Market structure and coherence of international cooperation: the case of the dairy sector in Malawi

Cesar Revoredo-Giha
SRUC-Food Marketing Research

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1. Introduction

- This presentation derives from a literature review carried out at the beginning of the ESRC/DFID project “Assessing the Contribution of the Dairy Sector to Economic Growth and Food Security in Malawi” (2012-2015).
- It is motivated by three facts:
  1. The Malawi Government considers dairy production a priority within the livestock sector.
  2. Supply chains in disarray have been identified in the economic literature as a barrier to growth for the agricultural sector (e.g., Gorton and White, 2007) .
  3. Also they can be a constraint to the achievement of food security in a country because less than the optimal amount will be produced with a given level of resources and at higher prices.

1. Introduction

- Reasons behind the malfunctioning of supply chains are various and they can be path dependent, some examples:
  - As in the case of industries born from **import substitution experiences.**
  - As the **result from structural reforms,** e.g., the case of the transition economies (e.g., Gow and Swinnen, 1998; Gorton et al, 2006).
- Because of this supply chains can be plagued with:
  - Problems of **inefficiency**,
  - High **transaction costs**,
  - **Unbalanced power distribution along the chain**.
  - Poor product **quality**.

1. Introduction

- In that context, cooperation from international donors can help improve the situation of the aforementioned supply chains through a number of ways:
  - Identification of problems (e.g., value chain analyses),
  - knowledge transfer that brings innovation.
  - the provision of credit for different supply chain stakeholders.

2. Purpose of the paper

- This paper aims to discuss:
  - The structure of the dairy supply chain in Malawi.
  - The work of different donors aiming to develop the dairy supply chain.
  - The coherence of the work carried by donors given the structure of the chain.
  - To extract some conclusions for future research.

- The discussion is mainly based on secondary information from available reports (in many cases online) produced for USAID, EC and other donors.

3. Evolution of the sector

- Market-oriented milk production started in Malawi as a result of an increasing demand for liquid milk in the southern region of Malawi, mostly around the major towns of Blantyre and Zomba.

- This development led a group of farmers to import high-yielding dairy cattle from South Africa and Zimbabwe.

3. Evolution of the sector

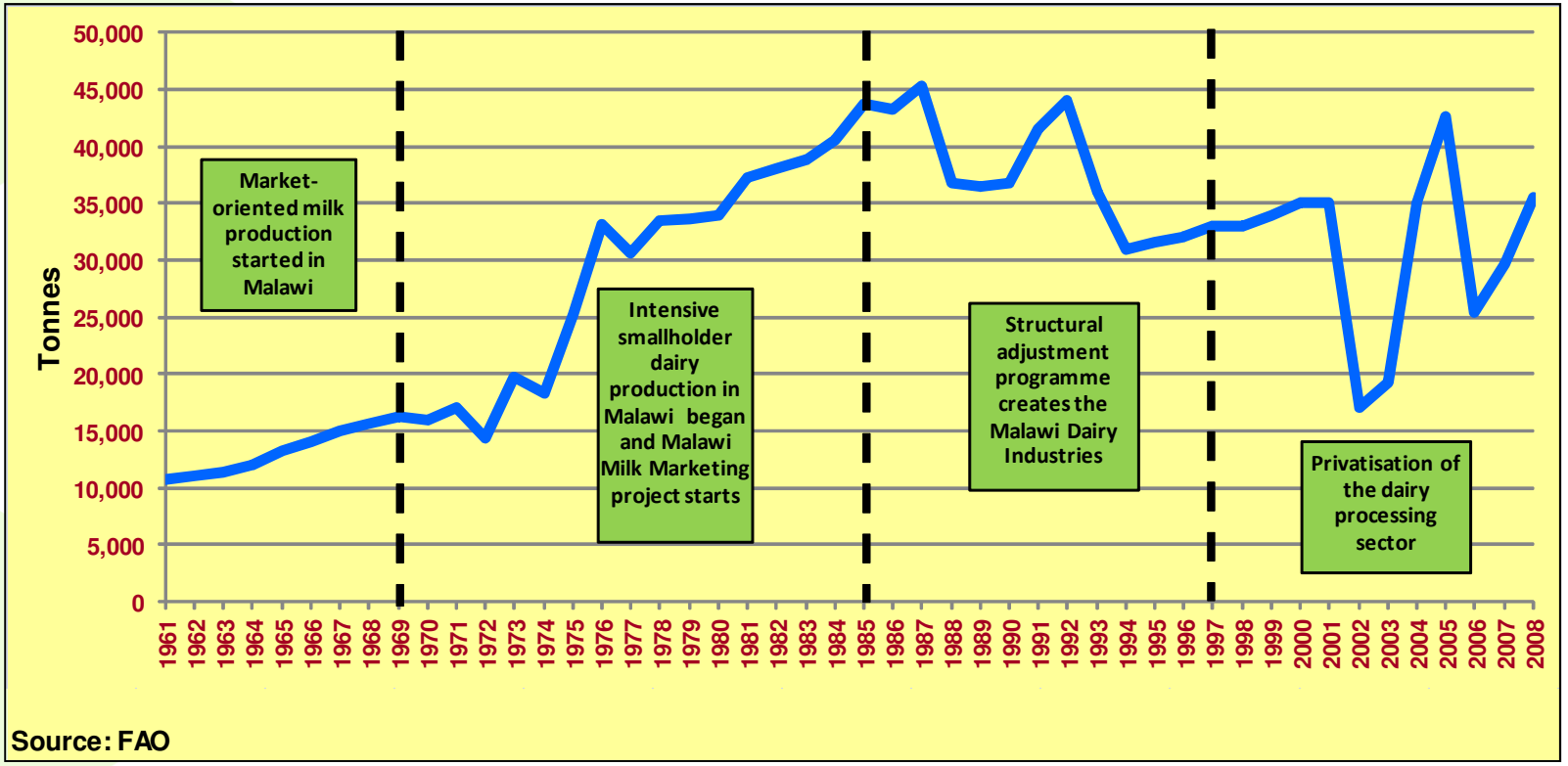
1952-54	1961	1969	1973	1974	1985	1997	1998	2001
Import of cattle for milk production	First plant to pasteurise milk	Intensive smallholder production starts Support by government and FAO Malawi Milk Marketing Project Blantyre plant starts	Lilongwe plant starts	Mzuzu plant starts	Structural adjustment programme MMMP replaced by Malawi Dairy Industries	Privatisation of MDI Creation of: Dairibord New Capital Dairy Northern Dairy Industries	Suncrest creameries USAID starts cooperation	Lilongwe Dairy

4. Stylised facts- Production

- In Malawi, dairy production is performed on both smallholder and large-scale dairy farms.
- The major differentiating features of these two dairy sub-sectors are the holding size, the genotype of cattle raised, and the level of management applied.
- The smallholder dairy sector is the largest subsector in the Malawian dairy industry, accounting for about 80% of the total produced milk.
- Distribution of milk marketed:
  - 80% in the Southern Region (e.g., Blantyre, Zomba)
  - 15% in the Central Region (e.g.,Lilongwe)
  - 5% in the North Region (e.g., Mzuzu)

4. Stylised facts- Production

Malawi: Production of milk 1961-2008



No a clear expansion trend and might be dependent on the policy implemented at the time.

4. Stylised facts - Consumption

- Relative to Africa, the consumption of milk products in Malawi is very low (lowest consumption of milk per capita in Africa).
- Imani Development Consultants estimated at 4.7 kg/capita/year compared to an Africa average of 15 kg/capita/year (CYE Consultant (2009) figures as 4 and 20 kg/capita/year, respectively).
- Fresh pasteurised milk is mostly sold to the higher and middle income groups.
- Sales and consumption of milk heavily concentrated in the urban areas.

4. Stylised facts – Informal sector

- Chitika (2008) estimated:
  - 19% of the milk produced was consumed on farm or wasted and the remaining
  - 81% marketed either to the formal sector through milk bulking groups (57%) or sold to vendors in the informal market (**23%**).

- These percentages differ from those produced by Imani Development Consultants (2004) who estimated that in 2004:
  - 6,500 tons of milk reached the formal sector (16% of total milk supply, including imports)
  - 27,000 tons or **50%** of total milk supply, including imports were destined to the informal market.

4. Stylised facts – Informal sector

- The existence of a difference in the price received by farmers in the formal and informal market is a feature of the milk market in Malawi.

- Imani Development Consultants (2004) estimated that the production cost for a litre of milk was between 14-16 MK/litre as at March 2004 for an average smallholder in the Southern Region.

- The price paid in the informal sector was around 20 MK/litre in the village when sold to institutional buyers. The base price for un-chilled milk paid by the milk bulking groups varied from 19 to 22 MK/litre.

4. Stylised facts – Processing sector

Company	Location	Production Capacity 1/ Thou. lt/day	Production Utilization 1/ Thou. lt/day	Idle capacity (%)	Main Dairy Products	Market share 2/ (%)
Dairibord	Blantyre	40	12-13	30-33	Pasteurized Milk,Flavoured Yoghurt and Chambiko	70
Suncrest	Blantyre	25	8-10	33-40	Pasteurized and Steri Milk, Drinking, Yoghurt	15
New Capital Dairy	Lilongwe	32	3-4	9-13	Pasteurized Milk,Yoghurt, Chambiko, Ice Cream	0
Lilongwe Dairies	Lilongwe	20	7	35	Pasteurized Milk, (Flavoured) Yoghurts	10
Northern Dairies	Mzuzu	9	1	11	Pasteurized Milk,Yoghurt, Ice Cream	5
Total		126	31-35	25-28		100

Source: Imani Development Consultants, 2004; CYE Consult, 2009.
Notes
1/ Information from Imani development consultants (2004) but cited as valid by CYE Consult (2009).
2/ Ceased operation. Shares around 2008.

Most of the processing sector is in the hands of 4 firms as New Capital Dairy has ceased operation (CYE Consultants, 2009)

4. Stylised facts - Donors

- The following donors are present:
  - USA (through **USAID**, United States Agency for International Development in the case of USAID this has been with the participation of the Land O'Lakes firm since 1999).
  - Japan (through **JICA**, the Japan International Cooperation Agency) and
  - Belgium (through **FICA**, the Flemish International Cooperation Agency)
- Donors have assisted the Government objectives for the sector, namely:
  - To promote dairy production (to achieve self-sufficiency)
  - To exploit export markets when surpluses arise;
  - To improve the diet of Malawians with dairy products.
  - To generate income in a competitive sector.

4. Stylised facts - Donors

- Not a detailed description of all the work that different donors are carrying out in the dairy sector in Malawi.
- In this paper we **focus on two work programmes** in the country, highlighting the different development strategies pursued by donors:
  - The first strategy can be portrayed under the tag of "**Strengthening the formal dairy sector**" (as exemplified by the USAID support through the work undertaken by Land O'Lakes)
  - The second strategy can be classified "**Development of local supply chains**" (identified with work supported in Africa by the JICA), named "one village one product" (OVOP).

5. Discussion

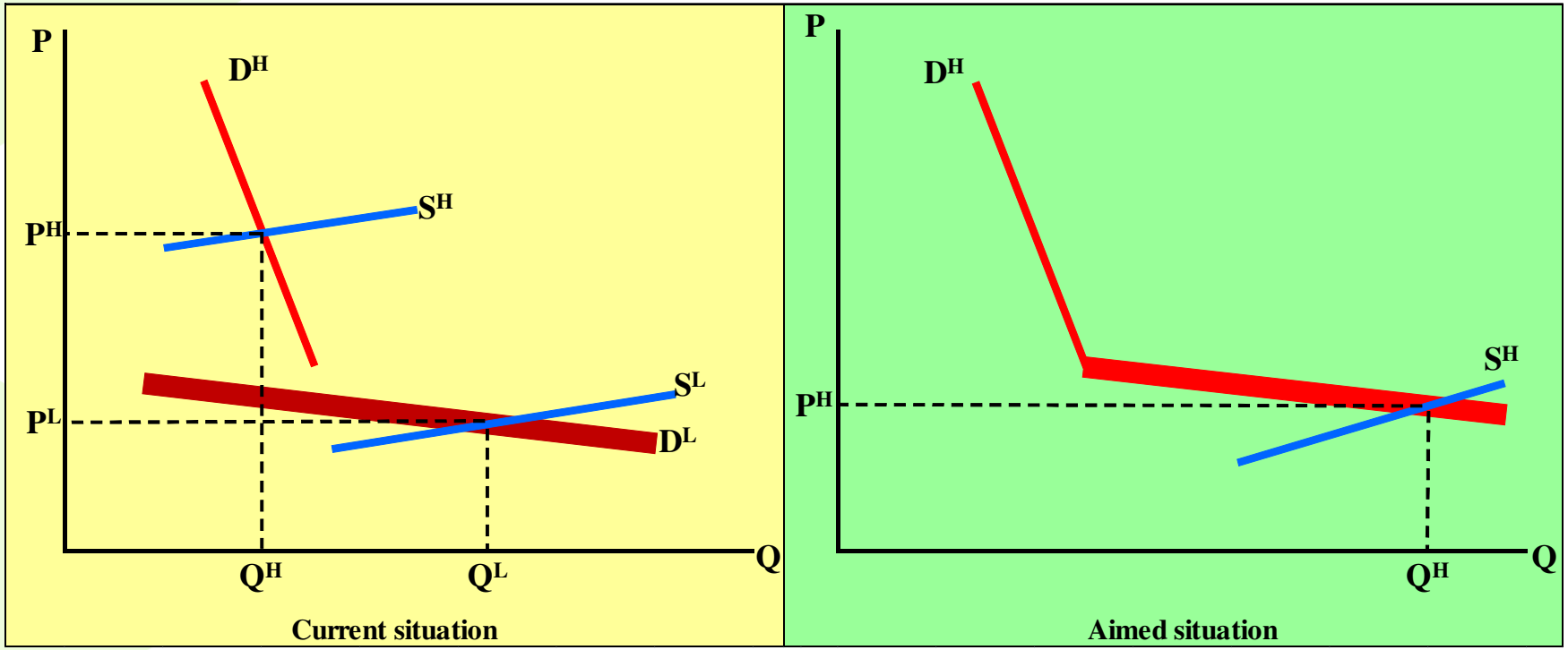
Discussion strategy:

1. To discuss why the two approaches followed by the donors are potentially in conflict.
2. To show that the choice of strategy is dependent on whether the sector is competitive.

- Note that the donors' strategies have several features in common, such as:
  - Increasing the efficiency of milk producers through micro credit,
  - Knowledge transfer,
  - Empowering producers organisation, etc.
- Therefore, we focus on those aspects that may lead to conflicts between the two approaches.

5. Discussion

Malawi dairy market: stylised current situation and target situation



The current situation has large part of the population consuming low quality milk and paying a low price. The aim is expand the market for high quality milk.

5. Discussion

- Overall the comparison between the two strategies can be seen as two different views of **what to do with an ineffective/inefficient supply chain**:

1. The strategy of strengthening the formal dairy sector followed by **USAID and others** is aiming to **revamp a supply chain that it is in disarray** and their strategy involves the entire supply chain.
2. On the other hand, **JICA's OVOP strategy** aims at **creating local supply chains** that sell processed milk directly to consumers, bypassing the formal sector.

   Furthermore, this strategy does not, to our knowledge, encompasses supply chain stakeholders beyond the producers (and of course their associations).

5. Discussion

- At the **most direct level** of comparison both strategies are actually in conflict with each other because a key feature of the formal dairy sector is the presence of significant excess capacity in processing that appears to arise because of the low supply of milk to the processing sector.

- The aim of **USAID** and the other donors' strategy is to **expand that supply of milk**, whilst **JICA's strategy** of supporting direct marketing of pasteurised milk to consumers worsens the situation by **reducing the supply of milk available to processors** and increasing their level of inefficiency

5. Discussion

- A more substantive comparison involves considering each strategy as an approach to development.
  1. The USAID and others are **betting on a formal sector that can be strengthened** to replace the unsafe informal market and satisfy an undernourished population with safe dairy products at affordable prices.
  2. JICA's strategy implies (though should noted that this is not explicitly stated) to **bypass the ineffective formal sector** to create a local supply of safe dairy products at affordable prices that can replace the informal sector.
- In our view, the right strategy depends in great measure on whether the dairy sector is a competitive one, i.e., whether the processing sector (and also maybe the retail sector) has market power.

5. Discussion

- If the **processing sector is not competitive**, then, all the work of **USAID** and others to expand the supply of milk might be wasted:
  - as producers will continue **receiving low prices** for their milk,
  - the **supply of high quality milk will still be insufficient** for the population,
  - **affluent urban consumers will continue paying high prices** for their milk and the informal market will remain.
- In this context, **JICA's strategy** might be appropriate because it will not only ensure the expansion of the supply of high quality milk but also "discipline" the non-competitive processing sector and force them to expand to compete.

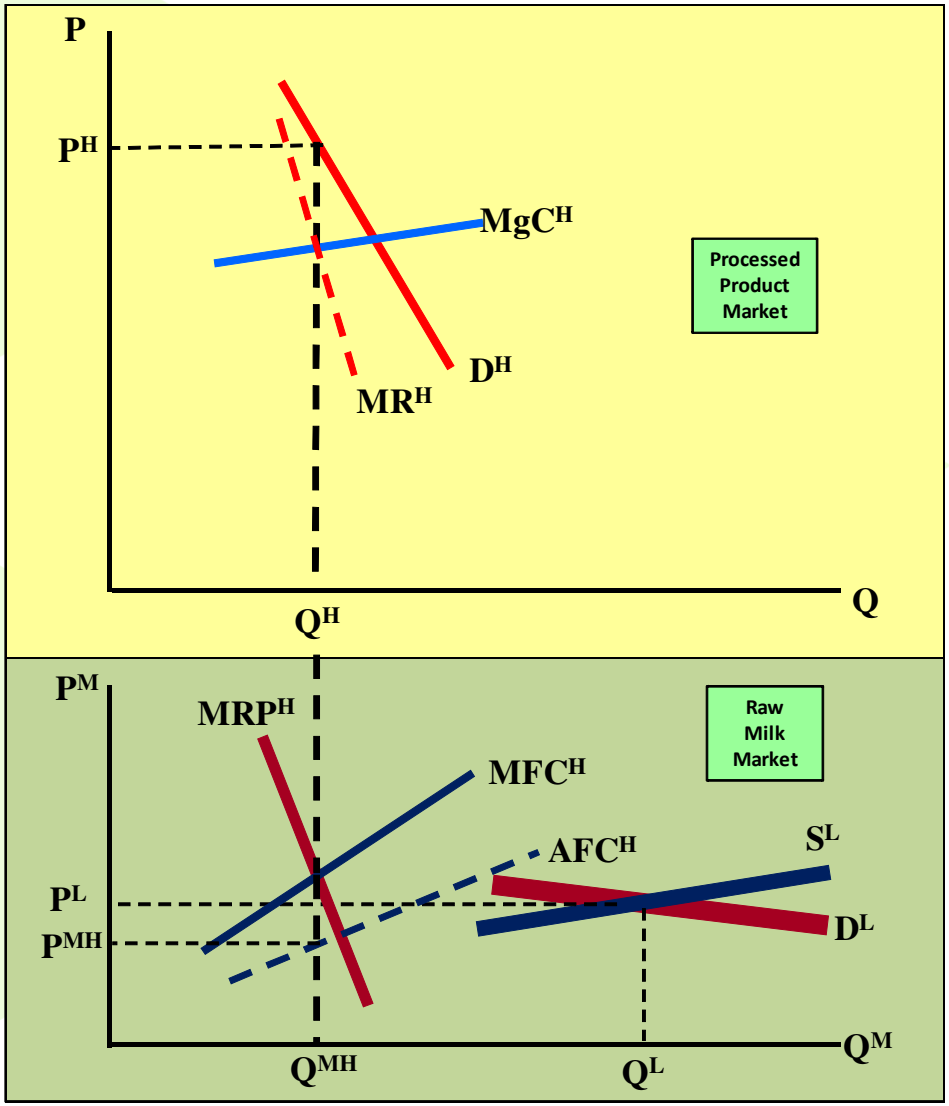
5. Discussion

- If the **processing sector is competitive but inefficient** the work of USAID and others is the optimal.

- **JICA's strategy worsens the situation** by reducing the amount of milk available to processors due to encouraging direct marketing of milk and investment should be directed at revamping the processing industry together with expanding domestic milk production **USAID strategy**.

- Note that high excess capacity increases the costs of processing plants due to their high fixed costs.

5. Discussion



- The facts from the different analysis of the Malawi dairy sector seem to point:

1. The dairy processing sector is oligopolistic and also oligopsonistic.
2. They sell expensive products to the most affluent part of the population.
3. They maintain milk prices paid to farmers low, making the informal market (low quality) attractive.
4. Imports of powder milk to be reconstituted worsens the situation of farmers and increase the power of processors.

Lerner index for processors for several competitor supply elasticities

Companies	Supply elasticity 2/					Shares
	0.8	1	1.2	1.5	2	
Dairibord	**0.87**	**0.81**	**0.76**	**0.69**	**0.60**	**70**
Suncrest	**0.12**	**0.11**	**0.09**	**0.08**	**0.07**	**15**
Lilongwe Dairies	**0.08**	**0.07**	**0.06**	**0.05**	**0.04**	**10**
Northern Dairies	**0.04**	**0.03**	**0.03**	**0.03**	**0.02**	**5**

Notes:

1/ Market demand elasticity used for the exercise was -0.564 (highest quintile in urban areas).

2/ Supply elasticity of all the competitors together.

The Lerner index indicates that Dairibord might have substantive market power and be a dominant firm.

6. Conclusions

- The purpose of this paper has been to discuss **why**, given the structure of the formal dairy sector, **cooperation strategies might be actually conflicting and ex-ante coordination of plans amongst donors would be desirable**.
- Key to the choice of the desirable strategy to follow (i.e., strengthen the formal sector or foster local supply chains) is whether the formal sector operates under perfect competition.
  - If the **sector is not perfectly competitive**, then efforts aimed at strengthening the different stages of the formal supply chain (such as improving the efficiency of farmers) might fail in the longer run due to a lack of incentives.

6. Conclusions

- The strategy of creating local dairy supply chains might be appropriate in order to "discipline" the formal sector, forcing it to expand the production of processed milk and reduce prices.
- If the **formal sector is competitive but inefficient**, the strategy of creating short dairy chains worsens the situation by further reducing the amount of milk available to processors and increasing their idle capacity and average costs.

- **Initial analysis** seems to indicate that the observed features corresponds to a case where the **processing sector has market power and at least one of the companies might be dominant**.
- Further research is needed to establish the degree of market power or/and inefficiency exist based on more up to date data, which is one of the purposes of our project.

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Thank you for you attention

Additional material

Lerner index (L) for each firm

In this paper we follow the approach by Landes and Posner (1981) of computing the L for a dominant firm. The L for a firm i is given by:

$$(1) \qquad L = \frac{(P - MgC_i)}{P} = \frac{1}{\varepsilon_i^d}$$

Where P is the output price, MgC_i is the marginal cost of the firm i and ε_i^d is the absolute value of the demand elasticity faced by firm i (i.e., elasticity of the residual demand defined as $Q_i^d = Q_m^d - Q_j^s$, where Q_m^d is the total demand and Q_j^s is the total supply of all the competitors to firm i (i.e., j firms). Differentiating the residual demand for i with respect to the prices and transforming the expression into elasticities and shares, one obtains the expression for the elasticity of the residual demand faced by firm i, which is given by (2):

$$(2) \qquad \varepsilon_i^d = \varepsilon_m^d \left(\frac{1}{S_i}\right) + \varepsilon_j^s \frac{(1 - S_i)}{S_i}$$

Where S_i is the market share of firm i defined as Q_i^d / Q_m^d, ε_m^d is the market demand elasticity and ε_j^s is the supply elasticity of firms j.