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The role of international commodity exchanges in the formation and transmission of prices and price risk along international coffee chains

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ABSTRACT

The 1990s has seen a shift in policy from multilateral price stabilisation schemes towards market liberalisation and private risk management strategies in the context of income stabilisation for agro-commodity exporting low-income countries. This paper argues that such a policy has failed to consider the uneven access of market actors to hedging instruments as well as changes in the structure and relationships between derivatives and cash markets for commodities that have serious implications on the way in which prices are formed and transmitted within the commodity system.

KEY WORDS

Commodity chains; market structure; coffee; price behaviour

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1. Introduction

The collapse of Bretton Woods and the abandonment of fixed exchange rates signalled the start of profound changes in the patterns of accumulation. One important result of those changes has been the increase in avenues for appropriation in the financial sector (Strange 1997; Epstein 2005; Stockhammer 2007). These new avenues arose as market actors faced new risks, in the first instance, those associated with floating exchange rates. New instruments, such as currency and interest rate futures, options and swaps, arose to redress these new risks. Hedging on derivatives markets became an imperative for all actors engaged in the trading of foreign currencies. The growth of derivatives markets also provided new opportunities for speculation and the exploitation of arbitrage opportunities. These financial practices have become widespread in other areas of the market economy, including stock exchanges as well as commodity exchanges located in the US and Europe.¹ Increases in financial interests on commodity exchanges have led a number of commentators to question the extent to which market characteristics, such as price volatility, have changed as a result, with many arguing that speculative flows in commodity markets have heightened volatility and are increasingly driving prices in the short and medium term. (Domanski and Heath 2007; Doyle, Hill et al. 2007; Brewster 2008)

At the same time, policy thinking around the management of commodity price instability shifted dramatically from an emphasis on the avoidance of excessive price fluctuations and also export earnings of commodities to one of private market based

¹ Until the 1970s, futures exchanges were separated along the lines of different underlying assets. Until 1969 the Chicago Board of Trade (CBOT) was exclusively a grain exchange, when it began trade in its first non-grain product, with a Silver futures contract. In 1975, CBOT launched its first interest rate futures contract, marking a break from trading exclusively in commodities. Today, the CBOT offers 13 agricultural products, 16 financial products and 4 metal commodity products for exchange. The London Stock Exchange, which first opened in 1698, has added a large number of commodity products in its list in recent years, 5 in 2004. Today, 31 single commodities and commodity indices based on futures prices in the energy, metals and agricultural markets are traded on the exchange, along with products based on bonds, covered warrants, exchanged funds, global depositary receipts, ordinary shared and structured products.

The London International Financial Futures and Options Exchange (LIFFE) was originally set up in 1982 as a financial futures and options exchange. In 1992 it merged with the London Traded Options Market (LTOM) and a further merger with the London Commodity Exchange (LCE) took place in 1996. A diverse range of financial instruments relating to short term interest rates (STIRs), bonds, swaps, equities and commodities are currently traded on LIFFE.

risk management strategies. Policy thinking before the 1980s was exemplified in the International Commodity Agreements for the maintenance of minimum prices, as well as the Compensatory Finance Facility of the IMF and the STABEX scheme of the EC that were put in place to ameliorate the adverse effects of commodity export instability. Political and economic factors culminated in the collapse of the ICAs, none of which survived the 1980s.

From the mid-1980s, a large literature emerged from academic, policy and international institutions criticising 'traditional' multilateral policies (Morgan, Rayner et al. 1994; Gilbert 1996; Akiyama, Baffes et al. 2003). It was argued that supply control and monopoly marketing through state marketing boards were both expensive and detrimental to economic efficiency since their operations dampened the supply responses of producers to price changes. The 1990s thus saw the, dismantling of marketing boards and the liberalisation of commodity markets in LDCs together with a push by the various international development organisations towards a private market based price risk management (PRM) approach based upon the use of hedging instruments by individual or groups of producers and marketing actors.² Such a policy, however, fails to place enough weight on the barriers that individual actors face in accessing hedging instruments, particularly in LDCs, owing to the financial, information, technical requirements of these PRM strategies. The formulation of these policies have also neglected to consider the role of alternative private risk management strategies that are often adopted by individual chain actors and the implications of these on the price risk environment that is experienced by chain actors upstream. In addition, the advocates for the wholesale use of hedging instruments fail to consider the realities on the markets on which these instruments are traded, for example how the composition of traders can impact upon price behaviour, nor do they consider the evolution of the relationship between derivatives markets and the commodity chains, along which the physical commodity is processed and distributed, that is, how changes in price behaviour on derivatives exchanges are manifested along commodity chains.

² In particular, the World Bank have been at the forefront of this shift in policy focus targeted through their International Task Force on Commodity Risk Management (ITFCRM),

This neglect to consider the role of derivatives market participants or phenomenon that take place at the interface of derivatives and physical markets in part results from the assumptions of orthodox financial economics, where all trading activities on derivatives markets are seen as stabilising. Similarly, there is an absence of literature on the relationship between derivatives and physical markets for commodities, since derivatives markets enhance the efficiency of physical markets in their role of completing markets along the lines of Arrow and Debreu. (Arrow and Debreu 1954)

This paper attempts to address the decoupling in the literature on the financial and real economies by examining some of the interactions between derivatives and physical markets for coffee. We look specifically at the role played by international commodity exchanges, on which derivatives contracts are traded, in price formation and price risk management, and the implications this has on market structure and income distribution along specific coffee chains.³ The main questions to be addressed in this paper are: How are short-run price variations transmitted along the commodity chain? How does this depend upon the structure of the marketing system, the types of market actors and the types of risk management strategies that are employed? What implications does this transmission of risk have on the structure of the chain, income distribution and sustainability?

The remainder of the paper proceeds as follows: first we will provide a brief discussion on the analytical separation within the economic literature on commodities between the spheres of enquiry into financial and physical markets; second, we suggest how the concept of financialisation may be applied in order to address this decoupling in the literature; section 4 gives a brief overview of the historical development of international commodity exchanges and some of the recent changes in the composition of participants on international commodity exchanges in general, with specific figures for the changes in the composition of trading activities on the

³ Another way of addressing this issue of decoupling is to analyse the relationship between price behaviour on physical markets and the types of trading activities taking place on derivatives exchanges. While we posit the relationship between speculation and price behaviour, this is not the main focus of the analysis in this paper. A quantitative study, by the present author, on the role of speculation by financial investors on commodities exchanges on price behaviour can be found as a working paper entitled “Changes in the structure of trading on international commodity exchanges and their implications on price behaviour: The cases of coffee and cotton” on the [website for the Swiss based research programme NCCR-trade - url to be confirmed](#).

coffee exchange of the New York Board of Trade (NYBOT) presented. In section 5, we illustrate the role played by international commodity exchanges in price formation, price risk management and how this could influence the structure and distribution along specific coffee chains in Tanzania and Uganda. Section 6 concludes.

2. Decoupling in the literature between financial and physical markets

Mainstream commodity market theory refers to the “theory of intertemporal price formation on speculative markets” (Ghosh, Gilbert et al. 1987).⁴ The theory focuses on the intertemporal relationships between quantity, and consequently price. As well as the relationships between market demand (for consumption) and supply, stock may be demanded for transactions; precautionary or speculative purposes. Taken together, these relationships define an intertemporal stock equilibrium. Movements in stockholding imply movements in prices. Prices are however, ultimately determined through the mechanisms of supply and demand. Market structure is understood as the relationship between the forces of supply and demand. On these basic tenets, econometric models of commodity markets are generally constructed to consist of a “demand block”, a “supply block”, together with an equation relating stocks and prices over time (Labys 1978; Akiyama and Duncan 1982).

Owing to the analytical separation in the mainstream economic literature between the spheres of enquiry into finance and production, recent economic approaches to the study of commodity markets have failed to account for changes in the nature of how incomes are derived by various actors in the commodity system. The neoclassical supply and demand analysis necessarily omits the possibility of derivative market actors shaping the structure of physical commodity chains. The power structure of these markets, the large incomes that can be derived from participation in derivatives markets that are contingent on the firm’s financial muscle has driven the increase in concentration of market actors at the trader level in tropical agro-commodity markets. Despite the reduction of formalised vertical integration in these markets, the high

⁴ At the heart of this approach is the definition of primary commodities as goods which simultaneously exhibit three defining features. Firstly, commodities are assumed to be readily storable. Second, commodities have a high degree of homogeneity, and related to this, commodity markets exhibit high degrees of competition. Such a definition distinguishes primary commodities from industrial goods characterised by high degrees of product differentiation, high opportunity costs of storage and oligopolistic market structures. (Ghosh, Gilbert et. al. 1987))

concentration of multinational trading companies has implications which are at odds with the neoclassical ideal of perfect competition.

Studies of derivatives markets have taken place separately from considerations of physical markets owing to the implicit assumption of derivatives markets functioning to complete markets in the Arrow-Debreu sense (Arrow and Debreu 1954). Economic studies on derivatives markets have, by in large, been limited to the sub-discipline of financial economics that focuses on the examination of the statistical properties of prices on derivatives markets, as well as their statistical relationships with the prices of the underlying assets.

By contrast to the mainstream economic literature, commodity chain approaches to the study of commodities have placed issues of power of chain actors at the centre of their analyses of the structure and functioning of commodity markets, in particular in terms of the distribution of surplus along commodity chains that result (Gereffi and Korzeniewicz 1994; Kaplinsky and Fitter 2001; Fold 2002; Gibbon and Ponte 2005). The strength of the various chain approaches to the study of contemporary commodity markets lies in their focus on endogenous explanations for changes in the functioning of chains, offering the potential for dealing with the political economy. There has, however, been a tendency of these approaches to neglect the relationship between commodity chains and their wider economic context as well as inter-chain relationships. In failing to consider the role of finance and financial markets, first of all, in shaping the structure and functioning of physical chains and secondly as a bridge, and coordinating mechanism, across chains, chain analyses have neglected to consider the role played by powerful agents (from within as well as outside the chain) in seeking out profits from their participation on commodity derivatives markets.

3. Recoupling: An analytical framework for investigating the relationship between financial and physical markets for commodities.

As discussed in the previous section, the analytical separation of the spheres of finance and the real economy have arisen owing to the assumptions of mainstream economics as well as the limited scope of alternative approaches to the study of

commodities. This decoupling in the literature has resulted in scarcity of research concerning phenomenon that occur at the interface of financial and physical markets.

Financialisation is a relatively new concept that can help us to shed light on the relationship between derivatives and physical markets and the consequences of this relationship on the accumulation processes of heterogeneous market actors. The definition of financialisation, as well as its importance in the contemporary capitalist system is much debated. (Epstein 2005; Foster 2007) Broadly, scholars studying the process of financialisation are interested in the character of financial expansion in penetrating multiple sectors of the economy that had previously been left relatively untouched by financial activities. Epstein describes financialisation in its broadest sense as “the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies” (Epstein 2005, p3). Other, more operational, definitions of financialisation include taking financialisation to entail “the Rise of the Financial or Portfolio Conception of the NFC (non-financial Corporations) in Financial Markets” (Crotty 2003, p273); “the increasing activity of non-financial business on financial markets” (Stockhammer 2004, p270); and “the rise of incomes from financial investment” (Stockhammer 2004, p270).

In the context of agricultural markets, the character and consequences of changes in the relationship between derivatives and physical markets can be examined using the concept of financialisation, as defined above, firstly, by looking at the changes in activities on commodity exchanges purely for speculative purposes in order to derive incomes from financial investment as opposed to hedging. Similarly, we can look at changes in the activities of commodity chain actors on derivatives exchanges. Thirdly, it is possible to investigate the implications of the changes in the volume and character of trading on international commodities exchanges on the structure of physical commodity chains by examining the price risk management and price transmission outcomes for heterogeneous chain actors with differentiated abilities to access hedging instruments. It is this third aspect that is the subject of the present paper.

4. The evolution of trading on international commodity exchanges

Futures contracts were developed in the context of trade in agricultural commodities as an exchange traded risk management instrument for physical market traders. As an agreement between two parties to buy or sell an asset (in this case some quantity of the commodity) at a certain time in the future at a certain price. This allows the buyer and seller to lock in a price and thus hedge against risks associated with adverse movements in price that might take place between harvest and delivery.

The trading of futures contracts can be traced back to Japan in the 18th Century for rice and silk, and the Netherlands for tulip bulbs. The modern form of commodities exchanges appeared in the American Midwest with the establishment of the Chicago Board of Trade (CBOT) in 1848. The commodities exchanges brought together farmers and merchants. Initially, the main task of the exchange was to standardise the quantities and qualities of grains that were traded, but within a few years, futures like contracts were being traded on the exchange. (Hull 2003) Soon after the introduction of futures contracts, speculators entered the market, trading in futures contracts in order to profit from price changes without the need to hold the physical commodity.

Futures and many other derivative instruments have subsequently been developed for a wide range of agricultural and non-agricultural commodities, and financial assets. These are traded on derivatives exchanges across the world.⁵

Over time, the composition of these exchanges, according to trader type has also varied. The participants in any one commodities exchange include physical market traders who engage in futures trading for hedging purposes and speculators (both, physical and non-physical traders) who take a position on the direction of future movements on the price of the underlying asset.

Whilst a proportion of derivatives trading have remained for the purposes of hedging by physical market traders, the share of derivatives trading taken up by financial

⁵ Currently, the major futures exchanges are the CBOT, the Chicago Mercantile Exchange, the New York Mercantile Exchange, the New York Board of Trade, the International Petroleum Exchange, the London Metal Exchange and Le Marché à Terme International de France.

investors has increased throughout the period after the end of the Bretton Woods system. Since 2000, there has been a further explosion in trading activities on commodities exchanges that was initially triggered by the Dot com crisis which saw a shift of funds from equities to commodities.⁶ The value of outstanding OTC commodity derivatives in June 2007 was over 7.5 trillion US dollars, compared with 0.77 trillion in 2002 and 0.44 trillion in 1998. (Bank for International Settlements 2007) The growth in commodities has been sustained as new investors enter the markets, these include various institutional investors such as hedge funds and to lesser extent pension funds.⁷(Doyle, Hill et al. 2007) Unlike hedge funds, pension funds have relatively long investment periods, 30 years for example, and can help sustain the level of investment in these markets over time. There has also been a growth in investment on commodity markets that has resulted from the lowering of entry barriers for smaller hedge funds with the transition from open outcry to electronic trading platforms that have taken place in many of the major commodities exchanges. Retail investment is also set to rise with an increase in the number of tradable products, such as Exchange Traded Funds (ETFs), Exchange Traded notes (ETNs) and Exchange Traded Commodities (ETCs). (Doyle, Hill et al. 2007)

With increasing financial activities in commodity markets that are already large compared with the size of physical production, the changing composition of exchange traders has affected market characteristics such as heightened price volatility as well as a dislocation between exchange prices and those warranted by supply and demand realities. (Domanski and Heath 2007; Doyle, Hill et al. 2007)

Taking the specific example of arabica coffee, it is possible to measure the extent of speculation in commodity markets and see how this evolves over time. The New York Board of Trade (NYBOT) divides all trading members into two categories, hedgers and speculators. Hedgers are defined as entities that are trading on the exchange who

⁶ Commodities represent an attractive asset class for investors since commodity prices move in line with inflation, commodities act as an inflation hedge. More importantly, commodity prices display a negative correlation with the price of other financial instruments such as bonds and equities and therefore constitute a good asset class in terms of diversifying portfolios and risk reduction. It is therefore not surprising that commodity markets see increasing investment during periods of economic downturns.

⁷ In their 2007 FSA study, Doyle, Hill and Jack, found that 75-80% of funds invested in the Goldman Sachs Commodity Index (GSCI) are from pension funds.

are also engaged in physical commodity trade, these will include the large international commodity trading houses. All other exchange trading members are classified as speculators. This distinction is, however, not clear cut. It is not straightforward to determine what constitutes speculative behaviour since all derivatives trading, including for price risk management will contain elements of speculation which are only apparent ex-post. As the manager of a commodity derivatives division of an investment bank explained:⁸

Speculation is a bit of a dirty word in the city but in actual fact most of what anybody does has a form of speculation.....[A]ll of the trade houses to a greater or a lesser degree will involve in those types of decisions, whether to decide to delay a decision to hedge a purchase by 30 seconds, by an hour, by a day, by a week, or to delay a purchase or delay a sale, doesn't really matter. So if you define that as speculation then there is a certain amount of it.

In spite of the difficulties in separating speculative and hedging activities based upon the NYBOT categories, we can use this distinction in calculating a lower limit for speculative activity as a ratio of total trading activities using the ratio of NPCT open interest to total open interest. Figure 1. illustrates the evolution of this measure of speculation on coffee futures trading on the New York Exchange from 1986 until 2007. For coffee futures, the ratio is volatile and NPCT trading activities have increased from between 10 and 30% of total open interest on the NY exchange in the 1980s to a ratio that varies between 40 and 70% in the 2000s. This rise of fund activity in commodity derivatives and its implications for the market have not gone unmissed by the brokers themselves:⁹

[The Market] is as distorted as it has ever been, at least since 1997. There has been huge fund interest in recent years both in futures and in options. In options 30-40% of LIFFE is made up of funds and in NYBOT the figure is 60%.

⁸ Quote taken from an interview with a derivatives broker conducted by the present author in London, 2007.

⁹ Quote taken from an interview with a derivatives broker conducted by the present author in London, 2007.

Figure 1

5. Prices, price risk and risk management in Tanzanian and Ugandan coffee chains

As discussed in the introduction to this paper, prices on international commodity exchanges, including those for coffee, have become increasingly volatile since the 1970s. Price cycles have become more severe both in terms of their frequency and amplitude.

Since the abandonment of various multilateral commodity price stabilisation schemes and compensatory finance facilities, participants in international commodity markets have had to seek new ways in which to react against and ameliorate the impact of heightened price volatility on world markets.

There are a number of different strategies that coffee chain actors can adopt in order to manage the risk associated with international price movements. PRM strategies can be divided into those that manage exposure to risk, i.e. through the use of hedging instruments, and strategies that reduce the exposure to price fluctuations, such as fixed price forward contracts, back to back selling, entering niche markets, and diversification. Which of these strategies are adopted by chain actors has clear implications for the exposure to international price movements of chain actors immediately upstream (see Table 1). This in turn, affects the types of PRM strategies adopted by upstream actors. The potential for chain actors to profit from new financial avenues of accumulation depends upon their exposure to price volatilities and their ability to engage in hedging strategies. In contrast to belief of proponents of the universal use of hedging instruments by chain actors to manage price risks, the ability of individual chain actors to engage in various risk management strategies will heavily depend upon the organisation of the market at a particular segment of the chain, access to finance, information and brokerage services.

Table 1

In the remainder of this section, an analysis of the relationship between price risk environment, price risk strategies, price transmission and the implications for the structure of the market and income distribution will be presented based upon the analytical categories in table 2. We look at the specific cases of coffee chains that originate in Tanzania and Uganda. The analysis is based upon a series of semi-structured interviews, with various coffee chain stakeholders, conducted by the author between January and September 2007 in Switzerland, the UK, Tanzania and Uganda.

5.1 The overall structure of international coffee markets

Of all agricultural primary commodity markets, the international production, distribution and consumption system of coffee lends itself particularly well in terms of studying changes in the structure of the market along the supply chain. The primary commodity, green coffee, ends up at the consumption stage as a beverage in the main, taking relatively few forms compared with, for example, cotton, sugar or wheat. Coffee is predominantly produced in LICs, within tropical zones, but consumed in the main in high income countries in Europe and North America. The coffee supply system is thus, relatively uncomplicated and it is not difficult to trace the general movement of coffee from production to consumption.^{10, 11}

Coffee production is fragmented across a large number of countries across the tropics. With the exception of Brazil, domestic consumption in producing countries is marginal. Figure 2 Shows the proportions of total world coffee exports from the 10 largest coffee exporting countries. Coffee production and marketing systems vary considerably between producers. The major share of world coffee is produced by smallholders, although sizeable estate sectors exist in a number of coffee producing countries, particularly in Latin America. So as well as being geographically fragmented across the world, coffee production tends also to be fragmented within individual producing countries. Similarly, the marketing systems differ from country

¹⁰ The coffee supply system is composed of individual, distinct, and interrelated commodity chains.

¹¹ We are concerned with the bulk of coffee trade and refer here to commodity grades of coffee specified on the international exchanges. The speciality coffee market is quite different, and the processes of price formation are quite different in these markets. Specialty coffee is often compared with the market for fine wines in the industry (find a reference for this).

to country, with varying degrees of state intervention or centralised coordination of distribution.

Figure 2

Post export, the international coffee system becomes much more concentrated. Owing to the risky nature of international trade in coffee (and commodities in general) resulting from international price volatility, international traders have undergone considerable restructuring in the past two decades (Daviron and Ponte 2006). Prior to the 1970s, the size structure of the international coffee trading sector consisted of a larger number of small and medium sized coffee only trading companies, together with a few larger diversified commodity trading companies. The trend has been towards the concentration of a few large coffee traders, many of which have merged with other commodity traders to become very large multinational commodity trading companies.¹² In 1998, the two largest coffee traders (Neumann Kaffee Gruppe (NKG) and Volcafé) controlled 29% of total market share, and the top six companies 50% (Daviron and Ponte 2006). In 2006, Volcafe (now part of ED&F Man) and the NKG have maintained their dominant positions in the market, and control over 30% of world trade in green coffee. Concentration of the top 5 companies has also increased since 1998, and now accounts for a market share of over 55%. (Table 2)

The final processing stage of coffee before coffee is in its consumption form, that is roasting and blending is also dominated by a small number of coffee roasting companies internationally. Table 3 shows the market shares of the top 5 coffee roasting and/or manufacturing companies, which together made up just below 50% of the world market.

Table 2

Table 3

¹² Volcafe, the leading coffee export company in the late 1990s, was purchased by the diversified commodity trading company ED & F Man. Esteve, currently the third largest coffee trader in the world, was purchased by Cargill to form ECOM, in 2000.

5.2 *The structure of Tanzanian and Ugandan coffee marketing systems*

Figures 3 and 4 depict the pre-liberalisation coffee marketing systems in Tanzania and Uganda respectively. The pre-liberalisation marketing systems in both countries were centralised in the sense that all coffee exports went through a single channel, the Coffee Marketing Board in Uganda and the State run coffee auction in Tanzania. Coffee production in both countries is dominated by small-holder production although there was, and remains, a small estate sector in Tanzania. While in Tanzania all coffee was marketed through the cooperative marketing system, Uganda operated a dual local marketing system with both private and cooperative marketing channels in operation.

Figure 3

Figure 4

The processes of domestic coffee market liberalisation, as well as the extent to which the markets were liberalised, differ between the two countries. The coffee market in Uganda was liberalised in 1990/1. The liberalisation process was rapid and Uganda remains the most fully liberalised coffee market in East Africa (Ponte 2001). The cooperative marketing channel for coffee has virtually disappeared and the vast majority of coffee is now marketed through private local traders. Figure 5 maps the Ugandan coffee marketing system following liberalisation. The coffee marketing board in Uganda became the Ugandan Coffee Development Authority (UCDA) in 1991 with a statutory mandate to “promote and oversee the development of the coffee industry through research, quality assurance and improved marketing” (UCDA, 2007). The UCDA has no authority to set prices but does provide price information to market actors as well as an indicative price for dry cherry (kiboko).

Figure 5

The initial period following liberalisation saw a growth in the number of coffee export companies registered in Uganda, from 34 in 1992/3 to 117 at its peak in 1994/95. Since 1995 the number of registered export companies has been falling, year on year, and numbered 25 in the 2005/6 marketing season. The export sector is highly concentrated, with the top 5 companies making up over 70% of the market share,

compared with 52.2% in 1996/7 (Ponte 2001). Moreover, the top 5 companies are all subsidiaries of large MNC trading houses compared with just 2 in 1996/7 (Ponte 2001). Local exporters have gradually been displaced from the top 10 exporting firms, and the sector in general. In 1996/7, 70 of the top 10 exporters were local, compared with 4 in 1998/99 and just 3 in 2005/6 (Table 4). Coffee production in Uganda is dominated by small holder production. This is geographically dispersed across several regions. There are two coffee seasons per year in each region and the time of the seasons vary between the regions north and south of the equator.¹³

Table 4

Owing to the variations in coffee seasons across the country, export companies are all based in Kampala and rely upon local traders to bring the coffee from farm-gate to factory gate. Local traders purchase dry cherry (kiboko) from farmers and mill it into what is known as fair and average quality (FAQ) coffee, this is green coffee that has not been sorted according to the size and shape of the bean. Exporters purchase FAQ coffee which is cleaned and graded, according to bean size and the number of defects, before it is ready for export.

The liberalisation process in Tanzania began in 1994/5 and has not been as complete as in Uganda. Tanzania has maintained its auction system. The cooperative sector remains relatively strong in the Northern coffee growing regions of Kilimanjaro and Kagera. Figures 6 and 7 depict the coffee marketing system in Tanzania since liberalisation in 1994/5. In 2003 there were further changes in the coffee marketing system with the introduction of direct export and the one licence law that prevented any single market actor to simultaneously purchase coffee locally and at the auction.

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¹³ During the months of January to April the drugar (Arabica) crop is harvested in Kasese, Paidha, Kapchorwa and Mbale. The robusta harvest takes place in Masaka, Mbarara, Bushenyi, Sembabule and Kalangala from May until August, and in the central regions of Buboga, Kiboga, Kayunga, Mubende, Mukuno, Wakiso and Mpigi from September to December.

¹⁴ Arabical coffee is grown in the Kilimanjaro highlands while Kagera is the only robusta growing region in Tanzania. The one licence rule was introduced in order to eliminate, so called, captive coffee that was sold and re-purchased by the same market actor (Temu, Winter-Nelson et al. 2001) Prior to the

Figure 6

Figure 7

In contrast with the Ugandan coffee system, private exporters were operating in the Tanzanian coffee marketing system prior to liberalisation although the vast majority of green coffee was exported by the cooperative unions. In 1994/5 83% of coffee exports were exported by the Cooperative union sector (Ponte 2001). This share fell to 26% in 1999/00 with the collapse of a number of CUs, in particular those in the Southern coffee regions (Ponte 2001). In 2006/7, the export share of the three remaining CUs stood at 8.76%.

Similar to Uganda, the coffee export sector in Tanzania is highly concentrated, with the levels of concentration having increased steadily since liberalisation. In 1994/5 the market shares of the top 5 exporters, in terms of market share, was 59.5%, this stood at 63.7% in 1999/00 and was 67.7% in 2006/7. The number of active export companies in Tanzania has remained relatively stable, fluctuating between 22 and 27, between 1994/5 and 2002/3. With the introduction of direct export licenses, the number of registered exporters has increased, although the number of exporters operating in the auction system remains at similar numbers to the pre 2003 levels. The dominance of foreign owned MNC exporters in the sector has also increased. In 1994/5 3 of the top 5 exporters were locally owned compared with 1 in 1999/00 (Ponte 2001). By 2006/7 the top 5 coffee exporters were all subsidiaries of large MNC trading houses.

Table 5

**5.3 *Price risks and price risk management at the international trader level:
implications on price transmission, income distribution and market
structure***

issuing of direct export licences, all coffee had to pass through the auction in order to be exported. Only owners of specialty coffees that can fetch premium prices could apply for direct export licences.

As a matter of course, the largest of the trade houses hedge all green coffee trades. E D & F Man and the Neumann Kaffee Gruppe have their own in-house options and futures brokerages in E D & F Man Commodity Advisors Limited and TRX Futures, respectively. In addition, both trading houses have large coffee research departments, based in London in the same buildings as their brokerages.¹⁵

The size and financial muscle of the dominant firms, together with their diversification across a number of commodities has allowed these firms to weather the increasingly volatile environment of international commodity markets. Smaller single commodity trading firms have either been forced out of the market or have entered into niche markets, trading in specialty coffees where prices are less volatile.¹⁶

The large commodity trading companies seek to derive part of their income through speculative activities. When asked whether they ever engage in derivatives trading for purposes other than pure hedging, the risk manager of a large international commodity trading company responded with, “Once in a while we take a speculative position....[It occurs] basically daily. You’re never fully hedged up so part of your position could always be regarded as speculative.”¹⁷ More than just a PRM-strategy, the exploitation of price variations by physical traders on derivatives markets has become part of day to day business and the generation of income.

Increasingly, physical traders are including the behaviour of financial actors on derivatives markets with information on physical supply and demand as part of the fundamental make up of commodity markets. Price movements that are exacerbated by financial actors themselves, provide opportunities for physical traders to derive profit:¹⁸

¹⁵ E D & F Man Coffee & Cocoa Research, and NKG Statistical Unit Ltd.

¹⁶ Another contributing factor to the concentration of the market at the international trader level has been due to improvements in communications technology, together with liberalised markets, that have led to greater price transparency along certain segments of the commodity chain. This has acted to erode the margins once enjoyed by international trading companies. Thus, firm size has become important in order to secure adequate trading volumes.

¹⁷ Quote taken from an interview with the manager of an international coffee trading company conducted by the author in Kampala, Uganda, 2007 .

¹⁸ Quoted from a telephone interview with a commodities trader based in the US, conducted by the author in 2007.

“there are some very savvy physical traders that know exactly what the speculators do, how they think and what they’ll do next and they play the game, definitely. They make it part of their own game”

This process has acted to reinforce the concentration of international traders in the bulk market for coffee. The coffee trade has been effectively separated into two markets where smaller firms survive on the basis of more traditional avenues of accumulation by trading in specialty coffees, where the pricing process, to a large extent, takes place away from the movement of prices on the New York and London markets.

In the bulk trade, the move from fixed price forward contracts that were the norm before the 1970s to price to be fixed forward contracts has serious implications on the exposure faced by upstream actors to price fluctuations originating from the international commodity exchanges.

5.4 Price risks and price risk management in producer countries: an examination of Tanzanian and Ugandan coffee chains.

Under cooperative marketing systems price risk was managed centrally and shared out amongst producers to allow individual producers to earn a stable income. In Uganda, both cooperatives and private local traders purchased at fixed producer prices and fixed margins (Ponte 2001), international price fluctuations were not transmitted to local actors in the Ugandan coffee marketing system but managed through the central marketing board.

In terms of exposure to international price volatility, prior to 1989, the International Coffee Agreement, ensured relatively stable export prices that translated to relatively stable farm-gate prices in both Tanzania and Uganda. In Tanzania, ownership of the coffee remained with individual small holder farmers and estates, through the cooperatives, up to the point of auction. This meant that farmers carried the risk of price fluctuations in the period between initial marketing and auction. Farmers’ incomes were, however, smoothed throughout the selling season since the payment

system entailed an initial fixed payment for coffee deposited at the village level primary societies, with second payments of the difference from the auction price following export. In this system, price risk was managed centrally and shared out amongst producers to allow individual producers to earn a stable income. In Uganda, both cooperatives and private local traders purchased at fixed producer prices and fixed margins (Ponte 2001), international price fluctuations were not transmitted to local actors in the Ugandan coffee marketing system but managed through the central marketing board.

Since the mid 1990s, price risk, risk management and their consequences have differed between Tanzania and Uganda owing to the differences in the liberalisation processes of domestic coffee markets. Within each coffee producing country, the experiences of different coffee chain actors depend upon the structure of the marketing chain with which they are engaged as well as their position along it.

Since liberalisation, there has been a greater transmission of international coffee prices to local prices at each segment of the chain (Baffes and Ajwad 2001; Fafchamps, Hill et al. 2003). However, the transmission of long-run and short-run price variations have not been uniformly transmitted along all segments of the marketing system. Taking the private marketing system as an example, we look at the relationship between price volatility, PRM strategies and the processes of accumulation along the three related, private marketing chains in Uganda (figure 8).

Figure 8

Both local and international export companies face the risk associated with world price volatility of coffee coming from the international exchanges in New York and London. The PRM strategies adopted by the two types of exporters differ considerably. International exporters tend to sell the majority of their coffee on a price to be fixed basis. All coffee transactions are hedged on NYBOT of Liffe, through their principle offices in Europe, and Singapore in the case of Olam. Orders for the purchase of futures and options come from the Kampala office and the timing of when

to place an order can depend upon the exporter taking a position on how he expects prices on New York or London to evolve:¹⁹

[W]e always take a position, putting into consideration what we expect to buy. It's not just a corrective move, but we know what we are buying and we hedge it.

The decision to hedge, as a PRM strategy therefore also contains a speculative element. By taking a position on the market, accumulation along new financial avenues is possible for this group of market actors. It might be expected that short-term price movements are transmitted upstream from international exporters. This is however not the case in practice. International exporters will themselves cushion the short-term volatility to some extent to make the procurement of coffee practical in the Ugandan context. They will maintain purchasing prices throughout a day and for longer periods if world price fluctuations are not too severe:²⁰

[We] try and cushion the volatility when it gets to the farm level. So we try to make a price for a longer time period, and that again depends on the market view and when during the day, and when during the week, we want to hedge coffee. We take advice from [our derivatives broker..... we take responsibility of getting the hedging wrong. If we get it right we get a bit more money, but we can hold a price at farm level for about 3 or 4 days. I guess if you're saying that volatility has increased...in the past we might have done that for a week, 10 days.

By contrast local exporters do not use futures and options in their PRM strategies owing to relatively small export volumes at any one time compared with the lot sizes in New York and London and their limited access to the necessary finance to engage in derivatives trading activities.²¹ Local exporters use a combination of PRM strategies that limit their exposure to international price fluctuations, namely by

¹⁹ Quote from interview of the manager of an international trading company in Kampala conducted by the author in 2007.

²⁰ Quote from interview with a coffee trader from an international trading company in Kampala conducted by the author in 2007.

²¹ Local traders do not engage in hedging on derivatives markets in spite of their understanding of the principles of these hedging instruments.

utilising forward contracts for a portion of expected sales and back to back selling. By limiting their exposure, local exporters also limit the potential to earn rents derived from changes in international prices. The use of forward contracts for export acts as a price buffer for actors upstream of the chain, mediating their exposure to international price fluctuations.

Local traders are to some extent shielded from very short-term fluctuations in world prices. They are however, still exposed to inter-day or weekly swings in the purchasing price of exporters in Kampala. Local traders buy and sell coffee on the spot. They have no access to contractual arrangements that can limit their exposure to short-term price movements. Local traders try to ensure large margins that can contain the price volatility. They will purchase kiboko at stable but low prices from producers to ensure a margin,²²

[The strategy that maybe we use is, at least go to the ground, try to procure coffee at a fair price for any eventuality, especially when it goes down. At least if you have procured it at the sort of farm level, at that sort of level, you buy it at a bit fair price...Not very expensive. So if it goes down, at least you don't lose a lot of money....we cannot sell all the time at x100%, as I told you, you can have some 10 or 20% [margin]...we keep [for price] exposure 20%.

[Local traders] don't have any strategies. Occasionally they get caught up. They will buy here [indicating a high price] and by the time they are selling the prices are here [indicating a lower price].....one of the strategies that they take, they try to cheat the farmers on the weights.....Otherwise, some of them, if they really get caught up then they will try to cheat the exporter. They try to mix in some stones, dust, non-coffee material, to cover some of these loses. So whenever the prices drop, we are very strict, we are very careful.”

²² Quotes taken from interviews with a local coffee trader and the manager of an international coffee export company conducted in Kampala, by the author in 2007.

Short-run price changes are thus not transmitted directly to producers but are manifest in low farm-gate prices. At the same time, coffee production in Uganda has been falling since 1997 despite increasing world coffee prices (figure 9).²³

Figure 9

The crisis of coffee production in Uganda is also reflected in the efforts of the Ugandan Coffee Development Authority (UCDA), NGOs such as NUCAFE, and a number of International exporters to promote production through the organisation of farmers and improved farming practices, for example, the NKG Small holder scheme and EDE consulting.

In order to compare differences in relationships between the exposure to price volatility, PRM strategies and accumulation processes of chain actors in the Tanzanian and Ugandan coffee marketing systems we take the example of the cooperative marketing channels. Chain A in figure 10 depicts a traditional cooperative marketing chain with small holder producers organised into primary societies at the village level, which are in turn organised into a regional cooperative union. Decision making is democratic amongst the members at the annual general meeting and information on prices and production is collated at the union level and disseminated to farmers through the primary societies. After liberalisation a number of farmers, and groups of farmers, unhappy with the costs and perceived inefficiencies of the cooperative unions decided to leave the unions in order to earn larger margins by marketing their own coffee. Some of these farmers groups utilised the marketing structure of the cooperatives and formed farmers' group alliances.²⁴

Figure 10

²³ The fall in coffee production from 2000 can in part be explained by the period of low world prices 1999-2001. Coffee prices recovered in 2002, but production has continued to decline through to 2006.

²⁴ Examples of relatively successful farmers group alliances are the G32 in Kilimanjaro region, made up of a collection of 32 newly formed farmers groups and former primary societies of the Kilimanjaro Native Cooperative Union (KNCU), and Kilicafé. Both the KNCU and the G32 have accounts and overdraft facilities at the Kilimanjaro Cooperative Bank, where a warehouse receipt system is in operations.

As in the Ugandan case, exporters in Tanzania are fully exposed to short-term movements in world coffee prices. International traders utilise the standard, price to be fixed contracts for sales, and hedge 100% of all coffee transactions through their principal offices. Cooperative Unions can also act as exporters, purchasing the coffee from the auction for export. None of the three CUs currently operating in the coffee market are using hedging instruments to manage risks associated with world market fluctuations, preferring to secure stable prices at premiums through participation in niche and specialty markets, most notably the fair-trade scheme. The KNCU, Kagera Cooperative Union (KCU) and Kilicafe are all registered as suppliers of fair-trade coffee. As exporters, KNCU and KCU tend to sell on forward contracts and some back to back sales in order to limit their exposure to price fluctuations. Kilicafe is currently the only farmers' organisation that has used options as a risk management strategy, but only a portion of coffee transactions are hedged in this way.

World coffee prices are transmitted through the auction to local marketing actors, but very short-term movements are mitigated by the fact that the auction takes place once a week during the selling season. Unlike the private coffee marketing chains in Uganda, green coffee remains the property of individual farmers until the auction. Farmers therefore bare the entirety of the risk associated with price variability transmitted through the auction. The payment system of the pre-liberalisation cooperative system remains in these three marketing chains and individual farmers incomes are smoothed with a fixed initial payment on deposit of parchment coffee followed by the differences earned by coffee from each primary society.²⁵ Weekly price fluctuations are therefore shared out amongst individuals belonging to a primary society and farmers. There is therefore more real accumulation taking place along the cooperative marketing chains in Kilimanjaro region, Tanzania, compared with the Uganda. Despite the efforts of the World Bank Commodity Risk Management Group, together with the CRDB bank of Tanzania, to promote the use of hedging instruments by cooperatives and farmers groups²⁶, with the exception of Kilicafe, no farmers

²⁵ Parchment refers to coffee that has been pulped to remove the fruit but with the husk still intact.

²⁶ The World Bank Commodity Risk Management Group recently funded a project conducted through the CRDB bank to make available hedging instruments, namely New York futures contracts, that were brokered by a third party in the US, via the CRDB bank. These hedging instruments were pitched to coffee market actors as "Kinga ya bei", or price insurance.

groups or cooperative unions are using hedging instruments.²⁷ Furthermore, the instruments offered by CRDB bank do not provide the potential for Tanzanian market actors to derive income from upswings in prices, but merely to protect them from downswings.

Figure 11

Figure 12

Coffee production in Tanzania has also been falling during the period of increasing world prices.

6. Conclusion

This paper has proposed and applied an analytical approach to the study of particular relationships derivatives and physical markets for coffee and some of the broad implications these have on production and marketing systems the collapse of the International Coffee Agreement (ICoA) and the liberalisation of coffee markets in Tanzania and Uganda. It has been argued that the rise in speculative activities by non-physical commodity trading actors on futures markets have contributed to an increase in price volatility on international commodity exchanges. This increased price volatility on futures markets has been increasingly transmitted to the physical markets since the collapse of the ICoA owing to shift PRM strategies, at the international trader level, towards a reliance on hedging instruments together with price to be fixed contracts.

It has been shown, with the examples of Tanzanian and Ugandan coffee chains that the new volatile environment at the world level, is not transmitted evenly along coffee chains, but depends upon the structure and organisation of local supply systems in origin countries. In the context of heterogeneous chain actors, the new volatile environment offers either opportunities or challenges to participants within coffee chains. New financial avenues for accumulation have been opened for the largest, most diversified, trading firms with access to financial resources, whilst presenting insurmountable challenges to small coffee trading firms engaged in the bulk trade.

²⁷ Kilicafé purchase options through a US brokerage rather than through CRDB bank.

This has led to an increase concentration of trading firms at the international level. Similar outcomes, in terms of market structure, are observed at the export level in Tanzania and Uganda, where firms that engage in derivatives trading are dominant. Local exporters that are excluded from using hedging instruments have suffered a declining market share since the period immediately following liberalisation.

Upstream coffee chain actors experience levels of price volatility that depend upon the PRM-strategies adopted by downstream actors, as well as the organisation of production and marketing. In Uganda, private local traders dominate the local marketing segment of the chain. In absorbing the price volatility they experience with large marketing margins, individual, unorganised farmers have experienced low, but stable, prices for kiboko. The cooperative marketing system in Tanzania has allowed the incomes derived from coffee production to be stabilised across farmers within a season. These marketing practices, however effectively prevent local chain actors from deriving income through financial avenues.

Coffee chain actors face new imperatives in the light of the long-run reduction in coffee prices, and increasingly volatile prices. To be competitive at the international trade level, firms' imperatives become increasingly aligned with financial speculators in seeking to derive incomes through the exploitation of arbitrage opportunities and increasing bidding on derivatives markets that is sustained by new entrants in the market, as opposed to the traditional type of competition amongst physical traders that tend to drive prices down with increasing market participants. (Knafo 2007)

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Figures and Tables

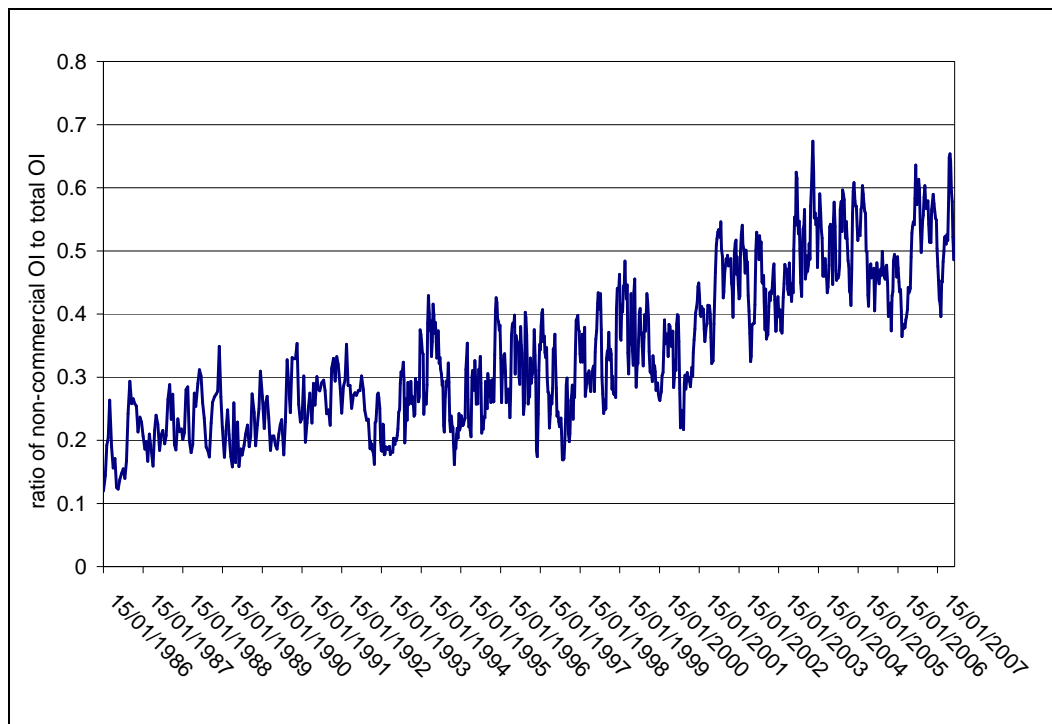


Figure 1. Ratio of non-commercial open interest to total open interest in coffee C contracts on the New York Coffee Exchange.

Price risk management strategy	Mechanism of price risk management	Implications for upstream chain actors exposure to international price fluctuations	Implications on the accumulation process
Price to be fixed contracts together with hedging on derivatives markets	Based on full exposure to price fluctuations and the offsetting of the risk through the purchase or sale of futures or options.	Price fluctuations are passed upstream along the chain	Possibility of earning financial rents associated with activities on derivatives markets.
Forward contracts	Transaction price set ahead of delivery date to reduce exposure to international price fluctuations	The transmission of price volatility upstream along the chain is limited by the forward contract	No possibility of earning financial rents associated with activities on derivatives markets. Income is derived along traditional avenues.
Back to back selling	Sell as rapidly as possible after purchasing coffee to limit the time period of the exposure to price fluctuations	Price fluctuations are passed upstream along the chain	No possibility of earning financial rents associated with activities on derivatives markets. Small and unstable margins earned along traditional avenues.
Fairtrade, specialty and niche markets	Market a differentiated product that does not depend as much on price movements on the futures market.	Limits price volatility upstream.	No possibility of earning financial rents associated with activities on derivatives markets. Small but stable margins earned along traditional avenues.
Diversification	Limit the reliance on income derived from any single product that may exhibit volatile prices	Price fluctuations are passed upstream along the chain	No possibility of earning financial rents associated with activities on derivatives markets

Table 2. Types of price risk management strategies adopted by commodity chain actors, and their consequences on price exposure and income derivation

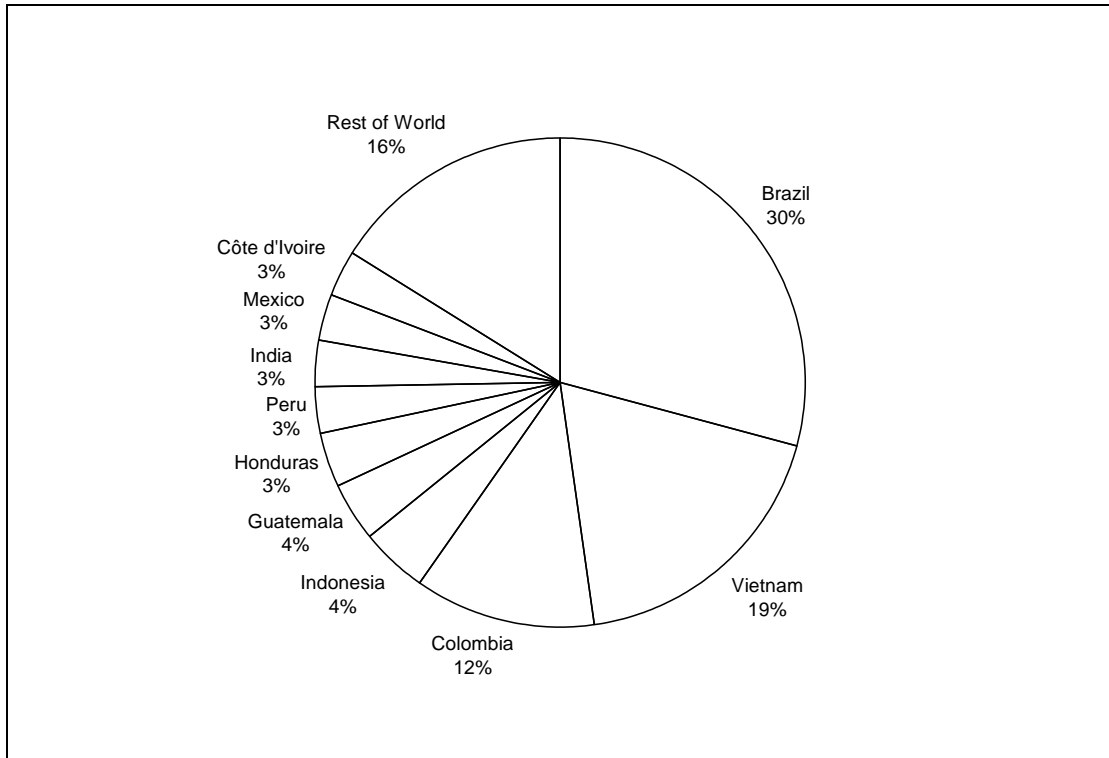


Figure 2 Proportion of total exports of green coffee from the top 10 coffee exporting countries in 2007. Data Source: ICO 2008

Trading Company	millions of 60 kg bags traded	estimated share of the world market	cumulative share of world market
Volcafe (ED&F Man)	15.6	17.83%	17.83%
Neumann	12	13.72%	31.55%
Esteve (Ecom)	9.5	10.86%	42.40%
Olam[†]	5.5	6.29%	48.69%
Noble*	5	5.71%	54.41%

[†]Olam is a diversified commodity trading company registered in Singapore.

*Noble is a Hong Kong based company and is Asia's largest diversified commodities trading company.

Table 2 Market shares of the 5 top trading companies for green coffee in 2006 (data source: ED&F Man Coffee Division, 2007 and ICO, 2006)

Coffee Roaster/ Manufacturer	millions of 60 kg bags traded	estimated share of the world market	cumulative share of world market
Nestle	12.8	14.63%	14.63%
Kraft	11.8	13.49%	28.12%
Sara Lee	8	9.14%	37.26%
Folger	4.8	5.49%	42.75%
Tchibo	3.1	3.54%	46.29%

Table 3. Market shares of the 5 top coffee roasting and/or manufacturing groups in 2006 (data source: ED&F Man Coffee Division, 2007 and ICO, 2006)

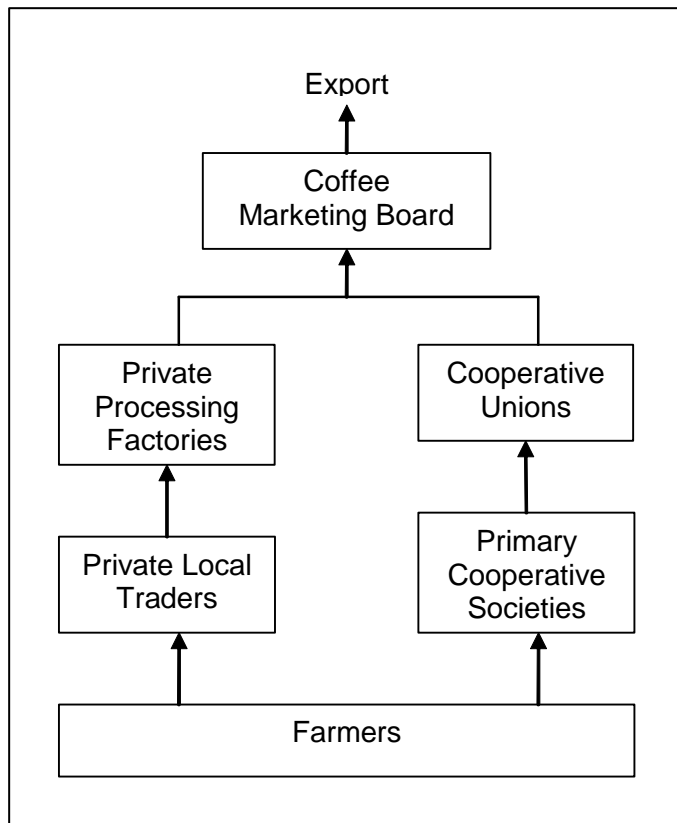


Figure 3. Ugandan coffee marketing system prior to liberalisation in 1990/1

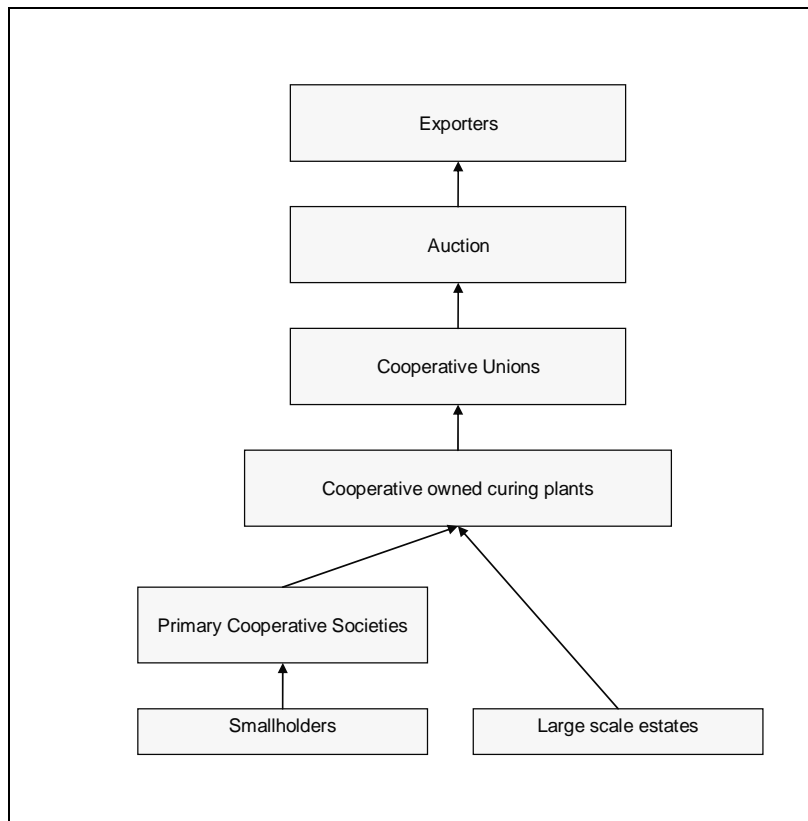
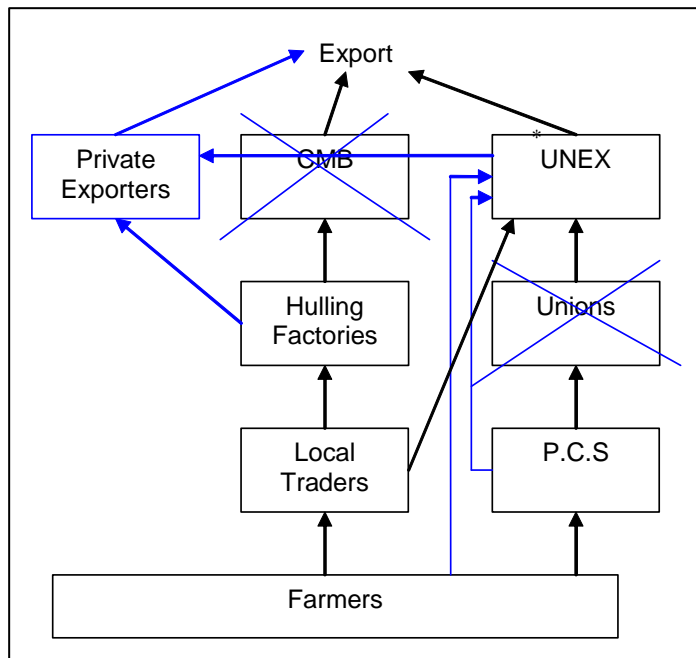


Figure 4. Tanzanian coffee marketing system prior to liberalisation in 1994/5



* UNEX refers to Union Export Services Ltd, the first company that was issued with a licence to export in the period immediately following liberalisation.

Figure 5. Ugandan coffee marketing system after liberalisation

	EXPORTER	% Market Share		Type of company
		Individual	Cumulative	
	GRAND TOTAL	100.0	2,002,324	
1	Kyagalanyi Coffee Ltd.	17.50	17.50	Subsidiary of coffee division of a large diversified commodity trading MNC.*
2	Kawacom (U) Ltd.	14.83	32.33	Subsidiary of a coffee trading MNC
3	Pan Afric Impex Ltd.	14.77	47.09	Ugandan office of a Sudanese, regional coffee trading and transportation company, supplying the Sudanese market in the main.
4	Ugacof Ltd.	13.10	60.19	Foreign owned coffee trading company
5	Great Lakes	9.86	70.05	Foreign owned coffee trading company
6	Olam (U) Ltd	8.89	78.94	Ugandan office of vertically integrated diversified commodity trading MNC †
7	Ibero (U) Ltd.	5.55	84.50	Subsidiary of a large coffee trading MNC‡
8	Job Coffee	3.03	87.53	Local export company
9	Lake Land Holding Ltd.	1.85	89.38	Local export company
10	Nakana Coffee Factory	1.80	91.17	Local export company

* Kyagalanyi Coffee Ltd is a subsidiary of Volcafe, part of the group ED&F Man, is the second largest coffee trader in the world

†Olam is a diversified commodity MNC, based in Singapore.

‡Ibero is part of the Neumann Kaffee Gruppe, the worlds largest trader of coffee.

Table 4. Market shares of the top 10 coffee exporters in Uganda - Oct/Sept 2005/06 (adapted from UCDA annual report, 2005/6)

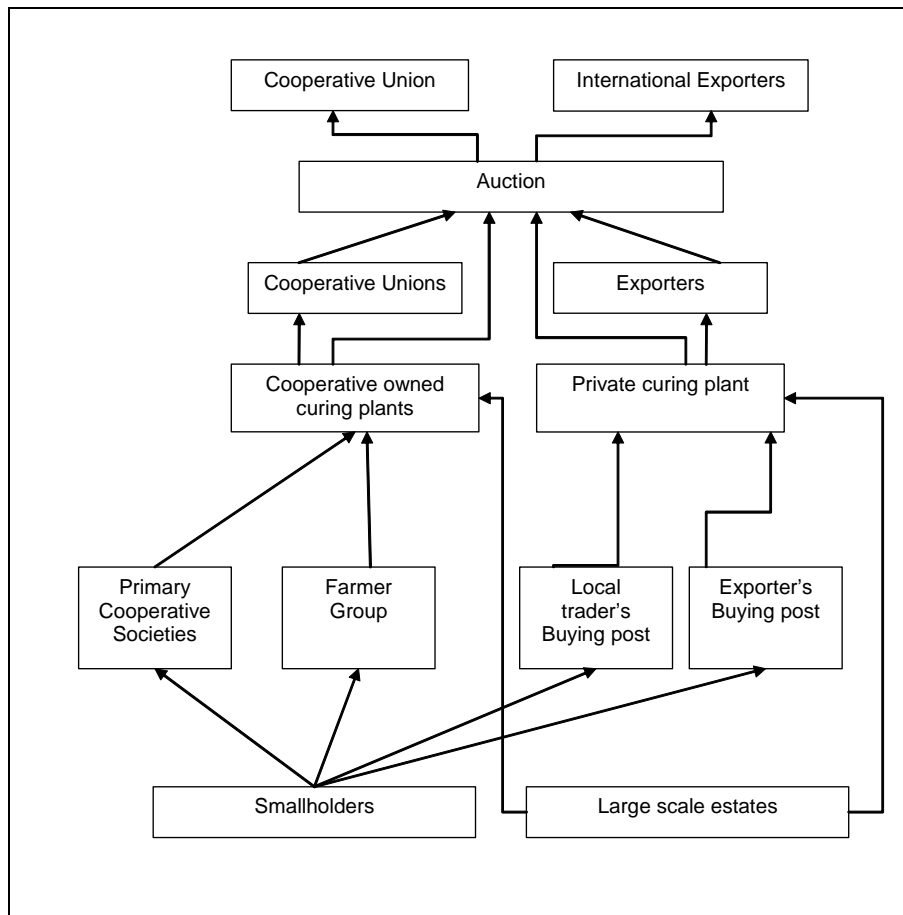


Figure 6 Tanzanian coffee marketing system between 1994/5 and 2003

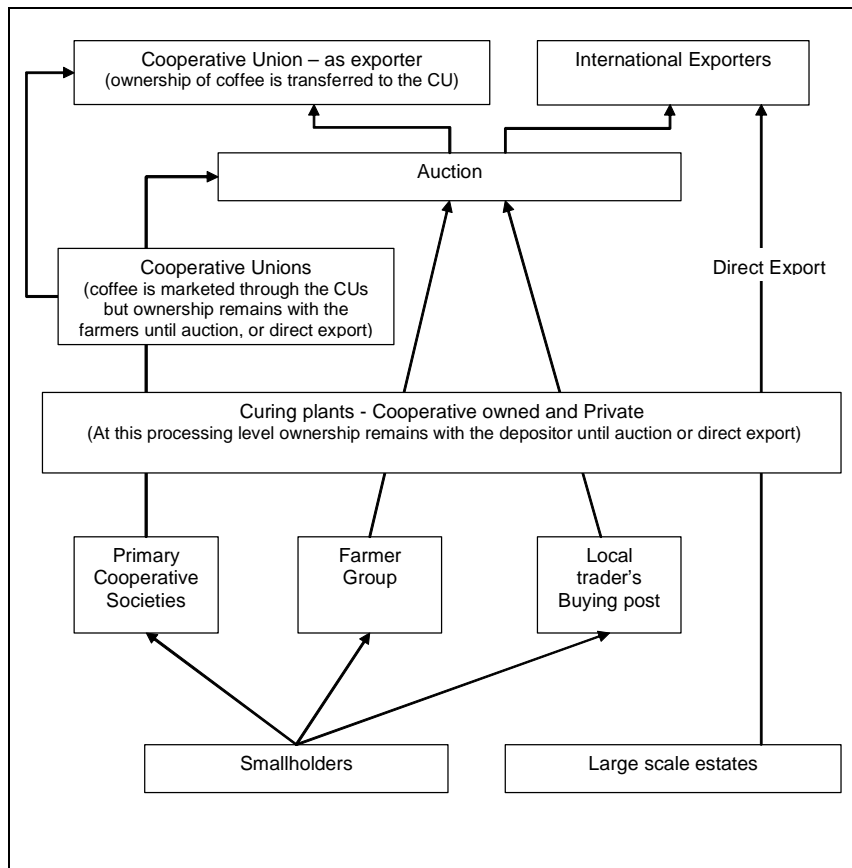


Figure 7 Tanzanian coffee marketing system since 2003

	EXPORTER	% - Age Market Share Individual	Share Cumulative	Type of company
1	Dorman (T) Ltd	21.57%	21.57%	MNC Subsidiary of Volcafe
2	Taylor Winch	16.97%	38.53%	MNC Subsidiary of Volcafe
3	Tchibo Trading	11.83%	50.36%	MNC subsidiary of a diversified European owned MNC
4	Mazao Ltd	8.82%	59.18%	MNC A member of the Neumann Kaffee Gruppe
5	Olam (T) Ltd	8.59%	67.77%	MNC
6	KCU Ltd	6.58%	74.35%	Cooperative Union
7	Kilimanjaro Plantation	3.60%	77.96%	Foreign managed farm leased from 4 village cooperative societies
8	Sherif Dewji	3.37%	81.33%	Local exporter
9	ACC	2.61%	83.94%	Local exporter
10	Tancof	2.19%	86.13%	Local exporter

Table 5 Market shares of the top 10 coffee exporters in Tanzania –Oct/Sep 2005/06
(Data source: TCB 2007)

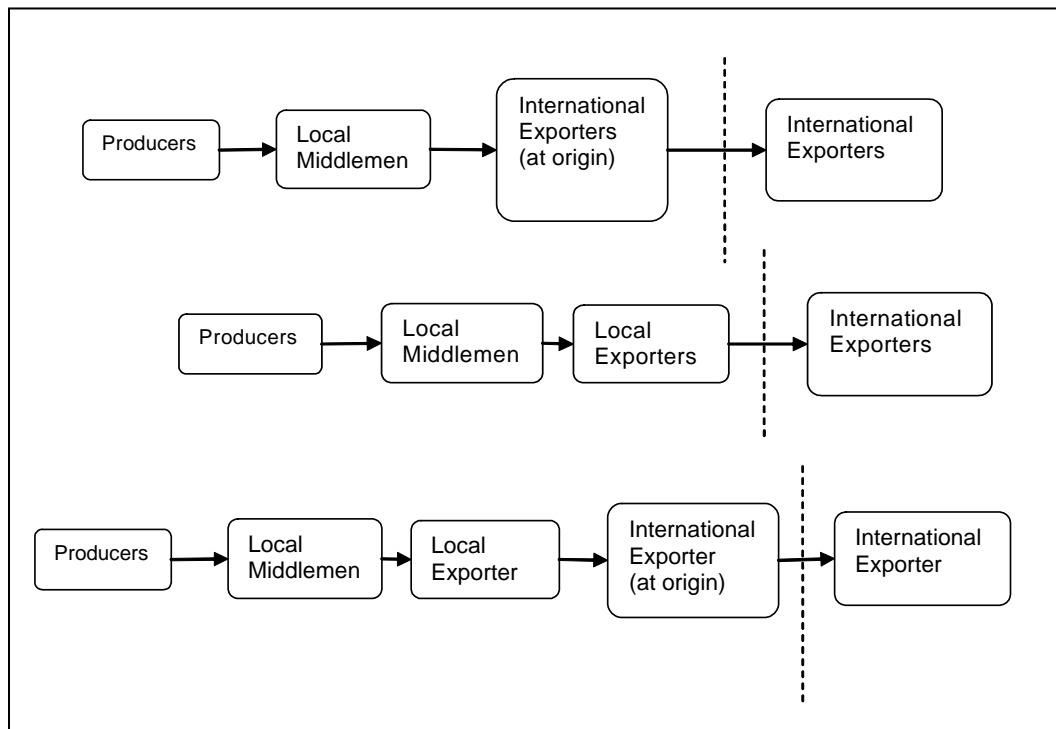


Figure 8 Private coffee marketing chains in Uganda

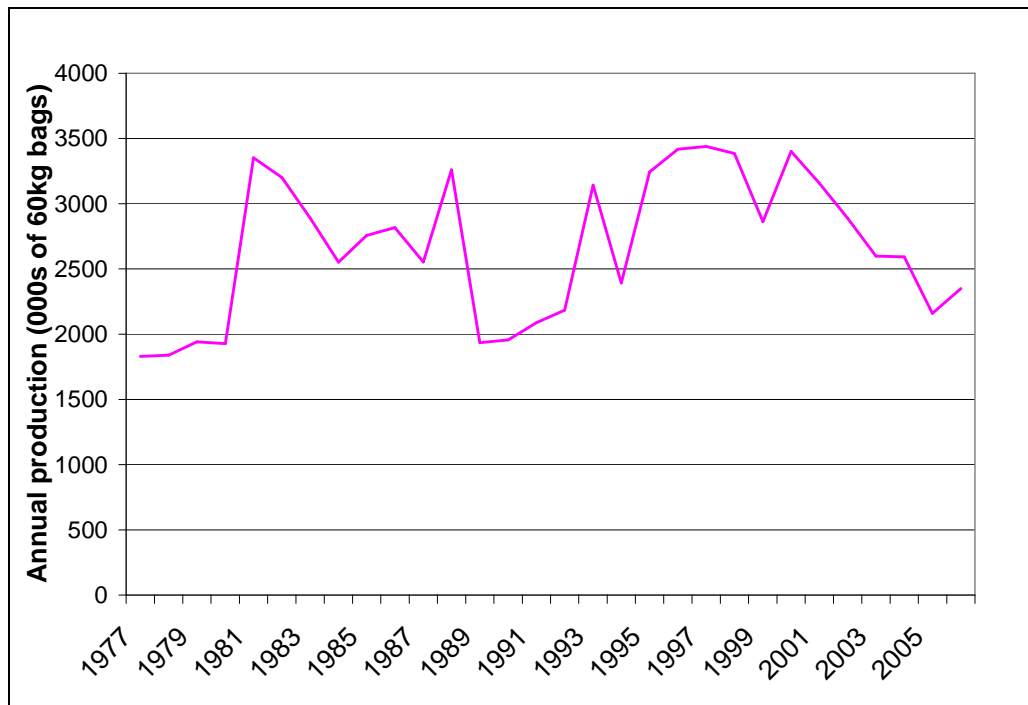


Figure 9 Annual coffee production in Uganda 1977-2006 (Data Source: ICO 2007)

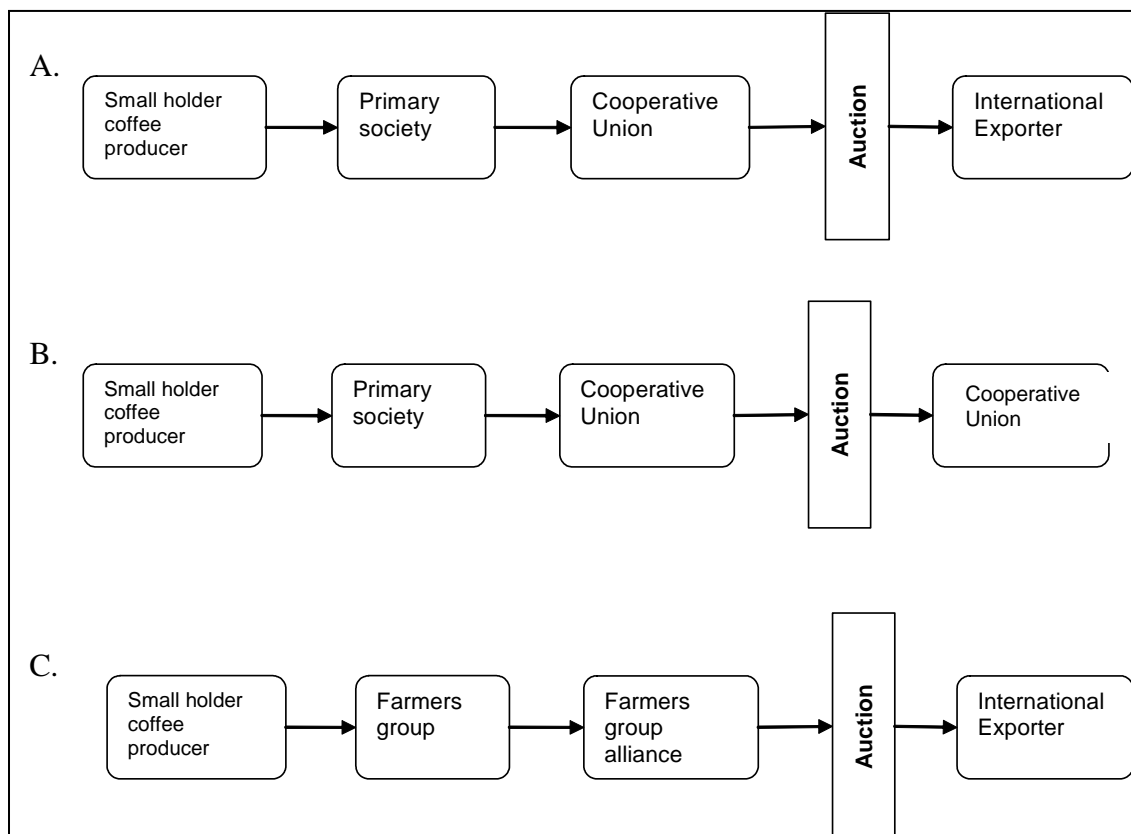


Figure 10 Cooperative coffee marketing chains in Tanzania



Figure 11. Annual production of arabica coffee in Kilimanjaro region, Tanzania, since liberalisation in 1994/5 (Data source: Tanzania Coffee Board, 2007)

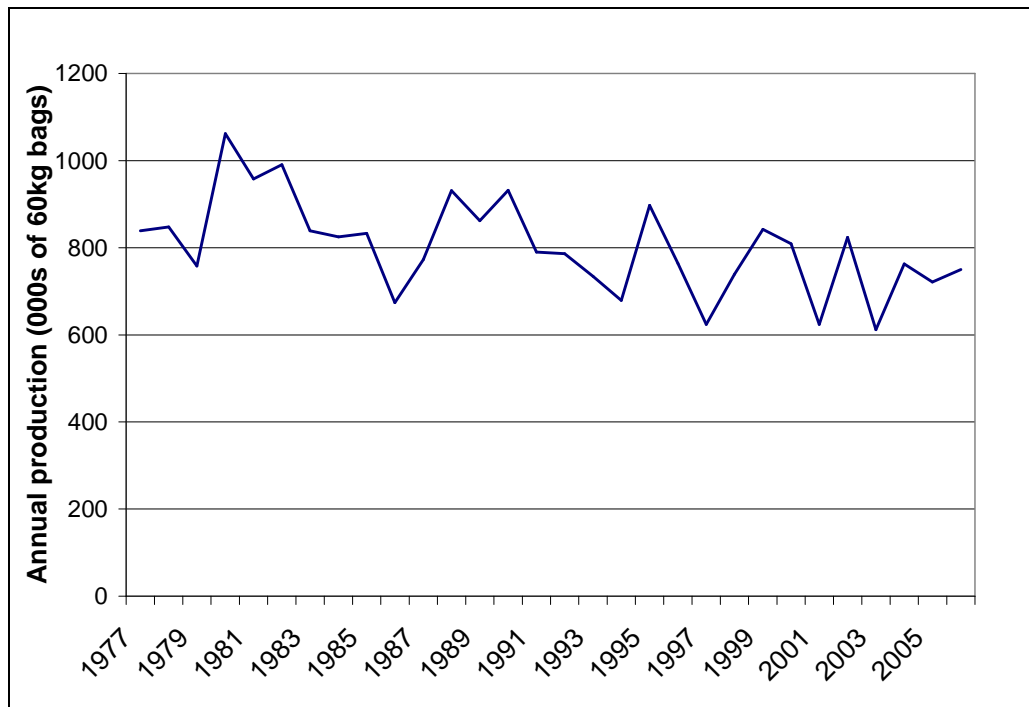


Figure 12. Annual coffee production in Tanzania 1977-2006 (Data Source: ICO 2007)