



REPORT 2014:1

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Origin labelling of food

- costs and benefits of new EU legislation for Sweden

AgriFood Economics Centre

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FOREWORD

The EU recently decided to evaluate whether mandatory origin labelling should be extended to a broader range of food products. The decision follows upon a debate where proponents of mandatory origin labelling argue that consumers have a strong interest in or even the right to know where the food they eat comes from. But is it a good idea to make origin labelling mandatory by law, or is it better to let producers decide if they want to label their products with origin? In order to answer the question, the benefits of mandatory labelling should be compared to its costs. Since there are almost no empirical studies comparing the costs and benefits of mandatory origin labelling for the product groups under consideration within the EU, it is difficult to make informed policy choices. This report uses unique data and provides new insights into the effects of extending mandatory origin labelling within the EU, from a Swedish perspective.

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Lund, April 2014

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Sammanfattning

Ursprungsmärkning ger konsumenter information om vilket geografiskt område ett livsmedel kommer från. För närvarande är ursprungsmärkning obligatorisk för ett begränsat antal matvaror enligt gemensam EU-lagstiftning, och enligt EU:s Förordning 1169/2011 ska EU-kommissionen utreda om ursprungsmärkning ska bli obligatorisk för fler produkter.

I denna rapport analyseras hur en utökad obligatorisk ursprungsmärkning påverkar konsumenternas nytta, producenternas kostnader och den internationella handeln med livsmedelsprodukter. Fokus är på Sverige och ett antal varor som är representativa för de produktgrupper som enligt EU:s Förordning 1169/2011 kan komma att omfattas av obligatorisk ursprungsmärkning i framtiden. Den övergripande slutsatsen är att frivillig ursprungsmärkning är tillräcklig för de studerade produkterna och att det inte finns ett behov av tvingande lagstiftning. Ett potentiellt undantag är yoghurt, där obligatorisk ursprungsmärkning av det land mjölken kommer från möjligtvis skulle kunna öka samhällets välfärd.

Ett tydligt resultat av studien är att marknaden tycks anpassa sig väl efter konsumenternas efterfrågan på ursprungsinformation för de studerade produkterna. För de varor där konsumenternas betalningsvilja för ursprungsmärkning är hög finns redan en omfattande frivillig märkning av geografiskt ursprung. På motsvarande sätt är den frivilliga märkningen av ursprung mindre omfattande för de livsmedel där efterfrågan på denna information är låg.

Att införa obligatorisk ursprungsmärkning när frivillig märkning fungerar är sällan motiverat. För livsmedel där såväl efterfrågan på ursprungsmärkning som graden av frivillig märkning är höga, kommer en lagstiftning om obligatorisk märkning inte att innebära några förbättringar för varken konsumenter eller producenter. I de fall där efterfrågan på ursprungsinformation är låg, och där marknaden anpassar sig genom att ha en lägre grad av frivillig märkning, finns en risk att obligatorisk ursprungsmärkning gör mer skada än nytta för både konsumenter och producenter. Även om det i debatten ibland hävdas att konsumenterna

har *rätt att veta* matens ursprung är ursprungsmärkningen inte gratis; någon måste betala och konsumenterna kan drabbas av de ökade kostnaderna i form av högre matpriser. Även konkurrenskraften för både den svenska livsmedelsindustrin och det svenska jordbruket kan påverkas negativt, eftersom de kan tvingas betala kostnaderna för ursprungsmärkningen utan att kunna höja priserna i motsvarande grad. Risken för negativa effekter är större för producenter i små och exportberoende länder som Sverige, även om lagstiftningen om ursprungsmärkning är samma för alla EU-länder.

Denna studie visar också att kostnaderna för och nyttan av ursprungsmärkning skiljer sig betydligt mellan olika varor. Detta innebär att lagstiftning om obligatorisk ursprungsmärkning bör anpassas till förutsättningarna för varje enskild produkt snarare än att utformas likadant för alla produkter. Det innebär också att ett utökat obligatoriskt märkningskrav inte kan motiveras med argumentet att konsumenter värdesätter ursprungsmärkning för varor som redan omfattas av obligatorisk ursprungsmärkning. Istället måste kostnad och nytta noggrant utvärderas för varje varugrupp där ursprungsmärkning föreslås bli obligatorisk.

Det är slutligen viktigt att komma ihåg att obligatorisk ursprungsmärkning inte är en generell lösning på problem i livsmedelssektorn. Det finns andra, bättre sätt att se till att livsmedlen är säkra att äta och att motverka fusk i livsmedelskedjan. Obligatorisk ursprungsmärkning är inte någon lösning på dessa problem.

Executive summary

Origin labelling provides consumers with information on which geographical area the foodstuff comes from. Origin labelling is currently mandatory for a limited number of food products according to common EU rules. According to EU Regulation 1169/2011, the EU Commission is to evaluate whether mandatory origin labelling should be extended to a broader range of products.

This report analyses how extended mandatory origin labelling affects consumer benefits, producer costs and international trade in food products. The focus is on Sweden and on a number of representative products which may be covered by mandatory origin labelling in the EU in the future. The overall conclusion is that voluntary origin labelling is sufficient for the investigated products, and that there is no need for compulsory regulation. A potential exception is yoghurt, where mandatory country-of-origin labelling of the ingredient milk could possibly bring additional value to society.

A central result of the study is that the market seems to adjust well to consumer demand for origin information on the products included in this study. For those products for which consumers' willingness-to-pay for origin labelling is high, there is in general already a high degree of voluntary origin labelling in place. Similarly, the degree of voluntary origin labelling is low for products for which consumer demand for information on origin is low.

Motivating mandatory origin labelling is difficult when voluntary origin labelling is already present. For products where both the demand for origin labelling and the degree of voluntary origin labelling are high, legislation on mandatory labelling will not result in any improvements for either consumers or producers. In those cases where consumer demand for origin information is low, and where the market adjusts by offering a lower degree of voluntary origin labelling, there is a risk that mandatory origin labelling will do more harm than good for both consumers and producers. Even if it is sometimes argued that consumers

have a *right to know* the origin of the food, origin labelling will come at a cost; someone has to pay, and consumers may be negatively affected through higher food prices. In addition, the competitiveness of both the Swedish food industry and Swedish agriculture may be harmed, as they will face higher costs but may be unable to increase their prices to cover these costs. There is a risk that the negative effects are more pronounced for producers in small open economies like Sweden, although legislation on origin labelling is the same for all EU countries.

This study also shows that the costs and benefits of mandatory origin labelling differ substantially across products. This implies that legislation on mandatory origin labelling should be adjusted to each individual product rather than equally designed for all products. It also means that an extension of mandatory origin labelling cannot be motivated with the argument that it already exists and is appreciated by consumers for other products. Rather, costs and benefits must be assessed individually for each product for which mandatory origin labelling is under consideration.

Finally, it is important to emphasize that mandatory origin labelling is not likely to be an appropriate instrument for handling other problems, such as ensuring food safety or preventing fraud in the food supply chain. To remedy these problems, other measures are more appropriate.

1

Introduction

The food supply chain is becoming increasingly global. In a single dish, we may eat Brazilian beef, Swedish potatoes, Italian tomatoes and green beans from Kenya. In the wake of this globalization, it is often argued that consumers have a right to know the origin of the food they eat, and that this information is not provided to a sufficient degree. In line with these arguments, it has recently been decided that the European Commission is to evaluate the costs and benefits of an extension of mandatory labelling of origin to a number of new food products (EU Regulation 1169/2011).

1.1 Mandatory origin labelling – a good or bad idea?

Extending mandatory origin labelling will induce both costs and benefits. The benefits will accrue to consumers who will be able to make more informed consumption choices. However, mandatory origin labelling may also bring increased costs to food producers. Costs may also increase more indirectly, as there is a risk that mandatory origin labelling will distort the international trade in food products and thereby result in a less efficient allocation of food production.

Even if consumers in general may want to know the origin of a food product, this is not sufficient to conclude that mandatory labelling is the solution. For mandatory labelling to be beneficial for society, the benefits will have to be larger than the costs of providing the origin information. Both benefits and costs must therefore be considered when assessing the effects of mandatory origin labelling for society.

In addition, the costs and benefits of introducing mandatory labelling depend on how the markets work. With functioning markets, producers adapt to consumer demand and provide origin information voluntarily when consumer benefits exceed producer costs. In this case there is no need for mandatory legislation. When markets do not function properly, the welfare effect of mandatory origin labelling becomes an empirical question, as welfare could either increase or decrease. In this case, the

costs and benefits of mandatory origin labelling have to be assessed. If the benefits are larger than the costs, mandatory legislation could be beneficial for society. As the costs and benefits are likely to vary across food products, it is important to analyse any proposal to extend mandatory origin labelling for each food product under consideration. This necessity provides the rationale for writing this report.

1.2 Aim and outline of the report

The general aim of the report is to investigate, from a Swedish perspective, whether it would be beneficial for society to extend mandatory origin labelling to the additional product groups proposed in EU Regulation 1169/2011. This investigation is carried out by analysing costs, benefits and other relevant aspects of the potential extension of mandatory origin labelling.

Chapter 2 is an introductory chapter where the proposed extension of mandatory origin labelling is introduced, and the food product groups and their representatives selected for this study are discussed in the light of previous developments in EU food policy. Moreover, a short exposition of the economics of food labelling is provided in order to clarify how the analysis in the rest of the report is carried out.

The first part (chapters 3 and 4) of the main report concerns consumers. How important is origin information to food consumers, compared to other attributes like price or best-before-date? Are consumers willing to pay for additional information about food origin? Which origin information is satisfactory to consumers? These questions are addressed in focus group discussions and in two empirical studies, by measuring (a) consumers' ranking of origin information relative to information about other food attributes and (b) consumers' willingness-to-pay (wtp) for origin information. The wtp study is conducted as an in-store experiment with actual consumers who have to pay for receiving origin information. This setup is selected in order to minimize problems of consumers' overstating willingness-to-pay, which is otherwise a general problem in these types of estimations.

In the second part of the report (Chapter 5), possible consequences for producers are addressed. What are the potential effects and costs for food producers if mandatory origin labelling is extended? What origin information is preferred by producers? These questions are evaluated through a literature review and discussions with representatives from the Swedish food processing industry.

The third part of the report (Chapter 6) analyses whether an extended mandatory origin labelling may affect international trade. Will mandatory origin labelling reduce imports? Will imports come from fewer countries? These questions are discussed based on an analysis of how the introduction of mandatory origin labelling for beef in the EU in 2002 has affected beef imports to the EU. By looking at past experiences, lessons can be learned regarding what to expect if origin labelling is made mandatory for similar product groups. A so-called gravity model is applied, using detailed data on imports to the EU, to obtain the results.

The fourth part (Chapter 7) uses the results from preceding chapters to conduct a cost-benefit analysis. The objective of this analysis is to answer the main question of whether a mandatory origin labelling of the product groups considered here is a good or a bad idea from a societal perspective. This should be considered the main chapter of the report, and since all essential concepts used previously are re-introduced here, the chapter may be read independently of the rest of the report.

The final chapter (Chapter 8) summarizes the main results of the report.

2

Background

Origin labelling provides consumers with information regarding which geographical area a product comes from. Origin may be labelled by producers either voluntarily or because it is mandatory. But what determines which one of these approaches is better for society? When is a regulation on mandatory origin labelling motivated? The main objective of this chapter is to provide a basis for how to approach these questions.

Apart from these main questions, a more general background to the report is also provided. Thus, the chapter begins with a short note on the EU legal framework for food labelling, an overview of the products used in the empirical studies and a brief discussion on how to define origin.

2.1 EU law on food information to consumers

The food labelling rules are set at the European Union level for all member states and up to December 2014, general labelling requirements are set out in EU Directive 2000/13/EC. This directive outlines the mandatory information that must be included on all food product labels, including the product name, ingredients list, use-by date, and any specific instructions or conditions of use. According to the directive, labelling of country-of-origin or place-of-provenance on food should generally be voluntary. An exception to this principle is when failure to indicate origin misleads consumers as to the true origin of a food, in which case labelling becomes mandatory. However, over the last 15 years, a large number of food-specific exceptions to the principle of voluntary origin labelling have been implemented in the EU. For example mandatory origin provisions have been implemented for honey, fruit and vegetables, fish, beef and olive oil.

A new EU law on the provision of food information to consumers will take effect in December 2014 (EU Regulation 1169/2011). Article 26 of the new regulation makes several provisions with regard to origin. First, mandatory origin labelling requirements are extended to the meat of swine, sheep, goats and poultry. Second, the EU Commission is to eval-

uate the need for extending the mandatory labelling of origin to more products, for example meat used as an ingredient, and milk used as an ingredient in dairy products (see Table 2.1 for a full list of product groups). Hence, for the latter product groups, a decision is yet to be made on whether or not they should be subjected to mandatory origin labelling. Table 2.1 provides an overview of product groups that are i) already mandatory, ii) mandatory from December 2014 and iii) product groups to be evaluated if there is a need for them to be covered by mandatory origin labelling.

Table 2.1: Overview of provisions for origin labelling in the EU

Mandatory	Mandatory from December 2014	To be evaluated*
Beef and veal** Fish (catch area) Honey Eggs Fruit and vegetables Olive oil Poultry of non-EU origin Wine	Meat of swine, sheep, goats and poultry	Meat other than beef, swine, sheep, goat and poultry Meat used as an ingredient Milk Milk used as an ingredient in dairy products Unprocessed foods Single ingredient products Ingredients that represent more than 50% of a food

*Product groups to be evaluated with respect to mandatory labelling according to EU Regulation 1169/2011. **The product group beef and veal covers fresh, frozen or chilled cuts of beef but not products made of beef, like meatballs

The focus of this study is on the product groups for which mandatory origin labelling is to be evaluated. Henceforth, when *extended mandatory labelling* is mentioned in this report, the interpretation is *an extension to product groups under evaluation according to the regulation*.

2.2 Products in the empirical studies

The two consumer studies in Chapters 3 and 4 analyse five food products selected to represent four of the six product groups that are candidates for mandatory origin labelling, see Table 2.2. The products are: partly skimmed milk, yoghurt with forest fruits, strawberry jam, bacon and a ready-made meal with beef. In addition, beef, for which country-of-origin labelling is already mandatory in the EU, is included as a

benchmark product. As meat used as an ingredient is a heterogeneous group, two rather different products are chosen to represent this group. The groups unprocessed foods and single-ingredient products are not included in the study.

Table 2.2: Overview of products evaluated in the consumer studies

Product groups to be evaluated by the EU	Examples	Products in the ranking study	Products in the wtp study
Meat other than beef, swine, sheep, goat and poultry		Not included	Not included
Meat used as an ingredient	Frozen ready-made meals with meat, meatballs, sausages	A frozen ready-made meal with minced beef	i) A frozen ready-meal with minced beef ii) Bacon
Milk	Skimmed milk	Partly skimmed milk	Partly skimmed milk
Milk used as an ingredient in dairy products	Cheese, ice cream, fruit yoghurt, cream	Fruit yoghurt	Fruit yoghurt
Unprocessed foods	Flour	Not included	Not included
Single-ingredient products	Rice, nuts, flour, cream, sour cream	Not included	Not included
Ingredients that represent more than 50% of a food	Jam (fruit /berries), sausages (beef/pork/lamb)	Strawberry jam (fruit content of more than 50%)	Strawberry jam (fruit content of more than 50%)
Product group for which origin labelling is mandatory	Examples	Product in the ranking study	Product in the wtp study
Beef and veal*	Steak, entrecote	Fresh beef	Not included

* EU Regulation 1760/2000

2.3 How to define origin?

If it is decided to extend mandatory labelling to some or all of the product groups suggested for evaluation in the regulation, the interpretation

of the term *origin* will be of central importance. Currently, the product groups covered by mandatory origin labelling consist of unprocessed food, and the origin of an unprocessed product such as a fruit or a cut of beef is relatively easy to determine. However, for processed food, the origin may be defined in several ways.

Origin may mean the origin of the ingredient, for example the origin of the pork in a sausage. In this case, how origin relates to the country of birth, fattening and slaughter of the pig must be decided.¹ Origin may also mean the place of last substantial transformation, i.e. the place of production of a processed foodstuff.² For example, to cure pork into bacon or make sausages is a substantial change, while simply cutting or slicing pork is not. In this case, the country in which the sausage production takes place, but not the country from which the pork originates, will count as the country of origin for the sausage.

The geographical delimitation of origin is another important aspect. Besides the country level, origin can be defined as a zone, such as EU/non-EU, without reference to the specific country. This interpretation is currently employed for honey (EU Directive 2001/110/EC). Moreover, the definition of origin may be narrower and based on the within-country regional level. This is the case for the EU labels on protected geographical indication (PGI) and protected designation of origin (PDO), which may be based on a region or specific place (EU Regulation 510/2006).

Table 2.3: Dimensions of origin

Geographical definition of origin	Food supply chain definition of origin
EU/non-EU	Origin of ingredient (pork in sausage)
Country	Origin of different stage(s) in the production process (birth, fattening, slaughter of the pig)
Region within a country	Origin as place of production (sausage factory)

¹ For beef, as a comparison, country-of-origin must be indicated for all three stages of production (EU Directive 2000/13/EC). When an animal is born, fattened and slaughtered in the same country, one origin denomination is sufficient.

² This is the interpretation of origin in the WTO Agreement on rules of origin (WTO, 1994).

For each product that is labelled with origin, the geographical area and part of the food supply chain referred to must thus be decided (see Table 2.3). The most appropriate combination is not necessarily the most detailed and might not be the same for all products, but depends on the type of origin consumers are interested in, and how high producer costs for providing the information are in each case.

2.4 Labelling as a remedy for information problems

In general, public intervention is justified when the market fails to provide an efficient solution. In the origin labelling case, a main concern is that the existence of asymmetric information, i.e. that producer and consumer access to origin information differs, may give rise to market failure.

A distinction of the **search**, **experience** and **credence** qualities of a food product is often made (see Table 2.4) (Nelson, 1970). Search characteristics, like the size of a loaf of bread or the colour of minced meat, may be ascertained prior to a purchase. Experience characteristics, on the other hand, can only be determined after experiencing (eating) the food in question. Examples of experience qualities include the taste and convenience of handling a particular food. Credence qualities, finally, are characteristics of a product, such as the level of animal welfare or the environmental impact of the production process, that cannot be ascertained even after eating the food.

Table 2.4: Food qualities

Food qualities	Examples
Search qualities	shape, colour, freshness, size <i>labelled origin</i>
Experience qualities	texture, gristle, tenderness, smell, flavour, juiciness
Credence qualities	<i>Unlabelled origin</i> , organic, feed used, hormones, cholesterol, food safety, social responsibility

Source: Table adapted from Becker (2000)

Consumers use search and experience qualities when they shop. Problems arise, however, if a food product contains credence attributes that

are valuable to consumers at the time of purchase. Since no information about these attributes is available, consumers cannot call on information about these attributes when deciding what and how much to buy. The result is that quantities demanded for these goods may differ from what would be optimal from a societal welfare point of view.

The classic remedy for imperfect information is to label products with the credence attribute(s). If there is asymmetric information, where only the producer, and not the consumer, knows about these attributes, the problem may be alleviated by introducing either voluntary or mandatory labelling. Implementing a regulation on mandatory origin labelling would imply moving the origin attribute from being a credence attribute to becoming a search attribute. This move is visualized by an arrow in Table 2.4. Such a move would enable consumers to use the origin information at the time of purchase, thus remedying the information problems discussed above.

2.5 Arguments for voluntary versus mandatory origin labelling

That food origin cannot be observed by consumers does not necessarily imply that governments should introduce legislation mandating firms to provide origin information; origin labelling may also be provided voluntarily by producers. Below, the rationale for voluntary and mandatory labelling of food attributes, respectively, is presented with special regard to origin labelling.

Rationale for voluntary labelling

Firms have incentives to voluntarily label positive credence attributes that consumers are interested in, for example if the fish in a packet of fish fingers have been caught in a sustainable way or if oranges come from a region well known for its high quality oranges. The main reason is commercial; profit-maximizing firms add additional information to a product as long as the revenues of doing so outweigh the costs (Schmalensee, 1972). For instance, some consumers want to buy organic food, and are willing to pay a price premium for it. In this case, voluntary labelling is enough to provide consumers with the information they want.

A product may lack positive credence attributes or have negative credence attributes that the producer would like to conceal. In this case, market forces can also help to disclose information. As rational consumers expect the worst, firms have an incentive to display all positive information because consumers will simply infer that a lack of information means that the attribute is missing (Grossman, 1981). Competition among firms further strengthens the incentives to make explicit claims about hidden positive attributes, allowing consumers to draw appropriate conclusions about food without claims (Ippolito and Mathios, 1990).

What happens if a firm decides to provide origin information that the consumers are not interested in? In this case, the firm will suffer the cost of information provision, but consumers will not buy more of the product or pay a price premium, and thus profits will decline. As a consequence, the firm will soon withdraw the information.

Hence, if the provision of origin information increases consumer demand, or makes it possible for the industry to extract a price premium for the food product in question, this information will be provided if markets work. A lack of origin information would indicate that consumer interest in origin is lower than the cost of providing such information.

From a government point of view, mandatory labelling regulation is not needed if voluntary labelling provides consumers with the information they want. So, for information that consumers may *want to know*, labelling is generally voluntary and market incentives are seen by governments as enough for information provision (Caswell, 2006). For example, eco-labelling is generally seen as a kind of *want to know*-information by governments (Caswell and Anders, 2011). The main role for the government in this case is to facilitate reliable voluntary labelling and to prevent fraud.

Rationale for mandatory labelling

Voluntary labelling may not be enough in some cases. For instance, firms do not disclose enough information voluntarily if information demand is driven by societal concern rather than consumer interest; that is, when lack of information may have a negative impact not only on the individ-

ual consumer but on society as a whole. For instance, if consumers' health is negatively affected by lack of information, costs can arise due to need of hospital care and loss of work hours. In this case, market incentives are not enough for an optimal level of information to be disclosed and there is a market failure.

The government may thus decide that the consumers *need to know* about aspects crucial to the purchase decision (Caswell, 2006). Features related to product and food safety and nutritional information are commonly viewed as such, and labelling is usually mandatory in these cases (Caswell and Anders, 2011).

The consumers' right to know the origin of a product

In addition to attributes that consumers *want* or *need* to know, it is sometimes argued that consumers have a *right to know* about certain attributes (Caswell, 2006). For example, proponents of mandatory origin labelling commonly argue that consumers have a *right to know* the origin of their food. However, consumers often state that they want to know where their food comes from³, but the stated interest does not always translate into a willingness to pay for the information on origin, as pointed out by the European Commission (2013b) for example. Hence, it is generally implicitly assumed that the *right to know* is a one-sided obligation; meaning that the consumer should be provided with the requested information without having to pay for it. This interpretation is evident in OECD (2013) where consumers were asked why they were not willing to pay extra for organic food; most respondents answered that they did not think that they should have to pay extra. However, somebody will have to pay the costs for information provision: the food processing industry, the farmers and/or the consumers.

As *the right to know* is not a free lunch but accompanied by *the obligation to pay* by somebody, the *right to know*-argument is more complex than it may seem at first sight. An important aspect with voluntary labelling is that the individual who enjoys the benefit of the origin information is the one who pays for the provision of the information, while consumers not

³ See for example BEUC (2013).

interested in origin information can buy unlabelled products at lower cost. When it comes to attributes that consumers *need to know*, the societal welfare gain from mandatory labelling is larger than the compliance cost, and it may be regarded as fair that the society shares the cost burden of important issues like food safety. Still, whether labelling of origin should be mandatory based on *the right to know*-argument is a trickier question. How large are the benefits, to whom do they accrue and who pays the cost if mandatory origin labelling is imposed because of a perceived *right to know*? Not addressing these questions in advance may give rise to unpleasant surprises after mandatory legislation is imposed.

2.6 Potential welfare effects of mandatory origin labelling

In order to analyse how society is affected by mandatory origin provision, we look at the welfare effects; that is, how costs and benefits for the society are affected if mandatory origin information provision is extended.⁴ Three different illustrative cases are presented in Table 2.5 below, based on Krissoff, et al. (2004). We assume that there are two consumer groups: one group indifferent to origin information and the other with an interest in origin information. Further, we assume that there is a legal framework to prevent the use of voluntary origin labelling for fraud, and to ensure that the information provided to consumers on a voluntary basis is credible.

Case 1: Limited welfare effects of mandatory origin labelling

In Case 1, consumers have a high interest in origin information, displayed by a high willingness to pay for this information. For producers, the cost of providing this information is low. In this case, voluntary labelling of origin is present as markets work, see Table 2.5.

The issue of mandatory labelling is not likely to be on the agenda in Case 1, as origin labelling is already voluntarily provided. If mandatory origin labelling were imposed, the added value for consumers would be low as they do already have access to the information. Producers already bear the costs for information provision, so they will not be negatively affect-

⁴ The costs and benefits of mandatory labelling may be both private and external but the primary impact would be on private costs and benefits. Therefore we focus mainly on private cost and benefits (producer costs and consumer benefits) in this report.

ed if the mandatory rules are equal to the existing voluntary system.⁵ In sum, the welfare effect of mandatory rules would be limited. Hence, in this case current voluntary origin labelling is sufficient to accommodate EU consumer interest in origin information.

Table 2.5: Benefits of mandatory origin labelling for society

	Case 1	Case 2	Case 3
Consumer benefits	High	Low	High
Producer costs	Low	High	Low
Current voluntary labelling	Yes	No	No
Outcome	Functioning markets	Functioning markets	Markets do not function
Benefits of mandatory origin labelling	Limited	Negative	Potentially positive

Case 2: Negative welfare effects of mandatory origin labelling

In Case 2, consumers have a low interest in origin information, while the costs of providing the information are high for the producers. Here, we would expect no voluntary origin labelling if markets work, as the costs are higher than the benefits, as shown in Table 2.5. So, in Cases 1 and 2 we have situations where the market functions and provides origin information when the benefits exceed the costs.

What would be the impacts on consumers and producers if a mandatory origin labelling were to be imposed in Case 2 based on the argument that the consumers have *a right to know* the origin of their food?

⁵ If the mandatory rules are more extensive than the existing voluntary system, then the reasoning in Case 2 will apply.

Mandatory labelling will impose costs on food suppliers. If the food industry is competitive, these costs will be passed forward to the consumers.⁶ The higher prices for the labelled goods imply that the consumers will be worse off; the food they used to buy is now more expensive than before, and the benefit of the information provided is not high enough to justify the increase in price for them. The price increase means that consumers' real income will decrease, and that they are able to buy less than before. In addition, consumers will buy less of the labelled food products and more of the foodstuffs not subject to the regulation, since the price of labelled food will increase compared to the price of unlabelled food. Hence, there will be a redistribution of demand, which is negative for suppliers of the labelled goods as they will need to reduce production. So, in Case 2, the costs of introducing mandatory origin labelling are larger than the benefits for society.⁷

Case 3: Potentially positive welfare effects of mandatory labelling

In Case 3, consumer interest in origin information is high, which is displayed by a high willingness to pay. The producer costs for providing information are low. In this case, we would expect firms to voluntarily label products with origin information, but this is not the case.

So, in Case 3, there is no voluntary labelling, despite the existence of a large origin-conscious consumer group with a high willingness to pay for this information; this means that there is some kind of market failure hindering an optimal degree of voluntary labelling from taking place. What will the impact be on consumers and producers if a mandatory origin labelling is imposed under these circumstances?

As in Case 2, the costs of information provision will be forwarded to the consumers. With a mandatory origin labelling system, consumers will

⁶ Section 2.7 discusses what happens if this assumption is relaxed. It starts by assuming that food suppliers (farmers, processing firms and retailers) face a horizontal industry supply curve, and that the supply curve can expand or contract at the current price level according to demand. An upward sloping supply curve would generate the same conclusions for the two cases, except that the costs of origin labelling would instead be distributed between both consumers and suppliers. See Krissoff, et al. (2004) for details. The exact amount of how much of the costs will be forwarded depends on the magnitude of industry costs and the elasticity of demand and supply. For a more detailed provision of how demand and supply elasticity matters for the distribution of costs and benefits between actors, see for example Lusk and Anderson (2004), and Joseph, et al. (2013).

⁷ This reasoning also applies if more stringent mandatory rules than current voluntary rules are adopted.

now be certain of the origin of the labelled commodities. Origin-conscious consumers will value and use this information and their demand for the labelled products will increase. Those consumers will be better off, despite the higher price. For the origin-indifferent consumers, demand will fall as a consequence of the higher prices, and they will be worse off.

In Case 3, we will thus have two different and counteracting effects as mandatory origin labelling will increase welfare for the origin-conscious consumers but reduce welfare for origin-indifferent consumers. Hence, we cannot in general say whether the consumers as a group will win or lose, or whether demand in total will increase or decrease. The net gain for the consumers is positive if the total gain for the origin-conscious consumers is larger than the total loss for the origin-indifferent consumers, but whether this is the case depends on the commodity in question.

So, it is *possible* for mandatory origin legislation to be beneficial for society as a market failure hinders an optimal provision of origin information. However, whether this is the case or not is an empirical question.

To conclude, in order to investigate the need for mandatory origin labelling, it is necessary to measure consumer benefits from origin information and producer labelling costs, and to survey the current level of voluntary labelling for the product in question. Comparing costs to benefits, and taking into account the presence of voluntary origin labelling, hence provide an answer to the question of whether origin labelling should be voluntary or mandatory from a societal welfare point of view. This is the approach taken in the rest of this report. We thus analyse whether the products under consideration can be classified as belonging to Case 1, 2 or 3. If a product belongs to Case 1 or 2, mandatory labelling is not recommended. If a product belongs to Case 3, mandatory labelling may be recommended.

2.7 Potential distributional effects of mandatory origin labelling

The total costs and benefits of mandatory origin labelling, as well as how they are distributed along the food supply chain, may matter for the so-

cial desirability of mandatory origin labelling. Below, the aim is to draw attention to some potential, but not always considered, distributional effects of relevance for the choice between a mandatory and a voluntary origin labelling system based on the three cases in section 2.6.

Consumers

As pointed out above, consumers who are not interested in origin information may have a willingness to pay for origin information equal to zero. However, if provision of origin information becomes mandatory, all consumers will pay the price through higher food prices for the commodities covered by the legislation, given that the costs are forwarded by the suppliers. This means that a mandatory provision of information has distributional effects to the disadvantage of origin-indifferent consumers. If origin-conscious consumers have higher incomes than origin-indifferent consumers, an inverted Robin Hood-effect may occur (Mazis, 1980). That is, the poor consumers will lose, as food becomes more expensive, while the wealthy consumers may experience a net gain if the loss due to higher prices is smaller than the gain from the provision of origin information. An advantage with a voluntary origin labelling system is that it does not result in such distributional effects, as the price premium for labelled food is only paid by those consumers who are willing to pay for the information.

Food processing industry

The compliance costs for providing origin information will burden the food processing industry. So far, we have assumed that the industry is able to forward the costs to the consumers. This may not be the case due to, for example, market power in the food supply chain (Krissoff, et al., 2004). Retailers with market power may decide not to accept higher prices from the food industry. In this case, the food processing industry may be forced to bear the increased costs through lower margins,⁸ which may harm the industry's competitiveness.

⁸See for example Lusk and Anderson (2004) who analyse the distribution of mandatory origin labelling costs across the livestock sector in the US.

Domestic agriculture

Consumers may prefer domestic food to imported food if they regard domestic food to be safer, if they wish to support domestic farmers or if they perceive that the environmental, animal welfare and worker protection laws under which domestic food is produced are superior to corresponding laws in exporting countries. Consequently, the introduction of mandatory origin labelling is sometimes regarded as an instrument to promote domestic primary production. For instance, proponents for mandatory origin labelling for beef in the US argued that origin labelling would increase the demand for domestically produced products and improve domestic livestock prices (Brester, 2004). Whether domestic demand will actually increase due to the expansion of mandatory origin labelling is, however, an open question, as pointed out in section 2.6.

Consumer demand may be expected to fall due to the increase in consumer prices caused by origin labelling costs. However, consumers may shift to domestic products if the perceived benefit from the information outweighs the higher price. The net effect on domestic demand therefore depends on which of these two effects dominates. In addition, if the food processing industry cannot forward the compliance costs to the consumers, it may try to lower prices paid to its suppliers and this could harm farmers.

International trade

Mandatory origin labelling may result in a redistribution of trade. For example, if consumers prefer domestically produced food and are therefore willing to pay more for it, mandatory origin labelling will shift demand from foreign producers towards domestic producers. This will harm foreign producers and will be seen as a reduction in imports. Domestic producers will gain market shares in their domestic market, but if they are also exporters they may lose sales on foreign markets and the total impact on their demand will be uncertain. The risk of a reduction in demand is particularly high for firms in countries with a small domestic market, like Sweden.

Even if consumers do not change their behaviour, demand for domestic and foreign goods may be affected, since the cost of implementing origin

labelling may change the price relationship between domestic and imported food products. If we assume that domestic food products have a higher price than similar imported products, origin labelling will result in a higher price of imported products relative to domestic products compared to before, which will reduce imports. This will represent a loss in efficiency in the use of global resources since production will be shifted away from efficient foreign producers towards less efficient domestic producers.

2.8 Invalid arguments for mandatory origin labelling

The previous sections of this chapter discuss the existence of asymmetric information as a potential reason for mandatory origin labelling. The public debate also proposes several other reasons for the introduction of mandatory origin labelling. However, as will be shown below, mandatory origin labelling is not a proper way to address these issues.

Preventing misleading voluntary origin labelling

It is occasionally argued that mandatory origin labelling is necessary as voluntary labelling is sometimes used in a misleading way, and does not provide accurate information to consumers. However, legislation on labelling already states that misleading labelling information is prohibited. Making origin information provision mandatory does not ensure that the labelling will be correct; misleading labelling may well exist under either a mandatory or a voluntary labelling regime if there is too weak a control system. The solution would instead be to strengthen the legislation on and the controls of current voluntary labelling practices.

Preventing fraud in the food supply chain

Introducing mandatory origin labelling is sometimes promoted as a policy instrument to prevent fraud in the food supply chain, not least in the aftermath of the widely debated horsemeat scandal in the spring of 2013. However, legislation already requires foodstuff to be labelled with the type of meat included in it. The horsemeat scandal arose as a consequence of deliberate fraud by some actors in the chain, but that issue will not be remedied by introducing mandatory labelling *of other information*, in this case the geographical origin of the food (European Commission, 2013a). Furthermore, if fraud is already prevalent in the food supply

chain, there is a significant risk that the potential mandatory origin labelling will also be misused. Instead, what is needed is more controls of how already existing legislation is complied with.

Promoting food safety

Even though it is sometimes argued that mandatory origin labelling could enhance food safety, it is not a food safety measure. The idea of mandatory origin labelling is not that it is up to consumers to avoid unsafe food by keeping up-to-date on potential food hazards in different countries. Instead, other, already existing, EU regulatory programs ensure that both domestically produced and imported food is safe to eat (European Commission, 2013b). If this system is not working properly, current practices targeted at ensuring food safety should be strengthened in preference to introducing mandatory origin labelling.

2.9 Concluding comments

Given that origin is not labelled voluntarily, a mandatory origin labelling requirement is most likely to lead to a welfare gain if consumers have such an extensive interest in origin information that their average willingness to pay for information on origin outweighs the costs of providing the information. It is important to recognize that if this is not the case, mandatory origin labelling may well make both consumers and (domestic) producers worse off, as the main effects will be higher prices and lower demand. Whether consumers, farmers, the food processing industry or retailers will bear the costs of labelling depends upon the structure of market power in the food supply chain in addition to how price changes affect the demand and supply of food. So, what will happen in Sweden if mandatory origin labelling is extended to cover more product groups? As this is an empirical question, the next four chapters (Chapters 3-6) will be devoted to an empirical investigation of the importance that consumers attach to origin information relative to other attributes, consumers' willingness to pay for origin information, an effort to estimate labelling costs for food processing firms and the impact of mandatory origin labelling on imports. The results of these studies will then be used in a cost-benefit analysis in chapter 7, to ascertain whether or not extended mandatory origin labelling will be beneficial for society.

3

Consumer benefits: Importance of origin relative to other information

Mandatory origin labelling may benefit consumers who could use this information to make more informed choices when they shop. Still, there are several questions that may be raised: How important is the origin information relative to other attributes like price, brand or food safety aspects? Are consumers prepared to pay for origin information? How does the willingness-to-pay (wtp) for origin information vary over different food categories? Is the origin information important in and by itself, or does it mainly generate benefits by sending signals about other important attributes, like eating quality or food safety?

This and the following chapter present two studies that deal with these issues. The first study (chapter 3) investigates how important origin is to consumers compared to other attributes. The second study (chapter 4) is an in-store experiment where consumers are asked to reveal their willingness-to-pay for origin information.

3.1 Objectives

The main objectives of this chapter are:

- To estimate the extent to which consumers value origin information relative to information about other food attributes.
- To ascertain whether origin information is equally important for different product groups.
- To compare consumer preferences for different denotations of origin.

3.2 Method

Data collection

The aim of the study is to arrive at ranking lists in which the order and importance of different food attributes, including origin, are displayed. The lack of available research on the specific products included in the

study necessitated four focus group sessions, conducted by a marketing research company, to identify the attributes consumers considered important when purchasing these products. The total number of participants in the groups was 31, and the groups were stratified according to age and residence (large or small town).

To assess consumers' ranking of food attributes, an online study was carried out in November 2012 in which a representative sample of Swedish consumers, with respect to age and gender, ranked different food attributes. The sample was recruited by a market research company and consisted of 1,500 individuals altogether.⁹ Based on the proposed extension of mandatory origin labelling, four different products were included: frozen ready-made meals with beef, strawberry jam (with more than 50% strawberries), yoghurt with forest fruit and milk with 1.5% fat. In addition, beef, for which origin labelling is already mandatory, was included as a benchmark product.¹⁰

There are two main advantages with this set-up compared to many other studies where the importance of origin attributes relative to other food attributes is investigated.¹¹ First, the degree to which an attribute is preferred to another attribute may be inferred. Second, observations may be summed across individuals by introducing a so-called anchor, a question regarding whether the respondents view all or only some of the attributes in the set as important.¹² Research indicates that food purchases are often based on routine, with low levels of involvement.¹³ A potential problem is hence that a respondent could view some, or all, of the suggested attributes in a set as irrelevant. If some respondents consider all attributes, while other respondents only consider a subset of them, we cannot aggregate ratings across individuals in a meaningful way (Lagerkvist, et al., 2012).¹⁴

⁹ A small reward in terms of reward points equivalent to SEK 10.50 was provided to each participant.

¹⁰ See section 2.2 for more information regarding the products in the study.

¹¹ For example (BEUC, 2013).

¹² See for example (Jaeger, et al., 2008).

¹³ See for example (Helsop, 2007).

¹⁴ An additional problem is that best-worse scaling typically relates all estimated attribute rankings to an (arbitrary) reference attribute, giving the importance of each attribute as a ratio relative to the reference attribute. This relativistic approach has limitations which can be taken care of when using an anchoring approach. For details, see Lagerkvist, et al. (2012).

The questions were structured in a best-worst rating manner. Each respondent was presented with 18 sets of five different information attributes, and asked to choose the least and the most important attributes in each set. Figure 3.1 shows a typical example of such a set.¹⁵

Figure 3.1: Example of an anchored best-worst question

Please use the following table to indicate the importance you give to various labelling information provided on the package when you are purchasing jam.

Considering only these 5 features, which is the <u>Least Important</u> and which is the <u>Most important</u> ?		
Least important	Feature	Most important
	Country where the berries were picked	
	Country where the jam was produced	
	Information about organic production (verified by government authority or EU body)	
	Ingredients	
	Date of packing	

According to your view; are the labelling features provided above important?

- Yes, all five features are important
- Some are important, some are not
- No, none of the five features are important

Choice of labelling attributes and denotations of origin

EU Regulation 1169/2011 contains no clear indication of how origin should be defined if mandatory labelling were implemented for the suggested product groups. As pointed out in section 2.3, origin could vary both on the geographical level (e.g. country, region within country or region within/outside the EU) and on the part of the food supply chain (e.g. where the ingredients come from or where the product was produced). For this reason, several alternative origin denotations are used, see Table 3.1. For example, for jam the supply chain alternatives for origin are i) where the jam was produced and ii) where the berries were

¹⁵ The choice situations were specified using the MaxDiff designer version 2.0.2 (Sawtooth Software).

picked. In addition, the geographical denotations of origin are i) at the country level or ii) at the EU/non-EU level, without detailing the specific country. In addition, origin in terms of traceability by the use of a numerical code is included.

Table 3.1: Denotations of origin in the ranking study

Product	Origin type		
	Country where	EU/non-EU zone where	Traceability to
Beef, Frozen ready- meal with beef	<u>the animal was</u> -born -fattened/bred -slaughtered <u>the meat was</u> -cut -packed <u>the meal was produced</u>	<u>the animal was</u> -born -fattened/bred -slaughtered <u>the meat was</u> -cut -packed <u>the meal was produced</u>	-breeder -slaughterhouse -group or specific animal
Milk, Yoghurt	<u>the animal was</u> -born -fattened/bred <u>the yoghurt was produced</u>	<u>the animal was</u> -born -fattened/bred <u>the yoghurt was produced</u>	-dairy
Jam	<u>the jam was</u> -produced <u>the berries were picked</u>	<u>the jam was</u> -produced <u>the berries were picked</u>	-production unit

In addition to origin attributes, several non-origin attributes are included, for example ingredients, nutrient value, brand, whether preventive medication has been given or not and information about organic production. In total, the number of food attributes ranges between 20 for milk and 30 for beef.

3.3 Results

The consumer rankings of the food attributes are presented below. The importance of an attribute is measured in percent and the total sum of the attributes for a product is 100%. The most important attribute has the highest percentage, and the attributes are listed in increasing order of importance. Note that the origin attributes are in a darker shade than the

other attributes in the figures, and that the percentage rate for each attribute is given in the figure.

The estimated attribute importance may be used to compare the relative importance of different attributes for a product. For example, if attribute A has an attribute importance of 10% while attribute B has an importance of 5%, then consumers find attribute A twice as important as B.

It is also possible to make comparisons between products. As the attribute importance levels depend on how many attributes are included per product, it is not possible to compare percentage ratios between products. However, relative comparisons of ratings between products can be made. For example, if attribute A is twice as important as attribute B for milk, but attributes A and B are equally important for yoghurt, we can say that attribute A is more important for consumers of milk than for consumers of yoghurt, relative to attribute B.

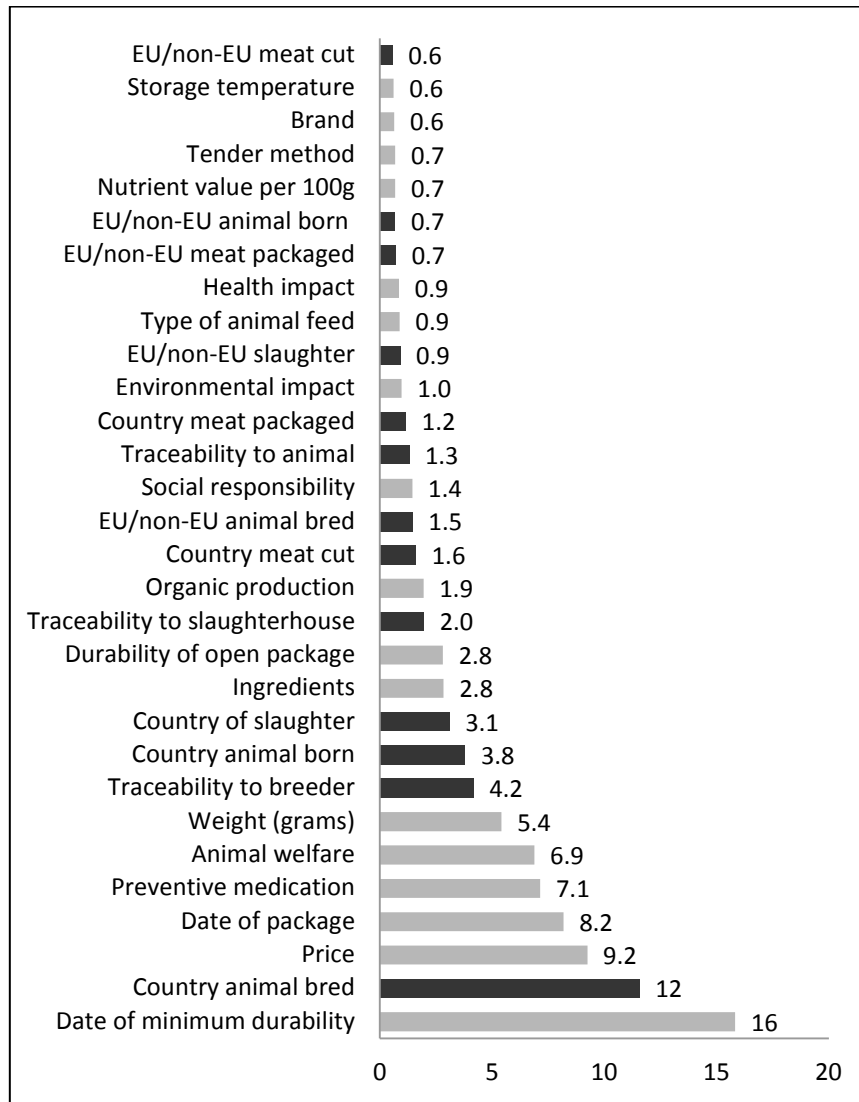
Fresh beef

The results for beef are presented in Figure 3.2. The most important attribute is date-of-minimum-durability with an attribute importance of 16%. The least important attribute is information on whether the meat has been cut in an EU member state or in a non-EU member state, with an attribute importance of 0.6%.

It can be seen that the country of origin of a cut of fresh beef is important to consumers.¹⁶ The attribute importance of country-where-the-animal-was-bred is 12%, and, as can be seen in Figure 3.2, this attribute ranks second after date-of-minimum-durability. It is clear that country-where-the-animal-was-bred stands out among the different origin attributes, as traceability-to-breeder (4.2%) and country-where-the-animal-was-born (3.8%), the second and third most important origin attributes, are of only medium importance to the consumers.

¹⁶ See Lagerkvist (2013) for a more in depth presentation of the results for beef, in addition to a comparison of different methods to rank food attributes.

Figure 3.2. Attribute importance for a cut of fresh beef (%)



Source: Own calculations

Other important food attributes are price, date of package, whether preventive medication has been used or not, and the degree of animal welfare in the livestock, as may be seen in Figure 3.2. It may also be seen that several of the attributes are of low or no importance to the consum-

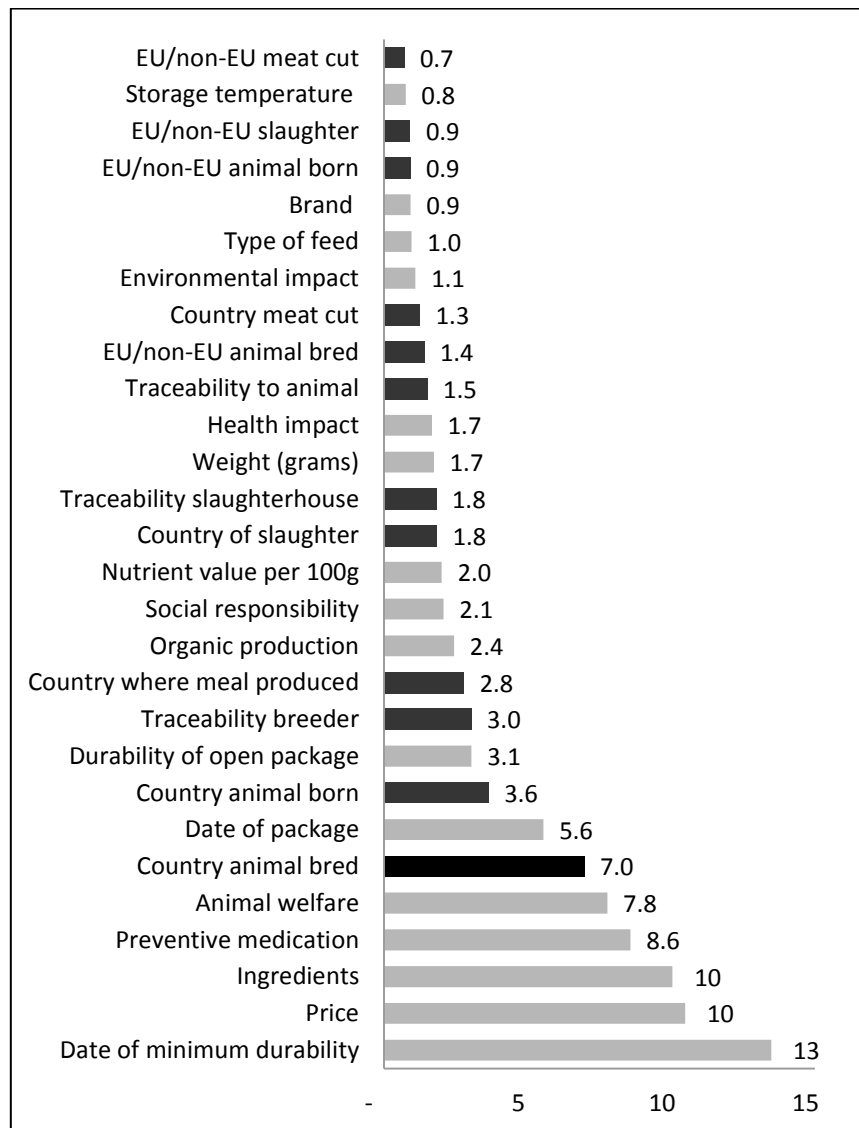
ers; examples are storage temperature and brand. Looking at the first ten attributes (out of 30), the sum of the attribute importance is 75%. That is, a third of the attributes account for three quarters of the importance to the consumers.

Concerning the denomination of origin, the results show that country-specific information is more important for the consumers than information about whether the meat is of EU or non-EU origin, without reference to a specific country. When comparing the country-where-the-animal-was-bred (12%) with the corresponding EU/non-EU attribute (1.5%), the country attribute is eight times as important to the consumers ($12/1.5=8$). Overall, the different EU/non-EU origin attributes cluster at the end of the ranking list.

Frozen ready-made meals

The results for meat as an ingredient, in this case exemplified by a frozen ready-made meal with beef, are shown in Figure 3.3. The first origin attribute, country-where-the-animal-was-bred, ranks as number six of the included attributes, and has an attribute importance of 7.0%. By contrast, country-where-the-meal-was-produced has an attribute importance of only 2.8%. As before, information on EU or non-EU origin is of low interest to the consumers.

Figure 3.3. Attribute importance for frozen ready-made meals (%)

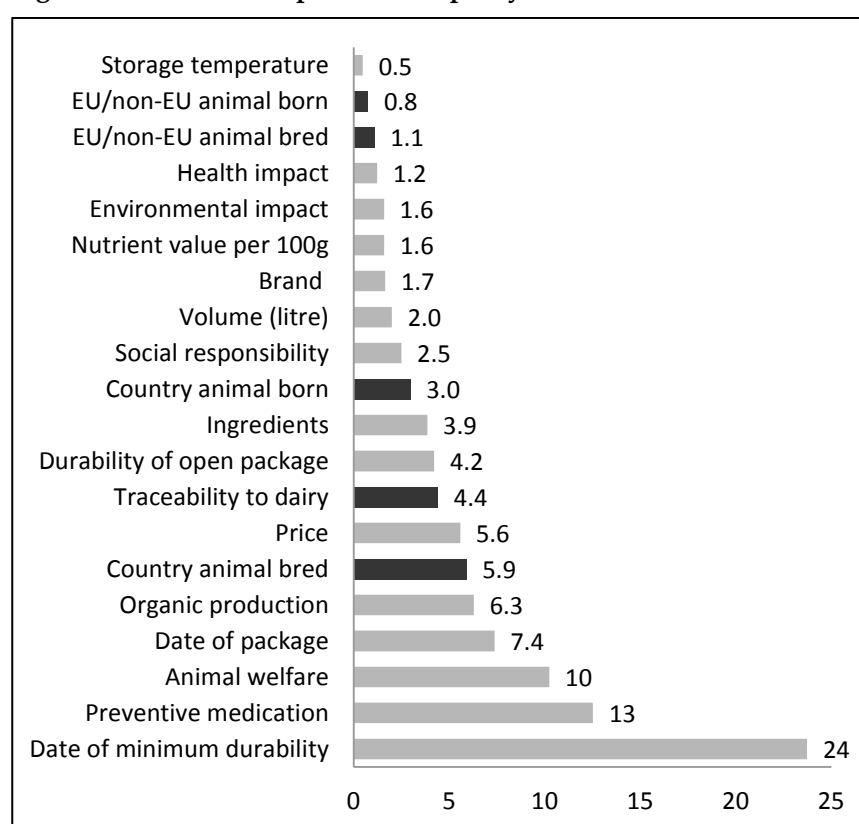


Source: Own calculations

Partly skimmed milk

For milk, the date-of-minimum-durability stands out as the single most important attribute with an attribute importance of 24% (see Figure 3.4). Country-where-the-animal-was-bred has an attribute importance of 5.9%.

Figure 3.4: Attribute importance for partly skimmed milk (%)

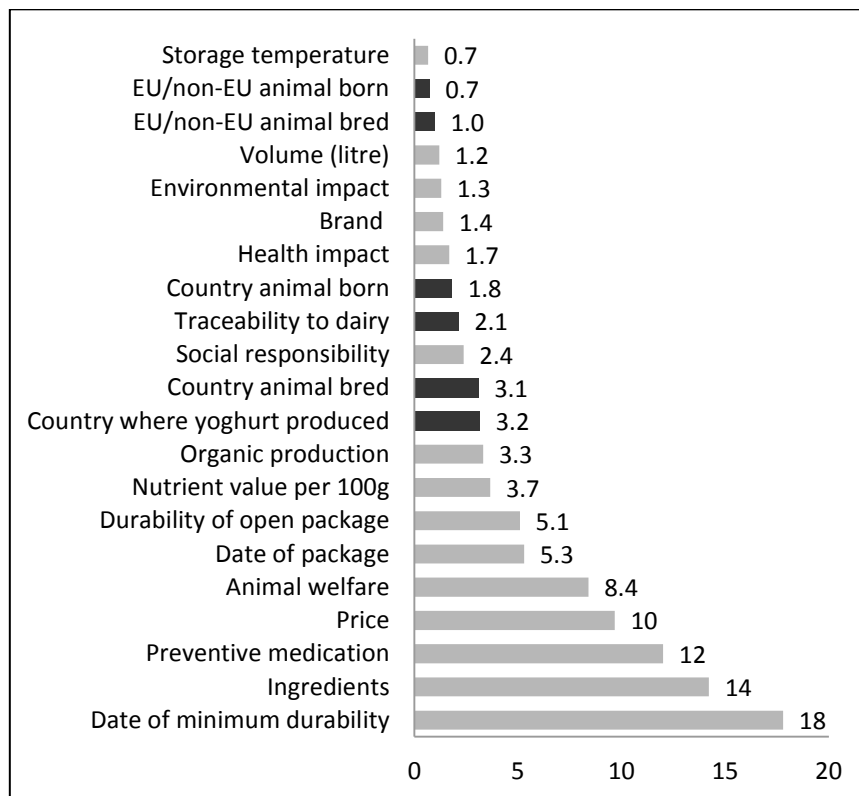


Source: Own calculations

Yoghurt

The results for milk as an ingredient in yoghurt show that the origin of milk is of low importance to yoghurt consumers, as seen in Figure 3.5. The first origin attribute, country-where-the-yoghurt-has-been-produced, has an attribute importance of 3.2%. It can be noted that it is more, or at least equally, important for consumers to know where the yoghurt has been produced compared to where the milking cows were bred.

Figure 3.5. Attribute importance for yoghurt (%)



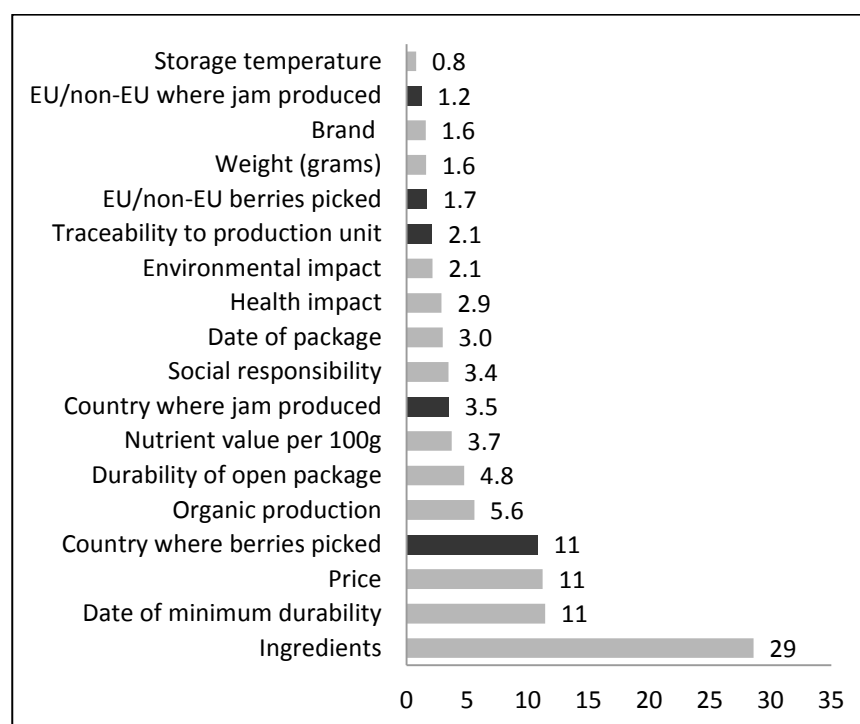
Source: Own calculations

Jam

For jam, the single most important attribute is ingredients, with an attribute importance of 29%, as illustrated in Figure 3.6 below. In contrast

to yoghurt, it is more important for the consumers to know where the berries in the jam were picked, compared to where the jam was manufactured. The attribute importance for where the berries were picked is 11%.

Figure 3.6. Attribute importance for jam (%)



Source: Own calculations

3.4 Discussion

The origin of food is clearly of some importance to consumers, but the importance of origin varies among products. For fresh beef, country-of-origin is the second most important attribute, while country-of-origin of the ingredient ranks as number four for jam, number six for a frozen ready-meal and milk, and as number ten for yoghurt.

The differences between products with regard to origin are illustrated in Table 3.2, in which three different types of origin attributes are related to

the most important attribute for each product. These are i) the country-of-origin for the ingredient, ii) whether the ingredient comes from an EU-member state or a non-EU member state and iii) the country-of-production of the processed food. Date-of-minimum-durability is the most important attribute for all products except jam, for which ingredients is the most important attribute. A ratio close to one means that the origin attribute in question is as important as the most important attribute for the product; the lower the ratio the less important the origin attribute. For example, a ratio of 0.25 (milk) means that the date-of-minimum-durability is four times as important as the country-where-the-animal-was-bred (which is the country-of-origin attribute with the highest attribute importance for milk).¹⁷

Table 3.2. Consumer interest in different denominations of origin

Denomination of origin	Beef	Frozen ready-meals	Milk	Yoghurt	Jam
Ratio of first country -of-origin attribute to the attribute of highest importance	0.75	0.52	0.25	0.18	0.38
Ratio of first EU/non-EU -of-origin attribute to the attribute of highest importance	0.09	0.10	0.05	0.06	0.06
Ratio of country-of-production to the attribute of highest importance		0.21		0.18	0.12

Source: The calculations are based on estimated attribute importance presented in Figures 3.2-3.6 above

The first type of origin attribute in Table 3.2 is country-of-origin. As can be seen, country-of-origin is highly important for beef with a ratio of 0.75, followed by beef as an ingredient in frozen ready-meals, while it is of least importance for milk as an ingredient in yoghurt with a ratio of 0.18. Notably, both fresh and processed beef stand out, with considerably higher ratios and thus higher consumer concern regarding origin, than for the other products. As a product becomes more processed, for

¹⁷ Table 3.4 shows that the attribute importance for date-of-minimum-durability is 24% and that the attribute importance for the first country origin attribute, country-where-the-animal-was-bred, is 6%; the ratio hence becomes $6/24 = 0.25$.

instance beef as an ingredient or milk processed into yoghurt, the importance of origin declines. For beef, the ratio falls from 0.75 to 0.52 and for milk from 0.25 to 0.18.

The second origin attribute in Table 3.2 is EU/non-EU-origin. A persistent result in this study is that information on EU/non-EU origin is of virtually no importance to consumers. The ratio is 0.10 or below for all products, as seen in Table 3.2. That is, the most important attribute is at least ten times as important as the first EU/non-EU origin attribute.¹⁸ This result is in line with Lagerkvist, et al. (2014) in which country-of-origin information was strongly preferred by consumers to EU/non-EU origin information for beef.

The third origin attribute in Table 3.2 is country-of-production. For processed food, origin can be defined as the country-of-last-substantial-change; that is the focus could be on where the production process took place rather than where the main ingredients originate from, as in the two previous cases. For yoghurt, country-of-production is the origin attribute with the highest rank, although country-where-the-milking-cows-were-bred follows closely; both have a ratio of 0.18. This implies that it is more, or equally, important to know where the yoghurt has been produced compared to where the milking cows originate from. This result appears to be specific for yoghurt. For jam, the origin of the country in which the berries were picked (0.38) is of much higher importance than the country in which the jam was produced (0.12).

Overall, the ranking is consistent among products. Date-of-minimum-durability is the most, or second most, important attribute. This is in line with previous studies (Bernués, et al., 2003, Nordic Council, 2007, Verbeke and Ward, 2006). Moreover, price ranks high for all products, as do ingredients, and attributes at the lower end of the scale are virtually the same across products. Lastly, the results show that consumers use relatively few quality cues at the moment of purchase, as several of the attributes have little importance to consumers. This is in line with

¹⁸ It is also possible to compare EU/non-EU origin with country-of-origin in a similar way. For beef, country-of-origin is estimated to be eight times as important as EU/non-EU origin. For beef as an ingredient, the corresponding figure is seven times, for jam six times and for yoghurt three times as important.

(Verbeke and Ward, 2006). The sum of importance for the 10 most important attributes ranges between 75% for beef as an ingredient to 86% for jam.

Looking at the non-origin attributes, it may be noted that the extent of animal welfare of the livestock ranks among the top attributes for all relevant products, confirming previous research findings (Tonsor and Wolf, 2011). In addition, whether the animals receive preventive medication or not, ranks high. The latter can be expected to be related to animal welfare, but also to public health as consumers may worry about residue in the food they eat. Further, attributes related to sustainability, like organic production or environmental impact, are of low interest to consumers in general. That attributes related to the production process are of low importance to consumers in general does not mean that they are insignificant; in fact, research and sales figures show that those attributes are of high importance for certain segments of consumers.¹⁹

3.5 Concluding comments

For consumers, origin information is important relative to other information cues for some food products, most notably for beef and to some extent for frozen ready-meals. However, the study shows that the degree of importance varies among products. For yoghurt, milk and jam, origin information is of considerably less interest. It also matters whether a product is processed or not; for both beef and milk, consumers are more interested in the origin of the fresh product compared to when it is an ingredient in a frozen ready-meal or yoghurt, respectively.

Whether consumers prefer to know the origin of the main ingredient, or where a product has been manufactured, differs among products. For yoghurt, the place of production is more, or at least equally, important as the origin of the milking cows. This is in stark contrast to jam, where the origin of the berries is of much higher relevance to the consumers than the place of manufacturing. Finally, there is an ordering of different denominations of origin, as consumers clearly prefer information on a specific country-of-origin to a wider EU versus non-EU demarcation.

¹⁹ See for example OECD (2013).

4

Consumer benefits: Willingness to pay for origin information

The consumer ranking study in chapter 3 shows that consumers are interested in origin, at least for some products. But are they also prepared to pay for receiving information on origin? This chapter contains the results of the in-store experimental study where consumers are asked to reveal how much they would be willing to pay for origin information. The results of this chapter will be used as direct inputs into the cost-benefit analysis carried out in Chapter 7.

4.1 Objectives

The main objectives of this chapter are:

- To obtain estimates of what Swedish consumers would be prepared to pay for origin information on the selected products.
- To analyse factors that affect willingness-to-pay (wtp) for origin information on the selected products.
- To learn if origin acts as a signal for other attributes for any of the selected products.
- To evaluate the importance, for Swedish consumers, of buying products from the geographical areas they live in (EU, Sweden or region within Sweden) rather than from other geographical areas.

4.2 Method

Data collection

An in-store experimental auction procedure was carried out in June 2013 to elicit consumer wtp for origin labelling. A total of 750 respondents were recruited to participate in the study lasting five weeks.²⁰ Based on the proposed extension of origin labelling in the EU, five different food

²⁰ In most respects the sample was representative of Swedish averages for all the products. One notable exception concerns the level of education, which is slightly higher than the average in the sample. This difference is probably due to the fact that the store is situated in a city (Lund) with a relatively large university.

products were included: frozen ready-made meals with beef, strawberry jam (with more than 50% strawberries), yoghurt with forest fruits, milk with 1.5% fat and bacon.²¹

Each respondent was directed towards one of five tables (one per food category) in the store where the interviews took place. The participants were then given, free of charge, the product they had qualified for in the initial screening phase. This product did not have any indication as to its origin(s). They also received a small amount of money for participating in the study.²² The participants were then shown the same product, but with an attached label indicating the type of origin information that would be disclosed if they won the auction. They were then informed, verbally as well as by a written concept description, of how the auction mechanism would work.

The main steps of the auction procedure are visualized in Figure 4.1. All the steps (and the questions that followed) were carried out on an iPad that was initially handed out to each participant. First the respondent revealed his/her maximum wtp for having an additional origin label on the product, and then the computer drew a random price for this information. If the provided wtp was higher than or equal to the random price (Case 1), the respondent “won” the auction and received the origin label, but had to make a payment equal to the randomly drawn price.²³ If wtp was lower than the random price (Case 2), the respondent “lost” the auction, which meant that he/she kept the product (without origin labeling) and paid nothing.

There are two main advantages in this setup as compared to most other studies where origin information has been estimated. Firstly, the exper-

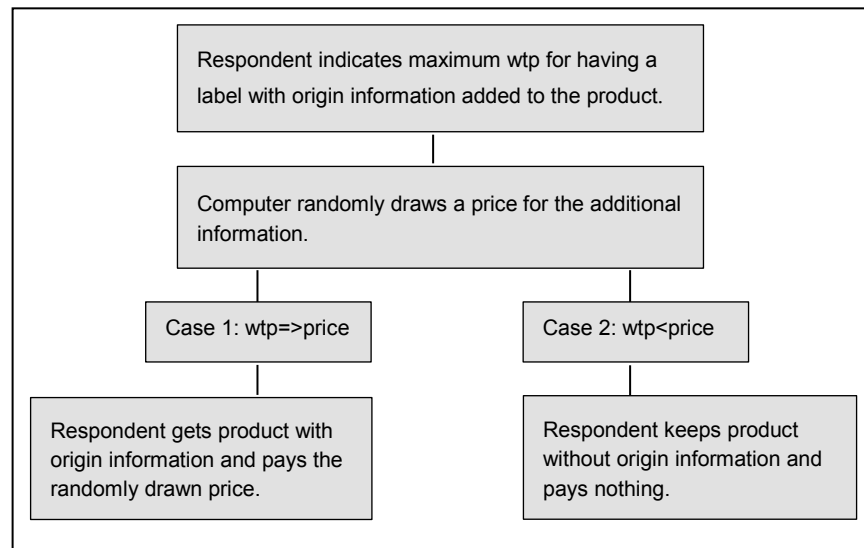
²¹ See Table 2.2 and the related text for inclusion criteria.

²² The reason for giving them money at this stage was a concern that many consumers only use credit cards when they go shopping. Since this was a non-hypothetical experiment, in which the participants would potentially have to pay with real money, we had to ensure that all respondents would be able to pay for origin information. The respondents were informed that the amount received could be used freely, and that they were in no way obliged to use it in the experiment. Two different endowments (SEK 10 and SEK 20) were used to test whether the endowment had any effect on wtp (which it did not have).

²³ Having the winner pay the price (rather than his stated wtp) has two main advantages. Firstly, the best strategy for each respondent is to disclose his/her real wtp, which may not be the case otherwise (Lusk and Shogren, 2007). Secondly, this setup more closely resembles a real purchasing situation, in which you pay a predetermined price for a product in the store, a price that may be considerably lower than your maximum wtp.

iment is non-hypothetical in the sense that respondents did actually have to pay for the information in order to get it. In most other studies, respondents only state their wtp, but do not have to actually carry out any transactions, which may lead to a hypothetical bias with stated wtp higher than real wtp. Secondly, the setup ensures that information on origin is valued in its own right. Thus, respondents do not know what the origin will be until they have paid for it, which implies that they pay for information *per se* rather than paying for an upgrade to a product with a known origin.²⁴

Figure 4.1. The main steps of the auction mechanism used in the study



Choice of denotations of origin

As previously discussed, there is no clear indication in EU Regulation 1169/2011 of either (a) which geographical level (e.g. country, region within country or within/outside the EU) or (b) which part of the food supply chain (e.g. where the ingredients come from, or where a product was produced) that would be used to define origin if the regulation was implemented. For this reason two alternatives (called **origin types** be-

²⁴ A further discussion on these aspects is provided in e.g. (Klain, et al., 2013).

low) are provided for each product included in the study.²⁵ Table 4.1 presents the different origin types in more detail. For each product, origin type 1 corresponds to less specific origin information and origin type 2 to more specific origin information. Note from the table that, for ready-made meals, the two origin types differ in terms of where in the food chain they apply, while for the other four products the distinction between origin types is based on geographical levels.

Table 4.1. The alternative origin types used in the study

Product	Origin type 1 (less specific origin information)	Origin type 2 (more specific origin information)
Frozen ready-made meals with beef	Country where meat product was made	Country where the meat originates from
Strawberry jam	If the berries were picked in EU or not (no specific country indicated)	Country where the berries were picked
Yoghurt with forest fruits	Country where cows were milked	Geographic region within a country where cows were milked
Milk (1.5% fat)	Country where cows were milked	Geographic region within a country where cows were milked
Bacon	If meat originates from EU or not (no specific country indicated)	Country where the meat originates from

4.3 Results

This section presents the results of the willingness-to-pay study. The size of Swedish consumers' wtp for origin information is presented, as well as how their wtp depends on different factors such as type of product, origin type and regional preferences.

Swedish consumers' willingness-to-pay for information on origin

The overall distribution of wtp across the five products is shown in Figure 4.2. As many as 36 percent of the respondents indicated that they were not willing to pay anything for origin information. Only 13 of the

²⁵ The different origin types were selected in collaboration with the National Food Agency in Sweden in order to cover the most viable alternatives of a potential future legislation for each product.

765 respondents (1.5 percent) indicated a wtp that was higher than SEK 10.

Figure 4.2. Distribution of wtp values in the study (all food categories included)

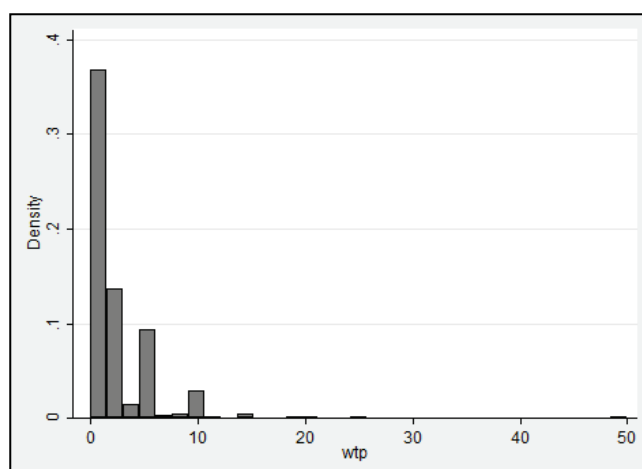


Table 4.2 reports median wtp for origin information on all products and origin types.²⁶ The breakdown of median wtp in the table is based on the same principles as in Table 4.1, with the less specific origin information for each product on the left hand side, and the more specific origin information on the right hand side. As an example, the median wtp for knowing if the berries in a jar of strawberry jam were picked in the EU or not (origin type 1) was SEK 1.12.

²⁶ The median, rather than the mean, was chosen to describe the central location of the data. The reason for this choice was that wtp was clearly non-normally distributed for all the five products (tested with a Shapiro-Wilks test). For distributions that are non-normal, the mean becomes increasingly sensitive to outliers and may yield results that are less intuitive when trying to describe the data.

Table 4.2. Median wtp (SEK)

Product	Origin type 1 (less specific origin information)	Origin type 2 (more specific origin information)
Frozen ready-made meals with beef	0.12 (0-2)	2 (0.5-5)
Strawberry jam	1.12 (0.5-2)	2.5 (1-5)
Yoghurt with forest fruits	1 (0.5-2)	1 (0-1)
Milk (1.5% fat)	1 (1-1.1)	1 (0.5-1)
Bacon	2 (0-2)	2 (1-2)

Note: Values in parentheses are 95% confidence intervals obtained by rank analysis

As shown in Table 4.2, median wtp for origin ranges between SEK 0.12 and SEK 2.50 depending on product and origin type.²⁷ No earlier studies that analyse wtp for origin information have been found for any of these products, and it is therefore difficult to determine whether the obtained estimates are high or low. A large number of studies have calculated wtp for origin information for other products like beef (Gao and Schroeder, 2009, Loureiro and Umberger, 2003, Umberger, et al., 2003), chicken (Bolliger, 2011), apples and tomatoes (Mabiso, 2005) and white onions (Ehmke, et al., 2008). However, all of these studies suffer from one or both of the potential shortcomings discussed previously (hypotheticality and not valuing information *per se*).

The only analysis found where neither of these two problems is present is a study of US consumers who valued origin information for beef steaks and pork chops (Klain, et al., 2013). Using an in-store experimental auction procedure, the overall mean wtp for origin information was estimated to be \$1.37. This is approximately equivalent to SEK 9.00²⁸, which is significantly higher than any of the values obtained for the products in this study.^{29,30} More specifically, it is considerably higher

²⁷ These median wtp values are aggregated in a later section in this chapter, so that total annual benefits for a typical consumer for each of the product/origin type combinations are obtained. These aggregated wtp values are then used as inputs into the cost-benefit analysis carried out in Chapter 7.

²⁸ Exchange rate USD/SEK: 6.55.

²⁹ The differences between mean and median wtp values in the current study were rather small and did not qualitatively affect the comparison with Klain, et al. (2013) where mean wtp was used.

than the wtp values for ready-made meals and bacon, both of which represent processed meat. Despite differences in the two studies, this outcome seems to support the finding of the ranking study; i.e. Swedish consumers are more interested in the origin of fresh products than in the origin of processed products.

Differences in willingness-to-pay across products

The objective of this section is to determine statistically if the wtp values for origin information in Table 4.3 differ among the products. This question is relevant since differences in wtp may suggest differentiated origin legislation for the various product categories.

Table 4.3. The products and origin types compared to determine if wtp is different for the different product types

Product	Origin type 1 (less specific origin information)	Origin type 2 (more specific origin information)
Frozen ready-made meals with beef		Country where the meat originates from
Strawberry jam		Country where the berries were picked
Yoghurt with forest fruits	Country where cows were milked	
Milk (1.5% fat)	Country where cows were milked	
Bacon		Country where the meat originates from

To compare the products on equal terms, only the specification of each product that refers to origin of the raw product on the country level is selected for comparison. As detailed in Table 4.3, this includes origin

³⁰ The difference also holds if the premium for origin information is regarded as a percentage of the price of the unlabelled products. Unfortunately, no prices for the unlabelled steaks were provided in the study (Klain, et al., 2013). To enable an approximate estimation of the price premium, we instead use an indicative price of \$4 per steak in US stores, based on information in (Loureiro and Umberger, 2003). The price premium can then be calculated as $1.37/4=0.3425$, which is considerably higher than for any of the products in this study.

type 2 for ready-made meals, strawberry jam and bacon, and origin type 1 for yoghurt and milk.

In sum, wtp for origin information on ready-made meals and jam was found to be significantly higher than for the other products, while wtp for origin information on bacon was significantly higher than for milk and yoghurt.³¹ The wtp for origin information on ready-made meals and jam could not be statistically separated, and the same was true for milk and yoghurt.

Differences in willingness-to-pay for different origin types

As previously discussed, the origin that may be displayed on labels can be differentiated along two dimensions: the geographical denomination and the location in the food supply chain. The objective of this section is to analyse which of the specifications of origin consumers prefer. This is important to know since it suggests how to best define origin (from a consumer point-of-view) in potential future legislation on mandatory origin disclosure. Differences found with regard to the two dimensions are now discussed in turn.

Four of the products had origin types that differed with respect to geographical denomination: strawberry jam (EU vs country), bacon (EU vs country), yoghurt (country vs region) and milk (country vs region). For each of these four products, a test was carried out to determine whether wtp was significantly different between the two specified geographical denominations.³²

The tests indicate that geographical denomination had a significant effect on wtp for strawberry jam, yoghurt and milk, but not for bacon. The effect is particularly evident for jam, where wtp for information about which country the berries had been picked in was strongly preferred to

³¹ A Kruskal-Wallis test was carried out to see if there were any overall differences between the products. This test indicated that there were indeed significant differences among at least some of the products. To further specify these differences pairwise, Mann-Whitney tests were used to compare each pair of products with regard to wtp. The tests that were carried out to compare wtp for the products were based on the wtp values predicted in the regression analysis (which is described in detail in Appendix 1).

³² Pairwise Mann-Whitney tests were used. The wtp values used in the tests were predicted from the regression model in the regression analysis (which is described in detail in Appendix 1).

information about whether the berries had been picked within or outside the EU.

Interestingly, regardless of being the more specific geographical denomination (as for jam) or the less specific (as for milk and yohurt), *country-of-origin* was the preferred geographical level of information for the consumers. This result both confirms and extends the results regarding geographical denominations presented in the ranking study. Not only was information about country-of-origin generally preferred to origin information on the less specific EU level, it also seemed to be preferred to the more specific within-country regional level.

Ready-made meals were the only product type where the origin type differed with regard to location in the food supply chain. Either consumers valued information about the country where the meat product in the meal was produced, or they valued information about the origin of the meat itself. The tests performed in this section were carried out to analyse whether wtp differs depending on which part of the food chain the origin information relates to.³³

The results indicate a strong preference for knowing the origin of the meat rather than the origin of the production. Thus, information about origin is valued higher when the origin relates to early stages in the food supply chain. This result is in line with the results from the ranking study where information about the breeding-country of animals ranked higher than origin information about country of production of the meat product for ready-made meals.³⁴

Aggregation of willingness-to-pay

To obtain aggregate annual benefit estimates (to be used as inputs into the cost-benefit analysis in Chapter 7), the median wtp values in Table 4.2 had to be multiplied by the total number of items purchased by a typical customer during one year. To obtain such estimates, each respondent in the in-store experiment was asked to provide his/her fre-

³³ The Mann-Whitney tests were carried out in the same way as in the previous section.

³⁴ See Section 3.3, Figures 3.2 and 3.3.

quencies of buying each of the five products included in the study. The results are presented in Table 4.4.³⁵

Table 4.4. Reported frequencies of buying the products in wtp study

“How often do you purchase...”?	Ready-made meals	Strawberry jam	Yoghurt	Milk	Bacon
Never (0)	0.42	0.11	0.08	0.25	0.08
Once a year (1)	0.07	0.22	0.02	0.01	0.07
Twice a year (2)	0.15	0.19	0.03	0.02	0.07
Once every other month (6)	0.10	0.20	0.04	0.02	0.19
Once a month (12)	0.13	0.18	0.11	0.04	0.28
Once every other week (26)	0.06	0.05	0.13	0.04	0.21
Once a week or more often (52)	0.07	0.03	0.59	0.63	0.10

Number of respondents: 765

Note: Values in parentheses indicate the interpretation of the statement that precedes it in terms of the number of purchasing occasions per year

The alternatives are arranged from “never” to “once a week or more often”, and the interpretations of what each alternative means in terms of the number of purchasing occasions in one year are provided within parenthesis after each alternative. Thus, “once every other month” is interpreted as 6 times a year while “once a week or more often” is interpreted as 52 times a year.

It is apparent from Table 4.4 that buying patterns vary considerably among the products. Milk and yoghurt are bought much more frequently than the other products (although a considerable number of the respondents never buy milk). Besides, ready-made meals and jam are

³⁵ The provided frequencies do not regard consumers that did not qualify for any of the products. Since these consumers, by definition, had lower buying frequencies than consumers included in the study, the reported frequencies are probably slightly higher than for average consumers.

bought on a less frequent basis. Notably, a considerable share (42 percent) of respondents indicate that they never buy ready-made meals.

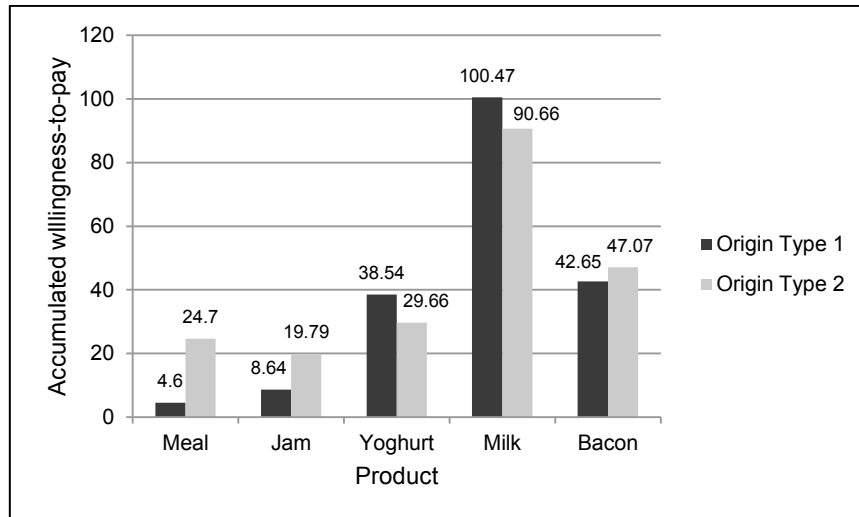
There are a couple of uncertainties related to Table 4.4 that must be dealt with in order to estimate the total number of items purchased annually by a typical consumer. Firstly, the notion of “once a week or more often” is ambiguous and does not necessarily imply exactly once a week. Secondly, the alternatives provided to the consumers ask for how frequently they buy the products, but not how many items they usually buy per purchasing occasion.

To come to terms with these problems, the described uncertainties were incorporated into a simulation procedure that made it feasible to estimate the expected total number of items purchased in one year for each of the products.³⁶ Multiplying these estimates by median wtp resulted in estimates of the total annual benefit of an origin label for a typical consumer. The results in terms of mean values from these calculations are presented in Figure 4.3.³⁷ For example, the average accumulated wtp was approximately SEK 20 per purchaser for knowing the country where the berries in the jam were picked. In the figure, differences between the products depend upon differences in median wtp, in frequencies of buying the products and in the expected number of items that are purchased on each occasion, while differences between the two origin types for a specific product depend solely upon different median wtp values.

³⁶ See Appendix 2 for details regarding the distributions used in this simulation.

³⁷ In a typical cost-benefit analysis, one would like to go a few steps further in the aggregation process by adding the benefits of all purchasers to get a national annual estimate. Further, one would typically want to look at all future benefits rather than just the benefits for a given year. That would enable a calculation of the present value of the benefits, which could then be compared to the present value of the costs to obtain a net present value of the suggested legislation. However, since the costs were not possible to estimate (as discussed in the next chapter) and since we have no reason to expect the annual benefits to differ between years, there would be no additional gain in trying to aggregate the benefits any further.

Figure 4.3. Mean values of accumulated annual wtp (total benefits) for an average purchaser.



Source: Own calculations

Milk is often bought in larger quantities than the other products³⁸, which is why accumulated annual wtp is higher for milk than for the other products. Bacon comes in second place, which is due partly to the rather high median wtp for origin information per item, and partly to the fact that bacon is often provided in packages of three. Accumulated wtp is lowest for jam and ready-made meals, mainly because these products are purchased rather infrequently compared to the other products. A further discussion of accumulated wtp in relation to producer costs and voluntary labelling is provided in Chapter 7.

Origin labelling as a signal for other information

Origin can act as a signal for other attributes that consumers value, like eating quality, food safety, health-related issues and social concern (Becker, 2000).

³⁸ Based on publicly available data we have assumed that between 1 and 4.75 packages of milk are bought on each purchasing occasion. See Table A2.1 in Appendix 2 for details regarding all parameter assumptions and data sources.

Knowledge of these signals is relevant for policy-makers, since it may detect primary consumer needs that could possibly be satisfied in a better way through other, more targeted policy instruments. As an example, if it is found that consumers want origin information mainly because they believe it signals the level of food safety, it might be better to design a legislation that would provide them with this food safety information more directly than would be the case with origin labelling.

To analyse the strength of these signals, the wtp survey included four questions regarding food attributes that respondents believed could be signalled by the origin information they had just valued. These attributes were:

- food safety in terms of the presence of dangerous bacteria
- food safety in terms of the presence of dangerous pesticides and chemicals
- social responsibility in production, including working conditions and animal welfare
- food (eating) quality

Figure 4.4 illustrates how one of these questions was formulated in the survey (free translation from Swedish). In this example the respondent is asked to indicate to what degree a country-of-origin label for pork in bacon would signal food safety in terms of dangerous bacteria. As seen in the figure, each question had a scale with 7 points, where 0 stated that "I do not agree at all" and 7 indicated "I agree completely". Since 4 represents the mid-point, any number that is higher than 4 would indicate that origin does act as a signal.

Figure 4.4 An example of a survey question on signal strength

Assume that the EU legislation on mandatory origin labelling was ratified, and that labels on all packages of bacon indicated the country-of-origin of the pork. How could this information be used when buying bacon?

With the help of this origin information I would be able to determine which packages of bacon could contain dangerous bacteria.

I do not
agree at all

I agree
completely

☐
1

☐
2

☐
3

☐
4

☐
5

☐
6

☐
7

With five products, two origin types and four attributes that may be signalled by origin information, we get a total of 40 different questions like the one in Figure 4.4. Table 4.5 presents the median score of each of these 40 questions. As an example, the median score of 4, which is indicated by a superscripted “a” in the column for bacon in the table, is the median of all the respondents who received the particular question in Figure 4.4.

The median scores in Table 4.5 range from 3 to 5, which indicates that, overall, origin information does not seem to provide strong signals of any of the included attributes.³⁹ For some products and origin types, the median scores were found to be significantly different from 4, and these are marked by asterisks related to significance levels (see details below Table 4.5).⁴⁰ Looking at these significance levels, it seems that origin information signals social responsibility slightly more, and food safety (in terms of bacteria) slightly less, than the other attributes.

³⁹ A Kruskal-Wallis test was carried out to see if there were any deviations from this general conclusion (of a low signal strength) for any of the products. The test result indicated that there were no significant differences for any of the products regarding signal strength.

⁴⁰ Significance levels were obtained using the Wilcoxon signed-ranks test.

Table 4.5. Median scores on the four questions on signal strength

Product	Meals		Jam		Yoghurt		Milk		Bacon	
Origin type	1	2	1	2	1	2	1	2	1	2
Signal										
Food safety bacteria	3	4	3**	4	4	4	5**	3	3	4 ^a
Food safety chemicals	4	5***	4	5*	4	4	5***	4	5**	4
Food quality	5**	5***	3*	4	5	4	5**	4	4	5***
Social responsibility	5**	5***	4.5	5**	5***	5**	5***	4.5	4	5**

Notes: *=significantly different from 4 at 10% level (Wilcoxon signed-rank test)

**=significantly different from 4 at 5% level (Wilcoxon signed-rank test)

***=significantly different from 4 at 1% level (Wilcoxon signed-rank test)

^a=median score for all respondents that received the example question in Figure 4.4

Thus there seems to be a limited but positive indication that respondents believe that origin information provides signals regarding social responsibility. Further, for the non-dairy products, the regression analysis (see Appendix 1) indicates that social responsibility is important for consumers when they decide whether they want to pay for the origin information.⁴¹ From a policy perspective, alternative and possibly more efficient ways of providing this information directly (for example by using a label where social responsibility is directly indicated) should therefore be evaluated.

Another policy-relevant question is whether the signals are different for any of the products depending on the origin type. As an example, would information about the country where the berries were picked (for jam) provide consumers with stronger or weaker signals about other attributes than information about whether the berries were picked inside or outside the EU? Information about any such differences indicates which would be the best origin type to use in order to (indirectly) provide con-

⁴¹ In the regression analysis, social responsibility is included in the variable "credence attributes" which is significant in Tier 1 (probability with a positive wtp) for all three non-dairy products.

sumers with the information they require about the signalled attributes.⁴²

Tests indicate that origin type plays an important role in terms of signal strength only for milk, where the signals for all four attributes were stronger for origin type 1 (country where cows were milked) than for origin type 2 (region within country where cows were milked).⁴³ Again, the *country*-of-origin thus seems to be the most important geographical denomination.

In conclusion, if origin is to be used as a means of providing consumers with information about other characteristics, it seems to be most relevant to provide this information of origin at the country level. Again, however, alternatives to provide this information by more direct means than through origin labelling should be evaluated.

Regional preferences

Origin information may also be valued by consumers for reasons other than sending signals about characteristics. Consumers may, for example, value origin information in order to be able to select only products that come from their own regions or countries. One possible explanation why these regional preferences may exist is the notion of ethnocentrism, which is based on the need for individuals to develop a sense of identity. It is manifested by a very strong inclination to buy products exclusively from one's own country or region (Shimp and Sharma, 1987).

Information on regional preferences is policy-relevant since it indicates that an important reason for demanding origin information may be that consumers want to buy domestic products. Thus, with strong regional preferences, mandatory origin information may have the effect of increasing demand for domestic products while decreasing the demand for products from other countries (both within and outside the EU). This possible effect should be appraised and evaluated before legislation on origin is made mandatory for any given product category within the EU.

⁴² It should be noted here that, once again, origin type may refer to either location in the food chain (for ready-made meals) or geographical level (for the other four products).

⁴³ Pairwise Mann-Whitney tests were used where the two origin types for each product and attribute were compared.

Each respondent revealed his or her maximum wtp for origin labelling of only one specified origin type (and thus only for one geographical region), as shown in Table 4.2. To analyse regional preferences, participants were provided with a claim which stated that if it were possible, they would only buy the product from the specific region they had been assigned in the wtp elicitation question.

Figure 4.5: An example of a question on regional preferences

If it were possible, I [the respondent] would only buy jam for which the berries were picked in Sweden						
I do not agree at all					I agree completely	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

For example, if a respondent were valuing origin information for jam on the country level, the claim stated “If it were possible, I [the respondent] would only buy jam for which the berries were picked in Sweden” (see Figure 4.5 for this specific example). As before, a response was indicated on a 7-point scale ranging from “I completely disagree” to “I completely agree”. Responses thus indicated preferences for buying products from the indicated region rather than from outside this region, implying that scores over 4 may be interpreted as positive preferences for the given region.

Median scores were 4 or higher for all combinations of product and region, and significantly higher than 4 for almost all combinations (apart from ready-made meals with origin type defined as country of production of the meat product, and jam with origin type EU/non-EU) (see Table 4.6). This implies that almost regardless of the size of the region and product analysed, respondents preferred to buy products which came from the region they lived in themselves. This result was also manifested in the regression analysis, where the strength of local preference was the most important overall determinant of wtp (see Appendix 1). Thus, in

general, strong local preferences are also accompanied by higher wtp values for origin information.

Table 4.6 Median scores on the likert scale for question on regional preferences

Product	Meals		Jam		Yoghurt		Milk		Bacon	
Origin type	1	2	1	2	1	2	1	2	1	2
Regional preferences	5***	6***	4	5***	7***	5	7***	6**	6***	6***

Notes: *=significantly different from 4 at 10% level (Wilcoxon signed-rank test)

**=significantly different from 4 at 5% level (Wilcoxon signed-rank test)

***=significantly different from 4 at 1% level (Wilcoxon signed-rank test)

For all products, country (that is, Sweden) was the geographical level with the highest median score, regardless of the type of alternative geographical level (for yoghurt and milk the alternative was the smaller geographical entity “region”; for jam and bacon it was the larger entity “EU”).⁴⁴

Regional preferences were particularly strong for milk.⁴⁵ Tests indicate that buying milk from your own region (and in particular if this region was the country level, i.e. Sweden) was more important than buying from your own region for any of the other products.⁴⁶ Additionally, regional preferences were particularly important for explaining the variation in wtp for origin information on milk in the regression analysis (see Appendix 1). For example, a strong preference for buying Swedish milk increased the probability of having a positive wtp by 58 percent.

The fact that median wtp for knowing the origin of milk was not higher than for the other products, despite these apparently high preferences,

⁴⁴ Tested with pairwise Mann-Whitney tests. The two levels for ready-made meals are, as discussed previously, both related to the country level, and thus the fact that there was no significant difference between the two origin types for ready-made meals does not affect the overall result that the country level seems to be significantly more important to consumers than other geographical alternatives.

⁴⁵ A Kruskal-Wallis test was carried out to see if regional preferences differed by product. The test indicated significant differences among the products, and these were then compared using pairwise Mann-Whitney tests.

⁴⁶ Regional preferences were most important for milk, followed by yoghurt, and least important for ready-made meals.

may sound counter-intuitive. One possible explanation for this seemingly contradictory result may be that milk was the least expensive of the five products. Looking at the price premia for origin information, in terms of percentages of the initial price of the products, the wtp for origin information was higher for milk than for all other products, except bacon. Secondly, the average frequency of buying milk was high compared to the other four products.⁴⁷ Thus the accumulated wtp for a given period was higher than for the other products, as previously discussed. Finally, almost all milk that is sold in Sweden is of Swedish origin, which limits the uncertainty regarding origin. Thus, although origin information in itself is highly valued, respondents already have (most of) this information, and thus it is not surprising that actual wtp to pay for a label of origin is limited.

From a policy perspective, the interpretation of these results is not clear-cut. On the one hand, respondents indicate a patent interest in buying all of the products from Sweden, which would suggest that, *ceteris paribus*, a mandatory labelling of origin would increase demand for domestic products in Sweden. On the other hand, it is likely that producers already know about these consumer preferences. As discussed in Chapter 2, this would probably result in a voluntary labelling of Swedish origin for products where these preferences are strong. If a voluntary origin labelling is already present (which should thus be the case for these products), making it mandatory would probably not change the demanded quantities for domestic products in any significant way.

4.4 Concluding comments

Wtp for origin information ranged between SEK 0.12 and SEK 2.50 depending on product and origin type. The highest wtp values were found for ready-made meals and jam, and the lowest values for milk and yoghurt. The country level was generally valued higher than the alternative, regardless of whether the alternative implied a more specific level of information (such as for milk and yoghurt) or a less specific level (such as for jam). For ready-made meals (where both levels refer to the

⁴⁷ 63% of all respondents stated that they bought milk (one or more packages) at least once a week. For the other products, the corresponding frequencies were: yoghurt (59%), bacon (10%), ready-made meals (7%) and jam (3%). See table 4.4 for more information.

country level), respondents had a significantly higher wtp for information about which country the meat originates from, than for knowing where the processed beef in the meal had been produced.

Overall, origin information did not seem to send any strong signals about other attributes for any of the products. Weak signals were found only for social responsibility. As expected, based on these results, the regressions did not indicate any impact of signal strength upon wtp. However, respondents who indicated strong signals of food safety and social responsibility had a significantly higher probability of being willing to pay something for the information.

Regional preferences were strong for almost all products and levels. Thus, respondents generally indicated a preference for buying products from the geographical area they lived in (EU, Sweden or the region within Sweden where they lived), compared to geographical areas where they did not live. The importance of buying products from one's own region was also confirmed in the regressions, where the strength of regional preferences was the most important overall determinant of wtp. Additionally, buying Swedish products was significantly more important than buying products from either the EU or from the region within Sweden where the respondents lived. This would indicate that the country level was the most relevant geographical area for origin information from a consumer point-of-view. The regression analysis, as well as tests based on the scale questions, also revealed that the preference for buying Swedish products was strongest for milk and least strong for ready-made meals.

5

Producer costs of origin labelling

So far, the focus in this report has been on consumer interest in origin labelling of food products. This chapter focuses on origin labelling from a producer point-of-view. It discusses the potential effects of mandatory origin labelling for the food industry, and how firms can adjust their production processes to reduce the additional costs incurred. The aim is to obtain estimates of the size of the costs for producers, in order to compare these costs with the consumer benefits in the cost-benefit analysis in chapter 7.

5.1 Objectives

The main objectives of this chapter are:

- To evaluate what effects mandatory origin labelling may have on the food industry.
- To estimate the magnitude of the costs of origin labelling.
- To discuss how the design and implementation of legislation on origin labelling affect the costs.
- To briefly discuss public costs of mandatory origin labelling.

5.2 Private costs of mandatory origin labelling

Mandatory origin labelling of unprocessed products, such as beef steak or fresh fruit, is relatively easy to implement in practice, but for ingredients in processed foodstuffs, such as meat in frozen ready-made meals, it is considerably more cumbersome. The reason is that the meat in one single dish may originate from several different countries. The composition of countries can differ over time, since food processing firms can buy meat from several countries, and the countries vary depending on seasonal availability, quality, price, etc. Besides, the meat is often blended in production without considering origin before being cooked. To implement origin labelling, food processing firms would need to establish routines to be able to keep meat of different origins separated throughout the supply chain.

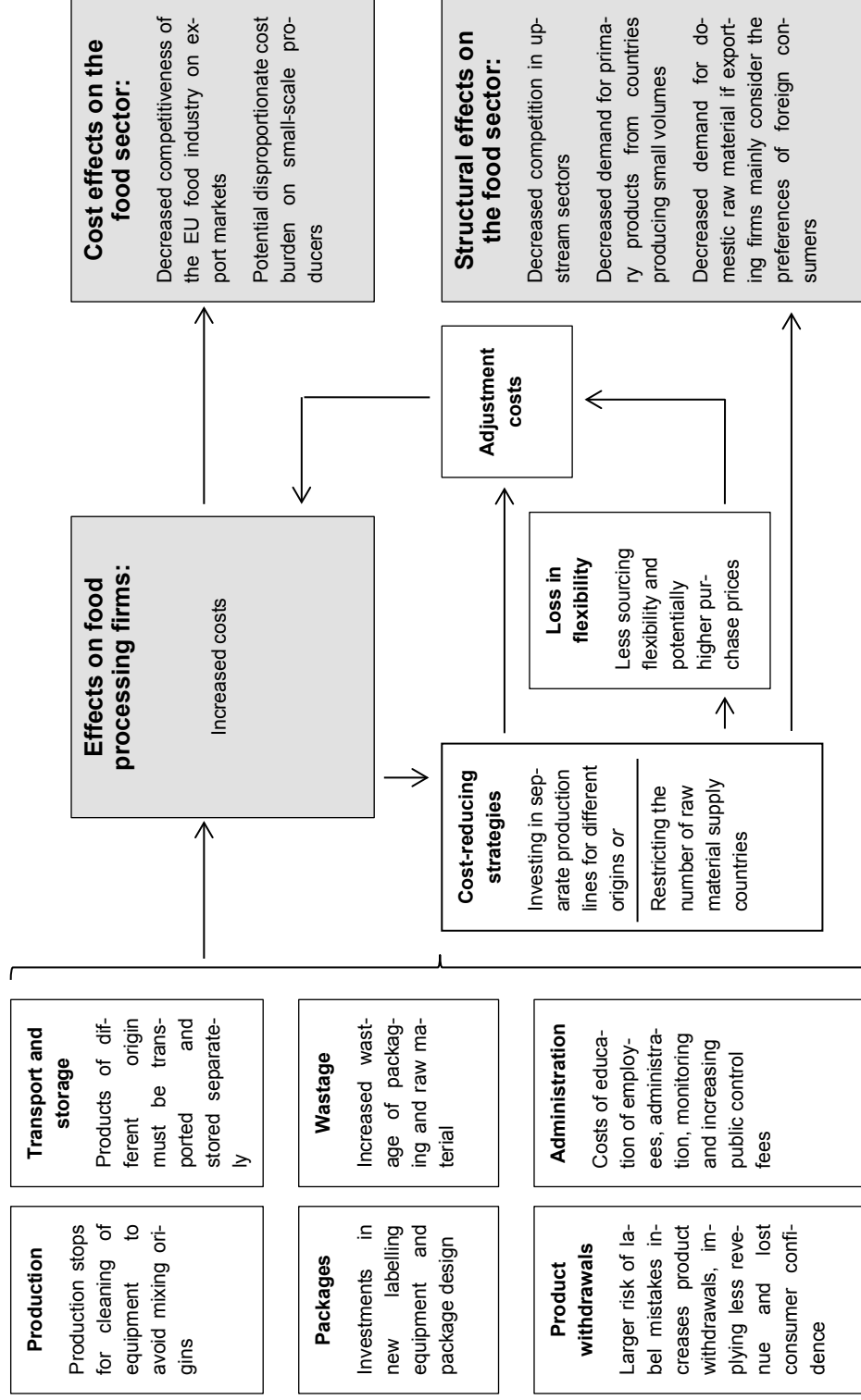
Producer response to mandatory origin labelling

Figure 5.1 and the text below summarize the effects of origin labelling on the food industry. Origin labelling has direct effects on how firms arrange their production practices. To keep ingredients covered by origin labelling separated, firms must stop production to clean the equipment, organize separate transport and storage for each origin and decide on how to handle the labelling procedure. For example, they may label at the production stage using stickers or a printer, which requires investments in labelling equipment; or they may pre-print information on origin on the packages, which implies handling and storing a larger amount of packaging material than before. Packages might also need to be redesigned to enable display of the information on origin.

In addition to affecting firms' production routines, origin labelling can also increase costs indirectly, by increasing administration, by lost revenues and consumer confidence caused by labelling mistakes and product withdrawals, and by increasing wastage of packaging and raw material, if spill-overs from different origins cannot be combined (CIE, 2006, Li, 2013, Terluin, et al., 2012).

Implementing origin labelling can thus bring direct costs for production adjustments and indirect costs for administration etc. If the costs are high or if the adjustments are cumbersome to implement, firms may search for alternative cost-reducing strategies. These could imply either investing in one production line for each origin (Terluin, et al., 2012), or restricting the number of raw-material supply countries (CIE, 2006, Informa, 2010). However, the former brings investment costs for production equipment, whereas the latter restricts the food processing firm's sourcing flexibility, and might imply higher purchase prices if the demand for raw material of a specific origin increases heavily. Hence, the alternative cost-reducing strategies imply some form of adjustment costs. Several alternative scenarios may thus result if the proposed extension of mandatory origin labelling is approved. Firms seek to minimize their costs, and the option that offers the smoothest and least costly adjustment varies across firms depending on the product they produce and their current routines for production, sourcing etc.

Figure 5.1. Effects of mandatory origin labelling for food processing firms



Source: Based on CIE (2006), Informa (2010), Terluin et al. (2012) and Li (2013)

In addition to incurring costs on the firm level, origin labelling may have cost and competition effects on the food sector as a whole. Due to an origin labelling-induced cost disadvantage, the competitiveness of the EU food industry on export markets, where not all firms must implement mandatory origin labelling, may decrease. The cost burden might be particularly pronounced for small-scale firms; if the costs of origin labelling are fixed, they will be spread among a smaller number of units, and mandatory origin labelling may therefore lead to disproportionate cost effects for small-scale processing firms (CIE, 2006). On the other hand, if small-scale producers were to use local inputs to a larger extent, their costs of implementing mandatory origin labelling might be smaller than those of global companies sourcing products from multiple origins (Tiessen, 2008).

If firms restrict their raw material sourcing to a small number of countries, additional competition effects may occur. The supply of raw materials is likely to become concentrated to a few origins that are able to deliver large volumes. Such concentration of primary production might reduce competition in this sector, and the demand for products from countries producing small volumes might decrease. For example, for Sweden, mandatory origin labelling of processed foodstuffs might decrease demand for Swedish raw material like beef, for which domestic supply is small compared to global supply volumes (Li, 2013). Furthermore, Swedish food processing firms that export large volumes might choose to mainly use raw materials from countries valued highly by consumers on export markets, i.e. not necessarily from Sweden. Hence, extending mandatory origin labelling will not necessarily promote domestic primary production.

Potential impact on firm demand and revenues

In contrast to increased costs, origin labelling may have positive effects for the food processing companies. If origin labelling leads to increased consumer demand and firm sales, or if it is possible to increase consumer prices, revenues would also increase and could compensate for the increased costs. However, if firms expect origin labelling to increase the revenues more than the costs, they will gain from voluntarily labelling

their products, and it is therefore questionable whether mandatory origin labelling will actually increase revenues for firms not using voluntary labelling.

Moreover, it is not necessarily the case that all costs will be borne by the food processing industry. Processing firms with market power could try to pass on some of the costs to their suppliers to avoid parts of the cost increases. In the rest of this chapter, however, we do not consider either the relative market power in the food supply chain or the potential increase in revenues, but focus on potential increases in the costs for food processing companies.⁴⁸

Estimating the size of firms' costs for origin labelling

This section will try to estimate the size of the costs to producers if mandatory origin labelling is extended. The section starts with a review of previous studies and continues with the lessons learnt from discussing mandatory origin labelling with representatives of the Swedish food industry.

Ideally, we would like to be able to present studies estimating the costs of extending mandatory origin labelling with a focus on Sweden. However, to the best of our knowledge, there are no such studies available. The only study applicable to Sweden is an estimate of the administrative costs associated with mandatory origin labelling of beef, but it is not relevant to the products affected by the potential origin labelling extension. Even in the larger European setting, previous studies on processed foodstuffs are scarce (see Table 5.1), and the existing studies are not directly applicable to the Swedish situation, as costs vary across countries and products depending on the details of legislation, the structure of the industry, the proximity to origin borders, current information systems etc. (Terluin, et al., 2012, Tiessen, 2008).⁴⁹ It is notable that the size of the estimated costs in Table 5.1 varies widely. This can be seen as an illustration of the uncertainty and difficulties described above; factors that are

⁴⁸ See for example Lusk and Anderson (2004) for an empirical analysis of the welfare effects of origin labelling.

⁴⁹ Studies on the costs of origin labelling have also been undertaken for example in the U.S., Australia and New Zealand, but these are not directly applicable to the European setting. See for example (Krissoff, et al., 2004), Informa (2010), NZIER (2005) and (CIE, 2006) for cost estimates.

difficult to predict affect the costs, and although based on the best knowledge available, the numbers are indicative, rough estimates of potential costs rather than exact figures.

Table 5.1. Selection of previous studies estimating costs of mandatory origin labelling

Study	Product(s)	Country	Cost increase estimate(s)
Potentially mandatory origin labelling of processed food products			
Terluin, et al. (2012)	Processed products: dairy drinks, cheese, peas and mixed salads	The Netherlands	Annual cost increases of 1-2% (dairy drinks) and 2-3% (cheese). 0.4-1.2 eurocents per package of peas (not including all investments) No estimates are available for mixed salads.
CLITRAVI (2013) *	Cooked sausage, cooked ham.	EU	EU/non-EU labelling: 1-5% Country labelling: cooked sausage: 8-25% for sourcing practices, 2-5% for packaging/labelling, 8-12% for compliance (controls, administration etc.) Cooked ham: 10-35% for sourcing practices, 1-3% for packaging/labelling, 8-12% for compliance (controls, administration etc.)
Upcoming mandatory origin labelling of meat of swine, sheep, goats and poultry			
UECBV (2013) *	Pork and lamb	France, Italy, Germany, Spain	0.06-1.04 €/kg, varying across countries, products and design of legislation.
Existing mandatory origin labelling of beef			
Nutek (2007) **	Beef	Sweden	Administrative costs: 190 million SEK/year

* Estimates provided by industry associations

** Complemented by information from (SLV, 2013)

Knowledge of the details of the production process of each product is necessary if the costs of mandatory origin labelling are to be estimated. We therefore discussed mandatory origin labelling with representatives

of the Swedish food industry. The contacts with the industry were initiated by a visit to a Swedish food processing company in the spring of 2012, and continued with a meeting in the spring of 2013 with member companies of the industry association "Livsmedelsföretagen".

The firms' representatives stressed that mandatory origin labelling is cumbersome and costly to implement, and that its costs are difficult to estimate. As described above, multiple adjustment scenarios are possible (see Figure 5.1), and it is difficult to predict in advance the adjustments which are needed. Consequently, the representatives could not provide any estimates of the size of the costs that would arise if mandatory origin labelling was extended. This can be seen as an illustration of the complexity associated with mandatory origin labelling; too many potentially uncertain factors affect the cost situation for reliable estimations to be possible at this stage.

The firms' representatives further pointed to the existence of guidelines on voluntary origin labelling for ingredients in processed foodstuffs. These allow labelling of a maximum of three alternative origin countries on the product package; for example, a label phrased "Origin: Denmark/Ireland/Sweden" means that the ingredient can come from any of these countries. The representatives stressed that if mandatory origin labelling allowed labelling of several alternative countries on the product package, firm compliance would be facilitated and the costs would be lower than if only one country must be stated (Li, 2013, Li and Sdh, 2007).

Design and implementation of legislation affect firm costs

The multiple potential adjustment possibilities thus make it difficult for the firms to assess how high the costs will be if mandatory origin labelling is extended. This difficulty is further reinforced by the uncertainty associated with how the potential legislation will be implemented. As discussed in chapter 2, it is not yet decided how origin will be defined in the legal requirements; it may refer to the different geographical areas EU/non-EU, country or within-country region. The firms' representatives proposed the several-country solution described above. Furthermore, the definition of origin could vary across the food supply chain-

dimension, and refer either to the origin of ingredients or to the place of last substantial transformation of the processed foodstuff.

How origin is defined is a factor that will crucially affect how high firm costs will be if mandatory origin labelling is extended. In general, the smaller the geographical area considered as one origin, and the earlier in the production chain origin is considered, the higher the costs will be to the processing firms (Li, 2013, Tiessen, 2008).

Besides, how legislation is implemented will also affect firm costs. Labelling generally implies displaying the information on the package, but voluntary initiatives for origin labelling use alternative information channels, such as companies' webpages and smartphone applications (Findus, 2013, LRF, 2013). Allowing for these alternative forms of labelling would also provide more flexibility and decrease the costs of mandatory origin labelling to the industry (Li, 2013).

The degree of voluntary origin labelling affects firm costs

So far, the discussion on costs has focused on the costs that are incurred by food processing firms when they start labelling their products with origin. However, the magnitude of the total costs to the industry also depends on how many firms already make use of voluntary origin labelling that corresponds to the coming legal requirements.

There are only a few studies investigating this issue⁵⁰, and we therefore performed an indicative study in an online grocery store to ascertain the prevalence of voluntary origin labelling of a sample of the products included in the consumer wtp study.⁵¹ The results are an indication of the prevalence of voluntary origin labelling, but do not represent the whole market for the different products. Figure 5.2 below shows the degree of

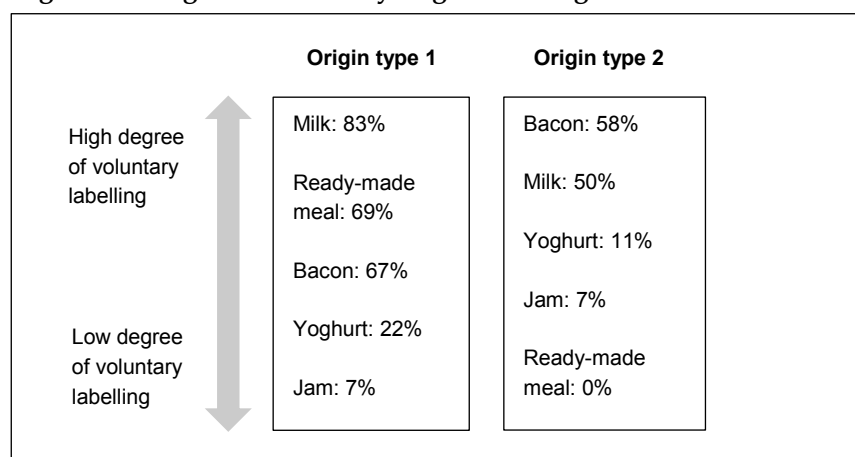
⁵⁰ To the best of our knowledge, the only study investigating the prevalence of voluntary origin labelling on the Swedish market dates back to 2008 and investigates voluntary origin labelling of a selection of meat and dairy products not covered by mandatory origin labelling. The only product included in both the study and this report is bacon. For more information, see (Movement Consulting, 2008).

⁵¹ The prevalence of the two different origin types was investigated by scrutinizing the product package for origin information. As a starting point, 4 products per brand and 4 brands per product were investigated. However, the number of investigated packages per product varied between 9 and 16 depending on the number of different products and brands available. The online store study was complemented by telephone interviews with firm representatives in some cases.

voluntary origin labelling for the investigated products and the origin types described in chapter 4.

The degree of voluntary origin labelling varies considerably across products and different origin types. In general, milk and bacon are labelled to a large extent, while yoghurt and jam are labelled more seldom. For ready-made meals, the degree of voluntary labelling varies markedly depending on the type of origin denomination investigated. This implies that if mandatory origin labelling is introduced, the costs to the industry are also likely to vary highly across the products. The degree of voluntary origin labelling and what it implies for the comparison of costs and benefits is further discussed in chapter 7.

Figure 5.2. Degree of voluntary origin labelling (% of studied items)



Note: Origin types 1 and 2 refer to the two types of origin information defined in Table 4.1 in chapter 4

5.3 Public costs of mandatory origin labelling

Costs of mandatory origin labelling might rise not only in the private sector but also in the public authorities responsible for the controls. The reason is that well-functioning and equivalent controls of firm compliance across and within countries are important to prevent origin labelling-related fraud and promote competition on equal terms. If some firms do not comply with the legislation on origin labelling, there is a

risk that mandatory origin labelling will have a negative effect on the cost situation and competitiveness of firms that do comply.

In general, the costs of public control are passed on to the companies, since the Swedish public control system is to be fully financed by fees. Still, some costs for the education of personnel, preparation and implementation of guidelines, etc. are financed by public means. There are no available estimates of the size of these public costs of mandatory origin labelling for the existing requirements on beef, or for the proposed extension of mandatory origin labelling (SLV, 2013).

5.4 Concluding comments

Implementing mandatory origin labelling of processed foodstuffs with multi-origin ingredients is complicated. Food processing firms may face increased costs and thereby lose in competitiveness. Moreover, mandatory origin labelling may also negatively affect primary producers in small countries like Sweden, if demand for raw materials is concentrated to a smaller number of countries that are able to supply large volumes.

At this stage, before the potential legislation is actually implemented, it is difficult for affected firms to estimate the costs of compliance, since many different adjustments are possible and many details of the potential legislation are not yet decided. According to representatives of the food industry, one possible way to facilitate compliance and to decrease costs would be to allow labelling of several countries of origin on the product package, as stated in the existing guidelines on voluntary origin labelling.

Due to the difficulties of foreseeing the effects of mandatory origin labelling, there are no cost estimates that can be compared to the consumer benefits in the cost-benefit analysis in chapter 7. The analysis in chapter 7 instead uses a ranking of the costs of origin labelling based on general factors affecting the size of the costs.⁵²

⁵² See section 7.1.

6

Impact of mandatory origin labelling on EU imports

The previous chapters in this report focus on consumer interest in and producer effects of mandatory origin labelling. If consumers and/or producers change their behaviour as a result of mandatory origin labelling, international trade in food products may also be affected. This chapter uses the already existing requirement on mandatory country-of-origin labelling (COOL) for beef to gain additional knowledge of the effects of COOL on international trade. The results are used for a discussion on the potential trade impacts of extending mandatory origin labelling to additional food products, since the impact of extended COOL cannot be estimated beforehand.

6.1 Objectives

This chapter describes the evolution of EU-beef trade and applies the gravity model to EU agricultural imports. The main objectives of this chapter are:

- To test whether mandatory COOL for beef has reduced the value of imports of affected products.
- To test whether mandatory COOL for beef has resulted in a concentration of the imports to fewer countries.
- To use the experience from COOL for beef to discuss the potential impact on imports of extending COOL.

6.2 Background

This section presents background information relevant to the analysis of international trade effects of mandatory COOL. First, the possible impacts on trade according to theory are presented, followed by a presentation of previous studies on the trade effects of COOL. The section ends with a description of the development of the EU beef market in relation to COOL.

Theory of country-of-origin labelling and international trade

Mandatory COOL legislation may have an impact on trade. For instance, there is the possibility that COOL rules will not be implemented in a similar way for domestic and foreign producers. In this case we would get a barrier to trade according to WTO rules. As an example, the US implementation in 2009 of COOL for meat was found to constitute a barrier to trade by the WTO (Jurenas and Greene, 2013). The current EU COOL regime for beef is not considered to be discriminatory, however.

Even if a specific COOL regime is non-discriminatory and results in a similar increase in the compliance cost for foreign and domestic firms, we might still observe an impact on trade. There are several reasons why this might happen.

Firstly, the price increase of both domestic and imported goods reduces demand, everything else equal.

Secondly, demand for domestic and foreign goods is affected by the price relationship between them. If COOL leads to changes in this relative relationship, it may affect the relative demand for domestic and imported products. This can be the case if there is an initial price difference between domestic and imported goods, so that an equal increase in the price of the two goods implies different price increases in percent. The initially more expensive good would in this case become cheaper relative to the other product. COOL may also affect relative demand if the scale of production is different for domestic and foreign producers. If the compliance costs of COOL are fixed, the impact on the production cost per unit will be relatively small for producers with a large volume but larger for small producers, and this may affect how large the price increase will be for the respective domestic and imported products.

Finally, the consumers' responses to labelling may also affect the demand for imported goods. If consumers prefer the domestic product and are therefore willing to pay more for the domestic variety of the product, the COOL rules will shift demand away from foreign producers towards domestic producers and hence reduce imports.

Based on the discussion above, what can we expect regarding how mandatory COOL might affect EU imports of beef? For non-EU-countries, the compliance costs resulting from a mandatory COOL legislation will increase the entry cost to the EU market, which could be expected to reduce the range of firms exporting to the EU, and hence the number of products imported by the EU.

There is also a possibility that the EU will import specific products from fewer countries. This may happen since firms/countries with a large export share to the EU will have stronger incentives to comply with the rules to protect their export. These companies will therefore probably have a larger incentive to accept additional costs due to COOL legislation than firms with a smaller export share to the EU. The result may be that only firms with a relatively large export share to the EU will continue exporting products, leading to a geographical concentration of imports by the EU.

Another reason for this kind of geographical concentration is that producers within the EU may adapt to COOL by reducing their number of suppliers (see chapter 5 for a discussion of this aspect). This effect may apply to imports from non-EU countries as well as from other EU member states. We would, however, expect intra-EU trade to grow relative to imports from outside the EU, since non-EU producers could be expected to face higher entry costs to the EU market.

Existing empirical evidence of the impact of country-of-origin labelling on trade

Empirical evidence of the impact of COOL on trade is scarce and based on case studies of COOL for individual products and markets; hence it is difficult to draw general conclusions on the impact of COOL on trade as a whole. However, existing studies have found trade effects of COOL, e.g. a reduction of imports and a geographical redistribution of imports among countries. The currently-available empirical studies that quantify the impact of COOL on trade are, to the best of our knowledge, those presented below.

Pouliot and Sumner (2012) analyse the impact of US COOL on imports of fed and feeder cattle from Canada. The authors show that COOL has reduced the relative price of imports and the relative quantity of imports, which may seem odd. Generally, a reduction in the relative price of imported goods would increase the imported quantity. Simultaneous reductions in price and imported quantities are possible, though, as a result of a shift in demand. In this case, demand for Canadian feeder cattle in the US is reduced since they become less attractive due to the COOL regulation. This evidence of a decline in imports due to COOL is supported by model simulations carried out in order to analyse the impact of COOL on the tomato trade between the US and Mexico. The simulations indicate that COOL labelling rules have led to a reduction in imports from Mexico and an increase in the US production of tomatoes (Johnnecheck, et al., 2010).

Finally, a study by Matsumoto (2011) analysing the impact of COOL regimes on the trade shares of bovine meat for several exporting countries finds that COOL has resulted in a redistribution of market shares for exporting countries.⁵³ However, the analysis does not provide information on the impact on the total imports of bovine meat. The redistribution of export shares is consistent with observations that operators within the EU have shown a tendency to choose large suppliers in order to reduce the costs of complying with the rules for beef (EU, 2007).

EU beef market and country-of-origin labelling

The implementation of COOL for beef came in a period of high volatility, related to Bovine spongiform encephalopathy (BSE), in the European beef market. The implementation of rules for registration of bovine animals and labelling of beef (EU Regulation 820/97, EU Regulation 1760/2000, and EU Regulation 1825/2000) was a reaction to the outbreak of BSE. As a result, these rules primarily focus on traceability of beef, and major parts of this legislation were implemented prior to the COOL legislation. The COOL-rules for beef were implemented as part of a package of rules for bovine animals, aimed at restoring consumers' confidence in the quality of beef products. The legislation (EU Regulation

⁵³ The studied period is 1994-2006 and covers HS-code 0201 fresh and chilled meat of bovine animals.

1760/2000) states that beef should carry detailed information on origin from 1 January 2002.⁵⁴

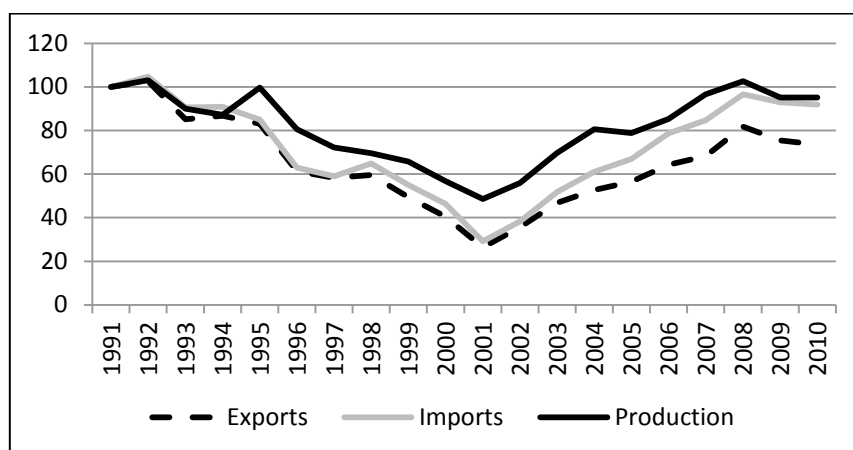
The demand for beef was strongly affected by the outbreak of BSE. The first human died from the *Variant Creutzfeldt-Jakob disease*, which was later connected to BSE, in 1995, and a ban on exports of beef from the UK was imposed in 1996. By the end of 2000 many countries had banned imports of beef from several European countries (Pickelsimer and Wahl, 2002). As a result of BSE, beef consumption in Europe declined sharply during the last years of the 90s. From 1995 to the beginning of 2001, the consumption of beef decreased by 28 percent in Europe, which is in stark contrast to the increasing beef consumption in North America during the same period (Pickelsimer and Wahl, 2002). This indicates the strong influence of BSE on the EU beef market. Figure 6.1 presents the evolution of production and trade in the EU15 countries.⁵⁵ The graphs in the figure represent indexes with the base year 1991; hence all values are relative to 1991 values for each indicator, which means that the graphs do not indicate the absolute values of production, exports and imports, but rather their changes over time. The figure shows a strong decline in both production and trade. This data thus indicates a decreasing consumption of beef in Europe in the 90s. Thereafter, both trade and production increase to the pre-BSE levels.

Compared to internal production, imports and exports for the EU15 are limited. The import and export shares of production are below 16% for all years. However, for individual countries within the EU15 group, the dependence on trade varies significantly. In Sweden, for example, the import share of production was 40.6% in 2011 (own calculations based on Statistics Sweden (2013)).

⁵⁴ For the purpose of COOL, Beef is defined as goods with HS-codes 0201, 0202, 0206 10 95 and 0206 29 91. (EU, 2000c).

⁵⁵ EU15 refers to the 15 members of the EU as of 1995.

Figure 6.1. EU15 beef market development



Source: FAO-stat (FAO, 2013), own calculations. Note: index base year is 1991

To identify possible differences in import patterns across beef items reported in the trade statistics, a more detailed view of the development of EU beef imports in absolute values is presented in Figure 6.2 and Figure 6.3. The two figures show the development of imports for those HS-lines that are most important in terms of value of imports, and cover about 95% of the total imports of beef. The full list of beef HS-codes covered by COOL is shown in Table 6.1.

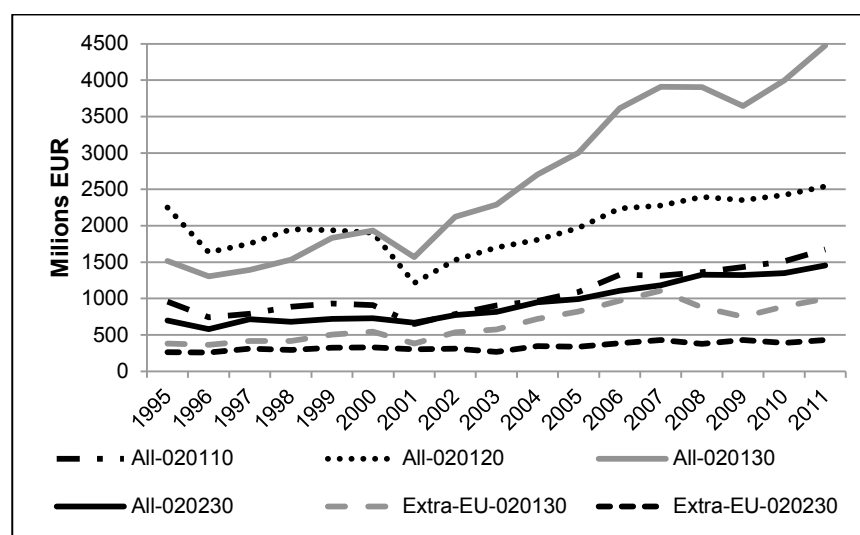
Table 6.1. HS-codes for bovine meat with COOL requirement

HS-code	Description
020110	Fresh or chilled bovine carcasses
020120	Fresh or chilled unboned bovine meat
020130	Fresh or chilled boneless bovine meat
020210	Frozen bovine carcasses and half carcasses
020220	Frozen unboned bovine meat
020230	Frozen boneless bovine meat
020610	Fresh or chilled edible bovine offal
020629	Frozen edible bovine offal

Most of the imports from non-EU27 countries consist of boneless bovine meat; hence, to represent most of the import value, two HS-lines are sufficient for imports from non-EU27 countries.⁵⁶ The figures present aggregates for the EU15 countries, including trade amongst the EU15 countries. In the data series labelled *All*, for example, imports to Sweden from Germany are included.

A first glance at the development of EU15 beef imports shows that most of the EU beef trade is intra-EU27 trade, as the values for imports from all countries are much higher than the values for extra-EU-trade. The data reveals a slight decrease in imports in 2001, but an increasing import thereafter with the exception of 2009. The increase is particularly marked for fresh and chilled meat (020130), which is also the most important imported beef item in terms of import value at the end of the period. It is also noteworthy that most of the imports consist of fresh or chilled meat rather than frozen meat, and that boneless meat has gained in value compared to unboned meat.

Figure 6.2. EU15 import of beef by HS-code

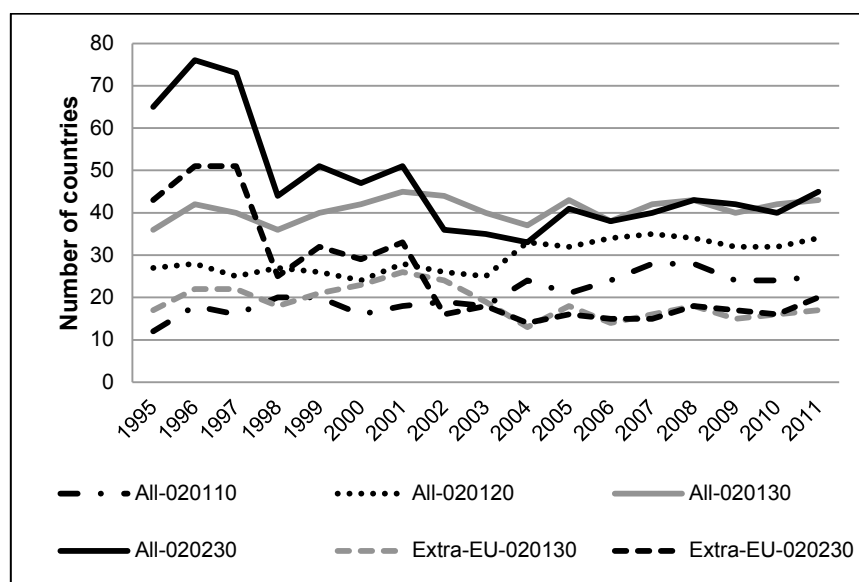


Source: Eurostat, own calculations Note: Extra EU-trade excludes trade with EU27 for the whole time-period

⁵⁶ EU27 refers to the members of the EU as of 2007.

Figure 6.3 shows the number of markets from which EU15 countries import. Imports from non-EU countries come from a small number of countries, while the trade within the EU is rather diversified but with a decline in 1998. It is not possible to draw any further conclusions about the development of the geographical concentration of EU15 imports from the figure alone.

Figure 6.3. Geographical diversification of EU15 beef imports by HS-code



Source: Eurostat, own calculations Note: Extra EU-trade excludes trade with EU27 for the whole time-period

To summarize, the evolution of the EU15 beef market has been characterized by a strong decline resulting from BSE and a subsequent recovery. Most of the trade is conducted with other EU-countries and the product diversification of the intra-EU trade is higher than in imports from non-EU countries.

6.3 Method

Estimation technique

The implementation of COOL could be expected to reduce imports and result in geographical concentration. The strategy to identify possible effects of COOL on EU imports for beef is to use a gravity model framework and estimate:

$$M_{ikt} = \ln GDP_{it} + \ln POP_{it} + COOL_{kt} + COOL_{kt} * EU + T_t + \mu_{ik}$$

where M is the imports to EU15 of good k (6-digit HS level) from country i at time t , $\ln GDP$ and $\ln POP$ are the log of GDP and log of population of the exporting country. $COOL$ is a dummy variable equal to one for beef from January 1st 2002.⁵⁷ $COOL_{kt} * EU$ is a dummy indicating imports of a good with COOL requirement to an EU15 country and T is a time-trend. μ_{ik} is a set of fixed product-exporter effects.

The estimates of key interest are $COOL$, which indicates the impact of COOL on EU15 imports from non-EU countries, and $COOL*EU$, which indicates whether there is a difference in the impact of COOL on intra-EU15 trade compared to imports from non-EU countries. For correct inference, it is vital to take into account other factors that affect trade and to use all observations, e.g. including zero trade flows; otherwise the COOL estimate will not correctly reflect the impact of COOL on trade. To account for the fact that imports are zero for some observations, the model is estimated using a Poisson fixed effects estimator. To capture changes to imports that are not a result of the implementation of COOL, several control variables are introduced. GDP and population are intended to control for changes in the supply potential of exporting countries, the time-trend controls for general changes in agricultural imports during the studied period and the fixed effects control for all variables constant over time for each good and every country. The fixed effects, for example, control for common language or good natural conditions for producing a specific good in a given country, or trade barriers that are not changed during the studied period.

⁵⁷ COOL for fruits and vegetables is captured by the fixed effects, since it is present during the entire period studied.

To correctly capture changes in the supply potential of exporting countries, it could be argued that the production of individual products is a better measure than GDP. However, a lack of product level data from a large sample of countries and difficulties matching the existing industry data to highly disaggregated trade data have dictated the use of GDP as a proxy for economic size of the exporting country. In addition, the country product fixed effects capture the differences in export potential for individual products from each of the exporting countries. These fixed effects are thus essential to capture unobserved heterogeneity across sectors and countries. The time-trend is preferred to the more standard time-fixed effects, since the latter might capture the impact of COOL, which is implemented simultaneously for all exporting countries. That is, the impact of COOL will not be fully captured by the COOL-dummy variable as required for correct inference. On the other hand, the time-trend might not capture all time-varying general changes that are not an effect of COOL. Results with time-fixed effects are therefore presented as a robustness test.

Data

Import statistics for the EU15 countries have been extracted from Eurostat (Eurostat, 2013). Information on GDP and population is retrieved from World Development Indicators (World Bank, 2013a).

The database used for this study covers products included in the WTO-definition of Agricultural products (World Bank, 2013b) but excludes fish (HS-codes 03, 1504, 1604, 1605 and 230120), which is quite different from traditional agricultural production, other live animals, (HS-code 0106) for example whales and camels, and products originating from animals not specified elsewhere (HS-code 05) such as bones, human hair etc., since these are not likely to be affected by the implementation of COOL and are quite specific. The level of aggregation of the trade data is 6-digits in the Harmonized system (HS).

The imports are aggregated for the 15 countries that were members of the EU as of 1995. Imports are from all available countries and territories excluding those countries that joined the EU in the period. These countries are excluded to reduce the risk of bias from the impact of the EU en-

largements during the studied period. In practice, some minor territories and countries are also lost due to lack of data on some variables. The studied time period is 1995 to 2011. 1995 is chosen as the starting year to facilitate the inclusion of the countries that joined the EU in 1995 as importing countries in the analysis, and 2011 is the most recent year with currently available data.

6.4 Results

The regression results are presented in Table 6.2. Including all agricultural trade, as opposed to only beef trade, in the regressions sample increases the number of observations and thus the information used to estimate the impact of COOL. This improves the precision of the estimates but at the same time induces the risk of biased estimates, resulting in incorrect inference, if heterogeneity across sectors is not fully controlled for. The results in Table 6.2 thus include estimates using the full sample covering all agricultural goods (All), Meat (HS code 02) and only beef.

Impact on import volumes

The estimated coefficient of main interest is COOL, which indicates the impact of COOL on imports from non-EU countries. In all three regressions the estimate is insignificant, which implies that we cannot identify any significant impact of COOL on the total import volume for beef. The second estimated coefficient of interest is the COOL*EU variable, which is also insignificant. This indicates that intra-EU trade is not affected in a significantly different way compared to imports from non-EU countries. The time-trend is positive and significant in all cases, implying a growth in imports of agricultural products, meat and beef over time. The precision of the estimates in the reduced samples (beef and meat) is not very good, as indicated by the high standard errors compared to the full sample. This is a result of the much smaller number of observations in these samples. The large standard error of the COOL variable is also a result of the lack of sufficient variation in the COOL variable in the data. The lack of variation in COOL makes it harder to identify the impact of COOL on trade. When the variable of interest shows little variation over time, fixed effect estimation will result in less precise estimates since the variation over time is used to identify the impact of COOL. Still, fixed effects

estimation is preferred since it controls for all time invariant factors affecting trade, which might distort the estimated impact of COOL if uncontrolled for.

The limited availability of variables to control for factors that affect trade, other than COOL, such as tariffs, might distort the estimates for COOL. This will only be an issue if these possibly omitted variables vary in time, since the fixed effects estimation captures the impact of all omitted variables that are constant over time. Tariffs are mainly constant during the studied period. In fact they are unchanged for six out of eight HS categories identified as beef. Moreover, tariffs are only reported for positive trade flows in the TRAINS database. This implies that estimates including tariffs would be performed on a reduced sample without zero trade flows. This would substantially reduce the sample in a systematic way and introduce a selection bias, which would be a serious concern (see for example (Westerlund and Wilhelmsson, 2011)).

Table 6.2: Regression results import volume

Variables	(1) All	(2) Meat (HS02)	(3) Beef
Ln(gdp)	0.226*** [0.053]	-0.031 [0.076]	0.122 [0.175]
Ln(population)	-0.894*** [0.321]	0.585 [1.419]	1.296 [1.818]
COOL	0.174 [0.132]	0.133 [0.140]	0.057 [0.150]
COOL*EU	-0.164 [0.156]	-0.042 [0.165]	-0.058 [0.176]
Time-trend	0.038*** [0.003]	0.035*** [0.011]	0.032** [0.014]
Observations	590,638	30,170	6,386
Number of id	36,371	1,853	379

*Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in brackets. All regressions include exporter-product fixed effects not reported*

Geographical concentration of imports

Even though no significant impact of mandatory origin labelling of beef on trade could be detected, it is possible that the labelling has resulted in a redistribution of import sources. The main hypothesis is that EU15 imports from fewer countries as importers adapt to the labelling by sourcing from fewer countries to reduce their segregation costs. Geographical concentration is measured by counting the number of countries that export each good to the EU15. This is a direct measure of geographical concentration that is not affected by price changes, and does not take into account the shares of each country from which the imports come. The former is an important advantage when analysing markets such as those for agricultural products where prices vary quite a lot over time. A high count indicates increased geographical diversification of imports. The estimated impact on the geographical concentration is presented in Table 6.3.

Table 6.3. Results geographical concentration of EU15 imports of beef

Variables	(1) Count All	(2) Count extra-EU
COOL	-0.121*** [0.045]	-0.281*** [0.101]
Time-trend	-0.004 [0.005]	-0.011 [0.011]
Constant	11.234 [10.417]	21.926 [22.646]
Observations	136	136

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in brackets. All regressions include product fixed effects not reported

The results indicate an increased geographical concentration of EU15 imports from countries outside the EU, since the COOL coefficient is negative and significant for the count measure (column 2). Excluding intra-EU15 trades in the regressions results (column 3) still indicates a geographical concentration of imports, since the coefficient is negative and significant. The results thus give a strong indication of a geographical concentration of the EU15 imports from countries outside the EU. Since

the raw data presented in Figure 6.3 above does not reveal any clear trends in the number of markets that the EU15 import from, it is not surprising to find the time-trend to be insignificant. A note of caution is warranted, however. The lack of controls for time-varying factors that might affect the geographical concentration of imports means that the results should be interpreted with caution.

6.5 Discussion

The results do not indicate an impact of COOL on the aggregated import volume of beef to the EU15 countries. This could be an indication that the additional impact of COOL on the traceability rules for beef was limited. It seems reasonable that the additional costs of COOL for beef were low for producers since they already had to comply with the rules for traceability; in this case, the results would mainly indicate what happened to the demand side when consumers got access to information on the origin of beef. In sum, this would imply that public access to origin information due to the COOL legislation has not affected consumer demand in any significant way.

There are several potential explanations for this finding. One is that consumers do not care much about origin when they actually go shopping, perhaps because voluntary labelling has already provided consumers with enough information on origin to guide their consumption decisions; hence the additional information from compulsory COOL has not changed consumer behaviour significantly. An additional explanation is that data on imports include not only beef sold to consumers, but also to restaurants, the public sector etc., which is not covered by COOL requirements. If the beef not sold to consumers constitutes a sufficient share of the demand for beef, possible changes in consumer behaviour might be difficult to identify.

Several circumstances make the estimation of trade effects of mandatory COOL on beef complicated. The outbreak of BSE had an impact on both the production and the trade in beef during the studied period (1996-2011), which might have affected the estimated COOL effect on trade. Furthermore, COOL for beef was implemented in the EU subsequent to the regulations for traceability, and the effects of mandatory COOL on

beef might therefore be underestimated, since parts of the costs had already been incurred. That no trade effects were found for beef does not necessarily imply that there will be no trade effects of the implementation of COOL for new proposed products. The reason is that these have not been preceded by such traceability requirements as for beef.

In contrast to the lack of impact on import volumes, the results give an indication that importing countries within the EU now utilize fewer suppliers of beef than before COOL was implemented. This geographical concentration of imports would suggest that both EU and non-EU countries with a relatively small export of beef to the EU may have been negatively affected by the introduction of COOL, while larger suppliers may have gained from it. It would thus be interesting for future research to use more detailed data to analyse the impact of the implementation of COOL for beef in the EU on the export patterns of countries exporting to the EU.

6.6 Concluding comments

The results indicate that the implementation of mandatory COOL for beef in the EU has not significantly affected the total volume of imports of beef to the EU. However, there is some evidence of a geographical concentration of imports. Since COOL for beef was introduced in addition to existing rules for traceability of beef, the cost for producers may have been limited; hence it could be that the estimates mainly reflect the potential impact of COOL on the demand for beef. The lack of significant changes in the volume of imports may therefore indicate that consumers' demand for imported beef in general has not been affected by COOL. Due to differences regarding existing traceability requirements, however, the lack of trade effects for beef is not immediately transferrable to new products in the proposed COOL extension. Thus, it cannot be ruled out that there will still be effects on trade for these products.

7

Comparing costs and benefits of mandatory origin labelling

This chapter contains a cost-benefit analysis of mandatory origin labelling based on the results of the studies on costs and benefits undertaken in previous chapters. The main objective is to analyse whether mandatory or voluntary origin labelling is the best alternative for the welfare of society. Hence, in this chapter, we provide an answer to the question of whether it is advisable to extend mandatory origin labelling in accordance with EU Regulation 1169/2011.

To answer the question, one must consider the costs and benefits of origin labelling as well as the current degree of voluntary origin labelling. Section 7.1 explains in detail how costs, benefits and voluntary origin labelling are compared; the analysis and the results are presented in section 7.2. Readers mainly interested in the final results can therefore directly turn to section 7.2, where the main results are presented in table format in tables 7.1 and 7.3.

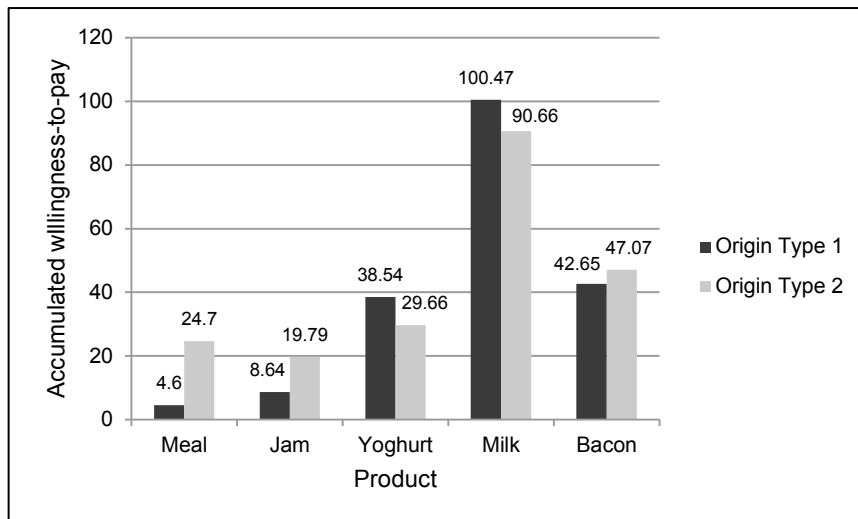
7.1 Method used to compare costs and benefits

Table 7.1 in section 7.2 brings together the results of the studies on costs, benefits and the degree of voluntary origin labelling undertaken earlier in this report. The table ranks consumer benefits, producer costs and the degree of voluntary origin labelling on a low-medium-high scale. This rather coarse scale is selected since the results of the studies are not directly comparable; consumer benefits are measured in monetary terms by consumer willingness-to-pay (wtp), producer costs are based on a number of general determinants and are not monetized, and the degree of voluntary origin labelling is measured in percentage terms. To make the results comparable, they are converted into this common scale. This implies that the products are ranked relative to the other products in the study, i.e. the table gives an indication of the relative order of costs and benefits, rather than the size of costs and benefits in absolute terms. This section describes in more detail how the ranking of benefits, costs and voluntary origin labelling into the common scale is done.

Consumer benefits of origin labelling

The total annual benefits of origin labelling for a typical consumer are shown in Figure 7.1.⁵⁸ The figure is the same as Figure 4.3 in chapter 4 and shows that accumulated wtp is highest for milk, followed by bacon, yoghurt, ready-made meals and jam.

Figure 7.1. Mean values of accumulated annual wtp (total benefit) for average purchaser in SEK.



Note: Origin type 1 refers to the origin information in the left column for each product in Table 7.1 in section 7.2 and origin type 2 refers to the right column. Values above each bar are the total wtp values. Meal is an abbreviation for ready-made meals

These values form the basis for the ranking of consumer benefits in Table 7.1 in section 7.2 below. Each product and origin denomination is compared to the product and origin denomination with the highest wtp, which is milk on the country level with an accumulated wtp of 100 SEK. Accumulated wtp is divided into three groups: low, medium and high. It is considered low when between 0 and 33 SEK, medium when between 34 and 66 SEK and high when between 67 and 100 SEK per average purchaser. The ranking is thus a relative comparison of the products, rather than a comparison in absolute terms.

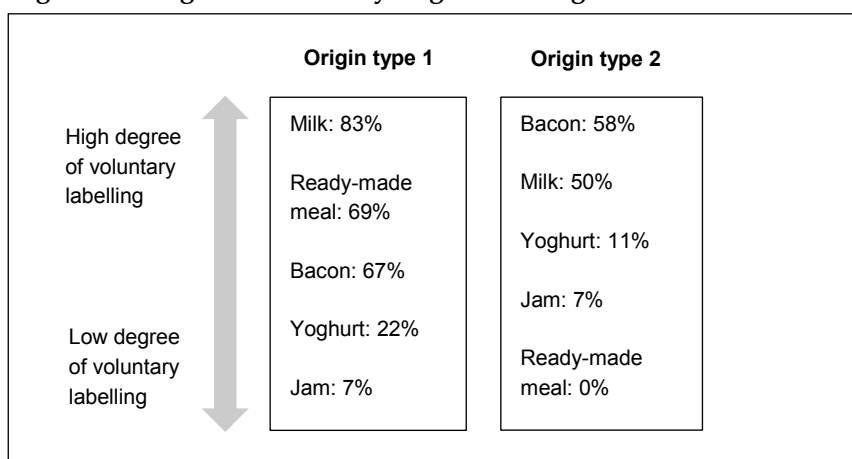
⁵⁸ See chapter 4 for more information on the calculation procedure.

The analysis in section 7.2 is based on the total benefits of origin labelling and therefore builds on Figure 7.1 above. It should be noted, however, that the benefits of making origin labelling mandatory are also affected by the degree of voluntary origin labelling; the more products that are voluntarily labelled, the smaller are the benefits of making origin labelling mandatory. Appendix 3 provides a calculation of the benefits of mandatory origin labelling that are left after producers have voluntarily labelled their products.

Degree of voluntary origin labelling

That consumers are willing to pay for information on origin means that firms have an incentive to provide such information to consumers if the wtp is higher than their labelling costs. To see to what extent producers voluntarily label their products with origin, we investigated the presence of voluntary origin labelling on the market through visual inspection of the product packages in an online grocery store. The results of this study are presented in chapter 5 and in Figure 7.2 below.

Figure 7.2. Degree of voluntary origin labelling (% of studied items)



Note: Origin type 1 and 2 refer to the two types of origin information in Table 7.1 in section 7.2

These findings form the basis for the classification of the degree of voluntary origin labelling in Table 7.1 in section 7.2 below. The degree of

voluntary origin labelling is considered low when covering 0-33 percent of the product, medium when covering 34-66 percent and high when covering 67-100 percent.⁵⁹

Producer costs of origin labelling

Ideally, we would like to compare the total benefits of origin labelling with the total costs, but the analysis of producer costs in chapter 5 did not result in any cost estimates since the consequences of mandatory origin labelling for producers are uncertain. Instead, the ranking of costs in Table 7.1 in section 7.2 is based on general criteria that are assumed to be important determinants of the magnitude of the costs that arise. In general, (a) the more complex the production process, (b) the larger the number of potential origins and (c) the more detailed origin information required, the larger the costs to producers. As an example, we would thus expect larger costs for labelling of the meat in a ready-made meal than labelling of fresh milk. The reason is twofold. First, a ready-made meal is a more complex product than fresh milk. Second, the meat may come from a larger number of supply countries than milk, since the latter is often produced under long-term contracts, which limits the number of possible origins.⁶⁰ Moreover, for all products, we would expect larger costs of origin labelling for the more detailed origin type 2 than for the less detailed origin type 1.

7.2 A cost-benefit analysis of extended mandatory origin labelling

The classification of costs, benefits and voluntary origin labelling in section 7.1 above forms the basis for Table 7.1 below. The table shows consumer benefits, producer costs and the degree of voluntary origin labelling on a low-medium-high scale for the five products ready-made meals, bacon, jam, milk and yoghurt and includes two different types of origin information for each product.

⁵⁹ It would be possible to define the degree of voluntary origin labelling in relation to the most often labelled product, similar to the classification for consumer benefits, but this would have the disadvantage of automatically classifying some products as voluntarily labelled to a large extent, even if the prevalence of voluntary labelling in absolute terms would be similar for all products.

⁶⁰ Another example is bacon and jam, where labelling of the EU/non-EU origin is expected to bring relatively low costs, since the majority of the imported pig meat and berries come from other EU countries (Johansson, 2013, Lukkarinen and Öberg, 2011).

Table 7.1. Consumer benefits, producer costs and degree of voluntary origin labelling for the investigated products

Products	Ready-made meal		Bacon		Jam		Milk		Yoghurt	
Type of origin labelling Factor	(a) Country for place of production	(b) Country for meat ingredient	(c) EU/non-EU for meat ingredient	(d) Country for meat ingredient	(e) EU/non-EU for berries	(f) Country for berries	(g) Country for milk	(h) Within-country region for milk	(i) Country for milk	(j) Within-country region for milk
Consumer benefits	Low	Low	Medium	Medium	Low	Low	High	High	Medium	Low
Producer costs	Low	Medium-high	Low	Low-high	Low	Low-high	Low	Low-medium	Low-medium	Low-high
Degree of voluntary labelling	High	Low	High	Medium	Low	Low	High	Medium	Low	Low

Source: Based on studies in chapters 4 and 5

Taking bacon as an example, the two types of origin information are the country of origin of the meat and whether the meat comes from inside or outside the EU. The results in the table are our best assessment of a cost-benefit analysis of mandatory origin labelling.⁶¹ The results are analysed in the rest of this section. The approach taken is to compare costs, benefits and the degree of voluntary origin labelling for each product to investigate if markets work satisfactorily, which is decisive for whether or not mandatory origin labelling is beneficial. The conclusions from this analysis are then summarized in Table 7.3 at the end of the section.⁶²

How to decide if mandatory origin labelling should be voluntary or mandatory?

To assess whether the extension of mandatory origin labelling is a good idea, we compare the costs, the benefits and the degree of voluntary origin labelling for each of the investigated products. The size of these three factors determines whether or not mandatory origin labelling is a good idea. Table 7.2 below shows three different potential cases: two types of market solutions and one case where mandatory origin labelling could be beneficial.

In Case 1, the benefits of origin labelling are high and the costs are low. Producers can therefore gain from labelling their products with origin if the high consumer interest in origin results in an increased demand for labelled products, or if producers can charge a higher price for products labelled with origin. In this case, there is consequently a high degree of voluntary origin labelling.

In Case 2, as a contrast, there is a low degree of voluntary origin labelling. In this case, producers have no economic incentives to label their products as the benefits for consumers are low and do not cover the relatively high producer labelling costs.

⁶¹ It could be that the costs of origin labelling also accrue to consumers, e.g. in terms of higher food prices, and that producers benefit from origin labelling, e.g. through higher revenues. These aspects are not included in the table, but are discussed in chapter 2 and chapter 8.

⁶² It should be noted that the results apply to the investigated products only; for other products qualifying for the potential origin labelling extension, the outcome may be different.

For products falling into either of these two categories, the market solves the provision of origin information to consumers, and mandatory origin labelling is therefore likely to have a limited or even negative impact on societal welfare.

Table 7.2. Benefits of mandatory origin labelling for society

	Case 1	Case 2	Case 3
Consumer benefits	High	Low	High
Producer costs	Low	High	Low
Current voluntary labelling	High	Low	Low
Outcome	Functioning markets	Functioning markets	Markets do not function
Benefits of mandatory origin labelling	Limited	Negative	Potentially positive

Note: When the three cases are discussed in chapter 2, current voluntary labelling are termed either “Yes” or “No” as the analytical approach is presented in a stylised way. Here, the low-medium-high scale is used as the degree of voluntary origin labelling in practice can vary from 0 to 100 percent

Both Case 1 and Case 2 are thus market solutions, but there is an important difference between the two cases. In Case 1, observing a high degree of voluntary origin labelling is an indication that the market seems to work. However, in Case 2, the absence of voluntary origin labelling is a market solution if the costs are higher than the benefits, but a low degree of voluntary origin labelling could also be a consequence of poor functioning markets, where producers do not label their products voluntarily despite high benefits and low costs. If this is the case, we end up in Case 3 above, where mandatory origin labelling could be beneficial

as a way to remedy the market failure. Assessing the outcome in Case 2 is therefore associated with greater uncertainty compared to Case 1.

Results: could mandatory origin labelling be beneficial for any of the assessed products?

Which of the investigated products fall into the three cases in Table 7.2 above? Starting with Case 1, there are three products and origin types with a high degree of voluntary origin labelling according to the results in Table 7.1: labelling of milk at the country level (product *g*), labelling of EU/non-EU origin of bacon (product *c*) and labelling of the country of production of ready-made meals (product *a*).

Labelling of milk at the country level most clearly fulfils the criteria for Case 1. Milk is voluntarily labelled mainly on the country level, since consumer benefits of knowing the origin are larger and producer costs are lower on the country level compared to the alternative within-country region level.⁶³ This suggests that mandatory origin labelling would not be beneficial for milk at the within-country region level either (product *h* in Table 7.1). The reason is that the market already provides consumers with the information they are mainly interested in, and mandating producers to provide more detailed information therefore brings low additional benefits to consumers but higher costs to producers.

Voluntary origin labelling is also common for bacon on the EU level. This product does not fulfil all the criteria in Table 7.2 since consumer benefits are of medium size, but producer labelling costs are likely to be low and the result is a high degree of voluntary labelling. Furthermore, our results indicate that mandatory origin labelling is not likely to be beneficial for the alternative origin type either (country of origin of the meat, product *d*). The reason is that the benefits of origin labelling do not differ markedly between the two origin types for bacon, i.e. consumers do not value information on the country level more than information on the EU level.⁶⁴ Introducing mandatory origin labelling on the country level would therefore mainly bring increased costs but low additional benefits.

⁶³ See chapter 4 and 5 for more information.

⁶⁴ See chapter 4 for more information.

The degree of voluntary origin labelling is also high for the country of production of ready-made meals. In this case, consumer benefits are low and thus do not match the criteria in Table 7.2, but the low producer labelling costs probably induce producers to label their products with origin voluntarily. However, for ready-made meals, the alternative origin type cannot be disregarded in the same way as for milk and bacon. The reason is that the alternative for ready-made meals, the country of origin of the meat, is a different type of information compared to the country of production.

Moving on to Case 2 in Table 7.2, there are four products in Table 7.1 with a low degree of voluntary origin labelling as a result of low benefits and potentially high producer costs: labelling of the country of the meat in ready-made meals (product *b*), country-of-origin and EU/non-EU labelling of the berries in the jam (product *e* and product *f*) and within-country region labelling of yoghurt (product *j*).

These products do not fully match the low-high-low classification of a market solution in Table 7.2 above, and the classification is further complicated by the absence of voluntary origin labelling, which may indicate both a functioning market and a market failure, as discussed above. Still, the low consumer benefits indicate that a low degree of voluntary origin labelling is likely to be a market solution for these products. Hence, a low degree of voluntary origin labelling does not automatically imply that mandatory origin labelling should be introduced.

Finally, are there any products in Table 7.1 where mandatory origin labelling could be beneficial, as in Case 3 in Table 7.2 above? None of the products fulfil all the criteria for Case 3. The only product that could potentially be considered is yoghurt at the country level, where consumer benefits are of medium size and the degree of voluntary origin labelling is low (product *i* in Table 7.1). Mandatory origin labelling could thus potentially increase societal welfare when it comes to yoghurt at the country level, but whether this would be the case ultimately depends on the size of the benefits in relation to the costs. Thus, in uncertain cases like this, which do not fulfil any of the three sets of criteria in Table 7.2, it be-

comes even more important to have detailed information on both the costs and the benefits of origin labelling.

All products and origin types in Table 7.1 are now classified into one of the categories in Table 7.2. This classification is summarized in Table 7.3 below, which orders the products from the top to the bottom according to their potential suitability for mandatory origin labelling.

The classification of products is not as clear-cut as the three cases in Table 7.2 suggest. The reason is twofold. Firstly, when analysing the products, an additional type of market solution was identified; one where the market provides origin information to consumers, but on another, more suitable, level of information. The products characterized by this solution are classified in the supplementary case 1b in Table 7.3 below. Secondly, the studies do not provide data to determine in detail whether the benefits of origin labelling outweigh the labelling costs. Yoghurt at the country level is therefore classified as a product for which mandatory origin labelling could potentially, but not undoubtedly, bring additional value.

Increasing potential suitability for mandatory origin labelling



Table 7.3. Results of the cost-benefit analysis

Cases	Product	Type of origin information	Implication for mandatory origin labelling
Case 1a: market solution: voluntary labelling	Milk	Country of origin of the milk	Low additional value of mandatory origin labelling
	Bacon	EU/non-EU origin of the meat	
	Ready-made meal	Country of production of the meal	
Case 1b: market solution: voluntary labelling by less detailed type of origin information	Milk	Within-country region of the milk	Low additional value of mandatory origin labelling Risk that mandatory origin labelling results in larger costs than benefits if introduced.
	Bacon	Country of origin of the meat	
	Ready-made meal	Country of origin of the meat	
Case 2: market solution: no or low degree of voluntary labelling	Jam	Country of origin of the berries	Low additional value of mandatory origin labelling Risk that mandatory origin labelling results in larger costs than benefits if introduced.
	Jam	EU/non-EU origin of the berries	
	Yoghurt	Within-country region of the milk	
	Yoghurt	Country of origin of the milk	
Case 3: mandatory labelling could increase societal welfare	-	-	Potential additional value of mandatory origin labelling
	-	-	High additional value of mandatory origin labelling

Source: Based on the analysis in chapter 7

7.3 Concluding comments

As discussed above and shown in table 7.3, none of the investigated products is an obvious candidate for mandatory origin labelling. Voluntary origin labelling seems to be sufficient, as producers' choice of mainly labelling products for which consumer willingness-to-pay is high indicates that markets function satisfactorily. This result is further supported by the complementary analysis of consumer benefits and the degree of voluntary origin labelling in Appendix 3.

If mandatory origin labelling is introduced, there is therefore a risk that the costs of origin labelling will be larger than the benefits. This may in turn affect both producers and consumers negatively, which is further discussed in the next chapter.

8

Conclusions

This report assesses the costs, benefits and trade effects of the potential extension of mandatory origin labelling according to EU Regulation 1169/2011. The analysis is a case study for Sweden. It evaluates consumer benefits through a ranking study and a willingness-to-pay (wtp) study and producer costs through discussions with the Swedish food industry. The trade effects are studied empirically through an econometric analysis of the effects of mandatory origin labelling for beef on food imports to the EU.

The report focuses on five products that are representative for the product groups under consideration for mandatory origin labelling. The results thus apply specifically to these five products. Still, it is possible to draw some general conclusions on the potential consequences of mandatory origin labelling.

This section contains the conclusions from the analyses undertaken in previous chapters. First, the policy recommendations with respect to the extended mandatory origin labelling are presented. Second, the most important results from the studies on consumer benefits, producer costs and international trade effects are briefly stated.

8.1 Policy recommendations

Voluntary origin labelling is sufficient

The results of the studies undertaken in this report indicate that voluntary origin labelling is sufficient for the investigated products. The reason is that there is already a high degree of voluntary origin labelling of products for which consumers are willing to pay for origin information. When voluntary origin labelling is lacking, there is, in general, low consumer interest in origin labelling. This implies that markets voluntarily provide consumers with the information they are willing to pay for, and there is no strong evidence that mandatory origin labelling would be beneficial for society for the analysed products. One potential exception is yoghurt, where mandatory country-of-origin labelling of the ingredient milk could possibly bring additional value to society.

Costs and benefits must be assessed individually for each product

The studies show that the costs and benefits of origin labelling vary substantially across the investigated products. This implies that a potential legislation on mandatory origin labelling should be adjusted to each product; it is not advisable to implement mandatory origin labelling on a general basis with the same information requirements for all products. It also means that it is not a good idea to extend mandatory origin labelling to new products based on the argument that it already exists and is demanded by consumers for other products. Rather, it is important to assess the costs and benefits individually for each product for which mandatory origin labelling is under consideration. If such cost-benefit analysis is not undertaken, there is a risk that mandatory origin labelling would do more harm than good as the costs may outweigh the benefits.

In addition to these overall conclusions, the studies on consumer benefits, producer costs and international trade effects result in a range of important findings. These are briefly stated in the following sections of this chapter. More details are found in chapters 3-6.

8.2 Consumers and origin labelling

Consumers rank origin high for some products

Origin information is important relative to other information attributes for some of the food products in the ranking study, most notably for beef (for which mandatory origin labelling legislation is already in place). However, for the other food products in the study, origin information is of less importance than many other food attributes. Hence, consumer interest differs across products, which implies that legislation on mandatory origin labelling should not be implemented on a general basis for different types of products.

Many consumers do not want to pay for origin information

Thirty-six (36) percent of the respondents in the consumer study show a willingness-to-pay equal to zero for origin information. This implies that there is a risk that mandatory origin labelling results in a redistribution effect among consumers with different preferences. In this case, meeting the requirements of those who argue that consumers have the *right to*

know the origin of food results in imposing an obligation on *all* consumers to pay for the provision of origin information, including those that are not interested in knowing the origin. In this case, mandatory origin labelling implies that origin-indifferent consumers will not have the possibility of choosing products that match their preferences. Nonetheless, this report does not support the hypothesis of an inverted Robin Hood-effect, i.e. that mandatory origin labelling would redistribute from the poor to the rich, since no significant income differences are found between those willing to pay for information on origin and those not willing to pay.

Consumer interest declines with the degree of processing

The studies indicate that consumers become less interested in origin when a product is processed, for example when beef is used as an ingredient in a ready-meal or milk is processed into yoghurt. This would suggest that consumers are less interested in mandatory origin labelling for processed food products compared to less processed products. This is an important result, as the potential extension of mandatory origin labelling covers certain processed food products.

Consumers want information on the country of origin

A strong and consistent result is that consumers prefer “country” as the geographical denomination of origin, rather than the “EU/non-EU” denomination, that is whether the product comes from inside or outside the EU. “Country” is also preferred to the more detailed specification “region within a country”. This implies that, from a consumer perspective, it is most appropriate to require information provision on the country level if mandatory origin labelling is extended. Thus, the most suitable legislation design is not always the one with the most detailed information requirements.

Swedish origin is all-important

According to the studies in this report, the main reason that Swedish consumers are interested in origin information is that they want to buy Swedish products. This would suggest that a general origin legislation requiring detailed labelling of specific origin is not primarily demanded by consumers. Regardless, it cannot be taken for granted that mandatory

origin labelling will increase sales of Swedish food; if consumers are willing to pay enough to cover the labelling costs of receiving information on Swedish origin, such information should already be provided voluntarily by the producers.

Origin does not strongly indicate food quality, food safety or social responsibility for consumers

The consumers in the willingness-to-pay study do not consider origin as a strong signal for food quality, food safety or social responsibility in terms of animal welfare and worker conditions. Consumers that are interested in origin are thus interested in the origin as such, and not as a proxy for other information. This implies that legislation on mandatory origin labelling is likely to become an ineffective instrument if its aim is to inform consumers of differences in production conditions, animal welfare etc. across countries. This result holds for the products investigated in the willingness-to-pay study; for other products, the conclusion might be different.

8.3 Producers and origin labelling

Firms prefer voluntary origin labelling

This report shows that producers prefer voluntary origin labelling to a mandatory legislation on origin provision. For producers, voluntary origin labelling is a way to profile a product and be able to extract a price premium from origin-conscious consumers. At the same time, for consumers with low price as a main concern, it is possible to provide unlabelled products at lower costs. This differentiation possibility is an advantage of voluntary compared to mandatory origin labelling.

Firms prefer less detailed labelling requirements

If mandatory origin labelling is introduced, producer costs of origin labelling will increase with the level of detail of the required information. When it comes to processed food products, firms would therefore prefer origin labelling with the place of production of the processed foodstuff to labelling of the ingredients. Similarly, firms would prefer labelling with a country to labelling with a region within a country, and labelling with EU/non-EU origin to labelling with a specific country. This implies

that producer and consumer interests in some cases oppose each other, as consumers prefer labelling on the country level. An alternative, middle-course solution proposed by the firm representatives would be to allow labelling with several alternative countries. In this case, a label stating origin as “Germany/Ireland/Sweden” would mean that the origin could be any of these stated countries.

Food industry competitiveness may be harmed

Estimating the costs of mandatory origin labelling beforehand is associated with a large portion of uncertainty and complexity. Firms face several adjustment alternatives, and it is difficult to predict which alternative incurs the lowest costs. If mandatory origin labelling is introduced, firms will have to find a way to handle the requirement on information provision, but there is a non-negligible risk that the costs will be high and not fully compensated for by increased prices or increased consumer demand. If this is the case, mandatory origin labelling may impede the competitiveness of the food industry on export markets, where not all firms must implement mandatory origin labelling. This implies that mandatory origin labelling may stand in stark contrast to other policy instruments aiming at promoting Swedish food exports, such as the vision “Sweden – the new culinary nation”.

Swedish primary producers may be hurt

Mandatory origin labelling may hurt Swedish primary producers, who may receive lower farm-gate prices if food processing firms transfer some of their costs to the primary sector. They may further face a decreased demand if food processing firms concentrate their sourcing of raw materials to fewer countries that can supply large volumes. This implies that mandatory origin labelling will not necessarily be beneficial for and promote domestic agriculture.

8.4 EU imports and origin labelling

No impact on imported beef volumes

The results indicate that import volumes to the EU have not been significantly affected by the mandatory country-of-origin labelling for beef. This means that there is no indication of consumers switching from im-

ported to domestic EU beef as a consequence of mandatory origin labelling. Thus, domestic primary producers and the domestic food processing industry may not experience increased sales due to an extension of the mandatory rules if consumers' purchasing behaviour is unchanged. That is, if the intention is to use mandatory origin labelling as a way to encourage consumers to buy more domestic food, it may not necessarily be an effective instrument to achieve this goal. This reasoning is further in line with the discussion above of a potential negative effect for Swedish agriculture as a result of mandatory origin labelling.

Imported beef comes from fewer countries

There is no indication that the volumes of imported beef to the EU have decreased as a consequence of mandatory origin labelling for beef. Mandatory origin labelling has nevertheless affected trade, as the study shows that the number of countries exporting beef to the EU has decreased. This implies that there has been a redistribution of trade, where some countries have benefited from mandatory country-of-origin labelling while others have been disadvantaged.

Which countries have gained and which have lost is not possible to tell from the study. One hypothesis is that small countries like Sweden may have had difficulties if importers tried to reduce their handling costs by mainly buying beef from countries that can supply large volumes. More research is needed, however, to investigate whether this has actually been the case.

8.5 Concluding comments

In conclusion, the recommendation is a continued voluntary origin labelling for the food products included in this report. The rationale for this recommendation is that the markets for voluntary origin labelling already seem to be working and providing consumers with information on origin when they are willing to pay the costs that arise from the information provision.

The argument that consumers have the *right to know* the origin of food is not a sufficient reason for introducing mandatory origin labelling. Since origin labelling comes at a cost, someone has to pay, and the *right to*

know the origin would reasonably also imply an *obligation to pay* for the costs that arise. If mandatory origin labelling is introduced despite consumers not being prepared to pay for the information, there is a risk that both producers *and* consumers will be negatively affected through increased production costs and higher food prices.

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Appendix

Appendix 1: Determinants of consumer willingness-to-pay

Method

To analyse the determinants of willingness-to-pay (wtp) for origin information, a regression model was set up. Since such a large proportion of answers indicated a zero wtp, and since there was no possibility for respondents to indicate a negative wtp⁶⁵, a censored regression model was appropriate to use. The Tobit model (Tobin, 1958), which is often used in censored regressions, assumes that the same factors determine both (a) the choice to pay anything at all and (b) the choice of how much to pay, given that you want to pay at all. This supposition was tested with a likelihood ratio test and the null hypothesis of equal effects of all the different factors on (a) and (b) (i.e. that the Tobit model is appropriate) could be refuted for all products.⁶⁶

To remedy this shortcoming of the Tobit model, a Cragg's two-tier model (Cragg, 1971) was used instead to analyse the data. In Cragg's two-tier model the limitations of the Tobit model are circumvented by incorporating two different processes (called tier 1 and tier 2 below), defined by a probit model and a truncated normal model, to analyse (a) and (b) separately. Tier 1 is thus used to analyse what determines the decision to pay or not to pay, while tier 2 is used to analyse the size of wtp if respondents decide to pay. All regressions were run using Stata® version 12.

Results

In Table A1.1 and Table A1.2, regression results in terms of marginal effects for tier 1 and tier 2 are presented in the upper and lower halves, respectively. The left part of each table refers to the less specific origin

⁶⁵ A negative wtp would be viable if, for example, respondents who are indifferent to the origin information find it more difficult to find other valuable information on the product when this origin information is present.

⁶⁶ Technically, the likelihood ratio statistic was calculated as $LR = -2[\ln LF_{Tobit} - \ln LF_{Probit} - \ln LF_{Truncated\ regression}]$ where LF is the maximized log likelihood function values for the model type indicated in the subscript. The null hypothesis is that the Tobit model is correct, and the test statistic is chi squared with degrees of freedom equal to the included number of variables. Note that all models need to have the same variables included in order to make the test valid. See (Lusk and Shogren, 2007) for further details.

type 1 for each product, while the right part presents results for the more specific origin type 2.

In summary, determinants seem to vary widely in importance depending on product type, origin level and tier. Overall, the most important determinant seems to be *regional preferences*. Thus, consumers who would always opt for products from the geographical area they live in have a higher probability of having both a positive wtp and a higher wtp if they choose to pay. This result seems to be particularly evident for milk, where the probability of having a positive wtp increases by between 35 and 58 percent for consumers with strong regional preferences. A second important determinant is *age*, which is significant in nine of the regressions. Interestingly, age appears to increase the probability of having a positive wtp, while it decreases the actual wtp of those that decide to pay. A similar difference between tier 1 and tier 2 also applies to university education. Hence, respondents with a university education are more likely to pay for origin information, but not more likely to pay a high amount once the decision to pay is made.

Some additional results of interest may be inferred from the two tables. Firstly, the variable *origin signals credence attributes* is a very important determinant for non-dairy products in tier 1, but not at all important for any products in tier 2. Respondents who believe that the presence of origin information on jam, bacon and ready-made meals indicates a higher degree of food safety and social responsibility thus have a significantly higher probability of paying for the origin information. However, once the decision to pay has been made, wtp is not significantly different between those who think there are strong signals and those who do not.

Secondly, income increases wtp significantly only for ready made meals, and only when valuing the country-of-origin of the meat (origin type 2). Although this wide-ranging lack of significance is a somewhat unexpected result, it is not uncommon when valuing information (see for example Klain, et al. (2013)). One possible explanation may be that the premium that respondents are prepared to pay for obtaining the origin information is so small that income levels become relatively

unimportant (and thus insignificant in the regressions), in contrast to situations where wtp is comparatively high.

Apart from marginal effects, Table A1.2 also presents three different predicted estimations of wtp based on the regressions: conditional mean wtp, unconditional mean wtp and unconditional median wtp. The difference between a conditional and an unconditional prediction is that the former is based only on respondents belonging to tier 2, i.e. it excludes respondents with a wtp of zero. Thus the conditional wtp values tend to be considerably higher than the unconditional counterparts for all products. The conditional means are included, since these are the base values for which the marginal effects in tier 2 apply.

Like the wtp values calculated from the actual data, the predicted wtp values are also non-normally distributed (tested with a Shapiro-Wilks test). As previously stated, the median value is the most appropriate measure to use in these cases. Since regression coefficients are directly affected by the wtp values of all respondents included in a regression, including large positive outliers results in the medians of these predicted wtp values, as presented in Table A1.1 and Table A1.2, being higher than the median wtp values based on the actual data in Table 4.2. The tests in the main text concerning differences between products and origin types are based on these predicted values.

Table A1.1. Results for tier 1

Tier 1: dependent variable Pr(wtp>0)	Origin type 1					Origin type 2				
	Meals	Jam	Yoghurt	Milk	Bacon	Meals	Jam	Yoghurt	Milk	Bacon
Origin signals credence attributes^a (baseline: weak or no signal)	0.095 [0.167]	0.27** [0.137]	-0.016 [0.136]	-0.268** [0.114]	-0.214 [0.166]	0.469** [0.172]	0.352** [0.13]	0.046 [0.148]	0.205 [0.143]	0.255* [0.153]
Origin signals food quality^b (baseline: weak or no signal)	0.173 [0.16]	-0.116 [0.181]	0.097 [0.127]	0.431** [0.118]	-0.052 [0.166]	-0.058 [0.157] cat ***	0.064 [0.162]	0.088 [0.159]	-0.206 [0.16]	-0.05 [0.134]
Household income (baseline: < SEK 20000/mth) SEK 20000-40000/mth	-0.006 [0.166]	0.053 [0.187]	-0.101 [0.124]	-0.409*** [0.114]	0.007 [0.163]	0.419** [0.202]	-0.025 [0.162]	0.25 [0.166]	0.151 [0.162]	0.107 [0.167]
more than SEK 60000/mth	-0.005 [0.19]	0.155 [0.204]	-0.245* [0.144]	0 [0.063]	-0.083 [0.182]	-0.175 [0.249] 0.233*	0.044 [0.166]	-0.051 [0.183]	-0.106 [0.206]	0.033 [0.188]
Regional preferences strong^c (baseline: weak)	0.142 [0.154]	0.167 [0.135]	0.077 [0.136]	0.584*** [0.134]	0.544*** [0.123]	0.233* [0.139]	0.075 [0.125]	0.346*** [0.123]	0.325*** [0.111]	0.1 [0.109]
Age	-0.001 [0.005]	0.008* [0.005]	0.01** [0.004]	-0.008* [0.004]	0.001 [0.005]	0.007 [0.005]	-0.002 [0.004]	-0.001 [0.004]	0.004 [0.004]	0.009** [0.004]
Household size > 2 persons (baseline: 1-2 persons)	0.017 [0.185]	0.178 [0.209]	0.225 [0.234]	0.283 [0.242]	-0.112 [0.171]	0.431** [0.201]	0.206 [0.187]	0.028 [0.197]	-0.268** [0.115]	0.312 [0.224]
Female (baseline: male)	-0.118 [0.132]	0.362*** [0.121]	-0.151 [0.11]	0.04 [0.132]	0.095 [0.129]	0.005 [0.143]	0.088 [0.127]	0.078 [0.141]	0.005 [0.12]	-0.052 [0.1]
Experience of origin legislation^d (baseline: low/no experience)	0.177 [0.199]	0.222 [0.125]	0.172 [0.125]	0.219** [0.09]	-0.039 [0.183]	0.226 [0.145]	-0.051 [0.216]	-0.049 [0.212]	-0.102 [0.223]	0.116 [0.135]
University education (baseline: no university education)	0.168 [0.132]	0.221 [0.17]	-0.02 [0.128]	0.079 [0.147]	0.011 [0.134]	0.343* [0.185]	0.001 [0.134]	0.226 [0.138]	0.287* [0.167]	0.119 [0.109]

Notes: *** p<0.01, ** p<0.05, * p<0.1; numbers in brackets are standard errors; coefficients and standard errors in grey are significant on at least a 10% level; significant categories (on at least a 10% level) have a black border around them

a) variable created by combining scores on likert scale questions for food safety (bacteria), food safety (chemicals) and social responsibility. Maximum score is 21; baseline defined by a score of 11 or below.

b) baseline defined by a score of 5 or below on likert scale question on food quality

c) baseline defined by a score of 5 or below on likert scale question on regional preferences

d) baseline consists of respondents who have indicated one of the following: have never heard of origin labelling legislation, not familiar with origin labelling legislation or somewhat familiar with origin labelling legislation.

Table A1.2. Results for tier 2, predicted wtp and number of observations

	Origin type 1					Origin type 2				
	Meals	Jam	Yoghurt	Milk	Bacon	Meals	Jam	Yoghurt	Milk	Bacon
Origin signals credence attributes (baseline: weak or no signal))	1.62 [1.449]	0.686 [0.576]	0.129 [0.69]	0.671 [0.681]	1.489 [1.273]	1.563 [1.086]	-2.146 [2.015]	-0.139 [0.478]	0.012 [0.437]	0.074 [0.762]
Origin signals food quality (baseline: weak or no signal))	0.514 [1.204]	-1.016* [0.584]	0.875 [0.7]	0.388 [0.649]	-2.417** [1.051]	0.516 [0.995]	1.5 [1.735]	1.397*** [0.492]	0.569 [0.568]	0.466 [0.61]
Household income (baseline: < SEK 20000/mth)						cat ***				
SEK 20000-40000/mth	1.2 [0.987]	0.717 [0.711]	-0.255 [0.78]	0.422 [0.649]	0.365 [1.344]	2.994*** [0.897]	-0.895 [1.74]	-0.404 [0.569]	-0.306 [0.518]	-0.328 [0.913]
more than SEK 60000/mth	1.309 [1.461]	1.081 [0.775]	-0.612 [0.801]	0.61 [0.789]	0.847 [1.518]	3.663*** [1.218]	0.42 [1.914]	0.574 [0.67]	-0.338 [0.661]	0.279 [0.964]
Regional preferences strong (baseline: weak)	2.109 [1.3]	1.65*** [0.557]	0.511 [0.568]	-2.879 [2.35]	1.638 [1.181]	1.421 [0.916]	0.82 [1.316]	-0.942* [0.493]	0.569* [0.344]	0.293 [0.638]
Age	-0.031 [0.03]	0.056*** [0.02]	-0.013 [0.022]	-0.016 [0.017]	0.003 [0.043]	-0.063* [0.038]	-0.038 [0.053]	0.039*** [0.014]	-0.031** [0.013]	-0.048** [0.019]
Household size: >2 persons (baseline: 1-2 persons)	0.86 [1.111]	-1.388 [1.018]	0.955 [0.721]	1.176** [0.543]	1.085 [1.396]	-1.771 [1.332]	-0.507 [2.113]	-0.684 [0.862]	-0.208 [0.507]	1.821*** [0.65]
Female (baseline: male)	0.28 [0.852]	0.542 [0.63]	1.398** [0.555]	0.547 [0.652]	-0.358 [1.015]	1.002 [0.975]	-2.169 [1.696]	-0.648 [0.486]	0.468 [0.36]	1.35** [0.531]
Experience of origin legislation (baseline: low/no experience)	-0.383 [1.132]	0.774 [0.881]	0.524 [0.774]	1.158 [1.295]	2.609 [2.045]		12.888* [7.304]	-0.09 [0.688]	0.293 [0.659]	0.701 [0.865]
University education (baseline: no university education)	0.931 [0.834]	0.711 [0.781]	0.631 [0.523]	0.076 [0.588]	1.556 [1.073]	-0.888 [1.017]	-0.821 [1.396]	-0.919* [0.51]	-0.995* [0.564]	-1.366** [0.633]
Predicted E(wtp wtp>0)	3.42 [1.97]	2.94 [1.35]	2.71 [1.19]	3.16 [3.06]	4.59 [1.91]	4.76 [1.98]	6.58 [6.27]	2.70 [1.25]	1.81 [0.75]	3.25 [1.42]
Predicted E(wtp)	2.00	2.03	1.89	1.98	3.00	3.41	4.45	1.39	1.19	2.52
Predicted median wtp	1.67	1.32	0.99	1.97	2.03	2.35	4.91	0.60	0.68	1.33
	1.34	1.67	1.71	1.60	2.37	3.23	3.08	1.26	1.10	2.44
Observations	72	70	76	74	75	67	72	73	76	73

Appendix 2. Simulation parameters for accumulated willingness-to-pay

To account for uncertainties when accumulating wtp, a Monte Carlo simulation model was set up with distributions that incorporated these uncertainties. Beta Pert distributions were used for all uncertain variables, and the actual parameters used are presented in Table A2.1.

Table A2.1. Simulation input data

	Ready-made meals	Strawberry jam	Yoghurt	Milk	Bacon
Number of packages per purchase	(1;5;1)*	1	1***	(1;4.75;2.875)**	(1;1.5;3)****
Voluntary labelling for origin type 1 and 2*****	1: 0.6875 2: 0.00	1: 0.0714 2: 0.0714	1: 0.2222 2: 0.1111	1: 0.83 2: 0.5	1: 0.67 2: 0.58
Wtp/item origin type 1	(0;0.125;2)	(0.5;1.125;2)	(0.5;1;2)	(1;1;1.1)	(0;2;2)
Wtp/item origin type 2	(0.5;2;5)	(1;2.5;5)	(0;1;1)	(0.5;1;1)	(1;2;2)

Notes: All uncertain variables were modelled using BetaPert(min;mode;max) distributions.

* Often sold in campaigns where you get 5 packages at a reduced price. But buying only one per occasion is considered more likely

** Consumption/person/year: 93 litres (SJV); Average household size: 2.66 (from own wtp data); assumption that purchaser buys milk for entire household; Average amount of milk bought per week: 4.75 (93*2.66/52)

*** The same calculations as for milk, assuming yoghurt makes up 50% of soured dairy products implies slightly below 1 litre per week (36.4*0.5*2.66/52=0.9)

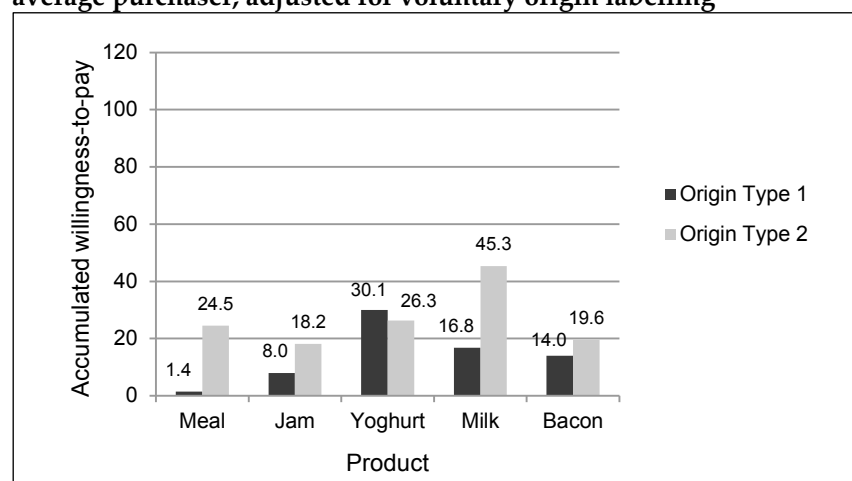
**** Often sold in packages of three

***** Based on a small sampling from an online store for the most common brands. 4 brands and 4 different products/brand. Assumption that each sampled product is sold in amounts equal to the others (which is probably not true, since some brands have a very large part of the market; e.g. Arla for dairy products). Assumption that wtp is zero for origin labelling if it is already present

Appendix 3. Complementary analysis of consumer willingness-to-pay and voluntary origin labelling

The analysis in chapter 7 is based on the total benefits of origin labelling and therefore builds on Figure 7.1 in section 7.1. However, since some products are already voluntarily labelled by producers, the benefits of mandatory origin labelling are smaller than indicated in Figure 7.1. By multiplying the accumulated wtp in Figure 7.1 by the share of products that lack voluntary origin labelling according to Figure 7.2 in chapter 7, we get an indication of the wtp that is left when producers have already labelled their products with origin voluntarily.⁶⁷ The results of these calculations are displayed in Figure A3.1 below. The figure shows the annual benefits of mandatory origin labelling for a typical consumer, which, although not aggregated to total benefits, may still be used to compare the benefits of mandatory origin labelling for different products.

Figure A3.1. Mean values of accumulated annual wtp (total benefit) for average purchaser, adjusted for voluntary origin labelling



Notes: Origin type 1 refers to the wider definition of origin while origin type 2 refers to the more specific definition (see also Table 7.2). Values above each bar are the total annual wtp values for a typical consumer. Meal is an abbreviation for ready-made meal

⁶⁷ The products in the wtp study do not include products already labelled with origin voluntarily. The resulting consumer wtp is therefore only representative for products that are not already labelled with origin.

The figure can also be used as an indicative test of whether markets work to provide consumers with origin information. If markets work, producers would primarily choose to label products with a high accumulated wtp, given that the costs of labelling are not higher than the benefits. If this is the case, the bars adjusted for voluntary origin labelling in Figure A3.1 will be more even than the bars in Figure 7.1 showing consumer willingness-to-pay for different products before adjusted for voluntary origin labelling. Comparing Figures 7.1 and A3.1, the bars do indeed seem to have evened out when adjusted for voluntary origin labelling, which is thus in line with what we would expect from well-functioning markets.⁶⁸

⁶⁸ Again, this holds given that the costs of origin labelling are lower than the benefits.

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