, giving a new life to the traditional form of catalogue or TV sale but also the direct purchase via Internet, either directly from retailers or producers, namely the ones exploring niche markets, involving real time payments using debit/credit cards or electronic transfers. However, one must recognize that these forms of distance retail trade only function well for certain types of products, since consumers are reticent to buy without previous inspection of their acquisitions. This situation is particularly felt at the markets for fresh fruit and vegetables, fish and meat.

To complete the description of technology-driven innovation, a brief mention must be made of the emergence of nanotechnologies,[21] which could be seen as a source of future changes, particularly due to the 'growing alliance between the cor-

porate food sector and scientific communities… [that] strategically place the corporate sector to shape the research trajectory and commercial applications of nanotechnology, and the future of agri-food systems', pointing to the emergence of a 'nano-corporate food paradigm' (Scrinis and Lyons, 2007, p. 22). Nanotechnologies not only complete and extend the reach of known productive technologies, from precision farming to nutraceutical production, passing through the improving of quality, durability and shelf life of packaged foods, but can be coupled, at the nano-level, with IT, allowing the generalization of the use of nano-sensors, which will reinforce large-scale production restructuring (Scrinis and Lyons, 2007, p. 22).

Impacts of Globalization on Food Chains

Impacts of globalization on food chains result from a number of factors. Without any pretension of being exhaustive, I will focus on the scale effects of the technology-driven innovations and on the outcomes of an increasing worldwide competition.

Impacts Resulting from Scale Effects

Besides IT, the most visible and important scale effect stems from the centralized acquisitions of purchase centres. These large infrastructures that only are profitable if significant quantities of products are to be exchanged allow these operators to obtain substantial discounts for large quantities, and simultaneously to impose minimum thresholds for the suppliers just to have access to the negotiation process.[22]

Size matters – by definition, strong market power makes these large players able to squeeze the prices paid to the producers or to force them to support marketing strategies supporting the costs of promotional sales. The competitive advantage of these operators is also reinforced by the extraordinary financial advantage of this type of business. In fact, different from small retailers that frequently accept delays in payment from their customers, corporate distributors/retailers do not maintain personal relations with consumers and any sale is immediately paid for: consequently, they do not suffer treasury risks due to unpaid debts. Furthermore, they can obtain substantial financial interest since they can take advantage of the gap between the sale and the 60–90 days during which they can delay payments to suppliers. Thus, it is obvious that this kind of business gives enormous financial leverage to corporate retailers, daily reinforcing the already considerable financial and market power of these actors, opening opportunities to mergers and acquisitions of competitors.

The results are obvious: on the one hand, many suppliers become entirely dependent on a single buyer and, on the other hand, isolated producers and/or small associations or co-operatives could find themselves excluded from the segment of the market formed by the sale points connected with these purchase centres. Knowing that the market share of these purchase centres shows consistently rising levels, the implications are clear: suppliers are forced to enter restructuring processes[23] solely to have access to the negotiation room.[24]

This means that any corporation able to establish these large centralizing acquisition centers can reinforce their market power on a daily basis to a point that, emulating identical procedures, becomes imperative for competitors to stay or to enter the business. This also means that the well-managed first innovators gained formidable

power and could erect entrance barriers against new competitors that have to find new places and new business strategies.[25]

This dynamic of food chains leads to a new market segmentation at the lower end of the food chain with a quite different distribution of power: on the one side, we find a small group of large distributors or retailers that rapidly gained market share and became oligopolies. And on the other side, there is a multitude of small retailers facing a diminishing market share, especially when they are not able to associate themselves in order to have their own large purchasing centres. This picture will be finished if we add to these two groups the isolated actors that voluntarily choose niche markets, which, by definition, are aimed at obtaining higher prices but, given their niche character, cannot expand beyond restricted limits. In spite of keeping fierce competition amongst them, however, it should be stressed that even these large players benefit from a close and complex form of articulation with other smaller actors in traditional or alternative markets, or even with the smaller producers of niche markets.[26]

A somehow different picture can be observed at the other zones of the food chain.

On the one hand, we can find identical scale effects in agriculture and the food raw-material trade, where a few actors reache such high levels of market power that it allowed a World Bank researcher to state: 'In all major consumer markets, decreases in world commodity prices have been systematically much less transmitted than increases to domestic consumer prices. This asymmetric response which has been attributed to trade restrictions and bidding processing costs, appears rather to be largely caused by the behavior of international trading companies' (Morisset, 1997, p. 28).

Different is the case of corporations relying on patent ownership and involved in production. They have to deal with worldwide increasing competition and with the growing costs of research and development.[27] This trend results in new highs of worldwide concentration of power through the formation of clusters of strategic alliances that are particularly important in the trade of grain/animal feed, seeds, agrochemicals and biotechnologies, as happened with Cargill and Monsanto and Novartis and ADM (Hendrickson and Heffernan, 2002).

The alliances can also be found in other segments of corporations directly involved in production,[28] such as the Beverage Partners Worldwide (BPW), a joint venture between Nestlé and Coca-Cola concerning ready-to-drink tea, or the Dairy Partners Americas (DPA) involving the Nestlé and New Zealand's Fonterra Co-operative Group Ltd.

Other Effects

Liberalization of trade (GATT and WTO) set in motion a global competitive dynamic that mirrors the image of the technological treadmill used by Cochrane (1979) to describe the historical evolution of agriculture in the US, with similar structural effects. The difference is that, nowadays, the effects of market competition are no longer restricted to national borders.

The result of these dynamics are new highs of de-territorialization of production of many food products, illustrated by the geographical concentration of intensive meat production based on globally sourced raw materials used as feedstuffs,[29] thus intensifying and extending the changes in the geography of production previously remarked at the national level. This happens through the concentration of intensive

agricultural production in the most favourable areas, which is the ineluctable outcome of the technological treadmill when actors are only submitted to market price stimuli. In this case, the goal of obtaining competitive advantage, or simply staying in business, forces producers into an incessant quest to increase productivity, concentrating production in better areas, and slowing down agricultural production levels or even abandoning agriculture in the less productive areas[30] and, therefore, contributing to the socio-economic decline of the less favoured areas.

Another dimension of the global food chains is related with an unrestricted international trade of food or raw materials to produce food, just to provide marginal gains to the holders of capital involved in this trade. In fact, international trade is based on a dynamic that depends on heavily subsidized infrastructures and limited and non-renewable energy sources to transport many goods that could be produced perfectly in the proximity of consumers. This apparent irrationality is justified on two grounds. One results from a private logic that does not care about social concerns that justify that even a tiny gain from trade is enough to promote long distance trade. The other is more technically driven, and it is inherent in the negotiation procedures and logistics logic that involve prices, but also volumes and quality standards, that often are difficult to obtain timely in regional and, sometimes, even in national markets.[31]

This overall logic is hardly sustainable,[32] unless transportation could find a new source of clean energy.

Since only few people are aware of the externalities involved in the global food system, it is highly improbable that this could generate an overall concern or constitute the basis for public demonstrations. Therefore it is understandable the lack of political will to design policies able to counter activities that produce negative externalities and, simultaneously, compensate the costs to producers of positive externalities. And when this exists, it is considered as equivalent to protectionist policies contrary to WTO agreements that only care about trade liberalization.[33]

Concluding Remarks: Identifying the Winners and Losers

Considering competition and scale effects, it is enough to identify winners and losers, but it is also necessary to have in mind that this increased worldwide competition is played out among actors that are quite differentiated in terms of economic and financial weight along each supply chain. Broadly speaking, two different types of competition are present in the agri-food sector.

One type involves supply chains with the uncontested command of corporate distributors and or retailers; supply chains where all the other intermediate actors (service providers, transportation and logistics, processing industries and farmers) are relatively small, and thus cannot escape the grip of the corporations. Farmers are the weakest link in these chains, since they are squeezed between two forces: on the one hand, they have to comply with corporate retailers' requirements (price, volume and quality standards); on the other hand, they suffer from the market power of the corporations that supply them with equipment and agro-inputs. This type of competition relates essentially to short supply chains, mainly aimed at fresh products, which tend to be under the control of corporate distributors or retailers, relegating the other intermediate actors to a subordinate role.

The other type of competition, found in longer supply chains that do not have a sole controlling actor, as when one or more of the large corporations such as Nestlé,

Unilever, Coca-Cola, Pepsico, Conagra, ITB are present. In this case, only the small actors present in the chain are subject to price squeeze. The other large players, either producer-driven or intermediate-driven corporations, prefer to try to find forms of supply-chain partnerships rather than entering into power games with players of identical financial and market power (Humphrey, 2006).

At the consumer level, the emergence of global food chains and the surge of corporate retailers brought perceived benefits: consumers benefited from the presence of these large retailers in terms of lower prices, better services and wider choices, even if in a differentiated way. The ones in highly populated areas could benefit from competition among large players, while consumers served only by one large retailer can count on relatively higher prices. Nevertheless, hyper-valuing these benefits lead consumers to a sort of schizophrenic behaviour: as consumers we see people bargaining for these advantages, even when they are aware that they are linked to outcomes that they prefer rationally to refuse, such as economic, social and environmental losses and, particularly, damages to the democratic system that is probably the most troubling outcome of globalization.[34]

Shortly, the absolute losers of the process of globalization of food chains are the smaller actors that have been forced to give up and get out of business. Relative losers are small retailers located at the downstream end of food chains facing unfair competition of corporate retailers, or farmers located at the upstream end of food chains suffering from uneven market power relations, either when dealing with input supplier oligopolies or being obliged to comply with volume, time and quality standard requirements, as well as a price squeeze imposed by the corporate distributors or retailers.

But the small operators located in the less favoured areas are the ones suffering the most, since they share all the burdens and, simultaneously, are the worst placed to participate in the global supply chains, and/or to fully exploit the kind of opportunities that globalization can grant to small producers.

In addition, it must be noticed that consumers located in less favoured areas could be considered as a relative losers of the process, since retail competition is scarce or non-existent in these areas. Therefore, they pay more for identical goods than consumers in places where competition really exists, as successive consumer surveys demonstrate.

Large distributors or retailers are the obvious winners, the ones that were able to capture the many benefits derived from trade liberalization and from the dynamic associated with the above-mentioned technology-driven innovations.

That is, those actors were instrumental in exacerbating the competitive weakness of many producers who previously suffered only from competition restricted to national or protected European Common Market boundaries.

Increasing downstream market power in the food chains put pressure even on large corporations involved in agricultural input production (seed and agrochemicals) or involved in food and beverage production. It pressured them to focus only on the most profitable segments of the supply chain, leaving to small actors the most risky and less profitable productive operations, and, furthermore, it pressured them to look for strategic alliances or supply-chain partnership with other giants.[35]

The emergence of the oligopolization of the large retailers stimulates the formation of larger ventures of their smaller suppliers through collective action, associating farmers, other intermediates or small retailers. It also urged other large corpo-

rations to countervail the market power of the corporate distributors or retailers, therefore contributing to alliances between the large players.

To conclude it seems appropriate to call attention to the Achilles' heel of this politically driven globalization of food.

The first challenge comes from collective action of a number of movements, ranging from more or less radical alternative movements to other grass-root and loosely organized rejection movements expressing the vitality of civil society that wants to have a word on the modes of production, marketing and consumption of food.

Recently, since the onset of the current financial crisis the usual political arguments that point to a globalization backlash have been reinforced greatly. World finance is far from being stabilized and fears of higher levels of protectionism are common.[36] Expected higher commodity prices, i.e. oil, will increase transportation costs,[37] therefore implying a severe adjustment of the global food chains (Moreira, 2004). Hence, part of the global trade in food and raw materials is condemned to fade away, at least concerning the products with relatively higher weight and volume by ton.

In short, political dissatisfaction with globalization, financial and food crises, grass-root and alternative movements' concerns about food production and consumption, and higher transportation costs constitute elements that point to a deep change in the current food paradigm.

Notes

1. I will use chain to abbreviate commodity chain or supply chain, knowing that as Friedland (2001) recognizes 'the nomenclature in this field is not yet settled down'. The terms interchangeably used in sociology are commodity systems, commodity chains, and the French filières, while economists also refer to value chains and supply chains even if usually their analysis 'is devoid of human beings'.
2. Busch (2010) approach goes in the same direction.
3. By intermediation-driven global capital, I mean the types of global capital essentially based on intermediation processes, either financial or commercial.
4. The article focuses on the major change drivers, which could lead the reader to think that changes followed a linear path, predetermined and inevitable. The length of the article does not permit reference to the nuances and specificities of the processes, as can be observed in de Raymond (2007).
5. Among them, let me highlight the following: Friedland (1984, 2001), Bonanno et al. (1994a, 1994b) and Morgan et al. (2008).
6. Well-known literature allows me to skip explanations of the main globalization drivers. Among those that the reader might find useful are: Bonanno et al. (1994a, 1994b), Clapp and Fuchs (2009) and Busch (2010) concerning agrifood; Gereffi et al. (1994) concerning the distinction between producer-driven and buyer-driven commodity chains; the edited books of Lechner and Boli (2000) and Held and McGrew (2000) where other dimensions of globalization are also treated; and, finally, Rodrik (2002, 2007) and Stiglitz (2002, 2006) for an economic perspective critical of the orthodoxy.
7. 'By the late 1980s a remarkable convergence of views had developed around a set of policy principle that John Williamson, infelicitously termed 'Washington Consensus"… Toward the end of the 1990s, this list was augmented in the thinking of multilateral agencies and policy economists with a series of so-called second-generation reforms that were more institutional in nature and targeted at problems of "good governance"' (in Rodrik, 2007). The first guideline extensively imposed by the International Monetary Fund's structural adjustment policies involve 10 principles: fiscal discipline; reorientation of public expenditures; tax reform; interest rate liberalization; unified and competitive exchanges rates; trade liberalization; openness to direct foreign investment; privatization; deregulation; and secure property rights (Rodrik, 2007, pp. 16–17). However, the way it was applied by the IMF was strongly criticized by authors such as Stiglitz (2002), turn the expression a label of market fundamentalism.
8. Johnson (2009) underlines that 'From 1973 to 1985 the financial sector never earned more than 16 percent of domestic corporate profits. In 1986, that figure reached 19 percent… This decade, it reached 41 percent'. See also Stiglitz (2010), for a deep analysis of the crisis, the issues of financial regulation

of those too big to fail, and the responsibility of the economics orthodoxy. Allais (1993) calls attention to the role of automatic software on finance volatility and crisis, and Sethi (2010) quotes a Financial Times article stating that 'After a detailed four-month review of the flash crash, looking at market data streams tick-by-tick and down to the millisecond, the SEC concluded that a single order in the e-mini S&P 500 futures market ignited an inferno of panic selling. It was over in about seven minutes, and $1,000bn was up in smoke'.

9. An interesting perspective comes from Flora and Bendini (2007), who consider changes as corresponding to a fundamental shift in the value chains, with farms forced to pass from market convention to industrial convention demands. I think that this perspective is based on conventions theory rather than in parallel with the approach developed here.
10. About the rising political importance of the civil society, see Friedland (2008).
11. That is, small family farmers, traditional local markets and artisanal production or small retailers, mainly family based.
12. See the discussion about the needed regulation of the institutions too big to fail (among others, Johnson, 2009; Stiglitz, 2010).
13. Several cases of vertical integration along the commodity chain illustrate this claim, such as in the automotive sector, information technologies and clothing industries where the leader corporation concentrate on design and marketing, while production is left to independent or quasi-independent producers. The same happens in many examples of food production, namely meat and broiler production, where the riskier part of the chain is usually reserved for autonomous producers (Bonanno et al., 1994, pp. 7–8; Gouveia, 1994, pp. 130–131; Heffernan and Constance, 1994).
14. As happens at the upstream of the agri-food supply chains with giants such as Bayer (Aventis), Syngenta (Novartis and Astra Zeneca), and Monsanto.
15. Reich (2007, pp. 53–55) refers that '[s]ize was no longer an entry barrier', but he also acknowledges, exemplifying with Wal-Mart, that '[l]arger size can still be useful to a firm – but not because of production scale, and not to keep competition at bay so prices can be raised'.
16. As illustrated by what happened to financial and environmental regulations during the George W. Bush Administration, or TNCs delocalization to countries where environmental regulations are not enforced.
17. Consisting of standards, certifications and accreditations with the involvement of state and private institutions. Particularly relevant for globalization of food is GLOBALGAP, which substituted EurepGAP as created by several European market chains.
18. With savings of 0.3–0.5% of the shipping value (Crafts and Venables, 2001, p. 26).
19. Electronic Data Interchange is the usual way of doing business by corporations such as Procter & Gamble, Colgate, Sony, Johnson Wax and Royal Brands when negotiating with Continente, the larger Portuguese retailer (Rousseau, 1997, p. 105). Also worth mentioning is factory gate pricing, a cost-saving procedure where products are collected by the retailer at the factory gates of the suppliers (le Blanc et al., 2006).
20. See Busch (2010) explaining the slow pace of RFID adoption.
21. About the significance of the nanotechnologies see Busch (2010).
22. Identical scale effects are observed in the relations between African exporters and producers of fresh vegetables and UK supermarkets (Dolan and Humphrey, 2001).
23. A good example of this restructuring is given by Harvey et al. (2002, pp. 86–95) when referring to the emergence of the Greenery International or the AENOR label.
24. Busch (2010, p. 336) quoting Grievink relays that '70 buying desks for supermarket chains now control most of Europe's food supply', and Fuchs et al. (2009, p. 32) quoting MacMillan point to '110 buying desks, which act as intermediaries between 3.2 million farmers and the consumer'.
25. This does not mean that all early innovators were able to achieve an oligopolistic level, some failed due to bad management or poor strategies, while others have been incorporated into larger operations through the merger and acquisition movement that characterizes the financially led business world.
26. de Raymond (2007) provides illustration of this kind of articulation. Conroy et al. (1996) show that in Central America larger exporters and importers frequently use traditional markets to obtain the volumes they need while giving preference to contracts with large players.
27. Increasingly substituting state-led R&D.
28. Even when the bulk of their profits come from non-productive activities.
29. Heffernan et al. (1999) note that 97% of US broiler production is concentrated in 40 firms, using 250 processing facilities.
30. Productivity calculated not in terms of agricultural production potential but measured by current market-driven prices regardless of the positive and negative externalities incurred by the fact that production is intensified in some places, and because the other face of the coin is the extensification

or abandonment of areas perfectly suitable to produce foodstuffs or raw materials. Externality is an economic concept that refers to the effects, positive or negative, provoked by economic activities that are not valued through market prices.

31. An example of this 'irrationality' happens when a small flower retailer in Portugal orders Mediterranean flowers from their usual supplier and the order is satisfied and delivered by a Dutch lorry that transport the flowers from the Netherlands after being produced and shipped from a production facility located some kilometers away from the final sale point.
32. This is due to the negative externalities involved in trade, namely long distance trade. Also worth mentioning are the perverse effects of subsidizing bio-fuel production on climate and food consumption.
33. As happens with much of the defense of the European model of agricultural production where externalities justify 'protectionist' policies.
34. See Reich (2007). Showing identical concerns, see also the trilema of globalization defined by Rodrik (2002).
35. See note 13 as well as Hendrickson and Heffernan (2002), Maloni and Benton (2000) and Mulrony and Chaddad (2005).
36. Currency disputes at the recent G20 summit in Seoul are an example.
37. Rubin and Tal (2008) in a recent newsletter note that 'in tariff-equivalent terms, the explosion in global transport costs has effectively offset all the trade liberalization efforts of the last three decades. Not only does this suggest a major slowdown in the growth of world trade, but also a fundamental realignment in trade patterns', and '[o]ver the last three years, every one dollar rise in world oil prices has fed directly into a 1% rise in transport costs'.

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