

Agriculture in the Age of Globalization

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ABSTRACT: This paper aims at analyzing the asymmetries in the process of globalization and its differentiated outcomes on (i) developed and less developed countries, and (ii) on LDC agriculture. The consequences of these asymmetries are reflected in the dramatic changes in world agricultural trade – an unprecedented growth of agricultural trade in real terms and a dramatic change in its composition which is increasingly moving away from bulk commodities towards high-value, processed consumer-ready agricultural goods.

The impacts of these changes on LDC agriculture have been quite differentiated, with most countries experiencing a worsening of their agricultural trade balance. This change of the LDC trade position is counterintuitive if we still think of agricultural trade as a comparative-advantage-based trade, i.e. based on cost competition. It seems instead that the change in the composition of agricultural trade is the epiphenomenon of a fundamental change in the rules of the game, which are increasingly based on the reputation of agricultural products and imply a quality-based competition.

Unfortunately, the implications for LDC agriculture do not seem encouraging. The intrinsic poverty of these economies, with the implied burden in terms of missing assets to compete under the new rules of the game and some adverse globalization-induced changes in LDCs macro fundamentals are crucial handicaps that work against the development of LDC agriculture. Furthermore, the underlying forces driving globalization (increasing returns to scale, research, development of new products, etc.) undermine the traditional role of agriculture as engine of growth.

The analysis carried out in this paper represents one more piece of evidence that the effects of globalization are asymmetric and that development success requires selective and phased integration with world markets. Without the required investments in terms of infrastructure, institutions, human and social capital, LDC agriculture will hardly be able to claim the expected benefits of globalization.

Keywords: globalization, agriculture, LDCs

JEL classification: O13, Q17

1. Introduction

No recent economic phenomenon has received more attention than globalization in scholarly circles as well as in the policy arena and even among lay-people. And no other phenomenon has so polarized the discussion around two contrasting views, which ultimately reflect alternative assessments of globalization. Its critics have argued that it has exploited people in developing countries, caused massive disruptions to their lives and produced few benefits in return. Supporters point to the significant reductions in poverty achieved by countries which have embraced integration with the world economy such as China and India are aiming at now. Irrespective of which side of globalization people stand on, both critics and supporters

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would agree that (i) the pace of globalization is uneven across the world, and (ii) its outcomes are differentiated.

This paper addresses the two issues above by firstly looking at the differentiated outcomes of globalization from the perspective of developed (DCs) and less developed countries (LDCs), and secondly focusing on the sectoral impact of globalization, specifically on LDC agriculture.

The starting point for tunneling the vision of globalization in this paper is on the *systematic* asymmetries of globalization in the sense that its benefits for the developed countries are easy to access and clearly visible, while in poor countries they are hard to come by and a failed globalization experiment can be very costly (Yotopoulos and Romano, 2007). The reasons for that should be sought primarily in the different institutional endowments between LDCs and DCs and in the adverse change of some LDC macro fundamentals entailed by the globalization process itself. Section 2 brings forward some stylized facts referring to these asymmetries at the global level.

Section 3 extends the argument of the systematic asymmetries of globalization to the sub-national level, be it sectoral, regional or social-class specific. More specifically, it appears that the effects of globalization become increasingly negative for the agricultural sector of LDCs as we move along the continuum from the tradable to the non-tradable agricultural output and from the conglomerate, to the commercial and to the subsistence farms in the agricultural sector. At the empirical level, this section formulates some agriculture-specific applications of the “decommodification” of a large swath of trade, and not only of (pure) services, in the modern version of globalization and adduces some tentative evidence (Yotopoulos, 2007).

Section 4 takes an overall view of some globalization-induced challenges to LDC agriculture, namely the diminishing profitability of agricultural production. This has important implications for the role that agriculture can play to contribute to LDC economic development under globalization. It appears that the change in the rules of competition that the process of globalization entails undermines the traditional role of agriculture as the engine of growth in LDCs.

Finally, section 5 summarizes the main findings of the paper.

2. Some Stylized Facts about Globalization and Poverty

Globalization essentially implicates the extension of the market and its deepening as a result of the reduction of the transaction costs of trading internationally. The most striking feature of modern globalization is the increase in trade and in financial integration across the world, a phenomenon which is true both over time and across countries. According to IMF (2002) estimates, the change of the share of trade in GDP¹ between 1981-85 and 1997-2001 was 3.9 percent for developed countries and 15.4 percent for developing countries, while the change in the ratio of external finance² to GDP over the same period was 77.3 percent and 19.9 percent, respectively. The extension of trade and of international finance in the post-WTO years of the modern globalization wave is due largely to the innovations in transport and communication technologies and to the parallel liberalization of trade and capital flows (Baier and Bergstrand, 2001; WTO, 2003 and 2004).

In such a situation, comparative advantage should normally benefit the LDCs, if for no other reason, because they operate with lower wage costs. In fact, a first glance at the evolution of LDC position in world trade shows that their share in world totals increased from 35.6 percent to 37.0 percent (+4.0 percent) between 1981-85 and 1999-2003 for LDC exports, while their import share decreased from 35.0 percent to 34.3 percent (-2.1 percent).

A more thorough analysis extends beyond the aggregates and focuses on the composition of trade with respect to goods and services. In the twenty years between early 1980s and today the contribution of exports of commercial services to total world exports rose drastically, from 16 percent to 20 percent³. In this case imports and exports from LDCs also show a different trend: according to WTO data, in the period 1981-85 to 1999-2003 the share of LDC exports in world commercial services exports rose from 27.2 percent to 27.8 percent (+2.07 percent), while the share of LDCs imports on world total decreased from 40.2 percent to 34.1 percent (-15.1 percent). These figures show that a dramatic change in the composition of world trade has been taking place since early 1980s and it is very likely that the cited statistics underestimate the phenomenon⁴.

¹ This flows-based approach is consistent with a more robust price-dispersion measure of trade integration (see, among others, Parley and Wei, 2001, and Hufbauer *et al.*, 2002).

² That is, the sum of external assets and liabilities of FDI and portfolio investments.

³ In absolute terms, the global exports of services grew regularly, reaching a value of USD 1,861 billion in 2003 (WTO, 2004), a more than fourfold increase compared to the previous twenty years.

⁴ In fact, it is worth noting that WTO takes an extremely limited view of "services". They involve mostly cases where either the provider (e.g., the teacher, or the "guest-worker") or the consumer of services (e.g., the patient)

The change in the composition of world trade benefited from the improvement in the technological infrastructure of transacting internationally (transport, telecommunications, insurance, and so on) which ultimately expanded the range of the categories of services that enter international trade. Various trends in the world economy have converged towards making services an increasingly important component of international trade, from the activation of the WTO General Agreement on Trade and Services (GATS) in January 1995, to the increasing tendency for international vertical specialization, i.e. the slicing up of the production process into distinct steps, allowing locational specialization across countries and outsourcing among firms (Hummels *et al.*, 1997; Feenstra, 1998). This dramatic change that transpired in recent years should not cause any systematic asymmetries between DCs and LDCs as long as it refers to the evolution of the trade in goods and services according to comparative advantage.

Yotopoulos (2007) throws a broader net around trade in services that covers part of the continuum between trade in (pure) commodities, to one extreme and trade in (pure) services, to the other (where the WTO-defined services reside). This becomes important because comparative advantage trade holds its mutual benefits at the extreme of pure commodities, i.e., agricultural commodities and manufactures, while “decommodified” trade, let alone trade in pure services, involves a significant component of reputation, an emblematic word which translates into economic rents that accrue to the producer. Examining this entire continuum represents a process that can eventually blunt any advantage that LDCs might have in the production of a number of services. Services are a luxury good whose share in family consumption rises with per capita income⁵. In an economy where the “customized” service component of final goods is gaining an increasing importance, reputation effects matter and virtually all traded services become *positional* goods⁶. The implication is that the poorer the country, the less likely it is that it can produce high-reputation goods because of the lack of skills,

moves to the location of its counterpart to effectuate the transaction; plus the “right-to-establish” services where the presence of the provider means that the McDonald’s franchise makes a miniscule investment to locate next to the consumer; plus, lastly, the outsourcing of services where the supplier and the buyer remain at their home bases and establish an interaction at arm’s-length via telecommunication. This is a rather restrictive definition of services, given the mix of commodities and non-commodities that normally enter international trade in the modern globalization.

⁵ The intuition behind this is that services have slower productivity growth than manufacturing, so that the relative price of services is increasing and, with an elasticity of substitution between services and other goods less than unity, this implies faster growth of the service sector.

⁶ For a thorough analysis of the implications of positional good competition on economic development, cf. Pagan (2007).

resources and appropriate institutions needed to build reputation⁷. As a consequence, we should expect a worsening of the LDCs' balance of payments due to the increase of high-reputation imports that replace some of the services that were previously locally produced.⁸ Even more important is that as the “culture” of globalization spreads and the middle-classes and the elites acquire a taste for importing “decommodified” goods and services, the foreign exchange constraint becomes binding with the attending contractionary effects on the LDC economy. Conceptually, the weight of this argument can be quantified by the decomposition of exports and imports of LDCs into “decommodified” trade components, such as agricultural goods processed and branded as opposed to bulk commodities, and in terms of luxury tourism as opposed to the back-pack commodified tourism.

Free movement of goods and capital is a good thing, unless the capital is mostly financial capital, drawn in a process of currency-substitution of the reserve currency for the local - i.e., soft currency. The purpose of currency substitution is to buy insurance against devaluation of the local currency by converting it into dollar assets. This leads to further devaluation (and often to financial crises) in the poor countries, causing distortionary effects in the economy (Yotopoulos, 1996; Yotopoulos and Sawada, 1999). The transmission mechanism from the monetary to the real economy causes resource misallocation from the non-tradable to the tradable sectors and, as a consequence, even more contractionary effects on LDC growth (Sawada and Yotopoulos, 2007).

The conclusion is that the asymmetries of globalization are *systematic* and they are likely to work against the poorer countries (Yotopoulos and Romano, 2007). In fact, the institutional requirements for the success of globalization are more likely to exist and are easier to satisfy in the richer regions or sectors (social or economic) of a country rather than among the poor. The same can be said considering the different endowments between developed and developing countries in terms of human (i.e., competence, skills) as well as social (i.e. trust) capital necessary to produce high-reputation goods. In other words, the poorer the country, the less likely it becomes that it can afford the entry costs necessary to claim any benefit from the globalization game (Miniesy and Nugent, 2007). Moreover, globalization also affects the

⁷ Think, for example, of the markets of derivatives, which are part of the common institutional structure in DCs, but unreachable in most LDCs for the lack of the institutional setup.

⁸ It is not easy to empirically support this statement with some figures because of lack of data for LDCs. However, some indirect support is provided with reference to agricultural trade in section 3 below.

macro fundamentals of LDC economies for the worse and the basic reason for this has to be sought in reputation effects operating both in the real and in the monetary economy.

It seems there is a new poverty trap under the modern globalization, not necessarily based on the lack of physical capital, but rather on the lack of appropriate institutions, human and social capital, and on the adverse change of macro fundamentals. Even more important, the standard economic policy recipe, based on “free trade – free market – laissez faire”, far from curing the disease, is rather part of the causation process (Yotopoulos, 1996). In fact, asymmetric reputation effects imply market incompleteness of the type that the Stiglitz’ asymmetric information makes rationing necessary in the case of the credit and other markets. In such cases, interventions are required to “close” the markets, both in the real and in the monetary economy, which, in turn, opens the Pandora’s box of *Good Governance* and of competence and integrity – which is another commodity that is expensive and in short supply in poor countries (Romano, 2007).

3. Agriculture under Globalization

How does LDC agriculture fit in this stylized picture? One would not be surprised to find that agricultural trade has experienced the same dramatic changes that overall trade experienced over the last two decades. Even more important, one would expect that the same factors that make globalization work against LDCs at the economy-wide level, (i.e., a poor institutional setting, lack of adequate human and social capital, and adverse changes in the macro fundamentals) would also negatively impact LDC agriculture – and more so than other sectors that happen to be less poor than agriculture.

3.1. Agricultural trade and globalization

The basic characteristics of world trade integration featured in the previous section carry over to the agricultural sector as well. The growth of world agricultural trade (in real terms) during the 1990-2002 period was close to 4 percent annually, roughly twice as much as the growth of agricultural production, and well above the growth in agricultural trade over the 1973-1990 period which was only 2.4 percent (WTO, 2004). Moreover, the value of world agricultural trade rose by 40 percent in real terms between 1990 and 2002.

The increase in trade as percentage of GDP is *prima facie* good news for the agricultural sector of LDCs. But trade is both imports and exports and looking separately at these two

components will provide a clearer picture of the overall impact of trade. If we look at the evolution of LDC agricultural imports and exports (Table 1), we see that both have increased in real terms since 1980, but the former grew more than the latter. It also happens, and perhaps only symptomatically, that the dramatic increase of agricultural imports of LDCs occurred after the mid-1990s, i.e., post the entering in force of the GATS (Figure 1). More specifically, agricultural imports to LDCs grew by a factor of 2.89 (i.e. at an annual average growth rate of 4.72 percent) between 1981 and 2003, while the exports from LDCs by a factor of only 2.42 in real terms (i.e. 3.92 percent per year). Over the two decades characterized by globalization, the LDC agricultural balance of trade has worsened and since the late 1980s many LDCs, especially among the least developing countries, have become major net importers of agricultural products (FAO, 2004).

Table 1. Evolution of total agricultural import to and export from LDCs (China excluded), three-year averages at constant prices^a

	Year average				
	1981-83	1986-88	1991-93	1996-98	2001-03
Import Value (1000 \$)	8,418,029	9,103,083	10,777,198	15,163,618	21,163,773
Export Value (1000 \$)	9,987,461	11,922,639	14,605,952	19,088,337	23,620,656

Source: FAOSTAT database

^aThe price base is the 3-year weighted mean value of the period 1989-1991.

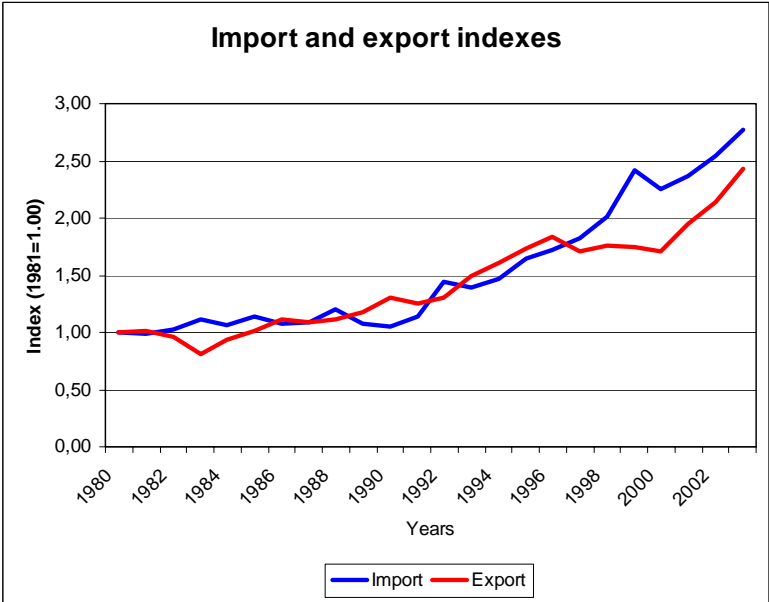


Figure 1. Evolution of total agricultural import to and export from LDCs (China excluded) at constant prices

Even more far-reaching consequences are implied by the change in the composition of world agricultural trade that has been emerging in recent years. Various empirical analyses (Gehlhar and Coyle, 2001; OECD, 2003; WTO, 2004) have reached the same basic finding: the most dynamic segment of world agricultural trade has been in high-value agricultural goods (i.e. the ones characterized by a high service component as a share of the value of agro-food final goods). For instance, the *World Trade Report 2004* (WTO, 2004) reported that trade of processed (i.e. customized) agro-food products expanded significantly faster than trade of semi-processed and unprocessed (i.e. bulk) agricultural products throughout the 1990s, rising from 42 percent in 1990-91 to 48 percent of global agricultural trade in 2001-02 (Figure 2). The resulting robust pattern in world agricultural trade, that has been building since the early 1980s and accelerated in the 1990s, is composed of shifting away from trade in bulk commodities and into trade in high-value processed consumer-ready agro-food products, with an equal percentage gain, while the trade share in intermediate semi-processed agricultural goods remains stagnant.

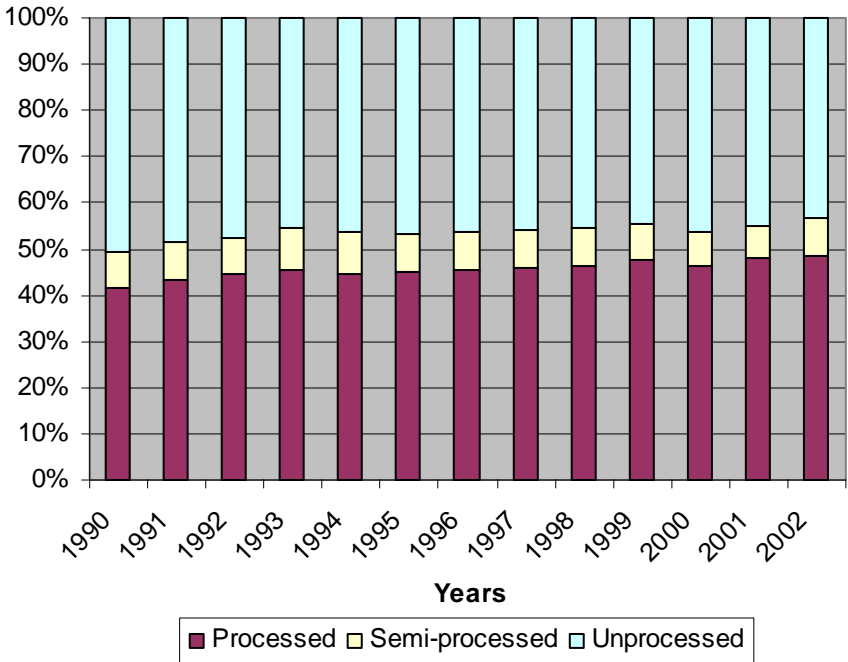


Figure 2. Composition of world agricultural trade by stage of processing

A number of factors have contributed to the decreasing share of primary commodities in agricultural trade, on the demand side (rising incomes and changing lifestyles) as well as on

the supply side (improvements in shipping technologies, lower transport costs, reductions in barriers to trade)⁹. However, recalling the different content in terms of reputation of agricultural products moving from bulk commodities to final processed products, it can be argued that reputation also plays a significant role¹⁰, affecting the behavior of consumers in the sense that, provided that they can afford it, consumers will demand better-reputed foods over standard foods, all other things being equal. This tendency is accentuated under globalization, when transportation costs decrease and the “world brand-name” becomes more alluring.

A test of this hypothesis would require trade data which are difficult to find, if they exist at all¹¹. Nevertheless, some indirect evidence can be drawn looking at the evolution of the agricultural trade composition for selected countries (Table 2). Though most of the change in the imports and exports shares can be accounted for by developed regions, it is interesting to see that also developing regions contributed to the change in the composition of the world agricultural trade¹². It is true that some LDCs experienced a decrease in the share of imports of processed agricultural products, but this applies mostly to economies that experienced an economic crisis between the two reference periods, as is the case with Argentina, Pakistan, and Turkey¹³. On the other side, the faster an economy grows the more dramatic the shift towards high-value products appears to be, as is the case with Asia’s NICs, India, and Chile.

In summary, the last two decades, and especially the 1990s, have witnessed a progressive shift from a *comparative-advantage-based* trade – i.e. the one for which agricultural commodities are better suited and LDCs better equipped to handle – to a *reputation-based* trade in agricultural products. This progressive emphasis on *quality-based* competition, as opposed to

⁹ It is interesting to notice that the same factors made it possible that certain products which previously were thought of as “non-tradable” are now eased into international trade. For example, Gehlhar and Coyle (2001) report pet food as an example of product movements along the tradability continuum.

¹⁰ Thus transforming standard competition, that is the one based on commodities, into competition of “positional goods”, that is the one based on goods showing different levels of reputation such that they can be ranked from the best to worst. Reputational differentials have been proposed as legitimate determinants of asymmetric outcomes under globalization, especially after the enforcement of global protection of intellectual property rights, as it is the case within the WTO Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS) framework (Pagano, 2007; Yotopoulos, 2007).

¹¹ In fact, to test the hypothesis would require to have data on bilateral trade for a given country, breaking down the agricultural imports and exports according to the degree of reputation of each product category, as measured, e.g., by the economic rents it enjoys relative to the bulk commodity, accounted for by delimiting the competition it is exposed to as a result of trademarks, product differentiation and in general the market niche it occupies.

¹² Consistently, the share of bulk commodities has been decreasing or steady in all developing regions, but for the economies in transition, which experienced a dramatic increase in the share of bulk commodities during the nineties, as a result of the collapse in real incomes (Rask and Rask, 2007; Gehlhar and Coyle, 2001).

¹³ One could be surprised that Mexico increased its share of processed products on total agricultural trade despite the financial and economic crisis experienced by this country, but we should remember the impact of NAFTA on Mexican trade.

cost-based competition may be one of the factors for the accelerating chronic decline in the international terms of trade of LDC agriculture, and especially since the 1990s. As a *prima facie* indicator, the terms of trade of LDC non-fuel primary products registered an average decline of –0.1 percent for the decade 1982-91 that became –0.5 percent for the decade 1992-2001 (IMF, 2004). This is precisely the period when agricultural trade was boosted and its composition changed.

Table 2. Share of processed products in exports and imports of agricultural product in selected economies, 1990-91 and 2001-02 (percentage)

Countries	Exports		Imports	
	1990-91	2001-02	1990-91	2001-02
High income				
EU 15	57	61	44	49
extra-trade	63	65	25	30
intra-trade	53	59	54	58
Norway	18	14	37	43
Switzerland	76	80	41	50
United States	30	38	36	41
Canada	15	28	42	47
Australia	37	43	48	60
New Zealand	52	62	49	61
Japan	60	48	27	40
NICs and fast growing				
China	28	42	20	19
India	18	19	20	41
Indonesia	21	38	19	24
South Korea	26	47	16	31
Malaysia	36	64	35	38
Taiwan	53	27	25	37
Thailand	29	40	21	33
Philippines	41	46	47	50
Chile	30	29	36	57
Low and medium income				
Turkey	23	35	38	25
Jordan	27	54	34	42
Kenya	13	20	36	53
Oman	30	77	52	72
Saudi Arabia	56	50
Zimbabwe	5	15	32	46
Pakistan	3	6	40	34
Argentina	50	51	55	46
Brazil	47	40	29	32
Colombia	7	19	35	39
Ecuador	6	20	28	50
Honduras	13	15	57	67
Mexico	21	42	39	45
Paraguay	19	29	94	75
Peru	67	61	36	45

Source: WTO (2004), Table IA.4 (modified)

3.2. Food security under globalization

In principle, globalization of agricultural trade can carry multiple advantages, and especially so for the poor. From the point of view of food security, spreading the risk and facilitat-

ing access are the two most important instruments for averting a food crisis¹⁴. Openness and communication-trade-networks, rather than self-sufficiency, are as important for LDCs now as they had been for the series of famines that Amartya Sen ever examined (Sen, 1981). Still, globalization can help in preventing a famine due to a food availability decline in a remote region only if the necessary infrastructure in terms of road, storage facilities, and distribution networks are already in place. Infrastructural poverty which has been featured above as a source of asymmetric outcomes of globalization becomes of paramount importance in the agricultural sector, especially where food crises are involved.

Increased trade competition under globalization should eventually enhance access to food via the reduction of food prices – which has already been happening with commodity prices stagnating or declining (Leon and Soto, 1995; FAO, 2004). Of course, this is true, provided that people can afford to buy imported food and that the government can access the foreign exchange to pay for it without distorting the macroeconomic balance. But in a country with a hard foreign exchange constraint nothing is a bargain when it is priced in dollars. Moreover, accumulation of foreign imbalances into sovereign debt, whether the origin is to pay for imports or to cover the demand for currency substitution, is likely to lead to inevitable (serial) devaluations. These are bound to provoke resource misallocation in the sectors that produce the domestic commodity, and especially in agriculture, through an excessive shift of resources from the nontradable to the tradable sector, since the latter operates in dollars and therefore is immune to the currency risk of future devaluations (Yotopoulos, 1996).

An attending benefit to the more robust and open trade that globalization entails is the reduction of the price risk (Bole and Lutz, 1979; Tyers and Anderson, 1992; World Bank, 1999). Assuming that risks are uncorrelated, globalization should act as an insurance mechanism eliminating aggregate risk by pooling it on a global scale. In other words, increasing the spread in geographical supply reduces the spread in prices. However, recent estimates (Dehn, 2000) show that, instead of reduction of price risk, there has been a sustained increase in commodity price uncertainty since the early seventies. This result is quite robust and holds after controlling for shocks and regardless of whether the data were disaggregated by region or

¹⁴ As forcefully put by Runge *et al.* (2003: 108), “If countries want the assurance of stable and predictable food supplies, they should seek more open trade, not more self-sufficiency. More open trade allows food to move from areas where it is in surplus to areas of deficit, and it enhances the capacity for deficit regions to feed themselves.”

by commodity producer type¹⁵. Along the same lines, Ayouz *et al.* (2004: 12), comparing the agricultural and capital price dynamics, show that capital and agricultural markets share the same statistical properties, that is both series are characterized by “non-linear dynamics in prices, with time varying volatility likely to formalize booms and busts, panics and crashes.”

These pieces of evidence call for interventions to cope with price volatility. Derivative markets for agricultural commodities represent one of the more effective and non-distorting instruments for intervention in such cases (World Bank, 1999; UNCTAD, 2002). In fact, such markets routinely exist in the DCs, but setting them up and regulating them becomes an expensive exercise that LDCs cannot afford. In the same vein, spanning of time, space and uncertainty that contingent markets achieve is impossible, say in Ethiopia, where the storage facilities do not exist to transfer the good-crop year surplus grain to the bad crop-year, nor does the road network exist for the grain in store to be delivered to the location that early warnings signal as an area of impending-famine. This example highlights once again a basic asymmetry of globalization: the institutional infrastructure required for globalization to succeed may be routinely available in DCs but it is unaffordable in LDCs.

4. The Consequences for LDC Agriculture

Data show that world agricultural trade has been shifting away from commodities and towards high-value products. The demand for processed agro-food products has been building up since the 1980s, especially so in LDCs. The pattern is clear, although the empirical evidence adduced in this paper is circumstantial due to the lack of agricultural trade statistics at a sufficient degree of disaggregation. To the extent that LDC production, although not necessarily also consumption, weighs on the commodity side, the balance of the LDC trade in agriculture is likely to be negative. What are the prospects of changing the composition of LDC agricultural trade by shifting away from the commodity-end of the continuum and towards the direction of services? This section will address the question briefly, first looking at the profitability of agricultural production in LDCs and then focusing on the role of agriculture in economic development.

¹⁵ Dehn (2000) used a data set of quarterly aggregate commodity price indices for 113 developing countries over the period 1957Q1-1997Q4, each index being a unique geometrically weighted index of 57 individual commodity prices. The average conditional standard deviation (after controlling for all shocks, i.e. 2.5 percent most extreme outliers in either tail of the distribution) of food prices over the period 1957-1997 increased from 0.06 over the period 1957-1972, to 0.07 in 1973-1985, up to 0.08 in 1986-1997.

4.1. The profitability of LDC agriculture

There are fundamentally two non-mutually-alternative mechanisms that allow firms to capture the rents generated from reputational advantages in moving along the continuum of pure commodities to pure services:

- a) by building an institutional “fence” which will guarantee product differentiation, be it branding, certification, protected denomination of origin, or any other specific measure of product differentiation and promotion;
- b) by securing market shares through building and reinforcing loyalty through advertising and marketing activities.

The prospects of success of LDC agriculture in pursuing this strategy are not encouraging. In fact, considering that LDCs are mainly oriented to producing agricultural commodities, the continuation of the present trend will result in worsening the profitability of the sector. Two factors contribute to that. On the side of the demand dynamics the Engel effect will claim a larger share of the household budget for the high-quality products as incomes and/or the size of the middle-income classes grow. On the side of the market structure, the high-quality/high-reputation products are transacted in less competitive markets, as opposed to agricultural commodities that are traded on the principle of Ricardian comparative advantage on the basis of the minimum cost of production. Should poor countries not be able to improve the reputational positioning of their own agricultural products, LDC agriculture may find itself marginalized in international trade.

D’Haese *et al.* (2007) provide an example of how LDCs can successfully play this game. They report how the “Fair-Trade” labeling for coffee in Latin America made the customization of a bulk commodity possible, so as to match the preferences of “ethical” consumers in DCs. Fair-trade coffee was able to penetrate DC markets and increase by 40 percent its sales in the last five years, despite the price differential that it bore relative to the standard coffee. Of course, moving up in the reputational ladder required some sensible institutional changes and considerable investments¹⁶. This is a success story that can inspire but cannot be easily replicated in poor countries.

Turning to the input side, LDC agriculture can become the victim of institutional fences being built around many inputs, such as in GM seeds, which are increasingly traded as pat-

ented goods. Pingali and Traxler (2002) provide a thorough analysis of the evolution of the agricultural biotech sector over the last decades, emphasizing as driving forces the intellectual-property-rights regulation and the advances in molecular biology. This caused a dramatic change in the locus of agricultural research which shifted from public institutions to private multi-nationals and from the local/national to the global research agendas. Consequently, GM seeds are now more expensive than their standard counterparts.

There is, in fact, only one example reported in the literature where farmers can have access to GM seeds at reasonable costs, the case of Bt-cotton in China. But, as argued by Fok *et al.* (2007), this was possible due to quite unique conditions, namely a specific institutional environment¹⁷ and the existence of scientific infrastructures and skills¹⁸, that enabled the competition between foreign Bt-cotton and Chinese Bt-cotton varieties. The replication of this experience in other countries is dubious unless fundamental changes in the institutional set-up of biotech research take place¹⁹ and massive investments are directed in the International Agricultural Research Center consortium. As long as these changes will not materialize, farmers will be facing more expensive seeds and, what is worse, they will have to pay for them annually, and in foreign exchange.

The overall assessment is that the profitability of LDC agriculture is likely to further decline because its terms of trade are likely to worsen both on the output and on the input side of production.

¹⁶ Among others, the creation of a fair-trade label to channel missing information to the consumers, the establishment of the fair-trade organization to organize and manage the whole marketing process along a new marketing chain, and so on.

¹⁷ The Chinese government was able to negotiate with biotech companies and eventually to absolve the Chinese farmers from being obliged to commit themselves to signing a contract, to paying technology fees, or to being prevented from holding back seeds between seasons for replanting.

¹⁸ A first factor of success was that Chinese scientists had their own Bt gene and could control its use by other research institutions according to their interests. This made it impossible to set up a cartel, as could occur between multinational biotechnology firms elsewhere. The second factor pertains to Chinese scientists' command of biotech and conventional breeding techniques (Fok *et al.*, 2007). In addition, the huge size of the Chinese market played a crucial role in strengthening the bargaining power of the Chinese government while negotiating more favorable (to the domestic farmers) conditions with the involved biotech companies.

¹⁹ Natural candidates are the softening of the existing IPRs regulations (Taylor and Cayford, 2003), the creation of public-private partnerships which can assume the form of a clearing house of the most suitable biotechnology techniques (Pingali and Traxler, 2002), or even the free-sharing of new biotechnologies, as it has been recently made by the CAMBIA consortium under an "open-source" license scheme (The Economist, 12th February 2005). For an analysis of the available options cf. Fok *et al.* (2007).

4.2. The changing role of agriculture in economic development

The worsening of the agricultural terms of trade depicted in the previous section recalls the “price scissors” mechanism we are familiar with in the literature on the role of agriculture in economic development, but with some important qualifications. First of all, the traditional price scissors were determined by the Engel effect and by the output and input market structure. Today, the changes in international competition brought about by globalization, based on the operation of reputation effects in the agricultural economy, create new pressure on agriculture and reinforce the traditional ones.

Moreover, under globalization the price-scissors problem comes into the picture at earlier stages than it was anticipated in the traditional literature on the contribution of agriculture to economic growth. In his classical work, Theodore W. Schultz (1953) characterized three stages of agricultural transformation in the process of development: the “food crisis”, the “food problem” and the “farm problem”. A number of authors have shown how the first two stages have served in providing the foundation for economic development (Lewis, 1954; Johnston and Mellor, 1961) and the “locomotive of growth” (Yotopoulos, 1996). In fact, at early stages of development modernizing agriculture constitutes the most reliable development strategy since it produces growth by turning to a commodity that has high income-elasticity of demand, food. By the same token, at this stage agricultural development constitutes the best incomes policy since the favorable produce prices in an environment of brisk demand contribute to spreading the dividends of growth broadly among the population, to hundreds of thousands of small farmers. Arguably, such *pluralistic* economic development makes for a sturdy engine of growth. But once development has been achieved and the “farm-problem” stage sets in, the very success of agriculture can turn into heavy ballast that slows down economic growth. According to Schultz it is only at this stage that the price scissors come into the picture²⁰.

In the current environment, the price-scissors problem enters the scene even at early stages of development because the world market integration means that there is virtually no economy which is not exposed to the breezes, the winds and the gales that blow over the

²⁰ At this stage pluralistic economic development has already turned the majority of the population into the middle-income class. Therefore “it is not the quantity of food that matters anymore, but the quality of the diet. (...) The terms of trade of agriculture deteriorate relative to other industries, farm incomes decline and people flee the sector to join the waves of migration to the cities. This is the “farm-problem” stage of agriculture that becomes tragic for the farmers and often turns farms into real estate. Only the largesse of the state towards agriculture can slow down this inexorable process.” (Yotopoulos, 2000: 7-8).

globalized world economy – only that their defenses vary directly with the level of development. The underlying forces driving globalization are so powerful and so intrusive that they will hit the poor LDC farmer much earlier than the case would have been without globalization.

The issue is what could be done to contain this evolution? A logical progression would have agriculture turn into a “new-economy” industry by adopting biotechnological innovations. However, we have already emphasized that, unlike the case of the Green Revolution, in the current gene revolution access to biotechnologies is not free and it requires foreign exchange (cf. Fok *et al.*, 2007). As such, this option will be hardly achievable by the poor LDC farmers and, for sure, it is not neutral in terms of distributive impacts that may favor large farmers or multinational corporations, e.g., through patents and copyrights.

An alternative option would be the “quality-discriminating agriculture” (Yotopoulos, 2000). Standardization within this mode of agricultural production is not geared to bulk markets. Instead each product category is developed through “mini-standardization” for the niche market of quality foods that targets the discriminating consumer. For quality-discriminating farm products to develop brands and establish niche markets beyond their local areas, it is imperative that excludability be established. The patenting and branding mechanism (the denominations and their logos) constitute important “quality seals of approval” that both protect the market and instill confidence in and assign prestige to the product. They are the foundation for building high-value niche products out of quality-discriminating agriculture. But, this process requires non trivial institutional investments. It is already in place in the European Union²¹ and is on the way in other developed countries, but it is not easy to be implemented in LDCs because of its requirements in terms of institutions, infrastructure, and human capital.

In conclusion, the underlying forces driving (the modern) globalization are centrifugal with respect to the role of agriculture in development. The rules of the game dramatically changed under the current wave of globalization and competition is now driven by increasing returns to scale, let alone by network effects, by research and development of new products, and so on. All these are features that do not fit in very well with the traditional commodity

²¹ European Union Regulations 2081/92/EC and 2082/92/EC have established the so-called Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Specialty Guarantee (TSG) which cover up today more than 700 agricultural products (out of which more than 160 cheeses, 145 fruits and vegetables, 100 fresh meats, 90 oils and fats, and 74 meat-based products).

that LDC agriculture produces. The dismal conclusion is that in these circumstances agriculture will not be anymore the engine of growth that it used to be in the pre-globalization development patterns in LDCs. Should agriculture become thus marginalized in developing countries, economic development will become even more difficult to achieve.

5. Concluding Remarks

Modern globalization has brought about fundamental changes in world agricultural trade: an unprecedented growth of agricultural trade-value in real terms and a dramatic change in its composition which is increasingly moving away from bulk commodities towards high-value, processed consumer-ready agricultural goods. These changes have been boosted by the improvements in transport and communication technologies and the progressive trade liberalization.

However, the impact of these changes on LDC agriculture has been quite differentiated, with most countries experiencing a worsening of their agricultural trade balance. This change of the LDC trade position is counterintuitive if we still think of agricultural trade as a comparative-advantage-based trade, i.e. based on cost competition. It seems instead that the change in the composition of agricultural trade is the epiphenomenon of a fundamental change in the rules of the game, which tend to favor the reputation-based agricultural products and is in line with the general trend in trade towards positional competition (Yotopoulos, 2007).

The implications of these trends for LDC agriculture are not encouraging. The intrinsic poverty of these economies, with the attending burden in terms of missing assets to compete under the new rules of the game - namely the lack of appropriate institutions, poverty in assets of human and social capital, plus some adverse globalization-induced changes in LDC macro fundamentals - are all crucial handicaps that work against the development of LDC agriculture and more so if we move along the continuum from the tradable to the non-tradable agricultural output and from the conglomerate, to the commercial and to the subsistence farms. Furthermore, the underlying forces driving globalization (increasing returns to scale, research, development of new products, etc.) undermine the traditional role of agriculture as engine of growth and cast serious doubts on the possibility that the agricultural sector can significantly contribute to the economic development of LDCs.

The analysis carried out in this paper represents one more piece of evidence that the effects of globalization are asymmetric and that development success requires selective and phased integration with world markets (Yotopoulos and Romano, 2007). Without the required investments in terms of infrastructure, institutions and of human and social capital, LDC agriculture will hardly be able to participate in sharing the expected dividends of globalization.

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