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## Low-income countries and commodity price volatility

HANNAH BARGAWI, ELVA BOVA, BENNO FERRARINI  
AND SUSAN NEWMAN\*

### KEY MESSAGES

- Low-income countries (LICs) are highly vulnerable to fluctuations in commodity prices. Excessive price volatility complicates macroeconomic management and can worsen long-run growth and development prospects.
- Financial speculation has caused price volatility in the international markets beyond what could possibly be explained on the grounds of fundamentals of supply and demand alone.
- Field studies of the cotton and coffee sectors in Tanzania and Uganda show that sound market structures and institutions need to be in place for producers, households and villages to cope with price shocks.
- The case study of copper in Zambia highlights the extraordinary difficulties LICs encounter in devising appropriate monetary and exchange rate policies over the commodity price cycle.
- Overall, we reach the conclusion that LICs' vulnerability to commodity price volatility requires international support targeting supply-side constraints, together with the establishment of a financing scheme compensating the effects of price shocks. Of course, it is crucial that international support be premised on the pursuance of sound governance and macroeconomic policy at the domestic level.

\* Individual Project No 12, 'Trade in Primary Commodities and Exchange Rates'. This chapter was put together with the individual contributions of the IP12 Alternate Leader, Dr Benno Ferrarini, World Trade Institute, Switzerland, and of the three IP12 PhD candidates based at the School of Oriental and African Studies, University of London. Section B was contributed by Susan Newman, Section C by Hannah Bargawi, and Section D by Elva Bova. Section E draws from the journal publications by Benno Ferrarini in relation to this NCCR project.

- In support of our argument for an increased role of foreign aid as a temporary device to counter excessive price volatility, we outline the main features of our proposal for such a compensatory financing mechanism and show, in the case of Uganda, that its application would be highly effective and relatively cost-efficient in achieving the goal of increased protection from price volatility and trade shocks more in general.

## A. Introduction

The difficult circumstances facing the poor, primary-commodity-exporting countries have long been enshrined in the legislative body of the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO). The Enabling Clause, introduced in 1979, reproduced the idea of non-reciprocity first embedded in Article XXXVI:8, allowing for preferential treatment in favour of developing countries, in particular of least developed countries (LDCs).<sup>1</sup> The Uruguay Round later accorded the LDCs a number of special treatment clauses by means of specific provisions in the WTO agreements, most notably the right to opt out of these agreements on the grounds of special development needs and capabilities. For instance, the Agreement on Agriculture allowed for special and differential treatment of developing countries, and LDCs in particular, through fewer obligations and the easing of rules and time frames of implementation.<sup>2</sup>

It has long been acknowledged that the benefits and long-term prospects for LDCs' participation in the world markets are undermined by their vulnerability to commodity price fluctuations and the special financing needs arising from dependence on a narrow basket of primary export crops. Indeed, Article XXXVI of GATT 1947, one of the Kennedy Round results, already contained a special reference to the circumstances of its weakest Contracting Parties. Even if statements of principle, it is remarkable that this legal text continues to provide an accurate description of the plight many of these countries are still facing today, sixty

1 See also Appellate Body Report, *EC – Tariff Preferences*, paras. 106ff.

2 For instance, Article 15 of the Agreement on Agriculture allows lower reduction commitments and longer periods for the implementation of these commitments, while LDCs are not required to undertake any reduction commitments pursuant to Article 15:2. Additional flexibilities exist notably in the areas of market access, domestic support and export competition. See J. McMahon, *The WTO Agreement on Agriculture: A Commentary* (Oxford University Press, 2006), p. 173.

years later.<sup>3</sup> However, while issues of agriculture and special and differential treatment provisions continued to feature in the Uruguay and Doha rounds, the issue of fluctuating commodity prices has been omitted from negotiations since the late 1970s.

This omission was largely a consequence of a number of multilateral interventions that were put in place during the 1970s that acted to stabilise commodity export incomes for developing countries. Interventions included the International Commodity Agreements (ICAs) for the maintenance of minimum prices for a number of commodities, as well as the Compensatory Finance Facility of the International Monetary Fund (IMF) and *Système de Stabilisation des Recettes d'Exportation* (STABEX) scheme of the European Community (EC) that were set up to ameliorate the adverse effects of export instability that arose from fluctuating commodity prices.<sup>4</sup> Many of these multilateral interventions have since broken down. Political and economic factors culminated in the collapse of the ICAs, none of which survived the 1980s.

Against this background, and in light of the increasing frequency and amplitude of commodity price fluctuations since the early 1990s, we argue that the issue of commodity price volatility ought to receive greater recognition in WTO negotiations – and in the debates about the development

3 GATT, Part IV, Article XXXVI: Principles and Objectives, paragraphs 4 and 6 stipulate that (emphasis added):

4. Given the continued dependence of many less-developed contracting parties on the exportation of a limited range of primary products, there is need to provide in the largest possible measure more favourable and acceptable conditions of access to world markets for these products, and wherever appropriate to *devise measures designed to stabilise and improve conditions of world markets in these products, including in particular measures designed to attain stable, equitable and remunerative prices, thus permitting an expansion of world trade and demand and a dynamic and steady growth of the real export earnings of these countries so as to provide them with expanding resources for their economic development.*

6. Because of the chronic deficiency in the export proceeds and other foreign exchange earnings of less-developed contracting parties, *there are important inter-relationships between trade and financial assistance to development. There is, therefore, need for close and continuing collaboration between the contracting parties and the international lending agencies so that they can contribute most effectively to alleviating the burdens these less-developed contracting parties assume in the interest of their economic development.*

4 In fact, Article XX GATT incorporated an exception in favour of obligations under ICAs. Ad Article XX extends the exception to any ICA conforming to the principles approved by the UN Economic and Social Council in its resolution 30(IV) of 28 March 1947. The latter invokes the principles of chapter VI of the Havana Charter.

challenges facing LDCs, more generally – if the international community's assistance is to be more effective. Within the context of the National Centre of Competence in Research (NCCR) focus on international trade regulation, the goal of this research project has thus been to provide better insights into the origins and implications of commodity price volatility in relation to LDCs and low-income countries (LICs) more generally, in order to lay the grounds for the design of a more coherent and equitable multilateral trading system.

Our research into the processes of price formation and the structure of commodity markets, and of the effects of volatile commodity prices on producers in LDCs, was conducted on the basis of selected commodity case studies (coffee, cotton and copper) and fieldwork in Africa (Tanzania, Uganda and Zambia). We have further focused on the relationship between aid and trade in the context of commodity price volatility, yielding a proposal for a compensatory financing framework to bring about more coherence between the multilateral trade and aid frameworks in dealing with the special financing needs of shock-prone economies. A third and final focus of our research has been on the issue of exchange rate management, both in the context of the broader macroeconomic management difficulties facing resource-rich economies along the commodity price cycle, and in support of an argument in favour of intermediate exchange rate regimes for the case of emerging economies.

The structure of this chapter reflects the contributions by the individual researchers working on a specific topic of relevance to the research project overall. Each section provides a summary of the author's key findings in relation to his or her research, with a final section outlining the main conclusions reached.

Section B analyses the processes of price formation in the coffee market along the global value chain and against the background of alternative institutional settings, influencing the distribution of returns and exposure to price volatility. We find that the growing presence of new financial players and speculative activities on international exchanges has led to a loosening in the relationship between prices and supply and demand conditions for coffee. Upstream coffee market actors, with limited ability to utilise futures markets for the purposes of hedging against price risks, depend on the types of price risk management strategies employed by downstream actors. This has important implications for price transmission and income generation at different stages of the coffee value chain and, ultimately, for the sustainability of the production and local marketing systems.

Section C focuses on the effects of volatile commodity prices on producers in LDCs, following widespread domestic liberalisation of export sectors. Our case studies of the coffee and cotton markets in Tanzania highlight the complexity of social and historic aspects determining the impact of commodity price volatility, and point to a limited ability of both commodity producers and domestic institutions to cope with the effects of sudden price changes. We conclude that the effects of commodity price instability and LDCs' poor integration with the world trading system are compounded by the existence of severe supply-side constraints in export sectors. For effective assistance, the international community – including the WTO – would have to recognise the challenges in the LDCs' institutional production and marketing environments.

Section D takes issue with the management of resource-based economies over the commodity price cycle. More than any other economies, LDCs are strongly affected by the boom–bust price cycles of major primary export commodities and by external market conditions more generally. To avoid externally induced balance-of-payments crises, it is necessary for these countries to implement an effective macroeconomic management strategy over price cycles, a task fraught with many complexities. Focusing on the experience of Zambia in the management of the current copper boom, we identify the key elements and the economic conditions conducive to successful macroeconomic management. We formulate a framework for the analysis of fiscal, monetary and exchange rate policies, as an indicator of countries' vulnerability and of governments' capacity to respond to terms of trade shocks.

Section E outlines the main implications of our proposal for a multilateral aid framework to compensate LICs against commodity price volatility and trade shocks. In light of LICs' reliance on foreign aid to support their balance of payments and fiscal positions, we argue that a revision of the extant multilateral aid framework would be conducive to reducing the impact of macroeconomic vulnerability on long-run growth and trade performance. In support of our proposal for a so-called contingency debt sustainability framework, we outline the findings of an econometric assessment of the relationship between economic vulnerability and the sustainability of LICs' balance of payments and external debt, and go on to present the core elements of a debt contract that would tailor the amount and type of financial assistance to the nature and magnitude of trade shocks experienced by LICs.

## B. International coffee markets and price volatility

We investigate the extent to which portfolio investment on international commodity exchanges drives the behaviour of prices, not only on the exchange itself, but also prices at which physical commodities are exchanged on the ground. It is shown that the growing presence of new financial players on international exchanges has led to a loosening in the relationship between prices and supply and demand conditions for the commodity. In addition we find that increased price volatility is associated with the entry of financial investors onto the international exchange.

Since coffee market actors differ in their ability to utilise futures markets for the purposes of hedging against price risks we find that the extent to which prices are transmitted along the supply chain, as well as the outcome in terms of income generation at different stages of the chain, depend crucially on the types of price risk management strategies employed by downstream actors. The resultant pattern of price has serious implications on the sustainability of the production and local marketing system.

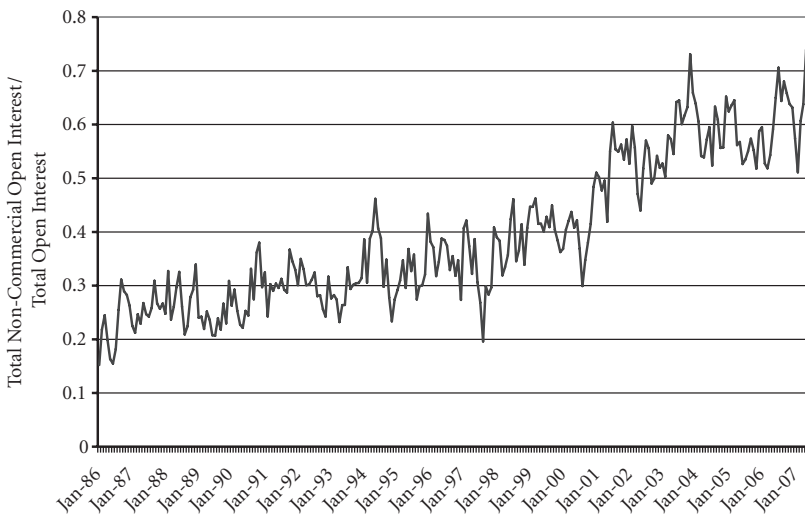
### I. *Portfolio investment and price behaviour on futures markets*

This part of our research explores the changes in composition of traders on the coffee exchange of the New York Board of Trade (NYBOT) and the implications of these on the behaviour of the price of coffee futures.<sup>5</sup> Using data from the NYBOT, for the period 1986–2006, it is shown that increases in the total volume of futures trading have been attributed mainly to the entry of new institutional investors such as hedge and pension funds. Their entry onto the market does not necessarily reflect supply and demand conditions in the international market; rather, they respond to changes in the global economic context more widely. For example, the dot-com crash of 2000 saw a massive shift in funds from equities to commodities, including coffee. Structural break tests identified a jump in the volume of portfolio investment on the coffee exchange that is associated with a break in the relationship between prices and supply and

<sup>5</sup> A more detailed exposition of methods and results for this part of the research can be found in S. Newman, 'The New Price Makers: An Investigation into the Impact of Portfolio Investment on Coffee Price Behaviour', paper presented at the international workshop, 'Challenges and Prospects for Commodity Markets in the Global Economy', The School of Oriental and African Studies, University of London, 19–20 September 2008.

**BOX 12.1 FINANCIAL INVESTMENT AND PRICE  
VOLATILITY – THE COFFEE ‘C’ CONTRACT**

- The Coffee ‘C’ futures contract – traded on the New York Coffee Exchange – is the hedging instrument most widely used by international trading houses that deal in Arabica coffee.
- The traded volume of Coffee ‘C’ contract has been increasing since the 1970s. The main component of this increase has been an inflow of financial investment from portfolio investors. The extent to which the market is composed of financial investors can be seen in the ratio of non-commercial to total open interest on the exchange (see Figure 12.1).
- Movements in the price of the coffee ‘C’ futures contract have increased in both amplitude and frequency (see Figure 12.2).



**Figure 12.1** The share of open interest attributed to financial investors on the New York Coffee Exchange 1986–2007

demand conditions. Prices became less responsive to changes in supply and demand conditions following the entry of hedge funds in 1993/4.

We examined the relationship between the volume of contracts traded by non-physical traders and a monthly price volatility index for the period 1972–2006. Two breaks in the relationship were identified (April 1994 and October 2002). The period that followed the break in 1994 is characterised by heightened price volatility that supports the argument

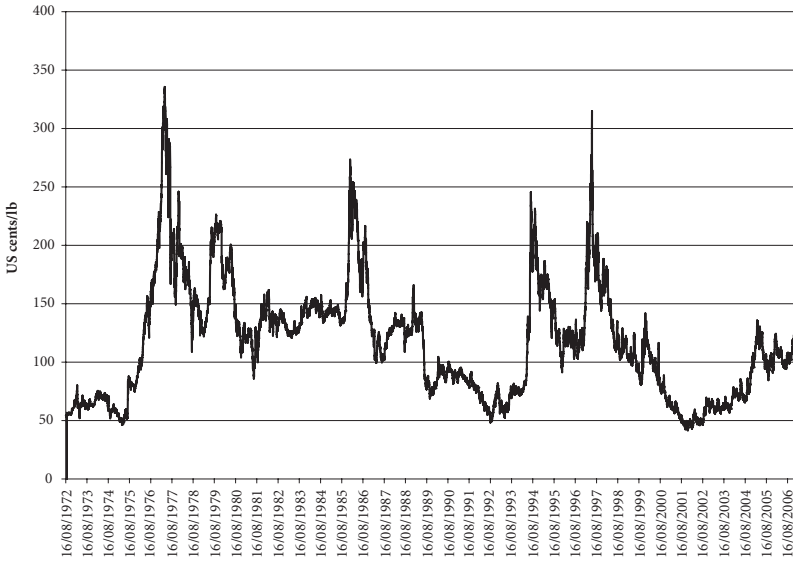


Figure 12.2 Daily closing coffee prices on the New York Coffee Exchange 1972–2006

that financial investment increased price volatility for coffee futures. In contrast, the period after the break in 2002 did not see an increase in price volatility despite the large inflow of funds from financial investors. This apparent contradiction in the relationship between financial investment on commodity exchanges and volatility can be explained if we consider the type of participants in the market, their motivations for trading and consequently, the nature of the trading activities.

The structural break in the relationship between price volatility and financial investment on the NYBOT coffee exchange in 1994 is explained by the inflow of funds associated with the inclusion of commodities by a number of large hedge funds. Hedge funds can profit from price volatility on commodities markets in a way that other financial investors cannot and provide commodity markets with a large proportion of the liquidity in them. An estimated 80 per cent of funds in commodity markets are looking for higher-than-market-following returns (alpha).<sup>6</sup> This alpha money is short-term and moves quickly into and out of the market. The volatility of fund in- and out-flows has implications on short-term price

6 E. Doyle, J. Hill and I. Jack, 'Growth in Commodity Investment: Risks and Challenges for Commodity Market Participants' (2007), FSA Markets Infrastructure Department, Financial Services Authority, London.



movements on commodity exchanges where large flows can rapidly drive prices away from the price warranted by world supply and demand.

The motivations of financial investors entering commodities markets in 2000 differed from the inflows of money due to hedge funds in the 1990s. Falling returns on equity and bond markets, together with the anticipation of inflation led to an inflow of funds seeking an inflation hedge and looking to diversify their bond and equity heavy portfolios. The period since 2000 has thus been accompanied by greater variety in the types of financial investors and investment strategies in commodity markets.<sup>7</sup> In particular, passively managed investment and portfolio products have been growing. Rather than trading on volatility, this group of investors profit from long-run price increases. Rather than enhanced price volatility, the period between 2001 and 2006 has seen an upturn in commodity prices that has been largely driven by financial investors with longer-term horizons.

## *II. Price transmission along coffee chains*

Our research also looked at the implications of changes on prices experienced by different actors along coffee chains that have taken place on international exchanges.<sup>8</sup> Since futures markets are relied upon for price discovery, departures from price movements that are warranted by physical market conditions can impact upon the supply and demand decisions of physical market players.

The international coffee system has undergone significant restructuring following the collapse of the International Coffee Agreement in 1989 and the liberalisation of coffee marketing systems in many coffee-producing countries under structural adjustment. As a result, all market actors became exposed to risks associated with price volatility. Revisiting early theories of futures markets shows that futures markets are inherently biased against producers and local exporters owing to the asymmetry between long- and short-hedgers in terms of opportunities to profit from price movements.<sup>9</sup> Moreover, since coffee market actors differ in their ability to utilise futures markets, the extent to which prices

7 D. Domanski and A. Heath, 'Financial Investors and Commodity Markets' (2007) *BIS Quarterly Review*.

8 A detailed account of this part of the research can be found in S. Newman, 'The Role of International Commodity Exchanges in Price Formation and Transmission of Prices and Price Risk along International Coffee Chains' (2008) NCCR Trade Regulation Working Paper No. 2008/12.

9 B. A. Goss and B. S. Yamey, *The Economics of Futures Trading* (London, Macmillan, 1978).

are transmitted along the supply chain depends crucially on the types of price risk management strategies employed by downstream actors, as illustrated in the case of Tanzanian and Ugandan coffee chains. These in turn depend crucially on the organisation of the market as well as access to finance, information, warehousing and brokerage services. Where there is no access to futures markets or cooperative risk management strategies, producers tend to sacrifice price level for the sake of stability, and local traders take on the risk but do so for a price. The resultant pattern in terms of price has serious implications on the sustainability of the production and local marketing system. At the international level, trading companies seized the opportunities to profit on futures markets, engaging in forms of speculative hedging. The spread of such business practices has resulted in further industrial concentration. Smaller firms are wiped out in the event of a perverse market movement whilst the largest, diversified, commodity trading companies expand their market share.

### C. The effects of price volatility on producers

This part of our research agenda focused on primary commodity markets in least developed countries and the effects of volatile commodity prices on producers, following widespread domestic liberalisation of export sectors. A case study approach considered coffee and cotton markets in Tanzania and highlighted complex, social and historic aspects. This work has drawn attention to the asymmetric effects of commodity price volatility over time and space across the country. Commodity producers' ability to cope with the effects of sudden price changes have become more complicated and blurred as other effects of domestic liberalisation have moulded these sectors. Domestic institutions at all levels have attempted to adapt and transform in the wake of these experiences but their ability to do this effectively remains partial and uneven. The research highlighted the crucial supply-side constraints in the export sectors of LDCs such as Tanzania in overcoming the effects of commodity price instability and in meeting WTO objectives of greater integration of LDCs in the world trading system. Greater recognition and appreciation of the challenges in the domestic institutional production and marketing environments is therefore urgently needed.

#### I. *Tanzania coffee and cotton fieldwork: main findings*

It is evidently important to address some of the impediments to the fulfilment of LDCs' full trade potential and our research contributes

to this understanding by considering the adverse impacts of commodity price volatility on producers. The research was focused on producers of cotton and coffee in Tanzania, an LDC which has undergone widespread domestic liberalisation and has been a member of the WTO since 1995. Cotton and coffee are important crops for Tanzania, in terms of export revenue but also in terms of rural poverty and employment. However, whilst other LDCs have been experiencing growth and expansion in their export sectors, such as Vietnam in the case of coffee and West Africa in the case of cotton, Tanzania's cotton and coffee sectors have been retracting. At the same time Tanzania's cotton and coffee producers have been exposed to increasing commodity price volatility arising from greater domestic liberalisation and integration into world markets.

The research relied on information gathered first-hand from producers of cotton and coffee in three regions of Tanzania to uncover the detailed effects of price volatility on these producers. This work was complemented by interviews with other institutional players in the domestic cotton and coffee markets to gain a better understanding of the post-liberalisation institutional set-up. The frameworks for delivering inputs and research and extension services as well as price-setting structures for cotton and coffee were analysed.

Research results showed that producers were unevenly affected by price fluctuations and that cotton producers were more exposed to price changes than coffee producers. Furthermore, the nature of price fluctuations was complicated across time and space. Producers were doubly hit by sudden price changes, firstly through changes in prices between years and secondly by within-season price changes. Differences between crops, across areas and within villages could be best understood by the differential impacts of domestic liberalisation on these crops. Supply and production of cotton and coffee were therefore constrained both by the effects of unstable prices and by the lack of supportive institutional structures for producers. Often unstable prices for cotton and coffee acted as the final deciding factor in pushing producers out of cotton and coffee production and towards rural and non-rural alternatives, with detrimental poverty outcomes.<sup>10</sup>

10 H. Bargawi, 'Cotton Price Fluctuations at the Ground-level: Assessing the Difference in Impact in Rural Tanzania' (2008) NCCR Trade Regulation Working Paper No. 2008/11.

**BOX 12.2 KEY FINDINGS ON THE IMPACT OF A DECLINE IN  
COFFEE PRICES IN KILIMANJARO REGION, TANZANIA**

The extent of the coffee price drop between 1999 and 2002 varied between producers, although most received less than TSH 400 per kg (about US\$ 0.3) at the lowest point, under one third of the nominal 2006/07 producer price. The impact of this decline in prices and income was diverse with only the wealthiest producers, reliant on other income sources, stating that they had not been affected. In general the impacts were felt across households with most producers lowering their consumption and expenditure in response to the drop in prices.

Spending reductions affected the entire household through cuts in expenditure on housing, clothing, school fees and other essential school-related equipment. A further area mentioned by the poorest was the search for employment and to a limited extent the sale of livestock assets in response to the income shortfall. Finally, the fall in prices over 1999–2002 was also a deciding factor in shaping agricultural decision-making and changes to coffee production in the area. A large number of producers, particularly the poorest, stopped applying the correct amounts of labour and non-labour inputs in response to lower prices. Wealthier producers on the other hand relied on alternative income sources to purchase inputs for coffee.

Despite varying degrees of dissatisfaction with current institutional structures surrounding coffee production, many producers continued producing coffee. For producers across wealth categories the revenue raised through coffee production remained a vital part of household income. Only through the income raised from coffee sales could households afford to make major cash investments in their children's education as well as allowing them to invest in more diversified production and income-raising opportunities.

Wider analysis of the cotton and coffee sectors revealed the vast institutional void left by the domestic liberalisation of these sectors in Tanzania. Furthermore, our work highlighted the unequal outcomes of institutional change on the ground, with ad hoc private sector, non-governmental organisation (NGO) or village society arrangements taking on new responsibilities. In some cases, particularly in the coffee sector, these new institutions have had limited success, although underlying village dynamics appear intrinsic to locating those most able to benefit from new institutional structures. Both the cotton and coffee sector in Tanzania have suffered greatly from a lack of coherent structures that ensure the effective and widespread delivery of information on prices, research and extension services (assistance) to producers. Furthermore, frameworks

for accessing inputs and for delivering output to market are also lacking, leading to unequal outcomes in terms of market access within Tanzania.<sup>11</sup>

#### D. Exchange rate policy and macroeconomic management: the case of Zambia

This study examines the complexities of the macroeconomic management in commodity dependent countries whose balance of payments and fiscal budget move pro-cyclically to the commodity price cycle. As highlighted by the 'resource curse' literature,<sup>12</sup> cyclical balance of payments and budget deficits complicate macroeconomic and investment planning. Moreover, as explicated by the 'Dutch disease' literature,<sup>13</sup> the positive prospects envisaged by a commodity boom may easily be reverted by an exchange rate appreciation which negatively impacts on the country's external competitiveness. These are some of the factors that explain the tight connection between commodity dependence and underdevelopment, often defined by the concept of 'commodity trap' or 'resource curse'. Historical evidence demonstrates that to overcome the 'curse', i.e. to promote a long and sustainable development process based on export diversification, macroeconomic management plays an overriding role.<sup>14</sup>

In the light of the Zambian experience in the management of the current copper boom this study tries to identify what are the key

11 H. Bargawi, 'Tanzania's Agricultural Institutions in Flux: Lessons from Coffee and Cotton Producing Villages' (2008) NCCR Trade Regulation Working Paper No. 2008/14.

12 P. Collier, 'Managing Commodity Booms: Lessons of International Experience' (2007) CSAE Working Paper, Department of Economics, University of Oxford; R. Auty (ed.), *Resource Abundance and Economic Development* (Oxford University Press, 2001); J. Sachs and A. Warner, 'Natural Resource Abundance and Economic Growth' (1997) CID Working Paper, Harvard University.

13 M. Corden, 'Booming Sector and Dutch Disease Economics: Survey and Consolidation' (1984) 36 *Oxford Economic Papers* 359–380; M. Corden and P. Neary, 'Booming Sector and De-Industrialisation in a Small Open Economy' (1982) 92 *The Economic Journal* 825–848; S. Van Wijnbergen, 'The "Dutch Disease": A Disease After All?' (1984) 94 *The Economic Journal* 41–55.

14 P. Collier, 'Primary Commodity Dependence and Africa's Future' (1992) *mimeo World Bank*; P. Collier and J. Willem Gunning, 'Trade Shocks: Theory and Evidence', in P. Collier and J. Willem Gunning (eds.), *Trade Shocks in Developing Countries* (Oxford University Press, 1999); D. Bevan and P. Collier, 'Anatomy of a Temporary Trade Shock: The Kenyan Coffee Boom of 1976–79', in P. Collier and J. Willem Gunning (eds.), *Trade Shocks in Developing Countries* (Oxford University Press, 1999).

elements and the necessary economic conditions for a successful macro-economic management. We formulate a framework for the analysis of fiscal, monetary and exchange rate policies, which assesses the actual capacity of governments to respond to terms of trade shocks and identifies countries' degree of vulnerability. Our research has three components. The first part examines the implications of mine ownership on the extent of fiscal and exchange rate policy, looking at and comparing the management of the recent copper boom in Chile and Zambia. The second part assesses the suitability of a flexible exchange rate regime with inflation-stabilising monetary frameworks for commodity dependent countries. The third part explores alternative exchange rate arrangements and puts forward a proposal for a commodity currency, an arrangement for commodity dependent countries applied to the Zambian economy.

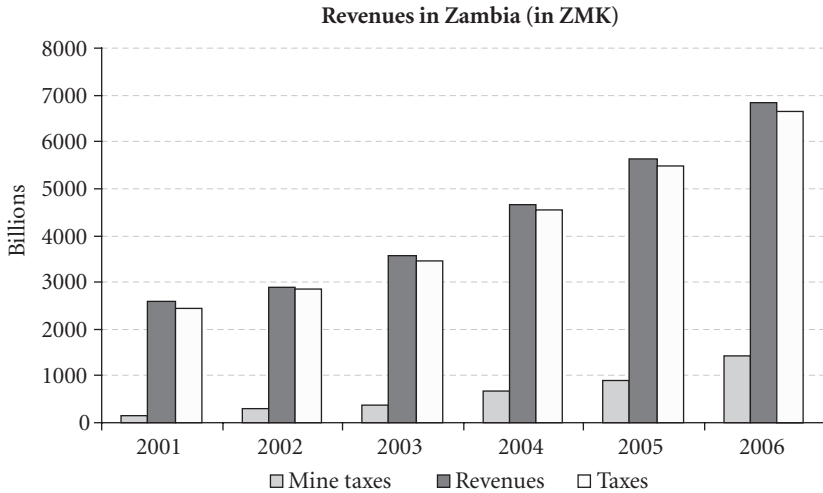
### *I. Relevance of mine ownership*<sup>15</sup>

Evidence from Zambia and Chile in managing the current copper boom highlights the role played by the ownership structure and taxation regime of the commodity industry. In Chile, the state-owned enterprise Codelco owns almost 40 per cent of the total assets of the mines while the remaining 60 per cent is owned by transnational corporations. In Zambia, the sector went through an almost complete privatisation and is now fully controlled and managed by transnational corporations, which benefited from minimal royalties and large tax exemptions and deductions until 2008.<sup>16</sup> As far as fiscal policy is concerned, such ownership structures meant large inflow of revenues to the Chilean budget and negligible inflow to the Zambian government (Figures 12.3, 12.4, 12.5, 12.6). The surge in revenues in Chile has been saved in accounts held abroad with the possibility to access part of these funds every five years.

When the government gets the inflow of export receipts, spending may be more easily phased out and postponed to periods when the country

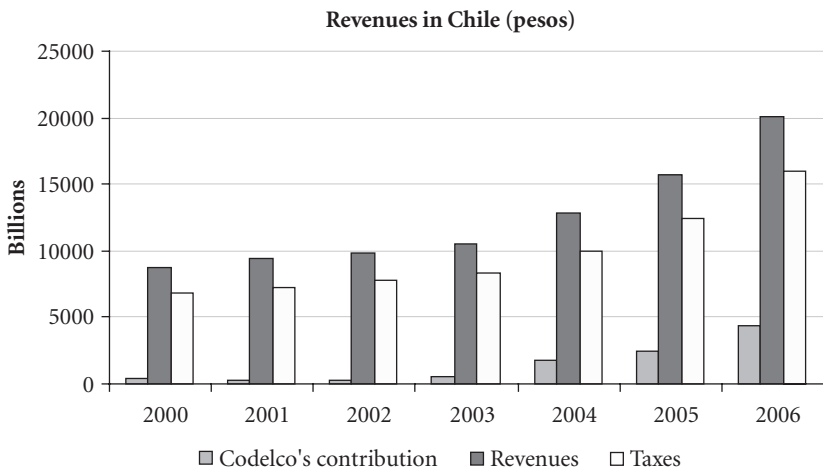
15 Due to space limits, the comparison between the implications of mine ownership in Chile and Zambia presented in this section abstracts from important qualifications made in relation to these countries' very different levels of economic development, governance and accountability. For a fuller discussion, the reader is referred to E. Bova, 'The Implications of Mine Ownership for the Management of the Boom: A Comparative Analysis of Zambia and Chile' (2009) NCCR Trade Regulation Working Paper No. 2009/13.

16 A. Fraser and J. Lungu, 'For Whom the Windfalls: Winners and Losers in the Privatisation of Zambia's Copper Mines' (2007) [www.minewatchzambia.com](http://www.minewatchzambia.com). J. Craig, 'Putting Privatisation into Practice: The Case of Zambia Consolidated Copper Mines Limited' (2001) 39(2) *Journal of Modern African Studies* 389–410.



**Figure 12.3** Revenues, general taxes and mine taxes in Zambia

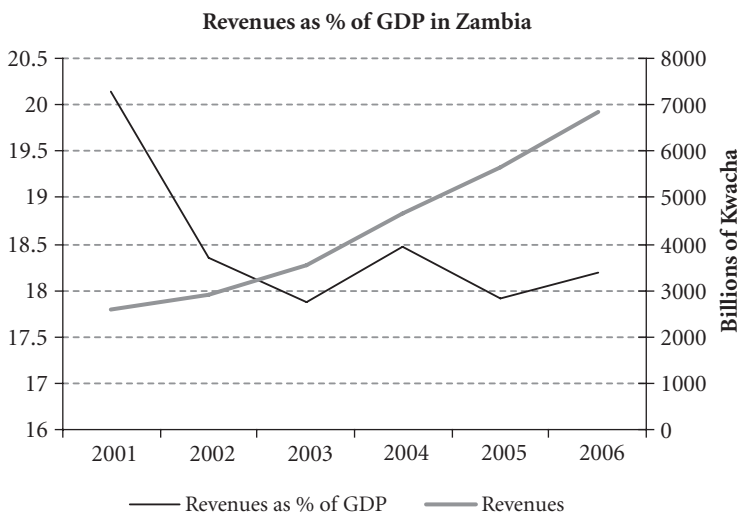
Sources: The World Bank, World Development Indicators and Zambian Revenue Authority.



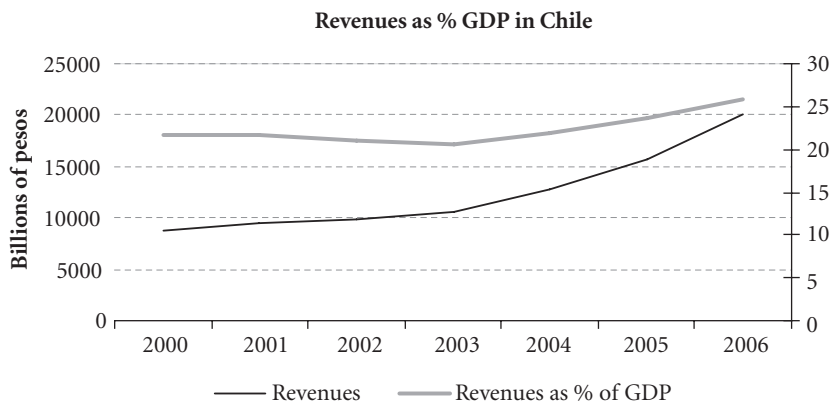
**Figure 12.4** Revenues, general taxes and mine taxes in Chile

Sources: The World Bank and World Development Indicators.

is more able to absorb new investments. This allows avoiding low-return investments, which were common in the first commodity boom during the 1970s and 1980s when countries were caught by a spending euphoria so that their economies became heavily indebted even before the boom



**Figure 12.5** Total revenues and revenues as % of GDP in Zambia  
 Sources: The World Bank, World Development Indicators.

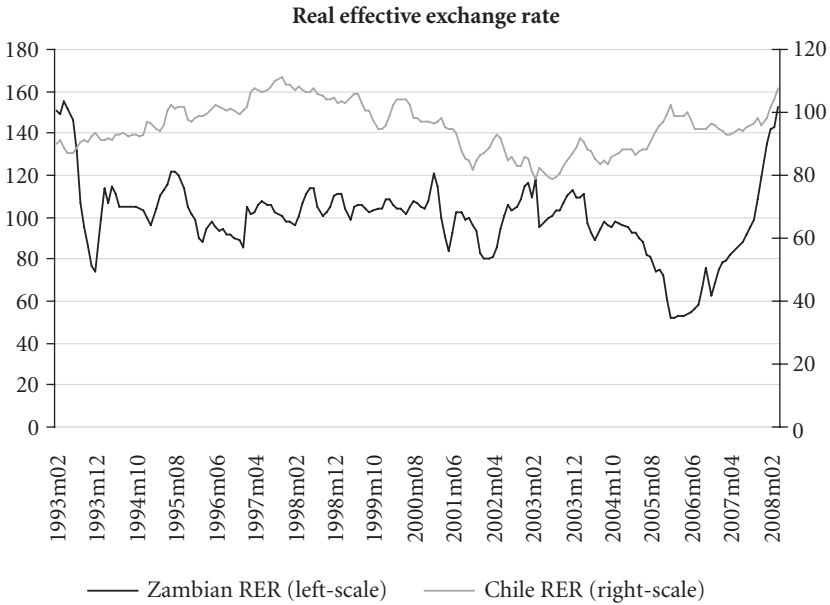


**Figure 12.6** Total revenues and revenues as % of GDP in Chile  
 Sources: The World Bank, World Development Indicators.

was over.<sup>17</sup> Furthermore, saving avoids incurring into a real exchange rate appreciation that may result from an increase in spending. In Zambia, the inflow of foreign exchange has been spent by the domestic market whose propensity and possibility to save are smaller and this has determined a real

17 A. Hewitt, *Economic Crisis in Developing Countries: New Perspectives on Commodities, Trade and Finance* (London: Pinter Publishers, 1993), pp. 56–78.





**Figure 12.7** Real exchange rates in Zambia and Chile

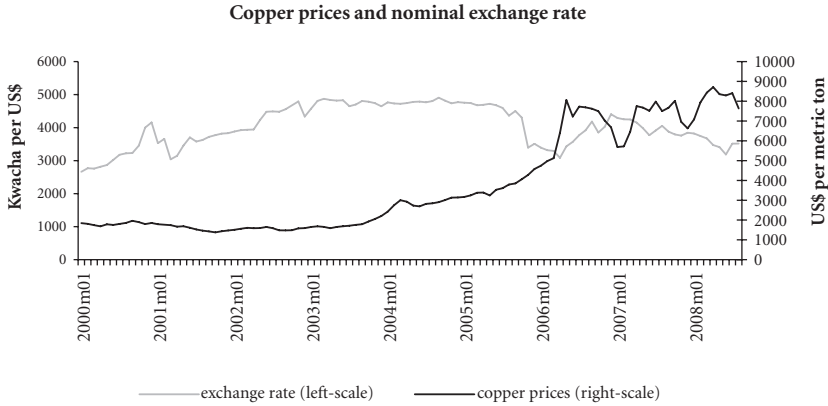
Sources: International Monetary Fund, International Financial Statistics.

exchange rate appreciation (Figure 12.7) which has negatively impacted on the non-traditional exports.

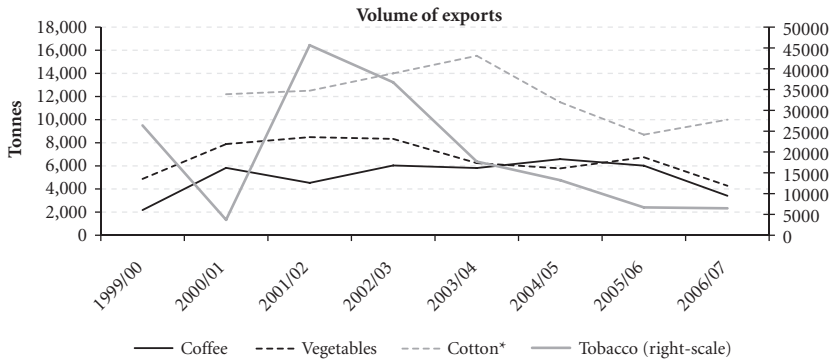
All in all, public mine ownership may expand the possibilities of macroeconomic management, notably fiscal and monetary responses to commodity shocks and this refers not only to direct ownership as such but also to the taxation regime, often negotiated in conditions of low prices with very little bargaining power on the side of the government.

## *II. Exchange rate management*

The second part of the research explores the implications of different kinds of exchange rate regimes in the context of commodity dependence and shows how exchange rate management can be a useful tool to offset commodity shocks and enhance sustainable development through export diversification. An analysis of the exchange rate management of the Zambian copper boom illustrates how floating regimes may determine exchange rate appreciations which are harmful for export competitiveness. In Zambia the increase in the export receipts has determined a sharp



**Figure 12.8** Exchange rate appreciation and copper prices in Zambia  
*Sources:* International Monetary Fund, International Financial Statistics, and Bank of Zambia, Zambia Export Growers Association.



**Figure 12.9** Non-traditional export performance in Zambia  
*Note:* the value for cotton has been multiplied by ten. *Sources:* International Monetary Fund, International Financial Statistics, and Bank of Zambia, Zambia Export Growers Association.

appreciation of the Kwacha and this, in turn, determined a contraction of some key non-traditional exports (Figures 12.8 and 12.9).

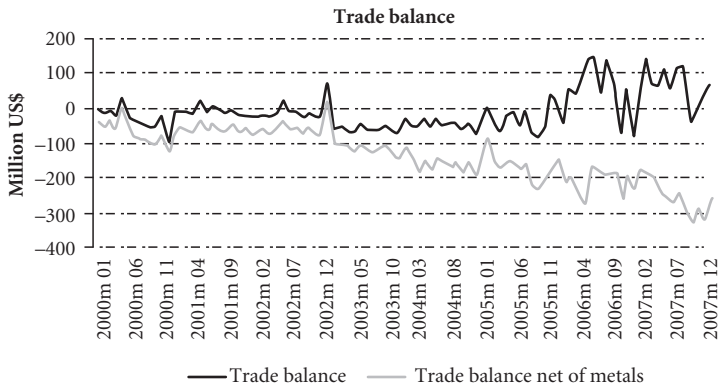
Applying vector autoregression (VAR) we find that the risk of an increase in inflation which usually results from a more managed exchange rate is relatively low in Zambia, as in most developing countries, where domestic prices are heavily dominated by food prices which depend more on supply than demand conditions. However, due to a high imported

component in the *Zambian Consumer Price Index (CPI)* – mainly imported food, oil and fertilisers – exchange rate management may impact on the economy via devaluations which increase the prices of imported goods. This complicates monetary policy since, to avoid an appreciation, prices of food and fertilisers<sup>18</sup> may actually increase with serious implications for poverty reduction and for the profitability of other export sectors, like agriculture. This kind of import dependence limits the extent of macro management and highlights an additional element of developing countries' vulnerability.

### III. Commodity currency

Further to Frankel's 2002 proposal<sup>19</sup> on a commodity currency this part of our research examines different arrangements for commodity countries and then formulates an exchange rate mechanism which takes into account both the interest of maintaining competitive exports and the concern for high inflation. Through macro simulations applied to the *Zambian economy* we assess the impact of an arrangement that is counter-cyclical to movements in the main commodity price but at the same time pro-cyclical to shifts in the terms of trade net of the copper exports (Figure 12.10).

The arrangement will then de-link the economy from the copper price cycle and at the same time promote non-traditional exports, which are the



**Figure 12.10** Trade balance and trade balance net of metal exports in Zambia

Source: Bank of Zambia.

18 Although oil prices are a large component of CPI, they are set by the government and thus are not too sensitive to changes in the exchange rate.

19 J. Frankel, 'Should Gold Exporters Peg their Currency to Gold?' (2002) World Gold Council, Research Study No. 29.

stepping stone for the diversification process. Given the large imported food component, the mechanism has a lower bound for the domestic currency set so as to avoid excessive increases in the CPI through exchange rate devaluations.

#### *IV. Towards a sustainable macroeconomic framework*

In the context of mineral-based economies a sustainable macroeconomic framework is one that will de-link the economy from the commodity price cycle, so as to avoid pro-cyclicality in the balance of payments and fiscal budget, and that will promote export diversification, avoiding excessive fluctuations in the exchange rate. From the analysis of the Zambian management of the copper boom in comparison with Chile, this research identifies the following elements for a sound macroeconomic system. First is the extent of fiscal policy space, which is essentially related to how the commodity industry is managed and controlled. The reason for this is that with a large share of public ownership and high taxation of the mines a commodity boom will increase government revenues. Assuming sound public governance, when mine revenues accrue to the public sector rather than to private companies, these could be more effectively used in a way to spur long-term investment and to avoid real appreciation which may be harmful for non-traditional exports. A second key element is the exchange rate regime and, precisely, its degree of flexibility, since this regulates central banks' intervention and sets how successfully central banks can achieve a real target, i.e. export competitiveness, but also a nominal target, i.e. price stability, which are key for the long-term development of the economy. The study indicates that highly flexible arrangements with the sole objective of price stability may indeed maintain the pro-cyclicality of the economy, while a more managed float will be more appropriate in promoting export diversification and setting specific patterns of trade.

#### **E. Commodity price volatility, trade shocks, and compensatory finance**

This section outlines our work on a proposal for a contingency aid framework, compensating LICs for external shocks affecting their trade balance. In view of the difficulties LICs experience in macro-managing their economies in the face of commodity price volatility and external shocks to the balance of payments more generally, compensatory finance has – under certain conditions and within a limited time horizon of application – the potential to circumvent the negative effects of

macroeconomic vulnerability on these countries' long-run growth and development performance.

Our work on compensatory finance followed a three-pronged approach: (1) an empirical assessment of the role of economic vulnerability in explaining debt distress episodes; (2) the definition of an accounting method to identify and measure the impact of exogenous shocks, and the proposal of a so-called contingency debt sustainability framework to adjust the amount, timing and grant element of aid flows in compensation of qualifying shocks; (3) the simulation of the proposed framework to the case of Uganda. What follows is a brief overview of the findings described in the three articles arising out of this research component.

#### BOX 12.3 LOW-INCOME COUNTRIES AND THE FOCUS ON AID

Our work on compensatory finance has mainly evolved within the field of foreign financial aid and debt sustainability, as a reflection of the crucial importance of official aid has had in financing LICs' persistent current account and fiscal deficits. Unfortunately, in the case of most recipient countries over the last three decades, aid has proven largely ineffective in promoting economic development and repayment capacity. The occurrence of debt distress, which is essentially a borrowing country's incapacity to service its debts, became the normal state for LICs and the donor community to find themselves in. The relationships between sovereign borrowers and lenders, like those concerning the donor community within itself, became increasingly complex. Lending policy experienced important shifts over time, from defensive roll-over lending, to Paris Club rescheduling and relief operations, to the multilateral debt relief initiatives of the late 1990s and early 2000s. Along came a progressive change in the scope and depth of the strings attached to official aid, constraining the set of policy options open to borrowing nations. The liberalisation of trade and capital accounts, and sweeping privatisation across economic sectors were part of the donors' standard prescription package, both bilaterally and multilaterally.

To the extent that LICs' policy and development has been shaped by their dependence on official aid, any question of coherence of international policy pertains to the realm of aid as much as it does to WTO. One aspect of coherence has been addressed with the emerging 'aid for trade' debate, recognising the role for aid in targeting specific bottlenecks impeding LICs' exploitation of market access opportunities. Another aspect concerns the role of contingency finance as a new instrument of targeted aid. Few would contest the evidence that volatility of commodity prices and the occurrence of trade shocks constitute a major causal factor underlying LICs' economic vulnerability and their incapacity to reap the full benefits from trade. Our work on contingency finance addresses the potential for a multilateral solution in this regard.

### I. Policy, vulnerability, and the new debt sustainability framework<sup>20</sup>

We investigate the factors undermining low-income countries' sustainability of external debt and of the balance of payments more broadly.<sup>21</sup> We assess the findings of the two studies constituting the empirical foundation of the lending and debt sustainability assessment framework currently adopted by the International Development Association (IDA) and the IMF<sup>22</sup> for their lending policies toward low-income countries.<sup>23</sup> Applying probabilistic analysis across a panel of low-income countries, we find that economic vulnerability indicators<sup>24</sup> are reliable predictors of debt distress episodes, while policy and governance indicators are generally not.<sup>25</sup> The empirical investigation casts doubts on the benefits from relying on the World Bank Country Policy and Institutional Assessment (CPIA) as a guiding principle for multilateral aid. Instead, it finds support in what appears to be an emerging consensus, namely that the effectiveness of foreign aid is increased when it is guided by concerns about poor countries' economic vulnerability, and particularly when it is disbursed in timely response to the price and trade shocks these countries experience.

### II. Proposal for a contingency debt sustainability framework<sup>26</sup>

In an attempt to redress these shortcomings of IDA aid allocation, we outline the basic features of a proposal for a Contingency Debt Sustainability

20 B. Ferrarini, 'Policy, Vulnerability and the New Debt Sustainability Framework' (2009) 21(7) *Journal of International Development* 895–914.

21 A. Kraay and V. Nehru, 'When is External Debt Sustainable?', World Bank Policy Research Working Paper WP3200 (World Bank, Washington, DC, 2004).

22 IMF and IDA, 'Debt Sustainability in Low-Income Countries – Proposal for an Operational Framework and Policy Implications' (International Development Association and International Monetary Fund, 2004) [www.imf.org/external/np/pdr/sustain/2004/020304.pdf](http://www.imf.org/external/np/pdr/sustain/2004/020304.pdf), 3 February 2004.

23 These policies are enshrined in the New Debt Sustainability Framework, as well as the 14th replenishment of the International Development Association: IDA, 'Additions to IDA Resources: Fourteenth Replenishment Report from the Executive Directors of the International Development Association to the Board of Governors' (International Development Association, 2005), [http://siteresources.worldbank.org/IDA/Resources/14th\\_Replenishment\\_Final.pdf](http://siteresources.worldbank.org/IDA/Resources/14th_Replenishment_Final.pdf)

24 For further information about the United Nations Economic Vulnerability Index, see United Nations Environment Programme (UNEP): [www.vulnerabilityindex.net/](http://www.vulnerabilityindex.net/)

25 B. Ferrarini, above note 20.

26 B. Ferrarini, 'Proposal for a Contingency Debt Sustainability Framework', (2008) 36(12) *World Development* 2547–2565.

Framework (CDSF).<sup>27</sup> The core analytical component of the framework is an accounting mechanism based on counterfactuals, suitable to identify and measure the impact of exogenous disturbances on LICs' balance of payments (BOP).

With the exception of well-defined shocks, such as sharp fluctuations in world market prices of traded commodities, it is typically not possible to clearly identify, ex-post, the exogenous nature of factors determining a country's BOP. To overcome this indeterminacy, the author builds on an accounting method introduced by Bela Balassa,<sup>28</sup> to specify trend deviations and hypothetical BOP flows that would have prevailed in the absence of certain events. The formal derivation of the method is described in the articles presenting the full results.<sup>29</sup> For the purpose of this discussion, it should suffice to note that the accounting mechanism provides the evidential basis for the CDSF to distinguish factors influencing an LIC's BOP sustainability under the control of country authorities from those which are not, and to compensate a country accordingly, through adjustments to the amount, timing and type of official aid disbursements. Figure 12.11 outlines the basic intuition and the financial instruments underlying the contingency framework.

With reference to some period of assessment ( $t$ ),<sup>30</sup> compensation for the liquidity and debt stock implications of qualifying events occurs essentially through two financial instruments: a contingent credit line, to compensate for the direct liquidity effects of exogenous shocks through timely adjustments of aid flows, and an automatic debt relief facility, to lower the external debt burden in light of unfavourable trend effects. Jointly, the credit line and the relief facility operate in function of an underlying, state-contingent, debt contract, which defines the policy conditions (conditionality) multilateral lenders attach to the loans.<sup>31</sup>

27 Of course, the major emphasis of any such analysis has to ensure that such an insurance scheme is incentive compatible, in order to minimise the moral hazard (and adverse selection) implications it has with regard to the actions (and the type) of debtor countries involved. For an exposition of the key issues involved, the interested reader is referred to Ferrarini, above note 26.

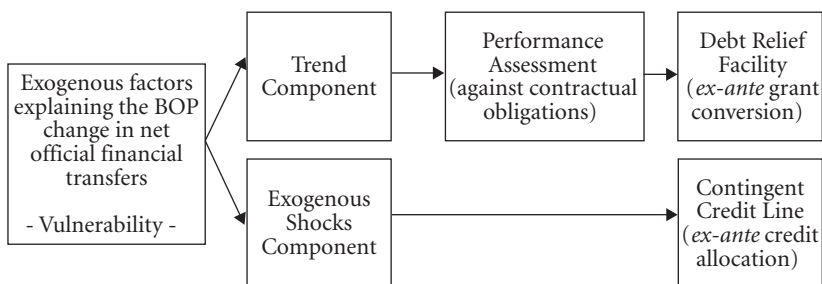
28 B. Balassa, 'Structural Adjustment Policies in Developing Economies' (1982) 10(1) *World Development* 23–38.

29 Ferrarini, above note 26, and B. Ferrarini, 'Compensatory Aid and Debt Relief: A Case Study of Uganda' (2009) 45(7) *Journal of Development Studies* 1134–1149.

30 The length of the reference period is determined by the minimum amount of time necessary for the verification of the occurrence and implications of exogenous shocks.

31 Optimally, such policy conditionality would be the outcome of a process of negotiation between the parties to the contract, and involve the stakeholders and civil society of the recipient country.

Contingent Assessment and Compensation (in relation to period  $t$ )



**Figure 12.11** The Contingency Debt Sustainability Framework (core elements)  
*Sources:* B. Ferrarini, ‘Proposal for a Contingency Debt Sustainability Framework’ (2008) 36(12) *World Development*.

Operating as a buffer against liquidity excesses or shortages, contingency credit involves the automatic disbursement – or amortisation,<sup>32</sup> for the case of positive shocks – of interest-free top-up funds in proportion to the net magnitude and sign of qualifying events. To avert the long-term repercussions of liquidity shocks, such disbursements occur automatically at the end of each period of assessment ( $t$ ). Shocks are modelled as random realisations around trends, hence mean-reverting with no particular justification for the contingency mechanism to disburse grants, instead of operating as an unconditioned and fully concessional credit line.

By contrast, trend effects are only in part exogenous to LIC, since their internalisation in policy enactments influence macroeconomic resilience – and outcomes more generally – over time. To circumvent the intrinsic identification problem arising from trend effects’ endogeneity, the contingency framework validates any such measures according to their conformity with donor conditionality. To the extent that a recipient country’s compliance with policy obligations is ascertained, it qualifies for the automatic grant-conversion of official credit flows in proportion to the net amount of BOP effects.<sup>33</sup>

32 Amortisation refers to the repayment of outstanding debt. An acceleration of amortisation amounts to a detraction of excess liquidity from the debtor country.

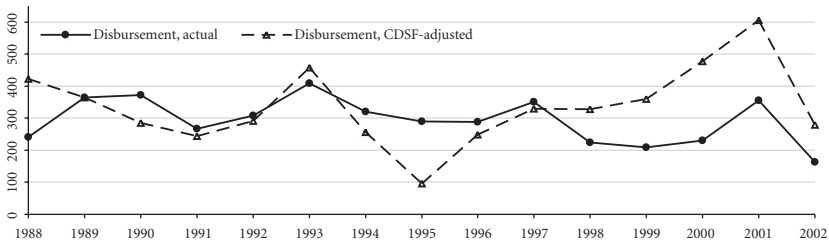
33 The conversion of loans in grants is equivalent to providing debt relief to the debtor country.



### III. A case study of Uganda<sup>34</sup>

As a final step of analysis, we simulate the implications of the contingency framework for the case of Uganda during the period 1988–2002. The CDSF accounting method is applied to extrapolate, ex post, the shock and trend effects experienced by Uganda. Accordingly, official loans and external debt stocks are adjusted by application of the credit and debt relief facilities, as outlined above.

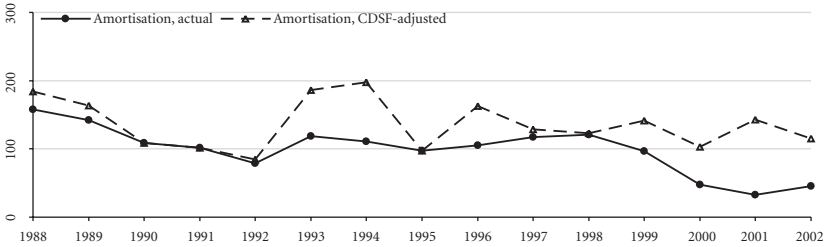
A comparison between the liquidity and debt stock implications of the CDSF and the outcome of the Paris Club and heavily indebted poor countries (HIPC) debt relief initiatives that actually involved the country during the period of analysis reveals that the contingency framework would have been highly effective in countering the severe disturbances to the country's trade balance, with beneficial debt stock effects. Indeed, Figures 12.12 and 12.13 display sharp liquidity corrections in loan disbursements and amortisations of existing debt over the entire period of analysis. For example, during years of extreme price fluctuations marked by the coffee price peak around 1995 – or during its dip, later in 2001 – the credit line would have detracted or added up to US\$ 200 million of loan disbursements to Uganda per year (Figure 12.12). Against the background of Uganda's close adherence to policy conditionality, additional benefits would have accrued to the country in the form of compensatory debt amortisations in the face of negative trend factors observed (Figure 12.13). As a result, the total external debt stock is



**Figure 12.12** Contingent Credit Line – CDSF simulation: Uganda, 1988–2002, million US\$

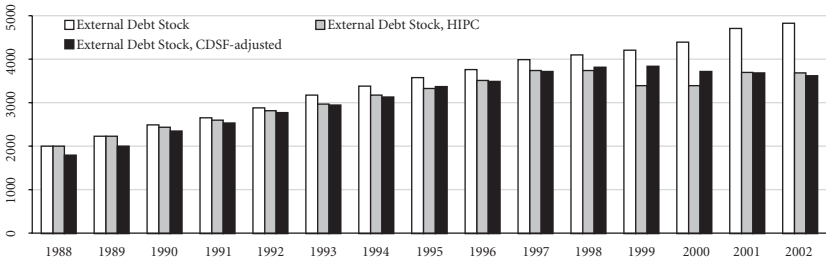
Sources: adapted from B. Ferrarini, 'Proposal for a Contingency Debt Sustainability Framework' (2008) 36(12) *World Development*, Graph 2 and B. Ferrarini, 'Compensatory Aid and Debt Relief – A Case Study of Uganda' (2009) 45(7) *Journal of Development Studies*, Figure 3.

<sup>34</sup> Ferrarini, 'Compensatory Aid and Debt Relief: A Case Study of Uganda', above note 29.



**Figure 12.13** Debt Relief Mechanism – CDSF simulation: Uganda, 1988–2002, million US\$

Sources: adapted from B. Ferrarini, ‘Proposal for a Contingency Debt Sustainability Framework’ (2008) 36(12) *World Development*, Graph 2 and B. Ferrarini, ‘Compensatory Aid and Debt Relief – A Case Study of Uganda’ (2009) 45(7) *Journal of Development Studies*, Figure 3.



**Figure 12.14** Debt Stock Reduction – CDSF simulation: Uganda, 1988–2002, million US\$

Sources: adapted from B. Ferrarini, ‘Proposal for a Contingency Debt Sustainability Framework’ (2008) 36(12) *World Development*, Graph 2 and B. Ferrarini, ‘Compensatory Aid and Debt Relief – A Case Study of Uganda’ (2009) 45(7) *Journal of Development Studies*, Figure 3.

simulated to shrink at a level comparable to that associated with the Paris Club and HIPC debt relief initiatives (Figure 12.14). Without these ad hoc relief operations providing any of the insurance benefits associated with the contingency framework, their overall transfer costs of US\$ 1,161 million are shown to be of similar magnitude to those associated with the CDSF, estimated at US\$ 1,216 million.<sup>35</sup>

35 *Ibid.*

## F. Concluding remarks

The research pursued within this NCCR project highlights the need for greater recognition of the difficulties price volatility poses for LICs' macroeconomic management and of the institutional gaps in these countries' domestic markets. The main policy implication is the importance of concerted efforts at the multilateral level towards targeted development assistance for LICs to overcome excessive vulnerability to commodity price fluctuations. This would require greater consistency between the current focus of the 'aid for trade' initiative and the broader question about the effectiveness of aid programmes involving the international financial institutions and the donor community more generally.

Our work on international coffee markets and local marketing structures in African countries highlights the fact that the current policy agenda of the WTO has not taken into account the specificities characterising today's international commodity markets. In order for the world trading system to engender development through export it is crucial for it to take into account the way in which commodity exporting developing countries are integrated into the world economic system, not just through direct trade relationships but also in terms of the way in which developing country actors are related to the international financial system through the international commodity exchanges. The negotiations around aid for trade in the current Doha round provide a possible opportunity for supporting stable export earnings for developing countries. However, this should not simply be in terms of providing technical assistance to enhance the access of developing country actors to hedging instruments on the international commodity exchanges, as has been promoted by the World Bank's Commodity Task Force, owing to the instabilities that originate from the futures exchanges themselves. Under the existing institutional framework at the international level, there is a need for cooperation between the regulators of international commodity exchanges and the International Financial Institutions in tackling the problems associated with market distortions that arise from financial investment on commodity exchanges. Otherwise, any technical assistance aimed at improving the risk management strategies for developing country actors will be futile and can exacerbate income inequalities already present along commodity chains.

Our study of the effects of volatile commodity prices on producers shows that the current policy agenda on agriculture and rural development in Tanzania and other LDCs has often failed to recognise the centrality of coherence in rural institutional structures and instead

focused on price transmission and market integration alone.<sup>36</sup> It is evident from our work that these will not be sufficient for bringing about the desired agricultural supply response in the Tanzanian context and in other LDCs. The WTO and other international bodies therefore need to work together to reconsider the institutional problems of commodity producing LDCs as central to the commodity question and beyond. Again, we see scope for the WTO's delivery of technical assistance and new aid for trade modalities, as an opportunity for the WTO to act alongside other development organisations to confront the institutional weaknesses in LDC commodity markets. In order for LDCs such as Tanzania to truly take advantage of the international trading system, the institutional structures surrounding the provision of information, inputs, extension services and marketing in agricultural commodity markets will need strengthening. Recognition of these institutional gaps in domestic markets can act as an important area in which the WTO can create policy coherence with other development organisations and ensure that its trade-related capacity building and technical assistance is consistent with programmes and objectives of other international bodies, such as the World Bank, the IMF and the United Nations agencies.

Finally, we see scope for the establishment of a contingency financing mechanism, as a temporary element of international assistance against the effects of price shocks, complementing the long-run objectives of improving LICs' resilience to shocks through technical assistance and capacity building. The key implication of our work is that international development assistance, including aid for trade, will only be effective if supported by a major multilateral effort devoted to the provision of compensatory finance. A coherent approach to multilateral policy towards LICs requires a concerted effort by WTO Members, also in relation to their role as members of the international donor community.

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