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Delphi study on country-of-origin labelling for processed foods

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Abstract

In the international scene, country-of-origin labelling (COOL) is a controversial issue. We aim at defining criteria for the country-of-origin marking COOL for processed foods and figure out the effect of COOL on international trade. We conduct qualitative and systematic research using the Delphi method. The panel of experts in food labelling and food policy was composed of 19 members in 13 countries. The experts actively discussed topics ranging from the possible protectionism of COOL to the desirability of worldwide standardisation of COOL, providing comprehensive perspectives on the issues concerning COOL. The essential consensus is that multiple countries of origin marking can give accurate information about the origin of food produced by two or more countries, avoiding misinformation for consumers. This research provides valuable insights for the formulation of COOL policy in various countries. The main limitation is due to the absence of the view of producer associations.

Keywords: Country of origin, Labelling, Processed foods, International trade, Delphi study, COOL policy

The country of origin is the “nationality” of food when it goes through customs in a foreign country and is similar to a “brand” that may be designed with a national flag when the food is for sale in a foreign market. The “nationality” determines which kind of treatment—preferential or non-preferential—the food receives at customs, and as a national brand, it is often associated with safety, quality and the general reputation of the nation.

According to the World Trade Organization (WTO) Agreement on Rules of Origin, when a good is produced by more than one country, the country of origin is the “country where the last substantial transformation has been carried out”. Although WTO member countries agreed that for goods not wholly obtained in one country the criterion for determining the country of origin is the last substantial transformation, the detailed rules for conferring the originating status may vary from country to country when a product is manufactured partially or entirely from non-original (foreign) material. For the same product, the country of origin may be the country where the primary material was produced or where the final processing was carried out, depending on the rules of origin of the importing country. For example, if shrimps are raised in country A and then shelled and frozen in country B, the country of origin of shelled and frozen shrimps is country A under the laws of the USA (USA 2004) because there is no substantial transformation in country B. In contrast, the country of origin of shelled and frozen shrimps is country B according to the regulations of the People’s

Republic of China, which has rules for recognising a substantial transformation in country B (The Regulation of the People's Republic of China on the Rules of Origin for the Goods Imported and Exported 2004; China's General Administration of Customs 2004).

In every country, the government plays a crucial role in matters concerning the country-of-origin marking of foods. Since the beginning of this century, the mandatory country-of-origin labelling (COOL) has been introduced in the European Union (2000), USA (2002) and some other countries and also has been applied to more and more products, to better guarantee food safety and quality. However, in the international scene, COOL is a controversial issue criticised as a trade protection measure. The most notable example was the COOL dispute between the USA and Canada/Mexico where the WTO ruled that US COOL measure is inconsistent with its WTO obligations WTO (n.d.-a, n.d.-b). COOL seems to be a trade protection measure, and the consumer's right to know the origins of their foods seems to conflict with free trade.

In recent years, much academic research on COOL has been carried out for studying the value of COOL information for consumers (Davies and MacPherson, 2010; Loureiro and Umberger 2007; Tonsor et al. 2013; Wang et al. 2013; Ward et al. 2005; Yong et al. 2010), the influence of origin labelling on consumers' choice (Chern and Chang 2012; Ivanković and Kelava 2012; Kimura et al. 2011; Klöckner et al. 2013; Lim et al. 2013; Menozzi et al. 2011; Peterson et al. 2013), the effect of COOL on trade (Johnecheck et al. 2010; Jones et al. 2013; Lombardi et al. 2013; Matsumoto 2011; Plastina et al. 2011; Rabbani et al. 2011). In reviewing the findings of the various research, we make the following observations: (1) It is a common view that COOL is useful for protecting consumers' interest by better informing them when they buy foods. (2) COOL can favour the sale of local products and would have a negative impact on international trade.

Among the existing literature, the products studied were beef and other single-ingredient foods (fruit, rice, fish, etc.) produced in one country and have not concerned the rules of origin. We have not found any academic publication on the COOL of the main ingredients of processed foods made in two or more countries.

In this framework, our research focuses on the international trade of processed foods that are produced with ingredients from one or more countries different than the country of final processing and are then exported to other countries. For a processed food traded internationally, we hypothesise the following business roles: (1) country A: it produces the primary material for the food; (2) country B: it handles the final processing of the food, with the primary ingredient imported from country A; and (3) country C: it introduces the finished product from country B.

The main objective of this research is to discuss the ways to mark the country of origin of food produced in two or more countries to provide accurate information to consumers. Since COOL is a controversial issue in trade policy, we want to study it in a broad perspective, particularly considering the following key issues:

- Would COOL really favour protectionism and how labelling may affect the business?
- Which products should be labelled with the origin information of main ingredients?
- Could COOL be substituted with the indication of the geographic region (a group of countries, e.g. European Union, ASEAN) and how to mark food with multiple origins?

- What would be the potential impact of the main ingredient origin statement on international trade flows and production systems in various countries?
- Should COOL be voluntary or mandatory?
- Is it possible to establish a global COOL standard for foods and what should be the definition of “main ingredient”?

We use the Delphi method (Turoff 1970; Linstone and Turoff 1975; Hakim and Weinblatt 1993; Gordon 2009; Bazzani and Canavari 2013) with the goal of gathering perspectives and ideas from experts in food labelling and food policy.

This Delphi study is conducted in three rounds. The panel of experts is composed of 19 members in 13 countries. Ten experts are academic, five are from government departments and four are representatives of consumer associations. Producer associations were invited but declined participation.

This Delphi study is conducted via the website <http://www.foodorigin.org> where participating experts were able to provide their answers to our questions.

The paper is organised as follows: After having analysed the legislative provisions on COOL in various countries, we define first the research objectives and then design the research process by Delphi method, structured in three rounds. The research results are shown by summarising and aggregating experts' responses to questions on ten topics. Finally, as conclusions, the consensus of the majority on COOL is highlighted around some critical issues, and the essential divergence is discussed.

Background

Motivation and legislative provisions on ingredient origin statement

The economic globalisation of the food sector means not only active international trade of foodstuffs but also the phenomenon that a foodstuff is manufactured in a country with ingredients produced in another country. An essential issue, in this case, is how to mark its origin to provide accurate information to consumers without creating obstacles to fair trade.

We began to pay attention to the issue of “country-of-origin” labelling when we noticed misinformation about the origin of the blend of extra virgin olive oil exported from Italy to China. In February 2011, the first author saw in several supermarkets in Guangzhou (China) olive oil bottles labelled in Chinese “Country-of-origin: Italy”, while the same oils in Italy were commonly known as “olio comunitario” or Community oil, that is, oil produced in the EU. The community oil produced in Italy is mainly a blend of oils originating from Spain and Greece. Then, we discussed the origin marking with four Italian suppliers of olive oil, of which two are bottling companies of Community oil and Italian oil and the other two are producers of Italian olive oil. Since the origin indication is complicated yet important when the Community oil bottled in Italy is exported to China, we decided to conduct our research on the country-of-origin labelling of food produced by two or more countries.

The legislative provisions on country-of-origin labelling for foods in various countries can be separated in two categories: one regards the determination of “country-of-origin” of the foods imported from other countries; another regards the statement on the place of origin of ingredients sourced from other countries and used in the domestic

manufacture of foods. Currently, the majority of countries in the world have laws in the first category, while only a few countries have regulations in the second category. In other words, the statement on “country-of-origin” of ingredients is compulsory only in a few countries for certain kinds of food.

In recent years, legislation on food labelling in many countries has evolved toward more stringent measures. We discuss here some examples of this trend, which reflects a growing interest of some stakeholders for more information about the origin of food.

The first legislation in the world on the mandatory statement about the place of origin or provenance of the main ingredient is the Italian Decree-law no. 157/2004 (Italy 2004). It requires an indication of the place of origin or provenance of the fresh tomato used in the production of tomato puree. Another interesting legislative initiative in Italy is Law No. 4/2011—“Provisions Related to Labeling and Food Quality” (Italy 2011), which was not considered consistent with the regulations of the European Union. Thus, it is not in effect because the implementing decree has not been promulgated yet. This law required a statement of food origin: For non-processed foods, an indication of the place of origin or provenance regards the country of production of the products; for processed foods, the information concerns the place where the last substantial transformation occurred and the place of cultivation and breeding of the main agricultural raw material used in the preparation or manufacture of the products.

In the European Union, the general provision on food origin labelling is set by Article 3 of Directive 2000/13/EC (Directive 2000): the indication of the place of origin or provenance is mandatory if the omission of such information might mislead the consumer. Meanwhile, some regulations of the European Parliament and the Council of the European Union determined that origin labelling is mandatory for the following foodstuffs: beef and beef products, fruit and vegetables, fishery and aquaculture products, honey, eggs and olive oil. For all other products, the origin may be indicated on a voluntary basis.

In 2011, the European Council adopted the new EU Regulation 1169/2011 (Regulation (EU) 2011) on food information to consumers, which extends the mandatory indication of country of origin or place of provenance to the unprocessed meat of swine, poultry, sheep and goats. In addition, by 2013, the European Commission had to adopt acts implementing the application of “voluntary origin labeling” of foods and make a report on the mandatory indication of the country of origin or place of provenance for the following products: (1) meat used as an ingredient; (2) types of meat other than beef, swine, sheep, goat and poultry; (3) milk; (4) unprocessed foods; (5) single-ingredient products; and (6) ingredients that constitute over 50% of a food product. However, until now, the European Commission has not adopted any action to implement these provisions.

Among the member states of the European Union, the UK has also made many noteworthy initiatives related to the ingredient origin statement. Its “Country-of-origin labelling guidance” (Country of Origin Labeling Guidance 2008) suggests that in cases where manufacturers describe a product as “Produced in the UK”, then the origin of any imported ingredients that characterise the product should be given.

We examined the labelling regulations of some other countries—Australia (Competition and Consumer 2010), Canada (Canada 2013), China (China 2011), Ghana (Ghana 1992), India (India 2011), Indonesia (Indonesia n.d.; Indonesia 2011), Japan (Japan 2008),

Malaysia (Malaysia 2006), Russian Federation (Russian Federation 2011), South Africa (South Africa 2010), Switzerland (Switzerland 1992; Switzerland 2008), and USA (USA 2002; USA 2013; *Fed Regist* 2008)—that we do not discuss for the sake of brevity. As a general framework, we noticed the following situation:

- The developed countries have already started legislation on the origin of food ingredients, but all focus on their national markets (community market for EU) without considering the foods traded in the international market.
- Developing and emerging countries (except South Africa) formulate food laws focusing on the issue of safety, but the information on the origin of food ingredients is not yet considered important for consumers. A significant example is that in Indonesia the food pre-market registration system requires a statement on the country of origin of milk and egg powder used as ingredients, but such a statement does not reflect on label requirements.

Materials and method

We used the Delphi method to conduct structured qualitative research on COOL, aiming to gather opinions and perspective from experts in food labelling and food policy in various countries.

The Delphi method is a controlled debate among experts who answer questions in two or more rounds. Most Delphi studies use a panel of 10 up to 50 people (Turoff 1970). Usually, the coordinator sends an invitation and the introduction of the survey to persons that might be interested in the discussion and are likely to contribute valuable ideas. Those who accept the invitation form the panel of experts, starting in the first round. After each round, the coordinator prepares a report on the previous round with anonymous summaries of the participants' opinions. The experts may revise their previous-round answers after reading the views of other participants. In such a process, the discussion on a topic may converge toward a "consensus"; or, if this does not occur, at least the reasons of divergence become clear.

How to measure consensus is not clearly defined. A previous study (Alexandrov et al. 1996) suggested a criterion for agreement of 67% for policy issues. However, the Delphi method is not a mechanism for decision-making; it is an instrument for the analysis of policy issues. The primary objective of policy Delphi is not to reach a consensus, but rather to estimate desirability and feasibility and let controversial aspects emerge.

We chose this method because COOL on main ingredients is a policy issue that can affect economic development and international trade and it requires to be analysed from multiple viewpoints.

The primary goals of this Delphi study are as follows:

1. To assess the desirability of a mandatory COOL policy on main ingredients, by exposing all the pro and con arguments.
2. To examine our detailed ideas about multiple countries of origin marking for processed foods.
3. To compare, with experts in various countries, our perspective on the effect of the COOL of main ingredients on national production and international trade.

This Delphi study was conducted in three rounds.

- The first round mainly focused on the possible protectionism of COOL, the necessity to label the origin of the main ingredient and its potential influence on international trade.
- The second round focused on discussing advantages and disadvantages of mandatory COOL of main ingredients and those of voluntary COOL, how to mark the country of origin of food produced in more than one country and how to guarantee the reliability of information about the country of origin.
- The third round discussed a regulative principle proposed for the formulation of policy on the COOL of main ingredients, the definition of “main ingredient” and the desirability for worldwide standardisation of the country-of-origin marking.

The labelling cost is a widely concerned question, but in this Delphi study, we did not ask the experts to discuss the cost of ingredient origin statement because in the majority of cases, the statement on the country of origin of the main ingredients used in the production of pre-packaged foods for a specific importer does not add any additional labelling cost to the exporter, because the information panel of the label must be customised for each importer according to the law of importing country.

Questionnaires used in the three rounds were developed around the arguments above. In total, there were 19 questions: 10 questions in the first round, 6 questions in the second round and 3 questions in the third round.

To form the panel of experts, in Nov. 2013, we sent 233 invitations to representatives of the following types of organisations in 65 countries. An introduction to this Delphi study and the first round questionnaire were attached to the request.

1. Academic (university, research institute)

Experts invited are mainly authors who have published papers on country-of-origin and food labelling or food traceability. Among the 68 scholars contacted, only 9 are in emerging and developing countries. Only one of the scholars who accepted the invitation is in an emerging economy, while 12 scholars are in developed countries.

2. Government departments (legislative body for food, public agency for food safety control, customs)

We sent 110 invitations to representatives of government departments who took part in the 41st Session of the CODEX Committee on Food Labeling in July 2013 and the 39th Session of the CODEX Committee on Food Labeling in May 2011. Altogether, 8 accepted and 7 politely declined the invitation because they were not COOL experts or because they could not participate in the study since COOL is a politically sensitive issue in the international trade scene.

3. Association of food producers

We sent invitations to directors or presidents of 43 associations of producers in various sectors (dairy products, beverage, olive oil, frozen food, seafood, cocoa, coffee,

pasta industry, fruit juice, etc.), but unfortunately, we obtained no acceptance. Reasons for non-participation could be the following: (1) Some industries are generally more opposed to COOL than in favour of COOL; (2) The associations of producers in developing countries know little about the issue of COOL, and the company brand or country brand (country-of-origin) is not yet crucial for their business; and (3) The majority of the directors or presidents of the associations of producers are not familiar with the Delphi method as an academic research instrument.

4. Consumer association

We sent invitations to 12 organisations of consumers in developed countries, and 5 replied affirmatively. Consumer associations in developing or emerging countries were not included because we felt they were not concerned about the topic.

5. External review expert

We recruited an external review expert, asking her to support the researchers in verifying the analysis of the panellists' responses in each round and the final report, to lower the risk of subjective interpretation.

In total, 26 experts in 15 countries accepted the invitation to participate in this Delphi study on COOL for foods.

To facilitate communication and optimise timing in this Delphi study, we built the website www.foodorigin.org, where the experts who accepted the invitation were granted access to the secure zone by creating a personal account. Before responding to the questionnaire, the participating experts could declare their expertise as an economist or jurist or food specialist.

Since none of the experts belongs to "Association of food producers", it is not possible to conduct research related to food producer associations. Since none of the experts indicated his/her expertise as "Jurist" and seven experts did not indicate their expertise, and because all six "Economists" are academics, it is difficult and unnecessary to compare the viewpoints of experts according to their type of expertise. Given that only one expert is in an "emerging country", in comparing experts' viewpoints, "emerging countries" will be considered together with "developing countries".

The first round questionnaire was completed by 19 out of the 26 experts in the timeframe from 1 Dec. 2013 to 15 Jan. 2014.

Thus, the final panel of experts is composed of 19 members in 13 countries: Australia, Belgium, Chinese Taipei, Ghana, Italy, Japan, Malaysia, Morocco, New Zealand, Panama, UK, Uruguay and USA. Table 1 provides more information on the participating experts.

Similarly to many other Delphi studies, the number of participants decreased in each round: As of 28 Feb. 2014, only 16 experts in 11 countries responded to the second round questionnaire; as of 3 April 2014, only 14 experts in 10 countries responded to the third round questionnaire.

We configured the Drupal-based web platform so that each participating expert can express viewpoints by making comments on questions, but cannot view comments made by other experts. Only the researchers and the review expert can see all comments.

Table 1 Expert panel members in developed and developing countries

Type of organisation	First round		Second round		Third round	
	Experts in developed countries	Experts in developing countries	Experts in developed countries	Experts in developing countries	Experts in developed countries	Experts in developing countries
Academic	9	1	8	0	7	0
Government department	1	4	1	4	1	3
Consumer association	4	0	3	0	3	0
Sub-total	14	5	12	4	11	3
Total		19		16		14

In each round, experts' opinions and comments were collected and aggregated in the following ways:

- Type of organisation that experts belong to: academic–government department–consumer association.
- Level of development of the countries where experts live: developed–developing.

In the report of each round, we compared their anonymous answers and highlighted the common and divergent points of view. Some experts did not provide substantive answers to all questions. However, each of them gave valuable comments to some questions. No response was rejected for the reason that the expert did not reply substantively to all questions.

Results

The results of this Delphi study are obtained by aggregating and analysing experts' answers to questions, which were elaborated around topics. Some topics were discussed only in one round because experts' opinions were clear and none of them made any substantive revision on their original statements after they have read the responses of other participants. Other topics were discussed in two consecutive rounds: either the discussion was started in the first round and deepened in the second round or it was launched in the second round and deepened in the third round.

The functions of COOL and trade protectionism

In addition to supporting that consumers have the right to accurate information on the origin of food, 15 participating experts agree that COOL of primary materials can increase consumers' awareness of the world we live in, while one does not think so. Three experts expressed their opinions only on the right to accurate information. Generally, the COOL of primary materials can increase consumers' awareness of the world, in particular, sensitise them to the producing countries. Moreover, a clear statement on the origin of main ingredients can help build consumer confidence in today's global food system.

As regards trade protectionism, the responses are very different. Some experts said COOL favours protectionism or could potentially be protectionist, while others have opposing opinions. There are also points of view between these two extremes. Regarding the impact on developing countries of COOL of primary ingredients, there are also different but complementary opinions. All the answers can be summarised as follows: COOL itself merely provides factual information to consumers and is not protectionism, but because of externalities, it is often legislated for trade protection and utilised as a trade barrier, so it is potentially protectionism. One can say it is necessary to take measures to fight against a trade barrier imposed through mandatory COOL. However, the effect of COOL depends on consumers' choice. COOL of main ingredients can have a positive impact on developing countries if specific ingredients are not available in developed countries; otherwise, the effect would be negative because the production standards in developing countries are low or not trusted. In any case, COOL can increase

the visibility of producing countries, and it can drive developing countries to improve their production standards.

The experts discussed whether or not the statement on the origin of primary ingredient produced in country A would lower the image of the finished product made in country B. Some experts answered “No”, while some said “Yes” or “possible”. One expert made a general affirmation: “It could either lower or increase it - depends on the products and the countries involved”. Moreover, three experts respectively said: “The quality of ingredient may be more important than the processing”; “COOL of main ingredients would just provide accurate information about where ingredients come from”; when a producing country of main ingredients has a poor reputation, “such labeling would encourage countries with weaker food safety regulations to step up and change their regulations for the better.”

Summarising, the effect of COOL of main ingredients on the perceived quality of a finished product depends on the characteristics of the main ingredient and the reputation of its producing country in the agri-food sector. If the producing country of an ingredient has a poor reputation, the origin statement will lower the image of the finished product made in another country; if an ingredient is recognised for good quality, COOL of ingredient can improve the image of the finished product, becoming a marketing instrument. In other ordinary cases, the effect of COOL would not be evident.

Whether or not to state the main ingredient origin principally depends on the law of the importing country and the importer’s business approach. COOL of the main ingredient can reduce the “imperfect information” of consumers if the origin statement is truthful and accurate. The accuracy of the information provided by the exporter and importer would determine which information to consumers is “imperfect”. If consumers care for the main ingredient origin, COOL of the main ingredient will likely decrease the market demand for the products with a disguised origin.

Products that need a COOL of main ingredient

Some academics and a government official think the COOL of the main ingredient would be not necessary or absolutely not necessary, while the experts from consumer associations deem it very necessary. The viewpoints of other experts are between these two extremities: Generally, they pay more attention to the COOL of main ingredients for olive oil and animal-origin food products, while for the other products (flour, noodles, fruit juice, etc.), it is less important to state the origin of primary materials.

We can mention exemplary products on which several experts’ opinion converged that it would be necessary to state the ingredient origin: olive oils for blends of olive oils, coffee beans for roasted coffee, green tea leaves for black (fermented) tea, cocoa for chocolate, fresh shrimps for shelled and frozen shrimps, fresh cod for frozen cod fillets, pork for ham or salami, beef for hamburgers and chicken for chicken nuggets.

Country of origin vs region of origin and the issue of multiple origins

In this context, region means a group of countries and the experts state their viewpoints on the necessity of indicating the originating countries for foods produced in the European Union. We noticed a clear-cut divide here, since the American academics

said “No” or “only voluntary”, while the Asian and European academics said “Yes” and made further comments. The government officials and the representatives of consumer associations said “Yes” or made positive considerations. The most interesting opinions can be summarised as follows: Although the statement of origin “European Union” is adequate for applying trade measures, for foods, their origin should be declared according to the law of importing country. Many countries do not accept the origin marking “European Union” and require the exact country of origin. Given that consumers in Europe note the differences among European countries and appreciate the origin labelling with country name, the indication of origin “European Union” is not very meaningful for consumers outside the EU. Moreover, a precise indication of origin will be useful for export promotion.

To deepen the discussion, we asked which factors should be considered for substituting the “country-of-origin” with “geographic region of origin”. The responses to this question are very different but generally complementary and can be summarised as follows: In substituting the “country-of-origin” with “geographic region of origin”, the most critical factor to be considered is the consumers’ perception of a specific region; another important consideration is whether the production standard in the region is uniform. From the consumer perspective, it is better to indicate a particular country instead of a large region. It is possible that the cost of COOL would be higher than that of stating the region, but the indication of a specific country of origin can bring a marketing advantage. In principle, the origin information of food should be provided to be readily and correctly perceived by the consumers in the country where the food is marketed.

The issue of how to mark the origin of “Multinational Food” was discussed in two cases: (1) A food is a mix of similar ingredients produced in two countries; (2) A food is made in a country with the main ingredient produced in another country.

In case (1), the opinions of academics on the statement of origin are very different and can be summarised as follows: both countries should be marked “countries of origin”; the country of origin should be labelled according to the *ad valorem* rule; nothing “should be marked” but let the market figure out which is preferred by consumers; a standard “one rule fits all” approach cannot be applied, and the actual “impact” varies. The experts from government departments and consumer associations have similar opinions: they prefer to label both countries as countries of origin. However, for applying trade measures, the originating status can be conferred only to one country and could be determined according to the *ad valorem* rule, while both countries could be marked as countries of origin for ingredients.

In case (2), most (11 out of 16) of our experts agree that multiple countries of origin labelling which specifies the producing country of the main ingredient and the manufacturing country of the finished product could resolve the issue of misleading consumers. Regarding the practice that all countries of possible origins would be listed, the majority (13 of 16) of experts do not agree with it because the list of countries would confuse consumers and the origin statement would have lesser value to consumers, who would ignore the origin information. Moreover, the longer list would bring higher costs for labelling (if the label dimensions should be increased), although the purpose of listing possible origins is to save costs for manufacturers when one origin is substituted with another origin for the reason of seasonal availability or managerial optimisation. It was suggested that if the

main ingredient is a mixture of various origins, the percentages of different origins should be considered; it is better not to list more than two countries of origin if there is not a particular purpose.

Impact of COOL of main ingredient on international trade

We invited the experts to discuss the impact of COOL of the main ingredient on trade flows among country A (producing country of primary ingredient), country B (where the final transformation undergoes) and country C (consumer country). Some experts think there would be no significant increases or decreases, while some believe COOL would definitely affect trade flows. All the responses can be summarised as follows: When a food is produced in country B with main ingredients from country A and then exported to country C, the influence of COOL of main ingredients on trade flows among the three countries would vary depending on many factors: for instance, the quality of the main ingredients produced in country A, the industrial know-how and labor cost in country B, the food culture and developing level of country C. If the ingredient quality is high, and the manufacturing process is strongly characterised by local (country B) tradition or particular technology (e.g. the production of chocolate), the trade flows among the three countries will increase. If the main ingredient is noted for poor quality, country C will import less product from country B, and the B-C trade will decrease. If the manufacturing process is simple (e.g. blending olive oils), it is possible that country C would directly import the ingredient from country A, and both the A-B trade and the B-C trade would decrease. Combinations of different products and different countries would result in various situations.

In multilateral international trade, if the ingredient origin statement is required, a producing country of high-quality ingredients will increase its export, while a country producing poor-quality ingredients will decrease its export and should improve their production standard to compete in the international market. The manufacturers in the processing country B will prefer to use high-quality ingredients; in order to reduce production cost, they would need a new strategy, for example, to invest in the ingredient-producing country A or an important consumer country C; in this way, country B will export its processing technology and management skills to develop global businesses. Thanks to the foreign direct investment of country B, country A will be able to produce and export finished products, and country C will import primary material and develop industrial production for its domestic market.

Voluntary vs mandatory COOL of main ingredient

In the second round, the majority of academics and the government officials agree that COOL of the main ingredient should be made on a voluntary basis, while a minority of scholars and the representatives of consumer associations deem that it should be mandatory.

Comments on voluntary COOL of the main ingredient are summarised as follows: It can be used as a marketing instrument; the producers that want to serve consumers with COOL information can make the origin statement according to consumer demands and this system does not impose additional costs on all producers and consumers. However, in a voluntary system, COOL only applies to business promotion; consumers cannot

access COOL information if producers do not want to provide it and prefer to conceal undesirable origins. Moreover, it is possible that the origin information would not be given in a standard form.

Comments on the mandatory COOL of the main ingredient are summarised as follows: It can provide more accurate information to consumers but could increase cost for all the producers including small companies, especially when producers change the source country because of seasonal availability or other factors. For less valuable ingredients a mandatory COOL would cause welfare losses. Moreover, it could become a kind of technical barrier to trade, especially for developing countries, in some cases even impeding exports from developing countries.

In the third round, we deepened the discussion by proposing a general regulatory principle for the formulation of a policy on ingredient origin statement: COOL of the main ingredient is usually made on a voluntary basis but should be mandatory for the foods that could be subject to fraudulent practices on the origin statement. Seven experts (50%) in seven countries (Australia, Chinese Taipei, Ghana, Italy, New Zealand, Uruguay and USA) agree or find interesting this general regulatory principle. A representative of a consumer association disagrees because he prefers “total mandatory”, while two academic and a government official disagree because they believe the mandatory COOL of the main ingredient would not help to resolve the problem of commercial fraud. Three experts neither agree nor disagree but have other considerations.

Comparing the opinions of each expert with his/her previous response to the question in the second round highlights some interesting evolutions (Table 2).

We do not see any specific pattern in the evolution of experts’ opinion. However, the fact that some of the experts changed their view on specific issues confirms that the Delphi process is an effective way to run the group discussion.

Table 2 Comparison of the answers between the second round and third round

Type of organisation	In the second round: Do you agree that COOL of main ingredients should be made on a voluntary basis?	In the third round: COOL of the main ingredient should be mandatory for the foods that could be subject to fraudulent practices on the origin statement.
Academic	Yes	No (it should always be voluntary)
	Yes	No (it should always be voluntary)
	Yes	Doubtful
	Yes	Doubtful
	Yes	Yes
	Doubtful	Yes
	No	Yes
Government	Yes	Yes
	Doubtful	Yes
	Yes	Doubtful
	Yes	No (it should always be voluntary)
Consumer association	No	Yes
	No	Yes
	No	No (it should be mandatory for all products)

Establishing a global COOL standard for foods and the “main ingredient” definition

To estimate the desirability for worldwide standardisation of COOL, the experts were invited in the third round to answer whether or not Codex should set detailed criteria for marking the country of origin to standardise worldwide origin labelling on the main ingredient.

Six academics, one government official and three experts from consumer associations confirmed that a worldwide standardisation of COOL is desirable. Another government official and one academic said: “not necessarily”. Two government officials mainly discussed the possibility of formulating such a standard on COOL.

The “main ingredient” definition is fundamental for the standardisation of COOL. Eleven experts agreed with the threshold of 50%, and some of them provided further considerations. All the answers can be summarised as follows: “Main ingredient means over 50%” is currently the most popular definition. However, the percentage should be defined better according to the characteristics of the ingredient, referring to the presence by weight in the final product (excluding water). The definition of “characterising ingredient” could be “appearance in the food designation (name) or be associated with the food designation, presence in words or pictures on the label”. To avoid misleading consumers, the minimum percentage of “characterising ingredient” should also be defined in accordance with other non-COOL regulations (e.g. that about advertising).

One point of utmost importance is how to guarantee the reliability of COOL information. In the second round, the experts discussed the necessity of traceability certificate to support origin declaration and the control of origin declaration in customs procedure. This topic refers to official inspection, but not for providing information to consumers.

The majority (13 of 16) of experts agree that the declaration of “100% (country name) (product name)” should be supported by a certificate of traceability because it is a good way to market typical products and some producers might use COOL information for the advertisement. For consumers, it is important that the origin statement would be truthful. The certification of traceability that could confirm the veracity of a “100% statement” would also be a marketing instrument. However, an important question to be considered is: Should the certification of traceability be mandatory for the “100% declaration”? If the answer is “Yes”, the requirement would be a technical barrier to trade for developing countries.

As regards customs procedure the responses of experts vary depending on their field and experience. Some experts agree that the certificate of origin issued by country B (last transformation country) should state the originating country of the main ingredient and provide an authenticated photocopy of the certificate of origin of the main ingredient issued by country A (producing country of the ingredient), while an expert responded “No”, and some experts have other considerations.

All the responses can be summarised as follows: It would be a positive approach that the certificate of origin issued by country B would state the originating country of the main ingredient and provide an authenticated photocopy of the certificate of origin of the main ingredient released by country A. If the main ingredient origin is stated on the label, this information should be shown on commercial documents. However, an authenticated photocopy of the certificate of origin of the main ingredient issued by country A cannot guarantee that the origin statement on the label would be truthful,

and importing country C might need another method to verify the origin if it would damage consumers' interests. The importer in country C should address this issue according to the law of the country and should be able to substantiate the origin claim on the label.

Future perspectives for COOL on main ingredients

Two aspects of this topic were discussed during the first round: If COOL for main ingredients is not yet required in a country, will the provision on the COOL of main ingredients be formulated in the near future? Or, if a country already mandates COOL of main ingredients, will the requirement be applied to more products in the near future?

The 19 experts in 13 countries actively expressed their viewpoints. In this case, unlike the divergences on some other topics, the opinions of the American academics are not evidently different from those of the representatives of consumer associations in the USA. Summarising, in the USA where COOL of main ingredients is not yet started, the provision will not be introduced shortly because of the political environment and industry opposition. In some developed countries (e.g. Japan) where COOL of main ingredients is already required for specific products, the provision will be applied to more products, while in the EU, COOL of main ingredients will become mandatory for particular food products in the near future. In some developing countries, it is possible to introduce COOL of main ingredients to keep up with the international trend, but in the majority of developing countries COOL of main ingredients will not be required shortly because the public knows very little about it.

Discussion

On the topics discussed above, there is not an absolute consensus, but applying the criterion for agreement of 67% for policy issues, we can note a consensus of the majority on some of the most important questions:

- COOL of main ingredients can increase consumers' awareness of the world we live in, in particular, sensitise them to the producing countries.
- Multiple countries of origin labelling which specifies the producing country of the main ingredient and the manufacturing country of the finished product could resolve the issue of misleading consumers.
- When a product made in two member states of the European Union is exported to a country outside of the European Union, the statement of origin "European Union" is adequate for applying trade measures. However, for foods, it is better to indicate the exact country of origin. A precise origin statement is a marketing instrument.
- The declaration of "100% (country name) (product name)" should be supported by a certificate of traceability because it is a good way to market typical products and some producers might use COOL information for the advertisement.
- Besides the definition that "constitutes over 50% of a food", the "main ingredient" should also include the characterising ingredient, that means "appearance in the food designation (name) or being associated with the food designation, presence in words or pictures on the label", even when its percentage is lower than 50%.

- It is necessary to label the origin of main ingredients for animal-origin food products and olive oil.
- A worldwide standardisation of origin marking will help reduce or even eliminate the confusion caused by different marking criteria, and the competent organisation should be Codex. However, this will be a challenging work for Codex.

A substantial limitation of our research is related to the unbalanced composition of the recruited panel of experts, due to the lack of participation by the associations of food producers (processors) that we invited. Because of that, the issues and views discussed above might be incomplete since a valuable perspective was missing. However, during the Delphi study, even though there was not any association of processors involved, we kept close contacts with some business operators, in particular, a Chinese importer of 100% Italian extra virgin olive oil and its Italian suppliers. Indeed, the case of Italian olive oil in the Chinese market was an essential starting point for developing the topics of this Delphi study. According to these business operators, “how to indicate country-of-origin has nothing to do with labelling cost; the labels for export are printed for each order; even a same importer could ask to modify the label for the same product in new order, for improving the product description or graphic design”. This opinion is consistent with the fact that the issue of labelling cost did not emerge clearly in our research.

Also, to further remedy, the absence of industrial associations in the panel of experts, in March 2014, while waiting for the experts’ responses to the questionnaire of the third round, we deepened our discussions with four Italian suppliers of olive oil, noting their different opinions:

1. Two small mill owners who produce olive oil from olives grown in Italy and supply only authentic Italian extra virgin olive oil maintained a firm position that a blend of olive oils bottled in Italy could not, in any case, be marked “Country of origin: Italy”.
2. Representatives of two big Italian bottling companies that buy olive oils and then make blends were much less strict and maintained different opinions:
 - one said the country-of-origin of a blend could bear the mark “Italy” if the importing country’s regulation allowed to do it;
 - another said that he would prefer to label countries of origin of Community oil as “Spain and Italy” or “Greece and Italy” according to the EC Regulation. However, the problem is that a Chinese importer could not accept multiple country-of-origin labelling and the blend of olive oils bottled in Italy could not be sold in the Chinese market if its country of origin is marked as “Spain” or “Greece”.

It is likely that the divergence on policies about origin statement of multi-provenance foods is triggered by the diverging interests between two competing business models: (1) production with local or high-quality ingredient and (2) production with low-quality ingredients imported from another country. This conflict situation could be a reason behind the refusal of the industrial associations to participate in this Delphi study, for the worry that supporting any specific position emerged in the study rounds would embarrass or irritate some of their constituents.

Therefore, we believe the absence of an industrial organisation in this Delphi study does not affect the general validity of the study regarding viable policy options, although we reiterate that our conclusions reflect only the opinions of participating experts (academics, government officials, representatives of consumers' associations).

Conclusion

In this Delphi study, there are apparent divergences between the opinions of American academics and those of the experts from consumers associations (in the USA and outside), while the perspectives of the academics in other countries are more near those of the representatives of consumers associations. The government officials stand between the American scholars and the experts from consumers associations.

Among the academics, the difference between American and non-American is curious. Maybe this is because the food supply system, food culture and consequently academic research in the USA are very different from those in other countries.

The most significant divergence is that COOL of main ingredients should be mandatory or voluntary. A voluntary COOL system has advantages and disadvantages, and mandatory COOL could remedy its weaknesses; an integrated voluntary/mandatory system could be the right solution. Since the markets in different countries have different supply systems, they need various COOL regulations. If a country does not experience commercial fraud based on false country-of-origin statements, its market does not demand mandatory COOL of ingredients, so its COOL of the main ingredient can be voluntary. If a country does endure commercial fraud related to the country-of-origin statement, its market needs new regulations, so mandatory COOL of the main ingredient should be introduced and applied to relevant food products to protect the interests of consumers and honest producers. Our proposal of the general regulatory principle—COOL of the main ingredient is made on a voluntary basis, but should be mandatory for the foods that could be subject to fraudulent practices on the origin statement—seems to be an equilibrium among the divergences. It is necessary to study this topic more in-depth: If mandatory COOL of main ingredients is applied to food that is subject to fraudulent practices on the origin statement, will the deceptive practices decrease? The answer may depend on the general legal environment of the country where commercial fraud related to food origin statement occurs.

Considering that the misinformation on the country of origin is a frequent fraudulent practice in the market of high-value foods, it will be appropriate to mandate the COOL of the main ingredient to the foods with high value. However, mandatory COOL on main ingredient itself can provide only information to consumers, so a mandatory traceability system should be enforced for resolving the problem of commercial fraud related to the origin statement.

A commonly concerned issue is whether mandatory COOL of the main ingredient would be a technical barrier to trade for developing countries. Since developing countries usually produce primary materials but do not manufacture foods with ingredients imported from other countries, mandatory origin indication of the main ingredient on the label of a finished product should not directly influence the customs procedures for the export of primary materials from a developing country if main ingredient traceability is not mandatory. Otherwise, mandatory traceability would become a technical barrier to trade for the developing country. To avoid the possible protectionism,

traceability systems should not be mandatory when the originating place of the main ingredient indicated on the label of a finished product is a developing country. Proposing such a policy would also take into consideration that the statement of origin from a developing country is less likely to involve fraudulent practice.

In the international trade of processed foods, the COOL policy of the importing country may affect the production system of exporting country: If the COOL of main ingredients is voluntary, in the market, there are real origin foods and disguised origin foods, and the globally sourcing companies can export more foods produced with low-cost ingredients from other countries; if the COOL of the main ingredient is mandatory, the demand for real origin foods will increase, and the disguised origin foods will decrease in the market. Consequently, the mandatory regulation of the importing country may favour the development of the traditional food production in the exporting country, while the business of globalised producers would be restricted and they will need to adjust development strategy, using domestic ingredients or transferring the production to another country.

The mandatory COOL policy applied in the importing country of finished products will also affect the economy of the producing country of primary materials. Because of the reduction of exports to the manufacturing country, it may invite some manufacturers to invest in the production of finished products and export primary materials to the importing country for its national output.

Therefore, from a short-term point of view, mandatory COOL of the main ingredient is “protectionism” in the sense of hindering international trade of disguised origin foods and protecting the consumers. In the long term, the mandatory COOL policy of an importing country will favour sustainable development in the partner countries.

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Availability of data and materials

The details of this Delphi study can be found in the database of Ph.D dissertations at the University of Bologna: Su, Y. (Jenny). (2014). Country of Origin labeling legislation: a Delphi analysis. Alma Mater Studiorum-Università di Bologna. http://amsdottorato.unibo.it/6656/1/Su_Yuezhen_tesi.pdf.

Authors' contributions

JS, supported by MC, contributed to the conceptualization, investigation, formal analysis and writing—original draft preparation—of the manuscript. JS contributed to the software, and MC, supported by JS, contributed to the methodology and writing—review and editing—of the manuscript. Both authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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References

- Alexandrov AV, Pullicino PM, Meslin EM, Norris JW (1996) Agreement on disease-specific criteria for do-not-resuscitate orders in acute stroke. *Stroke* 27:232–237
- Chen WS, Chang CY (2012) Benefit evaluation of the country of origin labeling in Taiwan: results from an auction experiment. *Food Policy* 37(5):511–519
- Devies P, MacPherson K (2010) Country of origin labeling: a synthesis of research. Food Standards Agency – Social Science Research Unit: Oxford Evidentia
- Gordon TJ (2009) The Delphi method. In: Glenn JC, Gordon TJ (eds) *Futures research methodology—version 3.0*. The Millennium Project of American Council for the United Nations University, Washington DC, pp 1–29
- Hakim S, Weinblatt J (1993) The Delphi process as a tool for decision making. *Eval Program Plann* 16:25–38
- Ivanković A, Kelava N (2012) Consumer attitudes to quality animal food products in Croatia. *EAAP Sci Ser* 133(1):195–204
- Johncheck WA, Wilde PE, Caswell JA (2010) Market and welfare impacts of COOL on the U.S.-Mexican tomato trade. *J Agric Resour Econ* 35(3):503–521
- Jones KG, Wozniak SJ, Walters LM (2013) Did the proposed country-of-origin law affect product choices? The case of salmon. *J Food Prod Mark* 19(1):62–76
- Kimura A, Kuwazawa S, Wada Y, Kyutoku Y, Okaoto M, Yamaguchi Y, Masuda T, Dan I (2011) Conjoint analysis on the purchase intent for traditional fermented soy product (Natto) among Japanese housewives. *J Food Sci* 76(3):217–224
- Klöckner H, Langen N, Hartmann M (2013) COO labeling as a tool for pepper differentiation in Germany: insights into the taste perception of organic food shoppers. *Br Food J* 115(8):1149–1168
- Lim KH, Hu W, Maynard LJ, Goddard E (2013) U.S. consumers' preference and willingness to pay for country-of-origin-labeled beef steak and food safety enhancements. *Can J Agric Econ* 61(1):93–118
- Linstone HA, Turoff M (1975) *The Delphi method: techniques and applications*. Reading, Mass.: Addison-Wesley ISBN 978-0-201-04294-8
- Lombardi P, Caracciolo F, Cembalo (2013) Country-of-origin labeling for the Italian early potato supply chain. *New Medit* 12(1):37–48
- Loureiro ML, Umberger WJ (2007) A choice experiment model for beef: what US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability. *Food Policy* 32(4):496–514
- Matsumoto S (2011) Impact of country-of-origin labeling on bovine meat trade. *J Agric Food Ind Org* 9(1):n. 3
- Menozzi D, Mora C, Faioli G (2011) Consumer's preferences for brand, country of origin and traceability of UHT milk [L'importanza di marca, etichettatura di origine e rintracciabilità nella scelta del latte UHT]. *Prog Nutr* 13(4):263–275
- Peterson HH, Bernard JC, Fox JA, Peterson JM (2013) Japanese consumers' valuation of rice and pork from domestic, U.S., and other origins. *J Agric Resour Econ* 38(1):93–106
- Plastina A, Giannakas K, Pick D (2011) Market and welfare effects of mandatory country-of-origin labeling in the U.S. specialty crops sector: an application to fresh market apples. *South Econ J* 77(4):1044–1069
- Rabbani AG, Dey MM, Singh K (2011) Determinants of Catfish, Basa and Tra importation into the USA: an application of an augmented gravity model. *Aquac Econ Manag* 15(3):230–244
- Tonsor GT, Schroeder TC, Lusk JL (2013) Consumer valuation of alternative meat origin labels. *J Agric Econ* 64(3):676–692
- Turoff M (1970) The design of a policy Delphi. *Technol Forecast Soc Chang* 2(2):149–171
- Wang HH, Zhang X, Ortega DL, Olynk Widmar NJ (2013) Information on food safety, consumer preference and behavior: the case of seafood in the US. *Food Control* 33(1):293–300
- Ward R, Bailey DV, Jensen R (2005) An American BSE crisis: has it affected the value of traceability and country-of-origin certifications for US and Canadian beef? *Int Food Agribusiness Manage Rev* 8(2):92–114
- Yong CK, Eskridge KM, Calkins CR, Umberger WJ (2010) Assessing consumer preferences for rib-eye steak characteristics using confounded factorial conjoint choice experiments. *J Muscle Foods* 21(2):224–242

Laws, regulations and other official documents

- Bazzani C, Canavari M (2013) Forecasting a scenario of the fresh tomato market in Italy and in Germany using the Delphi method. *Br Food J* 115(3):448–459
- Canada (2013): *Processed Food Regulations*
- China 2011: *General Standard for the Labeling of Pre-Packaged Foods*
- China's General Administration of Customs: *Provisions on the criteria for recognizing the substantial transformation under non-preferential origin ruling system, with list of goods applicable to the criteria of specific processing or ad valorem* (2004)
- Competition and Consumer Act 2010 of Australia
- Country of Origin Labeling Guidance, issued by the British Food Standards Agency (FSA) 2008
- Directive 2000/13/EC on the approximation of the laws of the Member States relating to the labeling, presentation and advertising of foodstuffs
- Ghana: *General Labeling Rule* (1992)
- India 2011: *Food Safety and Standards Regulations*
- Indonesia 2011: *The Procedure of Processed Food Registration BPOM Decree No. HK 03.1.5.12.11.09955*
- Indonesia: *Law 18/2012*
- Italy 2011: *Legge 3 febbraio, n. 4 - Disposizioni in materia di etichettatura e di qualità dei prodotti alimentari*
- Italy: *Decreto Legge n. 157/2004*
- Japan (2008): *Quality Labeling Standard for Processed Foods*
- Malaysia 2006: *Food Act 1983 incorporating all amendments*
- Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers

Russian Federation 2011: Technical Regulation on Food Product Labeling
South Africa 2010: Regulations Relating to the Labeling and Advertising of Foodstuffs
Switzerland 1992: Federal Law on the Protection of Trademarks and Indications of Source
Switzerland 2008: Ordinance on the Certification of Non-Preferential Origin of Good
The Regulation of the People's Republic of China on the Rules of Origin for the Goods Imported and Exported . 2004
USA 2002: Farm Bill
USA (2004) Commercial rulings division: country of origin of imported shrimp. Doc No HQ 563033
USA (2008) Uniform rules of origin for imported merchandise. Fed Regist 73(144):43385–43394
USA: (2013) Mandatory country of origin labeling of beef, pork, lamb, chicken, goat meat, wild and farm-raised fish and shellfish, perishable agricultural commodities, peanuts, pecans, ginseng, and macadamia nuts
WTO: United States—certain country of origin labeling—requirements request for consultations by Mexico
WTO: United States—certain country of origin labeling—requirements request for consultations by Canada

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