

Pros and Cons of Introducing a Mandatory Country of Origin Labelling for Dairy Products in Germany

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1 Introduction

In Germany, different voluntary labelling schemes are in place to describe the origin of dairy products covering varying degrees of binding conditions, for example, brands with geographical information privately defined combined with relatively vague obligations, private label initiatives (e.g., Regionalfenster)¹ with a regional declaration of the origin concerning main ingredients and their place of processing, protected designations of origin (PDO) and protected geographical indications (PGI) regulated by (EU) No 1151/2012 defined by particular quality or other value-adding characteristics or attributes. The German Food, Consumer Goods and Feed Code (LFGB) contains regulations for the protection of consumers against fraud and deception regarding origin labelling (LFGB, Article 11(1), sentence 2). Article 3(1) German Food Labelling Ordinance (LMKV) deals with indirect declarations of origin for food e.g., for milk products whereas it is mandatory to specify the name of the company or producer by an id-code so that an identification is guaranteed. In this context the main point is discussion is, that consumers may want to identify place of origin of the raw material and or processing of dairy products, but, at the moment, they are unable to do so with respect to all products offered.

In contrast to other products, like most meats, fruit and vegetables, provision of information on the country of origin or place of provenance is not mandatory for milk and milk as an ingredient. Regulation (EU) No 1169/2011 on the provision of food information to consumers identifies the need to explore the possibility to extend mandatory origin labelling for selected foodstuff categories, i.e. dairy. Thus the EU issued a study aiming to evaluate cost and benefits of introducing a mandatory country of origin labelling (MCOOL) for dairy products (EU Commission, 2015). The study intended to analyse a range of issues covering the need of consumers to be informed, the feasibility of providing mandatory indication of the country of origin or place of provenance, and, an analysis of the measures' economic implications, including the aspects concerning the common market and likely impacts on international trade.

Our paper is based on some outcomes of the study (EU Commission, 2015) with an explicit focus on Germany and elaborating in detail some extended aspects hereof. In the study impacts of possible origin labelling were assessed in terms of consumer's requirement, the economic effects on the food supply chain, and with respect to competitiveness of enterprises. In the study different approaches were employed like supply chain analysis, case studies to capture industry cost and principle industry arguments, literature review to cover consumers aspects and a model based quantitative impact analysis which is only summarized here. In our paper, in principle, we address two main questions, namely the need to inform consumers regarding the origin of food ingredients and the feasibility of providing mandatory indication of country of origin or place of provenance.

¹ The regional window comprises statements with respect to used agricultural ingredients, places of processing and optional statements considering up-stream products used like feed and seeds. Additional statements with respect to the way of production (e.g., organic) are not allowed in the original window. A region mentioned in context of raw material is required to be distinct and verifiable (e.g. county, state, or radius by kilometre) and need to be smaller than the national borders of Germany, but may exceed national borders (e.g., cereals of the Eifel). The main ingredient and main value providing components have to be sourced by 100 per cent in the region. Is the main ingredient less than 50 percent than 51 per cent of all ingredients have to be sourced from the region (Hermanowski et al., 2014).

The paper is structured as follows: section 2 describes shortly the German dairy sector, section 3 summarizes outcomes of German case studies and interviews along the supply chain, section 4 covers consumer arguments and in section 5 a combined evaluation is provided while first conclusion can be found in section 6.

2 Supply chain of the German dairy sector

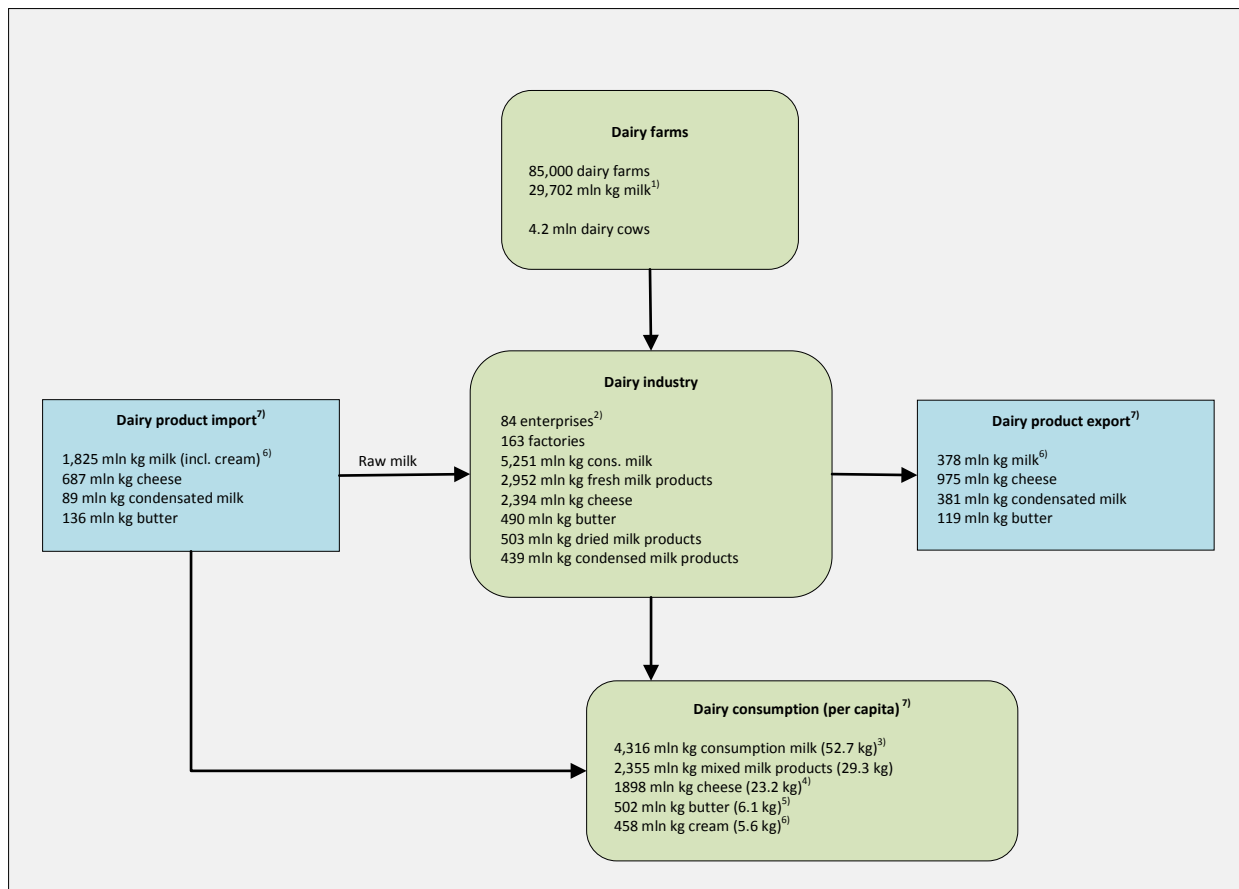
Possible effects have to be considered in the context of the German dairy sector which can be characterized by numerous milk producers delivering raw milk to milk collecting firms and processing enterprises often producing a range of products which require various milk ingredients. Data for the descriptive analysis covers the years 2012 and 2013.

An overview on the German supply chain is provided in Figure 1. With respect to total output value, milk is the most important single item. In 2012 cow milk production had a share of 18% of total agricultural output value followed by followed by cereals with 17% (BMELV, 2013). 85,000 dairy farms in Germany produced 30.7 billion kg of milk In 2012, of which 670,900 tonnes were organic milk (2.2% of total production). A dairy farm kept 49 cows on average with significant regional variations, whereas smallest dairy farms were to be found in Bavaria (31.5 dairy cows per farm) and the largest in Brandenburg (210.8 dairy cows per farm). Total quantity of milk available for processing in dairies was slightly lower due to usage and disposal on farms, about 3% of total milk production in Germany. Direct marketing covered 35.8 million kg milk sold directly to consumers as well as direct sales on cheese and yoghurt with about 3 million kg milk equivalent each.

In 2012, 84 enterprises with 163 plants processed more than 29.8 million t raw milk or cream produced in Germany, considering reprocessing, imports, exports and stock changes it were even 30.9 million t of milk (BLE 2013). A bit less than one third of German milk was processed respectively into cheese (32%), butter (31%) and fresh milk products (31%). Milk powder was less important absorbing only 2.8% of milk utilized.

In Germany, the dairy industry is dominated by cooperatives. According to a study of the Bundeskartellamt (2009) more than two third of German milk production is delivered and processed by cooperative dairies. In terms of turnover by far the largest dairy cooperative in Germany is the Deutsches Milchkontor (DMK) followed by the private company Theo Müller. With respect to numbers, cooperatives and private industries are equally distributed among the top-10 dairies. In 2013, there had been 5 cooperatives and 5 private firms. In terms of processed milk quantities, the three German largest dairies are DMK (6.9 billion kg), Arla Foods (2.5 billion kg) and Hochwald Foods (2.0 billion kg) (EU Commission, 2015, p. 22). As cooperatives are owned by farmers, so that profits earned will be passed on to members. But like other companies, cooperatives are required to accumulate reserve funds, provisions and contingencies. Being a member includes a contract to deliver all milk produced by the farmer and to take in all milk delivered on side of the cooperative. However also non-members can deliver milk to a cooperative. Cooperatives will pay a fixed milk price in advance. Afterwards the dairy farmers will get an additional payments based on the profits generated. Those firms often act within wide regional areas and include trade of raw materials or industrial milk across borders (EU Commission, 2015, p. 22).

Figure 1. Characteristics of the German dairy supply chain 2012.



¹⁾ Milk from dairy cows delivered to dairies, without deliveries of producers from EU member states. ²⁾

Companies processing at least 3,000 liters milk daily on a yearly average or delivering milk to other companies for further processing after heat treatment; companies producing processed cheese, sour milk cheese or products processed from whey and not processing raw milk are also considered as a dairy. ³⁾ Including own consumption on and direct sales of agricultural holdings. ⁴⁾ Including hard cheese, soft and semi-soft cheese, sour milk, cooked and whey cheese, processed cheese and processed cheese products, cream cheese, pasta filata cheese. ⁵⁾ In product weight including butter, milk fat, milk fat products with real fat content as well as butter of agricultural holdings. ⁶⁾ Not including acidified milk, kefir, yoghurt and mixed milk products of cream. ⁷⁾ Neither other fresh milk products nor milk powder is not included here.

Source: BLE, BMELV, Statistisches Bundesamt, ZMB

In Germany, the dairy sector is characterized by a strong domestic private demand and a distinct orientation on exports as well. Thus, the self-sufficiency levels of nearly all considered dairy products exceeds 100% with the exception of butter for which the self-sufficiency level is slightly below 100%. Considering imports, Germany satisfies almost all its additional requirements by imports from other EU Member States, which holds true for consumption milk, fresh milk products, butter and cheese. Imports of consumption milk and fresh milk products from third countries are only marginal. Most imports of drinking milk and other fresh milk products originate from Austria with a share of 20%. For cheese and butter, third countries' import shares of total imports account for 5.2% and 2.8%, respectively. The Netherlands are for cheese and Ireland is for butter the most important suppliers within the EU. Products of the German dairy industry are traditionally exported to other EU Member States; however, compared German imports, trading activities with third countries have gained much more importance. Approximately 9% of cheese exports and 7% of butter exports have a destination outside the EU. Still a significant amount is exported to countries within the EU with high shares of German exports of cheese send to Italy and butter exports aimed to France.

3 Case studies and interviews along the supply chain

To fulfil an anticipate need of consumers to know about the origin of products respectively the raw material serving as ingredients several sets of information were considered which were to combine two different aspects with respect to milk and milk as an ingredients:

- The stage of the supply chain level which depicts two options ‘place of milking’ or ‘place of the first processing of the milk product’(EU Commission, 2015, p. 42).
- The level of geographical origin which comprises three options (EU Commission, 2015, p. 42):
 - ‘EU origin’ where the label would declare the origin either as ‘EU’ or ‘non-EU’(EU Commission, 2015, p. 42);
 - ‘Possible Group Origin’ where the label would declare a group of Member States of possible group origin (e.g. Origin DE or NL or FR), with the consequence that the milk or product can be originated in all three countries, but there is no requirement that milk from all three countries is ingredient. However, under this option also only one country could be stated (EU Commission, 2015, p. 42).
 - Definite multi-country-group origin where the label would state one or more Member States of definite origin (e.g. Origin DE and NL and FR), so that the milk or product has to be originated in all mentioned countries. Under this label also a single country could be mentioned (EU Commission, 2015, p. 42).

The possible combinations of these aspects can be found in Table 1 and will be to 6 combination.

Table 1: Options for origin labelling of milk and milk used as an ingredient in dairy products

	Level of geographical origin		
Stage of the supply chain	EU/Non EU	Possible multi-country group	Definite multi country group
First place of processing	Option 1	Option 2	Option 3
Place of milking	Option 4	Option 5	Option 6

Source: EU Commission (2015).

To understand the nature of mandatory labelling versus the voluntary labelling respectively signalling information about the origin (place of processing and/or place of milking) following issues have to be regarded: Any labelling induces additional cost. In the case of an voluntary label additional cost is covered by a premium paid for that specific product depending on the type differentiation (i.e., regional, national) and the processor will display the place of origin or place of provenance easily recognizable for consumers. Voluntary labelling enables consumers to choose between an origin-labelled product and a non-origin labelled product. Cost in form of a premium are paid by consumers interested in this choice and at the same time it provides a competitive advantage for its processor compared to other processors. Usually only part of the products that are consumed will be labelled. Firms that supply these voluntarily labelled products will be those which can do so at lowest costs.

In case of mandatory labelling every product has to be labelled with an origin indication defined by certain rules. As mandatory labelling is an obligation to be followed by all producers and all consumers have to buy labelled products irrespective whether consumers depict any willingness to pay. Accrued cost will need to be covered by the chain as a whole and how cost will be allocated along the chain (consumers, processors and primary producers) will depend on chain characteristics. A consumer with a preference for product of a distinct origin can buy it without having to pay directly a premium for the origin information. He has only to cover indirectly the part of the cost accrued to all buyers. As all the products respectively raw materials have to be separated by their origins and are required to be labelled the involved cost might be higher than in the case of voluntary labels where only easy manageable tranches will be labelled in accordance with the willingness to pay.

In the case studies the above mentioned options were discussed with different dairy industries following general guidelines. In particular the likely costs and possible benefits attached to each scenario were to be captured considering, whether the factory would be representative with respect to the particular product if the option of origin labelling would become mandatory. For all covered products it was assumed that labelling rules would apply only to milk and milk as an ingredient and not to other ingredients with the exception of yogurt, where the labelling of the origin of the fruits was regarded as well. And more, only business-to-consumer (B2C) products are covered concerning origin labelling while business-to-business (B2B) products are not regarded (EU Commission, 2015). In total 6 case studies were conducted in Germany covering private industry and cooperatives. To broaden the view some additional interviews with stakeholders were carried out as well.

In-depth oral interviews based on common guide lines (protocol) signalled significant concerns of the German supply chain with respect to the introduction of origin labelling schemes, across cooperatives, private industries and milk producers alike as well as for all products regarded. Main advantages and concerns can be found in Table 2.

All German processors and producers expected an increase in cost if origin labelling would become mandatory. It might introduce physical and administrative costs associated with the labelling process itself, it could restrict firms in their sourcing choices or it could impose additional costs with respect to sourcing, can imply adjustments in the way of processing (e.g. keep product milk and milk ingredients of different origins separated or specifically treated, have required extra stops and cleaning in the production process, have induced changes in transportation and storage, etc.). However, a lot of emphasis in the discussions was put on the fact that labelling options will impact the flexibility of firms as within multi-plant processing companies and also across companies milk and milk as ingredient are allocated respectively reallocated according to economic and technical requirements regardless of any national borders within the EU. Thus, mandatory origin labelling reducing flexibility may induce indirectly higher cost. The fact that B2B sales are not included in the labelling may even enhance the problem (see also EU Commission, 2015, p. 44).

The processing industry as well as producers indicated their fear additional costs will be imposed on them as a result of a retailer's response to origin labelling. For example, a retailer using processed cheese with non-EU milk ingredients may ask its supplier to use only EU milk and milk ingredients because this better fits into the retailer's marketing profile. Firms selling products with a voluntary label of origin (referring to a Member State or specific production region) presume the risk of losing premium (see also EU Commission, 2015, p. 44).

Table 2: Advantages and concerns in the German supply chain

Agent	Advantages	Concerns
Producers	Better marketing of domestic produced milk	Increase in cost will decrease prices received by producer Decrease of export possibilities to other EU countries
Processing industries	No advantage	Increase in cost <ul style="list-style-type: none"> - Adding new processing lines, purchases of new machinery and product storage - Material cost (labels, packages), handling cost (for e.g., additional labels, problem: no flexible labels) - Cleaning between batches and additional waste and losses - Limitation in optimizing sources - Smaller tranches (no economies of scale) - Loss of flexibility as there are no plans to cover B2B (spot market) <p>Very limited options to mitigate cost increases to retailers and thus consumers Pressure on returns of the processing industries and/or Pressure to decrease milk prices for producers (cooperatives) For cooperatives: no possibilities to reject milk of members from other EU countries Place of origin is associated with differences in quality which are guaranteed by EU standards Request of retailers to use the most restricted label option Existing origin labels will lose their premiums</p>
Retailers	Better choices of products	Higher prices much depending on market power

Source: Based on EU Commission (2015) and own compilation.

4 Consumers' perspective

There is a huge body of literature dealing with consumer preferences for food labelled with geographical indications; however, outcomes differ considerably. Differences in consumer perceptions and demand for country-of-origin labelling (COOL) vary depending on the commodity and country respectively location considered (Awada and Yiamnaka 2012) as well as between different consumer segments (Martinez et al. 2010).

On the one hand, there are studies concentrating on consumer preferences for food products from non-EU countries that are sold as specialties with geographical indications in the EU, e.g. Café de Colombia, Ceylon tea, or Ecuadorian chocolate (Otter et al. 2014). On the other hand, there are studies dealing with consumers' preferences for products that are domestically produced and labelled as local or regional food. In regard to the latter, many studies show that domestic or local food is associated with a higher product and process quality irrespectively of any measured quality indicator. This covers aspects such as the products' freshness, taste and healthiness (e.g., Leitow and Jader 2005), food safety and quality issues (e.g., Henseleit et al. 2007; Profeta and Balling 2009), or the products' traceability (Vandermersch and Mathjis 2004). Further, studies found that domestic and local food indicates tradition and authenticity (Profeta et al. 2007), supporting domestic or local production (Ittersum et al. 2007) as well as local allegiance (Kubitzki and Schulz 2007). Trust in local farmers, the image of the country of origin, some environmental and ethical arguments are also assumed as associated background reasons for higher ratings of domestic or local food products (Vandermersch and Mathjis 2004).

When it comes to the relative importance of the geographical origin attribute among many other product attributes, Verbeke and Roosen (2009) showed for food in general that origin is more important than traceability. However, quality, shelf life and specification are of higher relevance. In respect to milk, a study

among Italian milk purchasers identified the place of origin as the most important purchase criterion, followed by trust in the seller or supply chain, and the price (Tempesta and Vecchiato 2012). However, in an Belgian study by Vandermerch and Mathjis (2004), the place of origin was spontaneously stated by less than 5 % of milk purchasers. Instead, the price, taste, habit and good value for money turned out to be of primary importance in regard to milk.

Consumers' willingness to pay (WTP) a price premium for food products labelled with geographical indications is evaluated in many studies, most of them basing on stated preference data. In general, positive effects of geographical indications are found, which are in most cases related with higher price premiums (Profeta et al. 2005). For milk and milk products, however, few studies exist in regard to the effect of the place of origin on consumers' willingness to pay a premium price (Tempesta and Vecchiato 2012). Forbes-Brown et al. (2015) identified strong preferences for ice cream with the 100 % Canadian milk attribute with a likely WTP premium of about 1,50 \$ for a 2 litre carton. According to Vandermerch and Mathjis (2004), 50 % of Belgian respondent's preferred Belgian-origin certified milk and stated to be willing to pay a price of 10 Eurocents per litre (that corresponds to a price premium of 20 % proportional to the total milk price).

In regard to mandatory country of origin labelling (MCOOL), most studies were undertaken in the context of the meat sector (Jongeneel and Balthussen 2014). According to results of a study conducted among U.S. consumers, only 23 % of the respondents were aware of MCOOL in the context of meat. The mean willingness to pay across various geographical origin labels was approximately double for respondents that were aware of MCOOL (2.53\$/12 oz boneless product) compared to those who are unaware and unsure. Products with United States' labels were most preferred (Tonsor et al. 2013). Leureiro and Umberger (2005) also analysed consumers' willingness to pay for MCOOL regarding beef, pork and chicken meat products labeled with "certified U.S." and came to similar results.

Based on an analytical framework, Awada and Yiannaka (2012) examined the effects of country of origin labeling (COOL) regulation on consumers purchase decision. They were able to show that a change from a no COOL to a mandatory COOL regime increases consumers' welfare only if strong preferences for COOL exists. The welfare of consumer decreases for those with weak preferences. Further, a change from a voluntary to a mandatory COOL regime will lead to both winners and losers, however, resulting in a loss in aggregate consumer welfare. Consumer welfare losses will be greater the more costly mandatory COOL is than voluntary COOL. In sum, effects of MCOOL depend on the distribution and strength of consumer preferences as well as on relative prices of the product.

5 Evaluation

To provide a combined evaluation of MCOOL introduction in an existing system with COOL is quite complex as quite a number of aspects along the supply chain have to be addressed.

A MCOOL is of different nature as a voluntary one, as the cost of voluntary labelling is covered by a price premium paid for by those consumers who chose it to buy and that way reveal a preference for that product with the attribute of COOL. In contrast with a mandatory labelling the cost are accrued to all products produced whether the consumers have a preference for the COOL attribute or not and he is not even able to choice an unlabelled product. The cost in that case is allocated along the chain and that way may be paid for – in principle - by consumers, retailers, processors and primary producers whereas the distribution will depend on demand and supply as well as on market power.

Another important issue is the fact that all products (milk) have to be labelled although there are certain quantities which require higher efforts. So, either these quantities are discarded, used to produce B2B products or products destined for Non-EU exports or combinations hereof. As a consequence these products will generate lower returns whereas the difference is also distributed along the chain.

The different labelling options seemed to imply different impacts (see also Table 3):

The EU/Non EU label (Option 1 and 4) will probably create only minor impacts for the supply chain for both stages of processing with the exception of processed cheese where the ingredients are often B2B products unfit for different reasons to be sold and used elsewhere. For consumers the information is most likely unsatisfying if they are interested in the origin as they often seek for regional provenance.

The possible multi country group labelling (DE or NL) (Options 2 and 5) will probably lead to relative small impacts often due to the cost of labelling itself and some adaptations in the processing. However, whether this type of label will provide information relevant to interested consumer is an open topic and perhaps will depend

on the numbers of countries mentioned on the label or on their shares. To have 2 countries stated (i.e. DE or NL) might be acceptable but a higher number of countries induce concerns. There is a likelihood that consumers might perceive the stage of processing differently. They may have a preference for the place of milking for some products while for others i.e., cheese they may prefer the place of processing.

The definite multi country group labelling (DE and NL) (Option 3 and 6) will most likely involve the largest cost increases for the supply chain. It is assumed that this options will provide the most specific information for consumers to express preferences either at country level or for a distinct group of countries. In the case that more than one country is stated on the label it is not clear whether consumers really will give these options a higher significance than with a possible multi country group labelling. So the following question remains unacknowledged: is a label stating that both origin (DE and NL) must be covered more important to interested consumers than a label mentioning that both origins may be covered (either DE, NL, or both).

Table 3: Summation of impacts of the different labelling schemes

	EU/Non EU	Possible multi country group	Definite multi country group
First place of processing	Option 1: minor impacts, only significant for certain production (e.g., processed cheese) No real information for consumers	Option 2: small impacts on cost Limited information for consumers	Option 3: relative large cost increase and heterogeneous changes in processing Most specific information for consumers to express preferences (at country level or a distinct group of countries)
Place of milking	Option 4: limited impacts, only significant for certain production (e.g. processed cheese), nearly no import on raw milk into the EU No real information for consumers	Option 5: quite small impacts (due to loss of flexibility in sourcing) Limited information for consumers	Option 6: largest cost increase (loss of flexibility in sourcing, additional measures, waste, noB2B label) and heterogeneous changes in processing Cost estimates for Germany (EU average): Drinking: +8.0% resp. + 4.0% (+ 2.15%) Cheese: +4.2% resp. + 2.1% (+ 2.12%) Most specific information for consumers to express preferences (at country level or a distinct group of countries)

Source: EU Commission (2015).

6 Conclusion

The following preliminary conclusions can be drawn:

- Mandatory labels create different impacts than voluntary labelling, in the latter case cost are covered by price premiums while in the first case cost are distribute along the supply chain comprising primary producers, processors, retailers and consumers.
- All consumers whether they are without interest and willingness to pay or not will face part of the financial burden of a mandatory label.
- Producers fear further price declines.
- Mandatory labels with a place of milking compared to the place of first processing may imply a bit higher cost due to a loss of flexibility in sourcing of processing firms.
- Distinct country or group of country label may provide most information for consumers at first side but whether this is really the case still has to be proved.
- Though compared to other solutions distinct country or group of country label may lead to the highest cost increases.
- Consumers' interest (regional labels, no combinations) and their willingness to pay may require more consideration and research.

- Based on such results other approaches may provide better solutions, but they will require to be well designed and to be promoted.

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