

Economic Competitiveness of the Meat Sub-sector in Morocco: The Case of Beef and Poultry¹

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Summary

The meat sub-sector is among the most important agricultural sub-sectors in Morocco. Since the middle of the 1980s, red meat and poultry underwent deep reforms, all related to trade and price liberalization. Nowadays, with the prospects of growing market liberalization in the context of multilateral (WTO) and bilateral (FTA with the US, the Association Agreement with the EU) agreements, the question of the domestic meat competitiveness is being raised more than before. The objective of this paper is to contribute to answering that question using appropriate quantitative tools. The methodology is based on the value-chain concept and uses nominal and effective coefficients along with the domestic resource coefficient (DRC) to assess domestic comparative advantage. Policy Analysis Matrix (PAM) allows us to implement alternative policy experiments related to bilateral and multilateral commitments.

The calculation of the cost-competitiveness index shows that Moroccan beef (Standard bone-in meat) and poultry could not compete with French and American products. However, Moroccan beef remains relatively more competitive than poultry. Besides, the DRC is 1 for beef and 1.34 for poultry meaning that Morocco seems to have no comparative advantage in producing poultry while neutrality is registered for beef.

Lastly, among interesting policy experiments, the combined scenario of an import tariff reduction, currency devaluation and a technical progress shows the best impact on the domestic meat competitiveness. In fact, with this scenario which aims at larger Moroccan market openness, the DRC improves by 21% for beef and 31% for poultry. This is also the only experiment that allows probable comparative advantage for poultry in Morocco.

Keywords: Morocco, beef, poultry, economic competitiveness.

Introduction

Livestock is one of the principal components of the agricultural sector in Morocco. It contributes for 25 to 30% of the agricultural GDP with US\$1 billion annual value added on average. It also offers employment to 2/3 of the active rural population since 74% of the farmers practice animal breeding. Besides, the production of the meat sub-sectors covers almost the totality of the national expressed demand with equal share contributions of red meat and white meat. Lastly, livestock allows farmers to maintain economic activity in rural areas due to its financing role and treasury (Benlekhal & Tazi, 2003).

Red meat and white meat sub-sectors have recently experienced a remarkable development according to the public and private programs set up for the

¹ Paper submitted to the Ninth Annual Conference on Global Economic Analysis, GTAP/UNECA, Addis Ababa, Ethiopia, June 15-17, 2006.

improvement of the productivity and effectiveness. However, a number of technical and economic constraints continue to limit their performances. For red meat, the dependence on climatic conditions (rainfall) is among the main constraints that lead to significant annual variability in production and prices. The low level of the stockbreeders' technicality and the relative disorganization of the marketing channels also impact the results of the sub-sector as a whole. For white meat, the principal issue is the importance of production costs, the absence of modern distribution chains, and the preponderance of traditional slaughtering units which do not respect sanitary requirements.

In addition, the meat sector is strongly protected in Morocco. The import tariffs of beef and poultry isolate those two sub-sectors, until now, from any international competition. At the same time, Moroccan commitments towards bilateral and multilateral agreements aim to increase exchanges and improve the economic effectiveness. Both meat sub-sectors are inevitably concerned with this new context of the world economy. Their progressive opening to trade raises questions about the effects of the probable imports on national production but also on the efficiency of resource allocation.

Admittedly, such effects are directly linked to the question of the economic competitiveness of the two sub-sectors in Morocco. This paper aims to contribute to answer this question through, first of all, a rapid overview on beef and poultry with particular focus on import trade policy. Then, we present the method of analysis based on the protection, efficiency and comparative advantage indices. The subsequent two sections present the obtained results as well as the impact of alternative policies on these indices before ending by concluding remarks.

1. Meat sector overview

Livestock public policy focuses on production and food safety in meat and dairy products. With regard to red meat and dairy products, the government intervention is being carried out through genetic selection programmes, the technical farming extension and the health protection of the livestock. Currently, national red meat production is about 320,000 T a year. The production of beef and veal remains the most important with on average 40% to 50% of the total production (Ministry of Agriculture, 2005). The remainder primarily relates to sheep and goat production.

Annual red meat consumption is nearly 10.5 kg/capita (El Bada, 2004). This level of consumption is very low compared with the recorded quantity in the developed countries with, for example, an average of 68.9 kg in the European Union (EU) in 2002 (FAOSTAT, 2004). Beside the consumer's income issue, the purported reasons are the weakness of imports (2,000 T/year) and the progressive substitution by the white meat since the beginning of the 1980's for economic reasons.

Now, according to the commitments towards the WTO, the beef and veal imports pay a basic MFN tariff of 254%, which limits the possibilities of the supply adjustment from abroad. An annual import quota of 4,000 T is envisaged in the provisions of the association agreement between Morocco and the European Union

with a reduction of 82.3% on the basic tariffs. The same quota is planned for the so-called 'Hilton' beef meat ('choice' and 'premium' categories) within the free trade agreement (FTA) with the USA. The total liberalization of this category of meat is envisaged after a 17 year period of the agreement. For the standard quality meat ('bone-in' category), the FTA binds a tariff quota of 2,000 T with an annual increase which does not exceed 2%. MFN Tariffs are maintained for the out-of-quota imports.

On its side, the poultry sub-sector has registered a spectacular development during the two last decades mainly due to the private investment efforts. The current production of white meat reaches nearly 340,000 T, which allows an average yearly consumption of 11 kg/capita. Nevertheless, this level remains lower than that of Brazil (35 kg) or South Africa (17 kg), two countries with almost similar economic conditions to those of Morocco. The stockbreeders explain the reasons of this relative weakness by the effect of the production costs on the selling prices. The tax system and the high import tariffs on inputs are often cited by the stockbreeders as the main causes of increasing production costs (Ait El Mekki, 2005; Jaafari, 2005).

Annual imports are very low and do not exceed 200 T. Brazil is the principal supplier with nearly 70% of the imports, followed by France (23%). The imported quantities are subject to an MFN tariff of 124%. As for beef and veal, the association agreement with the EU puts on an annual tariff quota of 200 T with a tariff reduction of 27.3%. On the other hand, the quantities envisaged within the framework of the FTA with the USA are higher. The tariff quota reaches 1,250 T for 'whole chicken and turkey' with a tariff of 60% and the total liberalization of the imports will take place as from the 19th year of the agreement. For the legs and wings of birds, tariff will be completely dismantled after 24 years of the agreement's implementation. The later starts with a quota of 4,000 T combined to the maintenance of a quantitative safeguard clause on the imports.

2. Methodology

The evaluation of the competitiveness and economic efficiency of a given sub-sector requires the combination of several methods of analysis. In addition to the use of the competitiveness-cost index, the calculation of the protection and domestic resources cost coefficients allow approaching the positioning of the domestic products compared to international competition.

2.1 Competitiveness-cost Index

For a given product, the competitiveness-cost index (CCI) can be calculated according to the following formula:

$$CCI = 100. DUC / (PUC. E)$$

where DUC indicates the domestic unit cost, PUC the cost abroad and E the nominal effective nominal exchange rate of the national currency. If CCI is higher than one, then the domestic product is not costly competitive.

The CCI assesses the performance of the domestic meat production and compare them to those of France and the USA, two principal trade partners of Morocco. The estimate of meat production costs in the three countries allows highlighting the most competitive as well as the most failing practices in Morocco.

2.2 Reference Price Analysis

To evaluate the levels of economic efficiency and comparative advantage of Moroccan meat production, the approach uses the policy analysis matrix (PAM). The PAM can reveal the difference between the efficiency and market prices that may lead to resource misallocation of different policy instruments (Monke & Pearson, 1989; Fabre, 1994). The first step of its construction builds the budgetary table with the production inputs inventory at private and social prices. Then, the approach carries out the decomposition of these inputs into tradable, non-tradable and domestic resources. This decomposition allows evaluating the transfers and profits generated by the pricing policy. The last step calculates the levels of protection and comparative advantage according to the following formulas:

- The nominal protection coefficient (NPC) which corresponds to the unit domestic price (DP) and the foreign price ratio (PP), with both prices expressed in national currency. If NPC is greater than 1, then the policy of the considered sector is protecting the producers (implicit subsidy).
- The effective protection coefficient (EPC) expresses the importance of the private value added (PVA) compared to the social or economic value added (SVA):

$$EPC = PVA/SVA$$

EPC greater than one means that the producers generate a value added higher than the optimal situation. In this case producers are economically efficient because of the positive protection and incentives.

- The domestic resources cost (DRC) indicates the relationship between the opportunity cost of the domestic resources (DR.) and the social value added (SVA):

$$DRC = RF/SVA$$

If DRC is lower than one, then the country has a comparative advantage for the considered product. The lower this coefficient is, the more the comparative advantage is important.

Beyond the calculation of protection and comparative advantage coefficients, the PAM allows to undertake policy simulations according to possible scenarios. The scenarios taken into account in this study are:

- Scenario 1: Revision of the import tariffs by application of a minimum tariff of 2.5% on all feeding materials and elimination of duty on the veterinary products.
- Scenario 2: 10% tariff reduction on chicken and beef meat imports.

- Scenario 3: 10% devaluation of the national currency.
- Scenario 4: 10% increase of the beef and poultry world prices, which can result from a reduction of production and export subsidies granted by leading export countries within the framework of the World Trade Organization (WTO) agreements.
- Scenario 5: 10% reduction of variable input prices as result of possible market competition and/or productivity improvement.
- Scenario 6: Combination of scenarios 1 to 5.

All these scenarios represent alternative policies suitable to be applied by the Moroccan government or imposed by the context of bilateral and multilateral agreements.

2.3 Data

For the beef sub-sector, the collected data relate to the fattening production system. This system, the most representative of the bovine meat in Morocco, is based on the fattening of young calves bought from cattle markets. The average weight of calves is about 200 kg. The operation of fattening takes 3 to 5 months during which the animals receive a feed rich in concentrates. The average age of slaughtering varies between 14 and 18 months for animals that weigh between 380 and 400 kg alive or nearly 220 kg carcass (Chafai, 2004). In the present study we consider a one year - 100 bull calves fattened by a farm in two semester bands of 50 bull calves each one.

On the poultry side, the considered breeding system is also the most frequent in Morocco. Adopted by 50% of the broiler producers, production takes 49 days with a 10% mortality rate, a consumption index of 2.3 kg feed per live kg., and an average weight of 2 kg/bird at slaughter (Ministry for Agriculture, 2002). According to Hassan (2004), the average number of breeding bands in the poultry units is about 4.5 a year. Each band reaches 9,000 birds which allow a production of almost 56,700 kg of meat if we consider a proportion of 70% of meat carcass (FISA, 2001).

In both cases, data was collected to estimate the competitiveness and efficiency indices for the 1999-2003 period. They are composed of animal purchase prices (bull calves and chicks), feeding and veterinary care costs, labor costs, amortization costs of the buildings and equipment, slaughter expenses, and other costs. The comparison to the performance of France and the USA required the collection of information from various sources such as the USDA, FAO, the Aviculture Technical Institute in France, the National Chicken Council in the USA, etc.

3. Competitiveness indices

Bovine Meat

The production cost of standard quality beef (Bone-in) is about \$5/kg carcass in which operational expenses occupy more than 88 % (table 1). The expenses of the animals to be fattened and the expenses of feed constitute the most important components since they represent respectively slightly more than 58% and 22.5 % of the total production cost. The financial expenses reach 5.5 % of the total cost.

Slaughter and amortization fees attain respectively 3.5 % and 2.7 % of the bovine meat production cost.

Table 1: Production costs of standard bovine meat in Morocco, France and USA

	Morocco	France	USA
Average carcass weight (Kg)/animal	195	325	381
Total cost \$/Kg carcass	4.94	3.64	3.17
Cost structure %			
Calves	58.4	60.2	59.2
Feed	22.5	15.2	19.8
Veterinary care	1.1	1.3	1.8
Labor	5.6	4.6	nd
Amortization	2.7	8.7	6.9
Slaughtering cost	3.5	3.1	1.7
Financial fees	5.5	1.5	5.5
Miscellaneous	0.7	4.6	4.6

The performance of the bovine fattening system in Morocco shows significant differences with those recorded on average in France and in the USA. Indeed, the carcass weight per animal is definitely lower with only nearly 60% and 50% of the respective weights of the bovines intended for slaughter in the two countries. In addition, the competitiveness-cost index amounts to nearly 135% compared to France and to 156% compared to the USA. The purchase prices of the animals to be fattened and the feed expenses are the principal reasons of the higher cost in Morocco. Moreover, the low weight of animals at slaughter leads to the absence of possible scale economies contrary to what would be the case for France and the USA.

Poultry

The production cost of chicken is close to \$2/kg carcass in Morocco (Table 2). Among the most important operational costs, feed and chicks to be bred enter respectively for 55% and 17% of this cost. The share of slaughter expenses reaches 8.5%, whereas amortization fees and financial expenses remain at 5.7% and 2.7% of the total cost.

Table 2: Production costs of standard poultry meat in Morocco, France and USA

	Morocco	France	USA
Average carcass weight (Kg)/animal	2	1.9	2.2
Total cost \$/Kg carcass	1.95	1.06	0.93
Cost structure %			
Chicks	17.32	14.17	14.69
Feed	55.12	49.19	51.44
Veterinary care	3.9	2.02	2.77
Heating	1.8	1.92	1.35
Labor	3.58	5.46	nd
Slaughtering cost	8.54	7.82	8.15
Miscellaneous	9.26	17.93	20.82

Compared to those recorded in France and the USA, the production cost of chicken in Morocco is significantly higher. The competitiveness-cost index is estimated at 184% and 210% respectively to these two countries. The carcass weights being almost the same in the three countries, the Moroccan higher cost is mainly due to the high feed and chicks purchase expenses in Morocco. Also, the lack of vertical integration of the broiler units weakens their position against the hatcheries, feed manufacturers, and poultry processing despite their confederation within the Inter-professional Federation of the Poultry Sector in Morocco (FISA). Conversely, the vertical integration of aviculture is important in France and in the USA. This allows breeders in these two countries to reduce the production costs in accordance with a better coordination of operator activities.

4. Policy Analysis Matrix Results

4.1 Transfers analysis

Table 3 shows that for the standard quality beef, the transfers on the producers income reach \$1.8/kg in the form of implicit subsidy. This amount represents 31% of the meat price at the slaughter-house. The high protection of beef and veal imports would be the principal cause of this result. Those transfers are attenuated in a significant way by a total implicit taxation on production inputs of almost 19%, which correspond to close to \$1/kg carcass. The non-tradable inputs contribute more to this taxation, particularly calves to fatten and capital.

Table 3: Production Policy Accounting Matrix				
		(Kg Carcass)		
	Revenue	Total Cost		Profit
		Tradable inputs	Domestic ressources	
Bovine Meat				
Market price	5.76	0.86	4.09	0.81
Social price	4.00	0.79	3.20	0.01
Transfers	1.76	0.07	0.89	0.80
Poultry				
Market price	2.26	0.73	1.21	0.30
Social price	1.31	0.60	0.98	- 0.27
Transfers	0.94	0.13	0.23	0.58

For chicken meat, the pricing policy generates a \$1/kg carcass positive transfer to the producers because of the tariff at the border. At the same time, the tradable and non-tradable inputs are subject to a tax of 18% and 19% respectively. The feed, which represents the most important input in poultry production, undergoes a total taxation of about 20 %. It is followed in absolute terms by the chick acquisition and slaughter expenses with an implicit tax of 20% and 26%. With such results, the producers should benefit from a total net transfer of \$0.6/kg carcass compared to the world market.

4.2 Indicators of protection and comparative advantage

As it may be expected, the PAM results show that bovine and poultry meat display an NPC greater than 1 (table 4). The EPC is also higher than 1, which means that the financial added value is higher than what it would have been without the government intervention. Of course, such conditions may encourage the domestic production of meat but it should not be forgotten that the economic efficiency of the producers is a direct consequence of the import protection policy. In spite of its relatively low import tariff, the poultry sub-sector seems to benefit from this situation more than the bovine meat sub-sector.

Table 4: Protection and Comparative Advantage Indicators

Indicators	Bovine Meat	Poultry
Nominal Protection	1.4	1.7
Effective Protection	1.5	2.1
Domestic Resource Cost	1.0	1.3

In addition, the estimated DRC for beef is 1, which represents a neutral situation of comparative advantage. On the other hand, poultry shows a DRC of about 1.3. This means that the poultry production system is costly in terms of domestic resources and the higher cost exceeds the social value added. Consequently, the country displays no comparative advantage for poultry under the current conditions of the production system taken into account.

4.3 Policy Simulations

Table 5 presents the effects of policy changes on the parameters of profitability, efficiency and comparative advantage for bovine meat and poultry sub-sectors regarding the new opening economic context. The revision of the inputs import tariff (Scenario 1) reduces the production cost by 15% for beef and 14% for poultry. NPC and EPC drop for the two sub-sectors at a rate ranging between 6% and 11%, but their value remain higher than 1. In addition, the DRC records a weak improvement of 4.4% for chicken and 1% for beef. However, the effect on the level of comparative advantage remains negligible for the two products.

**Table 5: Simulation Effects by Sub-sector
(Variation %)**

Scenarios	S1	S2	S3	S4	S5	S6
Bovine Meat						
Unit Cost	- 14.8	na	2.2	na	- 9.1	- 14.8
NPC	- 9.8	- 7.1	- 9.7	-9.7	- 11.0	- 25.7
EPC	- 10.5	- 13.3	- 11.1	- 11.8	- 9.8	- 29.4
DRC	-1.01	0	- 8.1	- 11.1	-4	- 20.8
Poultry						
Unit Cost	- 13.9	na	7.8	na	- 9.6	- 14.0
NPC	- 8.7	- 11.8	- 9.3	- 9.3	- 8.1	- 25.0
EPC	- 6.1	- 14.3	- 12.7	- 15.5	- 14.6	-31.9
DRC	- 4.4	0	- 8.7	- 15.9	- 16.7	- 31.2

The reduction of 10% of the import tariffs on both types of meat (Scenario 2) could lower the NPC by 7% for beef and 12% for poultry. The EPC could also display a fall of 13 % and 14 % respectively. Nevertheless, the two sub-sectors will always profit from a positive protection under the new conditions. Lastly, with this scenario, no significant effect could be noted on the comparative advantage parameter.

For scenario 3 (10% devaluation of the national currency), the production cost of bovine meat could increase by about 2%. Poultry remains more sensitive with an increase of 8%. This is because of the importance of raw material imports that enter in poultry feed manufacturing. NPC and EPC could decrease consecutively to the important increase in the economic price of the outputs (Cost Insurance Freight

Price) in terms of national currency. For the two sub-sectors, the fall of NPC and EPC exceeds 9% and 11% respectively. Meanwhile, effective protection remains largely positive with rates turning around 1.4 for bovine meat and 1.9 for poultry. Moreover despite a 9% DRC improvement, the 10% devaluation policy could induce no comparative advantage for the chicken production in Morocco. On the other hand, beef could benefit from a slight comparative advantage since DRC becomes 0.9 instead of 1 currently.

The 10% increase of bovine meat and chicken world prices (Scenario 4) could induce a reduction of EPC by 12% and 15.5% respectively. Nevertheless, the levels of effective protection remain relatively high at 1.4 and 1.8. The effect on DRC may be significant for poultry (reduction of 16%), but no comparative advantage would be noted.

The same results can be noted in the case of a 10% reduction of input prices (Scenario 5). Despite a 9% reduction of the production cost for the two sub-sectors, the nominal and effective protection coefficients would be always higher than 1. Also, the value of DRC becomes 0.9 for beef meaning that the sub-sector could begin to experience a comparative advantage. This is not the case for poultry for which DRC falls but amounts to 1.2.

Scenario 6 combines the whole of the preceding scenarios. The objective is to simulate the effects of a significant commitment in the liberalization of bovine meat and poultry sub-sectors in Morocco. The results show that the production cost could decrease by 14% for both sub-sectors. Also, NPC falls by about 26% for beef and 25% for poultry along with a respective EPC reduction of 30% and 32%. In spite of these diminishing scores, both sub-sectors should continue to be protected (nominal and effective protection) with rates turning around 1.1 for beef and 1.3 for chicken. Lastly, a significant improvement of DRC could reach 20% and 30% respectively. At this level, bovine meat production could display a comparative advantage in Morocco (DRC=0.8). At the same time, and only for this scenario, the production of poultry could begin to experience a comparative advantage with DRC of 0.9 instead of the current estimate, which is 1.3.

Concluding Remarks

The estimated production cost of the standard quality bovine and poultry meat in Morocco is higher than in France and the USA. Compared to these two countries, the index of competitiveness-cost is around 135% and 156% respectively for beef. For chicken, this index amounts to 184% compared to France and 210% compared to the USA. Consequently, both sub-sectors show weak economic performance in Morocco. The principal reasons of this situation are the high expenses on bull calves to be fattened and chicks and the animal feed cost.

In addition, the nominal protection and the effective protection coefficients (NPC and EPC) of the two sub-sectors are greater than one. They are 1.4 and 1.5 for beef and 1.7 and 2.1 for chicken. These results are because of the protection policy in force, which imposes high import tariffs on meat. This policy benefits the producers in both

sub-sectors by taking advantage from an implicit subsidy of \$0.8/kg of beef and \$0.6/kg of chicken meat.

With regard to the resource allocation, the country presents a neutral situation of comparative advantage for beef production. Also, the domestic resource cost reaches 1.3 for poultry meat, which means that the cost of the domestic factors of production exceeds the social added value. Changing the comparative advantage for the two sub-sectors requires the implementation of an integrated policy that concerns Moroccan trade policy as well as the economic behaviour of the world meat market. Indeed, among the scenarios undertaken with the policy analysis matrix, the most important improvement of the competitiveness is obtained by a scenario which includes, at the same time, an import tariff reduction on inputs and outputs, a devaluation of the national currency, an increase of world meat prices, and a decrease of input prices (technological progress and/or market competition).

Consequently, any measure within this integrated policy has to be encouraged with large and permanent dialogues between the government and the profession. In fact, FISA, the poultry association is entering into an agreement with the government under which each undertakes certain obligations. The government agrees to begin enforcing sanitary standards, and FISA undertakes to help the operators to improve production and distribution efficiency. The objective for both sectors is to improve economic efficiency of bovine meat and poultry production in Morocco through a better management of the production costs and an effective allowance of domestic resources.

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