

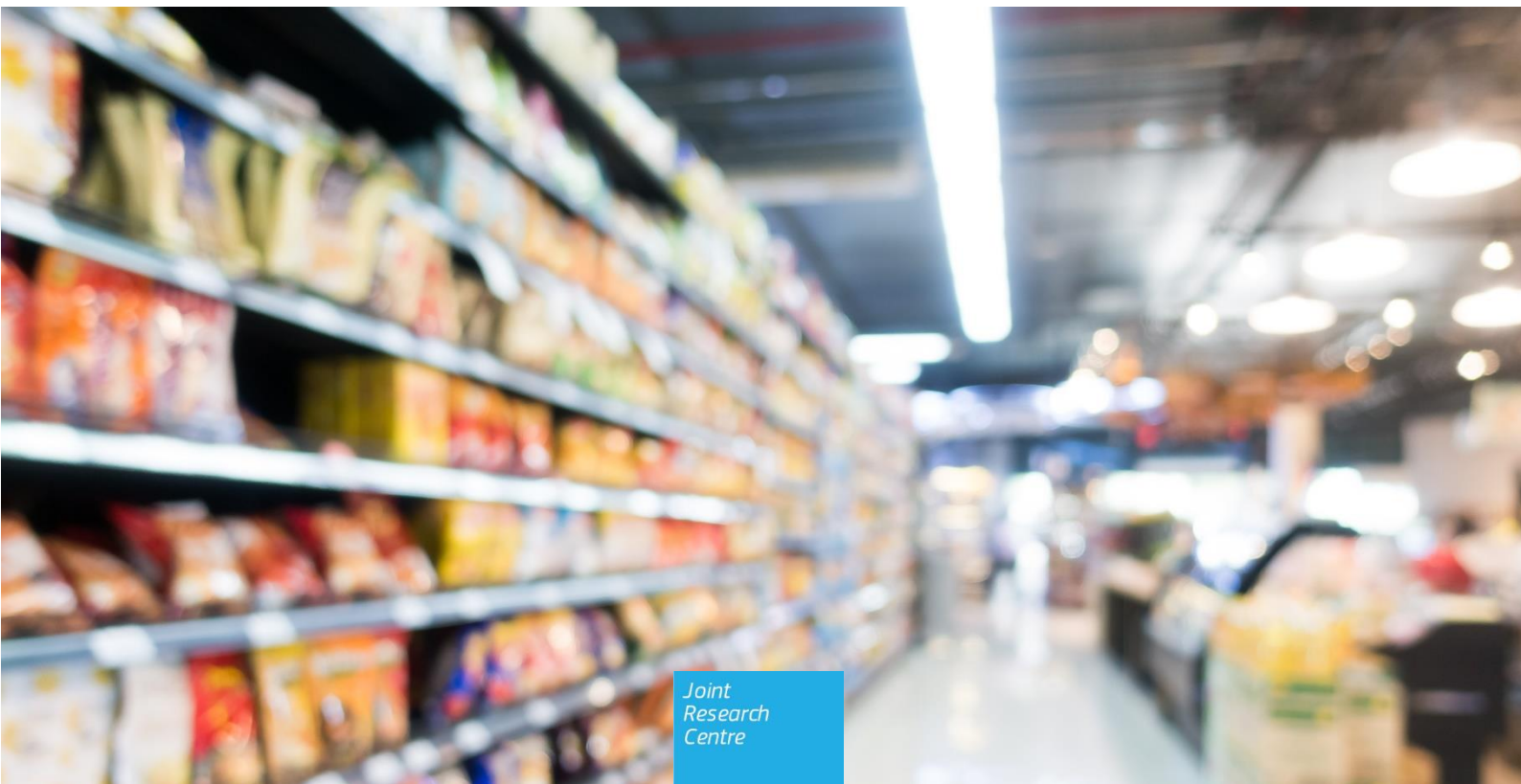
# Economic rationale behind differences in the composition of seemingly identical branded food products in the Single Market

*A review of the literature*

**Editors:**

Carlo Russo, Luisa Menapace, Marcello Sansone

2020



This publication is a report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

**EU Science Hub**

<https://ec.europa.eu/jrc>

JRC117796

PDF

ISBN 978-92-76-10936-5

doi:10.2760/164019

Luxembourg: Publications Office of the European Union, 2020

© European Union, 2020



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union, 2020, except: bottom cover: Abstract blur supermarket in department store, © Designed by mrsiraphol / Freepik

How to cite this report: Carlo Russo, Luisa Menapace, Marcello Sansone (Editors), *Economic rationale behind differences in the composition of seemingly identical branded food products in the Single Market: A review of the literature*, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-10936-5, doi:10.2760/164019, JRC117796.

# Table of contents

ACKNOWLEDGMENTS.....	6
EXECUTIVE SUMMARY .....	7
INTRODUCTION .....	10
<b>1 DRIVERS OF PRODUCT DIFFERENTIATION AND IMPLICATIONS FOR DC-SIP. A REVIEW OF THE INDUSTRIAL ORGANISATION LITERATURE CARLO RUSSO AND EDWARD KYEI TWUM .....</b>	<b>14</b>
1.1 INTRODUCTION .....	14
1.2 DEFINING THE SCOPE OF THE ANALYSIS.....	16
<i>The meaning of “quality” in economics.....</i>	<i>17</i>
1.3 CONSUMER PREFERENCES AS A RATIONALE FOR DIFFERENCES IN COMPOSITION .....	17
1.3.1 <i>Drivers of heterogeneity in consumer demand for attributes .....</i>	<i>18</i>
1.3.2 <i>Demand for variety and non-address quality models.....</i>	<i>19</i>
1.3.3 <i>Heterogeneous individual preferences and address quality models .....</i>	<i>21</i>
1.3.4 <i>Vertical quality model.....</i>	<i>22</i>
1.3.5 <i>Horizontal quality models.....</i>	<i>24</i>
1.3.6 <i>Credence goods.....</i>	<i>25</i>
1.4 COST FUNCTIONS AS SUPPLY-SIDE DETERMINANTS OF DIFFERENCES IN COMPOSITION .....	26
1.4.1 <i>Production costs .....</i>	<i>26</i>
1.4.2 <i>Costs of producing quality .....</i>	<i>27</i>
1.5 COMPETITION .....	28
1.6 REGULATION, INSTITUTIONS, AND TECHNOLOGY .....	29
1.7 SUMMARY AND CONCLUSIONS .....	30
1.8 REFERENCES .....	31
<b>2 DISCRIMINATION AND STRATEGIC RESPONSES OF FIRMS TO ARBITRAGE: IMPLICATIONS FOR DC-SIP LUISA MENAPACE .....</b>	<b>39</b>
2.1 INTRODUCTION .....	39
<i>Discrimination versus market segmentation.....</i>	<i>40</i>
2.2 QUERY OF THE INDUSTRIAL ORGANISATION LITERATURE .....	43
<i>Price-Quality discrimination (Mussa and Rosen 1978).....</i>	<i>44</i>
<i>Standard result of the third-degree price discrimination literature .....</i>	<i>45</i>
<i>Parallel trade .....</i>	<i>45</i>
2.3 DC-SIP-RELATED QUESTIONS THAT CAN BE ANSWERED BY THE INDUSTRIAL ORGANISATION LITERATURE .....	46
2.3.1 <i>Third-degree quality discrimination.....</i>	<i>48</i>
2.3.2 <i>Incentives to introduce national variations in response to a policy or institutional change that limits price discrimination.....</i>	<i>51</i>
2.3.3 <i>Incentives to invest in quality in response to a policy or institutional change that limits price discrimination .....</i>	<i>57</i>
2.4 CONCLUSIONS.....	59
2.4.1 <i>References .....</i>	<i>60</i>
<b>3 INTERNATIONAL STANDARDISATION VERSUS ADAPTATION OF MARKETING: GLOBALISATION VERSUS LOCALISATION LUISA MENAPACE AND NEGIN FATHINEJAD.....</b>	<b>62</b>
3.1 INTRODUCTION .....	62
3.2 THINK GLOBAL, ACT LOCAL.....	64

3.3	CONCLUSIONS AND LIMITATIONS OF THE LITERATURE ON INTERNATIONAL MARKETING AND INTERNATIONAL BUSINESS	67
3.4	PRODUCT ADAPTATION: A THEORETICAL APPROACH BY SCHMID AND KOTULLA (2011)	69
3.5	CONCLUSIONS	70
3.6	REFERENCES	71
<b>4</b>	<b>HOW DC-SIP INFLUENCES THE PURCHASE INTENTION? ANALYSIS OF FACTORS AFFECTING PERCEIVED QUALITY ANNARITA COLAMATTEO, MARIA ANNA PAGNANELLI, MARCELLO SANSONE</b>	<b>76</b>
	SUMMARY	76
4.1	INTRODUCTION	78
4.2	QUALITY, PERCEIVED QUALITY, AND MODELS: THEORETICAL BACKGROUND	79
4.2.1	<i>The information economy approach</i>	80
4.2.2	<i>Multi-attribute approach</i>	80
4.2.3	<i>Hierarchical approaches</i>	81
4.2.4	<i>Total Food Quality Model</i>	82
4.2.5	<i>Integrative approaches</i>	83
4.3	CONSUMER BEHAVIOUR AND PURCHASE MOTIVATION	84
4.4	FACTORS AFFECTING PERCEIVED QUALITY: REVIEW OF THE LITERATURE	86
4.5	CRITICAL FACTORS IN THE DC-SIP ISSUE: HOW DO THEY INFLUENCE THE PURCHASING PROCESS?	88
4.5.1	<i>Price</i>	90
4.5.2	<i>Packaging and labelling</i>	91
4.5.3	<i>Brand</i>	93
4.5.4	<i>Origin</i>	94
4.5.5	<i>Healthy and organic</i>	98
4.5.6	<i>Intrinsic factors</i>	99
4.6	CONCLUSIONS	100
4.7	REFERENCES	101
<b>5</b>	<b>SUMMARY OF THE RESULTS AND POSSIBLE POLICY IMPLICATIONS: AN ILLUSTRATIVE EXAMPLE. CARLO RUSSO</b>	<b>110</b>
5.1	BUILDING AN 'EXTREME SCENARIO' OF DC-SIP	110
5.1.1	<i>Technology and cost functions</i>	111
5.1.2	<i>Consumer behaviour</i>	112
5.1.3	<i>Modelling two markets</i>	114
5.2	EQUILIBRIUM UNDER PERFECT INFORMATION	114
5.3	EQUILIBRIUM UNDER DC-SIP	115
5.3.1	<i>Equilibrium quality levels</i>	116
5.3.2	<i>Welfare effects of DC-SIP</i>	118
5.3.3	<i>Changes in consumer purchasing decisions</i>	119
5.4	INFORMATION DISCLOSURE REGULATION	121
5.5	PRODUCT OF REFERENCE (PoR) REGULATION	124
5.6	ONE-MARKET, ONE-QUALITY (1M1Q) REGULATION	124
5.7	SENSITIVITY ANALYSIS	125
5.8	RESULTS AND POLICY IMPLICATIONS	127
5.9	REFERENCES	127
	<b>LIST OF ABBREVIATIONS</b>	<b>128</b>
	<b>LIST OF FIGURES</b>	<b>129</b>

**LIST OF TABLES ..... 130**

## **Acknowledgments**

We would like to thank all of the participants for their comments, discussions, and sharing of their insight into the topic at the Stakeholder Meetings held in Seville and Brussels on 14<sup>th</sup> May 2019 and 14<sup>th</sup> February 2020, respectively, where an earlier version of the report was presented. We would like to thank Jaroslaw Swierczyna from DG-GROW for his close collaboration in the realization of the workshop and in his valuable comments and further inputs into this report. We thank Stefano Soro, Head of the Food Industry Unit (GROW.D3) and Giampiero Genovese, Head of the Economics of Agriculture Unit (JRC.D4), for their continuing support and additional input into the production of this report.

## Executive Summary

1. This report presents the results of a review of the economic literature about the problem of Difference in Composition of Seemingly Identical Branded Product (DC-SIP). The problem is also referred to as *dual quality*. The DC-SIP problem emerges when a firm supplies products of different characteristics (such as ingredients, recipe, weight) without consumers being properly informed about the differences. The difference must be 'relevant', meaning that consumers might take a different purchasing decision if informed correctly.
2. Academic literature about DC-SIP is almost non-existent. Consequently, this report focuses on contributions that are indirectly related to the topic and yet are able to foster an understanding of the economic principles of DC-SIP. The report provides a conceptual analysis in order to explain the rationale for brand owners to use DC-SIP practices and policy related issues; it does not bring empirical evidence as it is not available in the literature.
3. The DC-SIP problem has an objective component (the difference in composition/weight) and a subjective component (consumer information and choice). The report addresses the economics of the objective component in Chapters 1, 2, and 3. The subjective component is discussed in Chapter 4. Chapter 5 presents an illustrative example of the possible consequences of regulation. The possible policy implications of the findings presented in this report are emphasised throughout the report.
4. Chapter 1 reviews the industrial organisation (IO) literature regarding firms' "strategic quality choice". From an IO perspective, product composition is a dimension of quality. It should be noted that in the IO literature quality is not necessarily hierarchical: products of different quality are just different (without one being necessarily better than the other). The core topic of the review presented in this chapter is the determination of market equilibrium when firms can compete on quality. the review reaches the following conclusions:
  - a. Differences in composition within the Single Market may be socially efficient if consumer preferences, cost functions, market structure, and institutions are spatially heterogeneous. However, this result requires consumers to be perfectly informed.
  - b. The number of varieties that firms can offer to consumers is limited. As a consequence, regulating DC-SIP may not result in a higher number of varieties in the market. Furthermore, the constraint on the number of varieties implies that firms must choose the most profitable ones. Because the profits from each variety might vary over space, firms may have an incentive to supply different varieties in different Member States.
5. Chapter 2 focuses on multi-country models of parallel trade and quality discrimination. The literature builds on the market equilibrium models in Chapter 1, assuming that firms can sell to different groups of consumers. In the absence of arbitrage, DC-SIP can be rationalised as optimal differential treatment of consumers by firms in separated national markets based on the features of demand.

- a. Quality discrimination among consumers in different markets is the result of profit-maximising behaviour by firms taking advantage of differences in demand conditions when markets are separated.
  - b. A firm with market power optimally reacts to policies (or to changes in institutional/legal environment) that impose a constraint on firm behaviour by adjusting the decision variables that are not subject to the policy. For instance, a policy that limits the ability of a firm to engage in price discrimination between national markets (e.g., ban on territorial supply constraint practices) may induce a quality response by a firm with market power, potentially leading to larger quality differences between national countries.
  - c. It is conceivable that national variations could be introduced by a firm in response to a policy that limits the ability of a firm to engage in price discrimination (e.g., ban on territorial supply constraints) between national markets. This response would represent as an attempt to maintain firm's ability to discriminate between markets in a situation in which national markets are otherwise well integrated. Nevertheless, whether introducing DC-SIP is useful for firms to maintain firm's ability to discriminate remains an empirical question. This could be the case if DC-SIP were able to undermine the ability or willingness of retailers to procure the product in the country where the product is cheaper. For example, a retailer could possibly be unwilling to source a product with varying quality to avoid consumers being dissatisfied.
6. Chapter 3 expands the discussion about international models by reviewing the marketing management literature. International marketing and international business researchers and practitioners have long debated the question of whether to adapt ('go local') or to standardise ('go global') the marketing mix across countries. Adapting some elements of the marketing mix (e.g., product) but not others (e.g., brand) can be rationalised as an optimum strategy of an international firm to improve performance.
- a. The main factors supporting the 'Go Global' approach (standardization of products across countries) are the benefits of cost reduction, improved resource allocation, cultural convergence, and technology development. The main factors supporting the 'Go International' approach (adaptation of products to local conditions) are related to the persistence of a large degree of difference in consumer taste, needs, and preferences across markets, the existence of country-specific laws and customs, and heterogeneity in the ecological and competitive environments.
  - b. A third vision emerged more recently supporting the idea that firms engage in both adaptation and standardisation as both have positive relationships with performance. A theoretical framework by Schmid and Kotulla (2011) identified four factors affecting the decision between standardisation and localisation: (a) cross-national homogeneity of demand; (b) potential for cross-national economies of scale; (c) cost of modification of the product; (d) foreign price elasticity of demand.
  - c. A key finding in the literature is that the marketing mix is jointly determined, meaning that any regulation concerning quality or product



composition (e.g. ingredients) is also expected to affect price, placement, and promotion (and ultimately market shares). The magnitude to which these components are affected depends on market conditions and product type.

7. The discussion in Chapter 4 focuses on consumer purchasing decision under imperfect information. A review of the extensive literature concludes that consumer perception and purchase motivation are key variables in DC-SIP issues. When extrinsic attributes have an important signalling role about the quality of the product, firms might be unwilling to communicate to the consumer changes in ingredients and recipe (intrinsic attributes), if this impacts on the perception of price, health, origin, the values of the brand, and ultimately the perception of quality and therefore on the purchase intentions of the consumer.
8. Chapter 5 presents a numerical example illustrating the equilibrium in a two-country market. The aim is to discuss the possible implications of DC-SIP regulation. The results of the simulation are conditional on the assumptions in the model and are not general. They must be interpreted as an example of possible unintended consequences of regulation, not as predictions of policy outcome.
  - a. We found that DC-SIP reduces social welfare and may have unexpected redistribution effects across firms and across consumers. It is possible that groups of consumers benefit from DC-SIP strategies. Similarly, it is possible that local firms may enjoy higher profits if the international firm engage a DC-SIP strategy (e.g. when tailoring versions to local demand conditions).
  - b. It is possible that regulation imposing the same product composition in all Member States is socially inefficient, especially if the demand and/or production costs are spatially heterogeneous. Such regulations may harm certain consumer groups and local firms in specific circumstances.
  - c. Policies ensuring that consumers have enough information to assess products properly (Information Disclosure) are socially efficient but may have a redistribution effect too. However, these policies might be difficult to implement in practice.
  - d. In theory, information disclosure regulations perform better than mandatory quality regulations.

## Introduction

In this report the authors illustrate the result of a review of the economic literature about the problem of *differences in composition of seemingly identical branded food products* (DC-SIP) in the Single Market.<sup>1</sup> The Authors are scholars from the Technical University of Munich (TUM) and the University of Cassino and Lazio Meridionale. The report was commissioned by the Joint Research Centre.

DC-SIP can be defined as marketing across Member States of goods as being identical when, in reality, they have a significantly different composition or characteristics may mislead consumers and cause them to take a transactional decision that they would not have taken otherwise (European Parliament legislative resolution of 17 April 2019 8\_TA-PROV(2019)0399, points 51 and 52).

The European Parliament states that:

*'the issue of dual quality [...] may be seen [...] the following activities:*

- *manufacturer places products on the market with varying flavors and compositions (i.e. different main ingredient) but with the same or similar (indistinguishable for the consumer) packaging appearance,*
- *a manufacturer places products of differing qualities on the market but with the same or similar (indistinguishable for the consumer) packaging appearance,*
- *a manufacturer places products of differing weights on the market but with the same or similar (indistinguishable for the consumer) packaging appearance,*
- *when launching a new product on a particular market, a manufacturer uses a product with a higher quality composition (e.g. higher meat quantity or quality of ingredients in the product) in order to attract consumers' attention and "teach" consumers to buy/adopt the product; after a certain period, however, a "recipe change" occurs without any obvious change in the product's packaging (except for the product composition given in small print on the back of the label).*

*The manufacturer carries out all of these activities without highlighting to the consumer clearly, emphatically, transparently and without misleading, the fact that the product is another product of different composition, weight, quality or other related characteristics.'* (European Parliament 2018/2008(INI))<sup>2</sup>

---

<sup>1</sup> The official documents cited in this introduction use the term *dual quality* instead of DC-SIP, following the initial perception of the problem. In this report, the authors opt for a more neutral definition because changes in composition do not necessarily result in products of different quality.

<sup>2</sup> [http://www.europarl.europa.eu/doceo/document/A-8-2018-0267\\_EN.pdf](http://www.europarl.europa.eu/doceo/document/A-8-2018-0267_EN.pdf)

The DC-SIP problem has objective and subjective components. The objective component is a non-negligible difference in quality, ingredients, weight, or other relevant characteristics. The Joint Research Centre released guidelines to test for such differences (JRC: "Framework for selecting and testing of food products to assess quality related characteristics: *EU harmonised testing methodology*" April 25, 2018).

The subjective component is imperfect consumer information. DC-SIP is only an issue if consumers are unable to take an informed purchasing decision. Under perfect information, market incentives are enough to achieve a social optimum. On the other hand, if consumers are not able to assess the difference between products sold under the same brand and packaging, inefficient market allocations are possible. The key issue is the distortion of consumer decisions due to lack of information. In fact, the European Commission stated that a public intervention is required if:

*'[...the variation in quality] has the potential to alter the economic behaviour of the average consumer who would take a different purchasing decision if he/she were made aware of such difference.'* (Commission notice C(2017) 6532 final)<sup>3</sup>

This report aims to investigate the incentives that firms may have to provide different varieties of the same product in different Member States. The analysis is essential in understanding the possible unintended consequences of possible regulations of the DC-SIP phenomenon. The existing economic literature was explored for contributions explaining the drivers behind product differentiation, with a specific focus on international marketing.

Although there is almost no scholarly contribution regarding DC-SIP explicitly, there is an extensive literature about related issues in the fields of Industrial Organisation and Marketing Management. Figure 1 illustrates the organisation of the discussion.

Chapters 1 to 3 focus on the issue of difference in composition, regardless of whether the products are seemingly identical or not. This is the objective component of DC-SIP.

Chapter 1 reviews the Industrial Organisation literature on strategic quality choice and product differentiation in one market. The discussion in Chapter 1 addresses the following study questions:

- *Why do firms offer different varieties of the same products?*
- *Why do firms not offer all varieties to all consumers and then let them choose?*

According to the literature, quality is an endogenous choice based on a profit maximisation criterion. The factors affecting this choice are investigated and it is concluded that firms may have an incentive to supply different varieties if market conditions are different across Member States.

This discussion is expanded in Chapter 2 which explores firm strategies such as discrimination and strategic response (in terms of quality) to changes in policy or in the institutional/legal environment. The focus of the discussion is on strategic quality choices in multiple markets and the consequent equilibria. In fact, DC-SIP can be considered to be a special case of spatial segmentation based on quality. Although DC-

---

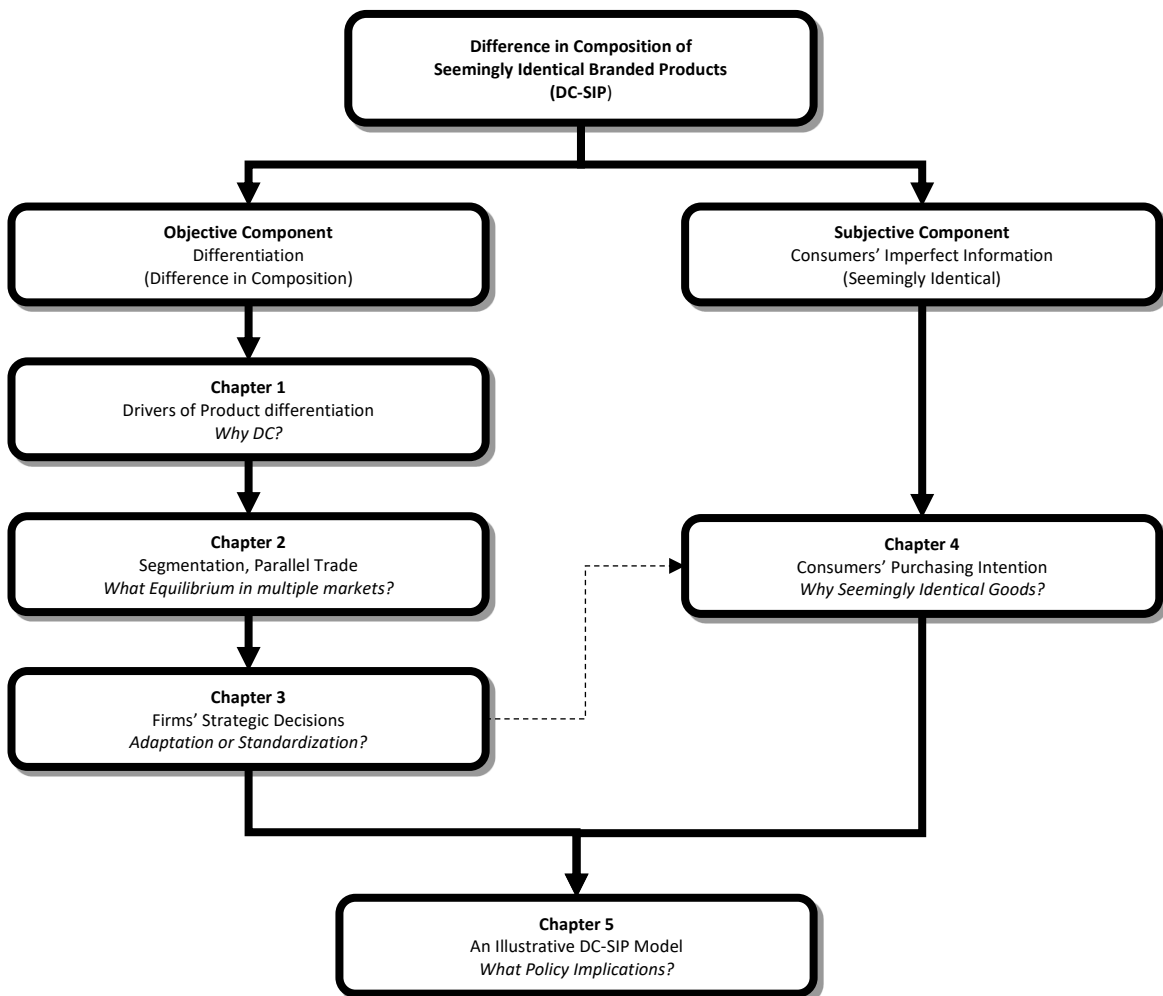
<sup>3</sup> [http://ec.europa.eu/newsroom/document.cfm?doc\\_id=47227](http://ec.europa.eu/newsroom/document.cfm?doc_id=47227)

SIP concerns the Single Market, multiple-market models provide interesting insights into the problem. In fact, the Single Market is so large that consumers are spatially dispersed. As a consequence, they cannot all shop in the same stores and spatial segmentation is still possible despite the common institutions. The study questions in this chapters are:

- *Can DC-SIP be rationalised as the result of quality discrimination?*
- *Can DC-SIP be rationalised as the result of a possible strategic firm response in anticipation (or as a consequence) of a policy or an institutional change that limits the ability of firms to engage in third-degree price discrimination (e.g., a potential limitation of their ability to impose 'territorial supply constraints')?*

It was found that a firm with market power optimally reacts to policies that impose a constraint on a strategic choice (for example: on quality) by adjusting the decision variables that are not subject to the policy (for example: quantity and/or price). This conclusion suggests that unintended consequences of DC-SIP regulation are possible due to the strategic reaction of firms.

Figure 1: The Structure of the Review



In Chapter 3, the survey is expanded to the international marketing field. The aim is to address the following study questions:

- *What strategies do firms adopt for quality-based market segmentation?*
- *What are the market drivers providing incentives for those strategies?*

An extensive literature debates the choice between a standardisation versus localisation approach to brand internationalisation. The former strategy is based on the supply of a standardised product in all markets, and the latter adjusts the goods to the characteristics of local markets. Consistently with the results from Industrial Organisation studies, it was found that four drivers guide the choice between the two approaches: (a) cross-national homogeneity of demand; (b) potential for cross-national economies of scale; (c) cost of modification of the product; (d) foreign price elasticity of demand. In addition, hybrid approaches are possible.

The managerial literature supports the conclusion that the marketing mix is determined jointly. This confirms the conclusion that regulation of composition and quality might affect the other dimensions of the mix, including price, promotion, and positioning.

In Chapter 4 the following study question is investigated:

- *Why may firms be incentivised to use seemingly identical brands and labels when marketing products with differences in composition?*

This section provides fundamental information about consumer behaviour and addresses the subjective component of DC-SIP.<sup>4</sup>

The conclusions of the literature review are illustrated in a numerical simulation in Chapter 5. A market equilibrium model is used to show the possible implications of a policy scenario. It was found that socially inefficient regulations are possible and that all options may have unintended redistribution consequences harming specific groups of consumers or local firms. Information policies seem to be preferable compared to imposing quality standards

---

<sup>4</sup> For a more detailed analyses of the impact of DC-SIP on consumers' purchase choices and welfare see Colen et al. (2019).

# **1 Drivers of product differentiation and implications for DC-SIP. A review of the Industrial Organisation literature**

*Carlo Russo and Edward Kyei Twum*

*University of Cassino and Lazio Meridionale  
Department of Economics and Law*

## **1.1 Introduction**

The first question a researcher is faced with when addressing DC-SIP is: *what are the incentives driving firms to offer seemingly identical products with a different composition to different groups of consumers?* The question addresses the objective component of the DC-SIP problem (why firms supply seemingly identical goods with a different composition). The subjective component (why firms do not inform consumers) is discussed in Chapter 4. The understanding the incentives for differentiation is the first step in the economic analysis of DC-SIP in Chapter 5.

The review has two aims. Firstly, a critical discussion of the economic incentives for product differentiation, and secondly the main conclusions from the literature regarding the equilibrium in differentiated markets are presented. The analysis of the literature supports the discussion in Chapter 5, allowing speculation about the possible consequences of regulation. The focus in this Chapter is on one-market equilibrium models, with the analysis of multiple markets being presented in to Chapter 2.

Figure 1-1: Drivers of product differentiation and implications for DC-SIP

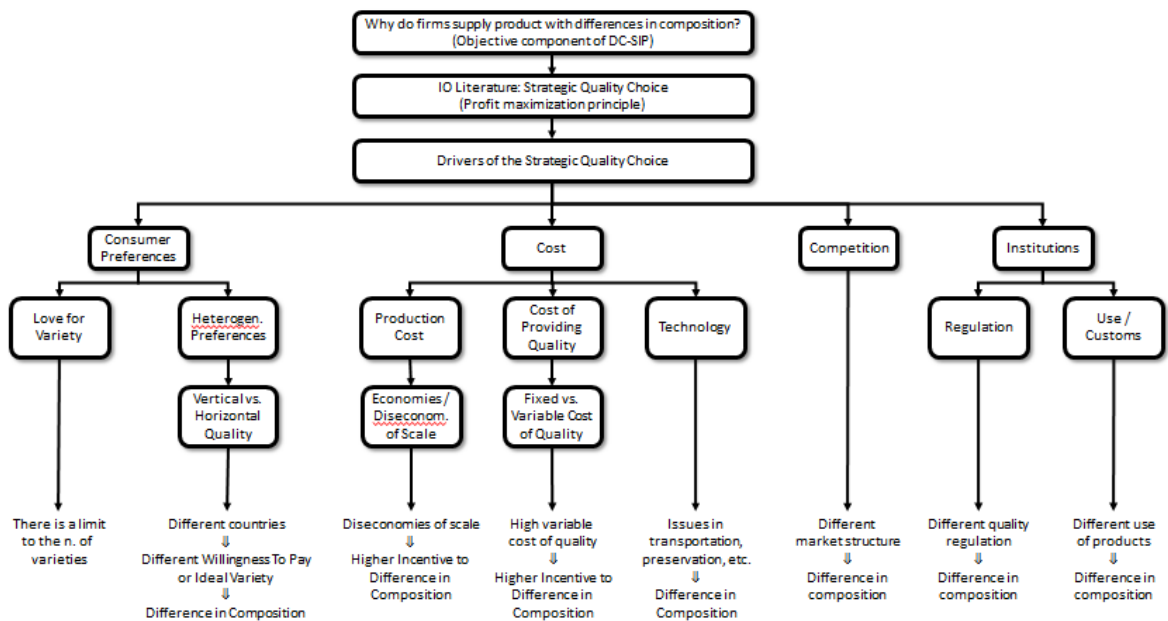


Figure 1-1 summarises the structure of the Chapter. The focus is on the analysis of the economic rationales for supplying a good with different compositions. This issue is the main topic of an extensive literature on Industrial Organisation (IO) regarding product differentiation and strategic quality choice. The main assumption is that firms behave rationally. They supply whatever variety (composition) maximises profits.

Firms choose the composition that maximises profits under a set of constraints and market conditions including technology, consumer demand, and the structure/conduct parameters of the industry. The review presented in this chapter summarises the relevant parameters in four categories: (i) consumer preferences (Section 1.3), (ii) cost functions (Section 1.4), (iii) competition (Section 1.5), and iv) regulation and technical issues (Section 1.6) (see Lancaster 1990).

The review identifies several key conclusions regarding DC-SIP. The literature about monopolistic competition and consumer love of variety concludes that the number of varieties that firms can supply in a market is limited. This conclusion suggests that it may not be viable to impose regulations forcing to sell all existing varieties to all consumers (in order to avoid discrimination and expand consumers' choice set).

Because the number of varieties is limited, firms must strategically select the optimal compositions. The literature states that consumer preferences, cost structure, market structure, and institutional environment are the key variables to be considered. A key policy conclusion supported by the literature is that imposing the same product composition in all markets may be socially inefficient if the four variables diverge across Member states.

The remainder of the Chapter illustrates these conclusions in detail.

## 1.2 Defining the scope of the analysis

Differences in composition is a well-known issue in the economic literature, and is found under the definitions of 'strategic quality choice' and 'product differentiation'. These issues are classical topics in Industrial Organisation (Tirole 1988; Pepall et al. 2014; Waldman & Jensen 2016). The extensive literature includes thousands of contributions and is too large for the purpose of the study presented in this paper (e.g., Eaton & Lipsey 1989).<sup>5</sup> As a consequence, the analysis presented here is limited to studies that are directly related to the study question. From the point of view of the DC-SIP problem, the review presented here investigates the factors determining the choice made by firms regarding product composition.

The main distinction in the literature is between perfect information versus incomplete information models (e.g., Wolinsky 1984). Because the focus in this Chapter is on the objective component of the DC-SIP problem only, the analysis is restricted to perfect information models alone. Imperfect information is discussed in Chapter 4 and here is only considered when instrumental to the topic. Similarly, the focus is on contributions that may have direct or indirect reference to the agri-food supply chain, ignoring the vast research about differentiation in the service markets such as insurance (e.g., Spence 1978) or utilities (Woo et al. 2014). The delimitation of the scope of the review allows a compact illustration of the main findings in the literature.

According to Industrial Organisation (IO) theory, product composition is part of the general idea of 'quality'. Following the typical setting by Lancaster (1966, see Section 1.3), quality is just a set of product attributes. A difference in composition between two products means that the goods offer consumers a different set of attributes and therefore the quality is different. However, it must be noted that this does not necessarily imply that one product is better than the other, but they are simply different. This idea is discussed further in sections 1.3.4 and 1.3.5, where vertical and horizontal quality models are presented. In this Chapter the mainstream economic jargon and differences in quality simply mean that the product is offered in different varieties, with no speculation about the relative values of the varieties.

---

<sup>5</sup> A search in Google scholar using the keywords 'Product differentiation' and 'Industrial Organization' returned 30,500 results.



### **The meaning of “quality” in economics**

In the economic literature (especially in the Industrial Organization literature), the word “quality” is used in many different contexts to refer to any type of product differentiation. It refers to the nature and intensity of product attributes or characteristics (Lancaster 1966). Products serving the same purpose but with a different attributes or characteristics are “of different quality”. It must be noted that the term may refer to a vertical idea of “quality level” (e.g., high quality versus low quality products) and a horizontal notion of “different variety” (such as different flavour or colour) alike. In this sense, it includes the case of differences in composition of seemingly identical branded (food) products (DC-SIP). An important distinction is the attribute classification in search, experience and credence. This classification is based on the ability to consumers to learn about the “quality” of a product before purchase (search quality), after purchase (experience quality) or not at all (credence quality). DC-SIP concerns differences in experience or credence attributes.

### **1.3 Consumer preferences as a rationale for differences in composition**

The incentives to adapt the composition of products to consumer preferences are discussed in this Section. The literature concludes that if consumer preferences regarding recipes are spatially heterogenous, firms might want to supply products with different compositions to each group. Consequently, preference heterogeneity can be a driver in the objective component of DC-SIP.

The consequences of postulates regarding consumer preferences are investigated in relation to the optimal choice of product composition firms can make and – consequently – in relation to market equilibrium. In particular, two key postulates are discussed: love of variety (Section 1.3.2) and heterogeneity of individual preferences (Sections 1.3.3, 1.3.4, and 1.3.5). The postulates have resulted in two vast streams of contributions providing key insights into the objective component of DC-SIP.

The foundation of the IO models about consumer demand for quality is the seminal work by Lancaster (1966). The Author modelled consumer choice when ‘quality matters’, building the foundations of analysis of demand for differentiated products. The approach is founded on three main postulates: (i) consumers buy the products because they derive utility from their characteristics or properties (the product ‘attributes’), (ii) products differ in the type and intensity of the attributes they offer to consumers, and (iii) consumers have heterogeneous preferences over the set of available attributes.

Consumers consider products as bundles of attributes. In general, each product contains more than one attribute and each attribute is contained in more than one product (although with differing intensities). Consumers optimise the combination of products they buy in order to maximise the utility they derive from the attributes. When taking their decision, consumers face a budget and a technical constraint. The budget

constraint requires the total expenditure for the basket of goods to be equal to or lower than the available consumer wealth. The technology constraint requires the bundle of attributes to be obtained through a feasible combination of existing products (e.g., involving non-negative quantities, or in any case compatible with the nature of the goods). Under the assumption of rationality, consumers choose the basket of goods from the feasible ones that yields the highest utility.

At the optimum, the Lancasterian consumer chooses the basket of goods yielding the highest intensity of the desired attributes for their Euro. Defining quality as the set of desired attributes, the Lancaster model provides the theoretical foundations for the definition of consumer value as the quality/price ratio.

Consumer value of a given good is subjective and relative. It is subjective because it depends on individual preferences, which means the value attached to the same product may differ from consumer to consumer. It is relative because the consumption choice is defined by comparing quality and price of all available goods. A product is chosen if it provides higher value than the available alternatives.<sup>6</sup> The subjective nature of value is addressed in the next section 1.3.1 and in Chapter 4. The implications of relative nature of value on competition are discussed in section 1.5.

### **1.3.1 Drivers of heterogeneity in consumer demand for attributes**

Subjective demand for quality is one of the most important motivations for the objective component of DC-SIP. It explains why firms offer products with different attributes (i.e., of 'different quality') to consumers with different preferences. Producers may differentiate their product as an adaptation technique, a strategy to introduce a new product onto a market (country) meeting the taste of consumers. Mathur (2017) and Vignali (2001) suggest that McDonalds adapted their offer to consumer taste by changing their original menu in their attempt to go international. For example, McAlloo Tikki and Chili Paneer Pockets are being sold in India, McSpaghetti is increasingly being sold in The Philippines, McLaks (grilled salmon sandwich) in Norway, Chilled yogurt drinks in Turkey, and Samurai Pork Burger with sweet sauce in Thailand. McDonalds enter the new market offering a set of products including 'localised' varieties in order to attract customers who value local food. Preferences are heterogenous across space and so is the range of products that McDonalds supplies.

A sizable literature has developed over the years investigating the implications of preference heterogeneity for firms operating in differentiated industries. A brief overview is provided in Sections 1.3.2 and 1.3.3 in order to illustrate the different modelling approaches. The drivers of heterogeneity in consumer demand for attributes are divided into two main groups: (i) models of heterogeneous individual preferences, and (ii) models of individual demand for variety. The former group investigates systematic difference in preferences across segments of consumers, the latter assesses the consequences of the assumption of quasi-concavity in the utility functions of individual consumers.

---

<sup>6</sup> Assuming that the goods give the consumer a utility that is at least equal to the reservation utility, that is, the utility that consumers would obtain if they abstain from the purchase.

### 1.3.2 Demand for variety and *non-address* quality models

Non-address quality models explain why firms supply a limited number of product varieties to a market, and DC-SIP can be considered to be a consequence of this limitation. In an ideal world where there is no constraint on product differentiation, firms can supply all possible varieties to consumers and then let them choose the one they prefer (charging a price premium). On the other hand, if the number of varieties is limited, firms must choose which ones to supply. Obviously, the optimal choice in this regard may differ across Member States if market conditions and consumer preferences are heterogeneous. As a consequence, differences in composition may emerge across Member States.

The typical textbook models of consumer choice assume strictly quasi-concave preferences (smooth indifference contours strictly convex to the origin) and infinitely divisible products (e.g., Nicolson & Snyder 2011). Strict convexity of indifference curves implies a 'taste for variety' because, by the definition of convexity, for any basket of  $n$  goods it is possible to find a basket of  $m > n$  goods that provides higher utility and does not cost any more money.

This result is often defined as 'demand for variety', meaning that – keeping all other factors constant – the consumer prefers to experience a large number of goods instead of restricting the purchase to few selected items. In fact, under the common assumption that indifference curves are asymptotic to the origin, the consumer will buy all available products, although in a small quantity. This approach is particularly suited to models investigating the 'representative consumer', the hypothetical buyer whose optimal basket exactly replicates the aggregate sales in the market. Obviously, this representative consumer has to purchase all marketed varieties.

The 'demand for variety' assumption has resulted in a large literature on differentiated markets. These contributions are often referred to as *non-address* model because consumers have a demand for all existing products without focusing on a specific variety (or address) (Eaton & Lipsey 1989). The two main focuses of this set of contributions are the assessment of the degree of product differentiation in the market and the entry conditions for firms. The foundations of the theory were established by Chamberlain (1933) in his book about monopolistic competition. In the general rendering of the theory, consumers exhibit a fixed total demand that is allocated among the entire set of products in the market (regardless the number of goods). Each firm produces one variety so that the number of products in the market is equal to the number of firms. In the absence of entry barriers, firms enter the market as long they expect positive profits and equilibrium is reached when firms are at zero-profits. In the presence of economies of scale (as in the Chamberlain model), the presence of monopolistic competition is inefficient because it yields excessive differentiation. In contrast, other models that assume different utility functions (Dixit & Stiglitz 1977) or cost structures (Spence 1976; Perloff & Salop 1985) produce opposite results such as under-provision of differentiation or even social optimum.

More recent contributions focus on generalising the CES demand function that was introduced by Dixit & Stiglitz (1977) (such as Behrens and Murata 2007; Zhelobodko et al. 2012; Bilbiie et al. 2012). A recent contribution by Parenti et al. (2017) proposes a

flexible framework encompassing most of the existing models by considering a large set of demand and competition features. The model uses the general concept of elasticity of substitution between varieties in a symmetric consumption pattern to derive the equilibrium, finding that the higher the elasticity of substitution is (i.e., the lower consumers' love for varieties), the less differentiated varieties are, and so the lower the mark-ups made by firms are.

Monopolistic competition models are increasingly used in studies of international trade and heterogeneous firms (e.g., Melitz 2003 providing an extension of Krugman 1980). In general, the purpose of these models is to derive the entry/exit conditions in the export market, and consequently, the degree of product differentiation. In this regard, Nocco et al. (2014) provide a characterisation of international monopolistic competition based on 'variable elasticity of substitution' and linear demand, concluding that:

*"[...] product variety is too rich (poor) when varieties are close (far) substitutes, the sunk entry cost is small (large), market size is large (small) and the difference between the highest and the lowest possible marginal cost realizations is small (large)." (p. 309)*

This finding summarises the key drivers of the equilibrium in non-address models: 'demand for (love of) variety' (often measured by the elasticity of substitution between varieties), entry costs, possible economies/diseconomies of scale, and the size of the market. The equilibrium is obtained by comparing decreasing profits from entry (the marginal benefit from entry decreases with the number of firms) with a constant or increasing cost of entry. The benefit from entry depends on how much consumers are willing to pay for variety and on how large the market is (the larger the market, the larger the share for the individual firm and therefore the profit from entry). A fairly common result in the literature is that if consumers are price-sensitive in their choice of variety, price margins are lower (because of competition) and there are fewer products on the market (because the zero-profit condition is achieved with a smaller number of firms). Similarly, if entry costs are high, fewer firms (usually the most efficient ones) enter the market.

Non-address models can be used to understand why firms may prefer to supply consumers with a limited selection of products instead of offering all existing varieties to all consumers in the Single Market. If consumer demand for variety is low (i.e., they are 'highly' sensitive to price in their choice of variety), and the cost of marketing a new variety is high, firms might prefer to restrict varieties. An important example of marketing cost in the agri-food system is the access cost to limited shelf-space in supermarkets. This cost can be due to upfront payments (such as slotting allowances) or to the opportunity cost of foregoing alternative varieties due to a physical constraint on capacity (shelves can only fit so many different product) (e.g., Bloom et al. 2000).

The main conclusion concerning DC-SIP is that even in the presence of love for variety, firms cannot offer all existing varieties to all consumers. Given the constraint on the number of varieties, firms supply the most profitable ones. The literature explaining why the most profitable varieties may vary across Member States and why differences in composition may emerge as a consequences presented in the next section 1.3.3.

### 1.3.3 Heterogeneous individual preferences and *address* quality models

Address quality models explain why firms may decide to supply products with different compositions. The goal of this approach is to assess whether or not it is profitable to supply a differentiated product. The question is directly related to the objective component of DC-SIP.

The majority of contributions in this Chapter focus on the case of differentiation between single-product firms in a single market. This simple setting facilitates the illustration of the fundamental economic principles in a relatively simple setting. Yet, the analysis can be easily extended to the case of multi-product, multi-market firms. Multiple markets are discussed in Chapter 2 and a multi-product analysis is provided in Chapter 5.

The theoretical foundations of address models establish a link between product attributes and consumer willingness to pay for goods that meet their preferences. Differentiation emerges as a consequence of a principle of profit maximisation. In order to charge consumers higher prices, firms supply different products to different consumers. Differences in composition across Member States are expected as a consequence of the attempt to adjust recipes to local taste. According to the literature, heterogeneity of preferences may be a major driver in the objective component of DC-SIP.<sup>7</sup>

The literature on the address model is extensive. The general models for consumer demand are presented in this section. Sections 1.3.4 and 1.3.5 illustrate the corresponding market equilibrium models.

Address models are based on the seminal work by Lancaster (1966). In the standard Lancaster framework, the preferences for the attributes are defined at the individual consumer level. Each consumer has his/her own preference system. The differences across consumers are summarised in the marginal rate of substitution (MRS) between attributes, representing the relative preference of an attribute over another one. Due to heterogeneous preferences, different consumers may choose a different bundle of goods in order to maximise the utility of the goods.

Although preferences are taken as given by economists, an extensive literature has investigated factors affecting preferences and ultimately consumer choice (e.g., Roos et al. 1998; Aertsens 2009). Cultural, social, demographic, and economic (such as income) variables are routinely used as explanatory variables to estimate demand 'when quality matters' (for instance, Rosen 1974 on hedonic price models; Berry 1994; Berry et al. 1995; Train 2009 on discrete choice models; see Bonnet & Richards 2016 for a recent survey of methodologies).

These factors can be used to explain why demand may vary over space. For example, cross-country examination suggested that the relationship between income and beer consumption has an inverse U-shape (Swinnenn & Colen 2011). Nam et al. 2010 argued

---

<sup>7</sup> As mentioned already, the literature in this Chapter refers to perfect information models. The discussion of the subjective component of DC-SIP can be found in Chapter 4.

that the increasing demand for meat consumption in Asia is influenced by the traditional use of chopsticks and eating etiquette at the table. A study across 11 EU countries found that cultural differences determine food-related behaviour notwithstanding the Single Market (Valli & Traill 2005). Similar differences between urban and rural areas were found by Celik, Ates, and Ceylan (2010). Seegebart et al. (2016) found that the statistically significant difference in the demand for organic food in Germany and the USA was explained by the different shares of similar cross-border consumer segments in the two markets.

In general, there is consistent evidence of statistically significant systematic differences in preferences and consumer behaviour across groups (either consumer clusters or countries). The heterogeneity can be driven by the difference in social and cultural background or even by the different weight that each cluster has in the market. In both cases, firms face a different consumer demand and may have an incentive to supply different products. This result is the foundation of classical market segmentation and product differentiation strategies (e.g., Smith 1956, see also Chapter 2 of this report).

The postulate of heterogeneous consumer preferences has motivated an extensive literature on quality choice and product positioning (e.g., Gwin & Gwin 2003). In this class of models, consumers have specific preferences over a continuous space of parameters describing the attributes of products (the attribute space). These studies are often referred to as *address* models because

*"different consumers have different most preferred locations in this space and thus can be thought of as having different addresses in that space"*  
(Eaton & Lipsey 1989, p. 727).

A key difference in address versus non-address models is the nature of competition between suppliers of different products. In address models, the competition is localised. A given product only competes with those located nearby in attribute space. On the other hand, the demand system in the non-address model defines an elasticity of substitution matrix for all available alternatives. Consequently, each product competes with all other goods.

Address models are divided into two main groups: vertical and horizontal quality models:

*"In horizontal differentiation, consumers do not agree on a preference ranking among the available products in the model, whereas in vertical differentiation, consumers share the same ordinal ranking but differ as to the intensity of their preference for higher-ranked products."* (Saitone & Sexton 2010, p. 344)

#### **1.3.4 Vertical quality model**

In vertical quality models, if products are offered at the same price, all consumers prefer the same one. Such a unanimous choice is defined as the highest quality product. Consumers agree on the ranking, but they differ in their evaluation of the perceived quality differences and, therefore, they are heterogeneous in their willingness to pay for such differences. An extensive literature has developed on the topic (Giannakas 2011).



The original studies are by Mussa & Rosen (1978), and Gabszewicz & Thisse (1979, 1980).

The contributions focused on the choice of the optimal quality level and price competition in a differentiated industry. A key result is that firms can attenuate price competition (escaping the Bertrand zero-profit outcome) by introducing quality differences in their products (Shaked & Stutton 1982). In addition, vertically differentiated industries can result in natural oligopolies with a small number of brand-producing firms (Shaked & Stutton 1983).

In a typical vertical quality model, consumers choose between a finite number of products. Usually, each firm supplies only one branded product. Consumer choice is determined by the maximisation of a surplus or indirect utility function of some sort where the price is subtracted to the consumer willingness to pay (WTP) for the product. In turn, the WTP is a function of product characteristics (i.e., quality) and consumer preferences. Firms choose price and quality strategically in order to maximise profits.

The setting has been applied to a large number of topics. For example, Giannakas (2002) used a vertical quality model to describe the effects of mislabelling of organic food, Lapan & Moschini (2004) addressed the issue of innovation, trade and Genetically Modified (GM) Products, Bontems et al. (1999) investigated private labels, Zago & Pick (2004) considered labelling policies, Moschini et al. (2008) modelled Geographical Indications, and Crespi & Marette (2001) applied the model to food safety certification. The researchers in all these examples debate the properties and the implications of the market equilibrium when the industry provides high-quality goods (such as organic, GM organism free, branded products, GI or certified products) and low-quality goods (such as conventional, GM, unbranded, or uncertified products).

These studies are organised as three-stage games. In the first stage, the firms or the regulator take a strategic decision regarding an issue of interest such as whether to entry the industry, to impose a standard or a certification, to create a private label, to impose a regulation or a ban on importing. In the second stage, the firms decide the quality of their products, and in the third stage they compete on price. Consequently, the researcher can model the impact of the first-stage decision on quality and prices. The results can be used to compute consumer welfare, profits, and ultimately social welfare.

A limited set of contributions considers the possibility of multiproduct firms. The topic was introduced by Katz (1984) who noted that multiproduct firms might refrain from differentiation because of possible cannibalisation of same-brand products. Gilbert & Matutes (1993) proposed a model describing the market outcome when firms can supply up to two varieties (basic and premium). Cheng & Peng (2014) generalise the results for any finite number of varieties and for positive costs of expanding the assortment. The multi-product models provide interesting insights into the assortment strategies adopted by firms. Katz (1984, p. 164) found that:

*"There may be spillovers between the submarkets for high- and low-quality variants, where the degree of competition in one submarket affects the degree of competition in another. As a result of these spillovers, some firms may choose not to offer full product lines even in cases where such specialization is inefficient from a social perspective. This specialization is*

*particularly likely to occur when there is intense competition at the low end of the quality spectrum.”*

Multi-product models highlight the interdependencies of products offered by the same producer. In particular, they stress the profit opportunities from supplying different varieties to different market segments. A multi-product firm can offer high-price, high-quality goods to the consumers with high WTP and low-price, low-quality goods to consumers with low WTP. Instead, a single-product firm must satisfy both markets segments with the same quality/price combination.

The issue will be developed in Chapters 2 and 5 where multi-country models are illustrated. Yet, the intuition is directly derived from the above discussion. The objective component of DC-SIP emerges because a multinational firm may increase profits by offering a specific quality/price combination in each country instead of supplying the same quality in each market.

### **1.3.5 Horizontal quality models**

Horizontal quality models describe a market where the quality ranking of the goods depends on individual preferences and varies across consumers. This approach is suited to differences in composition that do not result in ‘objectively lower quality’ of the goods. These contributions provide insights into the differentiation strategies of firms. In particular, they identify the conditions determining whether firms have an incentive to provide different varieties compared to competitors. A key finding is that firms may have an incentive to supply products of different compositions to consumers if preferences are heterogeneous. Furthermore, all firms in the market choose the optimal variety simultaneously, meaning that their decisions are interdependent. The composition of the product also depends on the compositions of all other goods in the market.

Horizontal quality models build on a seminal paper by Hotelling (1929) describing a spatial model of price competition between two firms choosing their location on a hypothetical Main Street. Consumers face total cost for the goods that is the sum of price and a ‘transportation cost’, a function of the distance between their location and that of the firm. Consumers choose the outlet that is associated to the lower total cost. In this setting, both firms locate their business at midpoint, serving half of the street each. This result is widely known as the *minimum differentiation* principle because both firms choose the same location even if the entire street is available. Salop (1979) found that in a large market without boundary effects (the so-called circular road) a symmetric equilibrium exists and the minimum differentiation principle does not necessarily hold.<sup>8</sup>

The spatial model by Hotelling was extended to cover location in non-spatial context, originating the so-called *characteristics approach* (Lancaster 1990).<sup>9</sup> Firms in this

---

<sup>8</sup> The problems of uniqueness of equilibrium in the simple Hotelling-type model are debated in Salop (1979), Novshek (1980), and Economides (1984). Quite early it became evident that the minimum differentiation principle is not a general result (Lerner & Singer 1937; Eaton & Lipsey 1975).

<sup>9</sup> In this regard, see Horstmann & Slivinski (1985) for a formal discussion.



approach choose the characteristics of the product just like the firms in Hotelling choose their location on Main Street. The direct application of the Hotelling model to product differentiation concludes that, at the equilibrium, the number of products supplied increases with the size of the market and decreases with the substitutability between products in the group (the transportation cost) and the size of fixed costs in production. Furthermore, the model finds that the market overprovides variety (Lancaster 1990).<sup>10</sup>

In the attempt to overcome the limitations of the Hotelling model, researchers developed a number of *location-analog models* (Lancaster 1990). Firms in these models locate their product in the *attribute space* by choosing the product specifications (i.e., the bundle of attributes). Each consumer has an *ideal variety*, which is a preferred combination of the relevant product attributes. Transportation cost becomes a monetary evaluation of the disutility that consumers incur when consuming a product offering a combination of attributes that is different from the ideal variety. The disutility is usually modelled as a compensating function, which is convex in the Euclidean distance in the attribute space between the ideal variety for the consumer and the location of the product (Lancaster 1979). Merél & Sexton (2011) provide a discussion of the generalised Hotelling model and its extensions.

Horizontal quality models are widely used in a variety of studies including (for example): strategic assortment (e.g., Alptekinoğlu & Corbett 2008; Gaur & Honhon 2006), competition and anti-trust issues in differentiated market (for example, the extensive literature about the breakfast cereals industry in the U.S.A. such as Schmalensee 1978; Scherer 1979; Nevo 2000), consumer search, differentiation, and agglomeration (Sthal 1982; Sajeesh 2016).

Horizontal quality models can be used to investigate DC-SIP when consumers do not agree about the ranking of the products. For example, consumers may have different opinions about the flavour of a products or the size of the packaging.

### **1.3.6 Credence goods.**

As a final remark, it must be noted that food product attributes are not restricted to the organoleptic characteristics alone, but might include immaterial characteristics that are not directly observable by consumers, the so-called credence attributes (Darby & Karni 1973; Allaire 2018). Credence attributes such as origin (e.g., Carter et al. 2006; Menapace et al. 2011), ethics (e.g., De Pelsmacker et al 2005; Zander & Hamm 2010), or status (e.g., Wiedmann et al. 2009) are also relevant for consumers and should be considered to be part of the definition of quality from a Lancasterian perspective. They are of particular relevance to the DC-SIP issue. The presence of credence attributes is a condition for the breaching of the Unfair Commercial Practice Directive 2005/29/EC (UCPD). In fact, quality differentiation is a violation if:

- *"consumers have legitimate specific expectations from a product compared to a "product of reference" and the product significantly deviates from these expectations;*

---

<sup>10</sup> Noticeably, these results are similar to the Chamberlain model of monopolistic competition (Section 1.3.2).

- *the trader omits or fails to convey adequate information to consumers and they cannot understand that a difference with their expectations may exist;*
- *this inadequate or insufficient information is likely to distort the economic behaviour of the average consumer, for instance by leading him or her to buy a product he or she would not have bought otherwise.”*  
(Commission notice C(2017) 6532 final)

If the consumer is able to assess the attributes of food products perfectly, DC-SIP/dual quality is not an issue because bullet points 2 and 3 are not met.<sup>11</sup> This discussion will be expanded in Chapter 4.

## **1.4 Cost functions as supply-side determinants of differences in composition**

The analysis of consumer preferences in Section 1.3 debated the demand-side determinants of difference in composition. In this section, the literature addressing the main supply-side determinants is reviewed. In principle, firms may have an incentive to supply goods with different compositions even when consumer preferences are homogeneous if production cost differ across countries or if input prices are different. Differences in composition emerge in these cases because of cost-minimisation. A classic example is the use of a less expensive ingredient in an export market. Other examples include the use of local production plants (and local varieties) or different input proportions.

The existing literature suggests that the choice of quality (and consequently of composition) depends on the nature of the cost functions. In this regard, the literature points out two broad classes of costs: production costs, and the cost of providing quality.

### **1.4.1 Production costs**

Cost functions measures the cost of producing a given quantity of a good. Brécard (2010) noted that the assumption regarding cost structure may affect the equilibrium outcome in vertical quality models. Although this is a general conclusion, the focus in this section is on two main issues: returns to scale and production non-convexities (Eaton & Lipsey 1989).

If the technology exhibits economies of scale, there might be an incentive to avoid market segmentation and quality differentiation (Levitt 1983). On the other hand, diseconomies of scale favour small scale and possibly local or differentiated production. As discussed in the section on monopolistic competition models, the assumptions

---

<sup>11</sup> Noticeably, the seminal paper of Darby & Karni (1973) refers to a similar frame in the service sector. In the case of car repair services the Authors noted that “*the consumer is unaware of the ability of the repair service to satisfy a given want*” (p. 67). As a consequence, reputational incentives do not hold, frauds are possible, and “*Under such circumstances the consumer is sold services which, if he were adequately informed, would not have been purchased*” (p. 68).

regarding the returns to scale may drive the equilibrium outcome and the consequences for welfare.

Production non-convexities result from factors such as product research and development costs, set-up costs, or indivisibilities of fixed capital. These factors imply decreasing average costs over an initial range of output and may limit the number of varieties that firms may be willing to supply. In general, these non-convexities are modelled using simple costs functions that assume a fixed cost of entry, without stipulating the actual determinants.

International advertising is an example of the two issues. The literature debates the scale economies or diseconomies in advertising (see Melewar & Vemmervik 2004). A centralised approach may exploit the competencies of the home headquarters and deliver global messages through a common brand identity (e.g., Ryans & Donnelly 1968; Peebles et al. 1978; Link 1988; Laroche et al. 2001). On the other hand, diseconomies of scale in advertising result in generic messages that fail to generate consumer involvement (e.g., Hite & Fraser, 1990; Cavusgil et al., 1993). Furthermore, international advertising may generate non-convexity in the cost function, if it results in a fixed cost for the launch of a new variety.

In general, if the economies of scale outweigh the benefits from market segmentation, firms may prefer to sell large volumes of homogeneous goods. On the other hand, in the presence of diseconomies of scale, the incentive to supply goods of different composition increases because firms do not gain from high volume production.

#### **1.4.2 Costs of producing quality**

The optimal quality level in industrial organisation models is obtained by comparing the marginal benefit of increasing quality (usually, the increase in consumer willingness to pay for the goods) with the corresponding marginal cost. Consequently, the predicted quality of the marketed goods depends on the assumptions regarding the cost function. In general, it is expected that if – for whatever reason – the cost of providing quality in two markets is different, the quality provided also differs.

The majority of contributions model the cost of providing quality as: i) a fixed cost of quality improvement (e.g., Ronnen 1991), and/or ii) an increase in variable costs that is proportional to quality (e.g., Mussa & Rosen 1978 or Lehmann-Grube 1997). The first type of cost refers to situations where upfront investments (such as new plant, R&D expenditures, or advertising) are required to increase quality. The variable cost of quality refers to situations when quality depends on raw materials or skilled labour.

All other factors being constant, the quality outcome depends on the assumptions made about the cost function. In his classic paper about business location, Hotelling (1929) considered a linear cost function for differentiation (a transportation cost) and obtained a 'minimum differentiation' principle where all firms produce a homogeneous product.<sup>12</sup>

---

<sup>12</sup> It must be noted that d'Aspremont et al. (1979) showed that the principle of minimum differentiation was not proved by Hotelling in his model because the game has no Nash equilibria in prices when firms are sufficiently close to each other - due to the assumption of linear transportation cost.

Tirole (1988) assumes that there is no cost in providing quality (so that production costs are independent of quality) and derives a 'maximum differentiation' result where one firm provides the maximum quality level and the other firms provide minimum quality. Convexity in variable costs of providing quality may lead to a variety of results. For example, Mussa & Rosen (1978) and Ecchia & Lambertini (1997) derived a finite differentiation result where firms offer products of different quality but do not adopt extreme solutions.

In general, the optimal quality level is derived by equating the marginal benefits and the marginal costs of increasing quality. All else being constant, the more the cost grows with quality, the lower the equilibrium quality is.

## 1.5 Competition

Perfect competition models assume homogeneous goods and undistinguishable suppliers. They are not suited to study product differentiation because suppliers produce undifferentiated product by assumption. As a consequence, the extensive literature product differentiation was developed using imperfect competition models (Saitone & Sexton 2010; Bonanno et al. 2018). Two main modelling issues are addressed in this section: the competition type (quantity versus quality), and the timing (sequential versus simultaneous).

Several contributes investigated the consequences of assuming Cournot versus Bertrand competition in product differentiation models. The idea that product differentiation may not require price competition was introduced by Gal-Or (1983), who developed a model of quality and quantity competition. She found that a new entry in the market results in a decrease in quality and an increase in aggregate output, with ambiguous welfare effects. Bonanno (1986) built a three-stage game where firms first decide whether to entry (stage 1), then the quality level (stage 2) followed by their prices or output (stage 3). He concluded that the solution of the game depends on the solution concept that is adopted at the third stage. If the firm play a Bertrand-Nash game, the outcome is product differentiation (albeit the level of differentiation may be small). On the other hand, if they play Cournot-Nash, the firms offer homogeneous products according to the minimum differentiation principle put forward by Hotelling. Motta (1993) generalised the results of Bonanno by using more flexible cost functions and found firms may produce differentiated products in both quality and quantity competition (i.e., the minimum differentiation principle only holds as a special case). He also found that the degree of differentiation is higher under price competition than under quantity competition. A similar result was derived by Brander & Spencer (2015). Symeonidis (2003) and Breton et al. (2003) introduced R&D fixed costs with possible spillover and found that the relative efficiency of Cournot and Bertrand competition depends on the model parameters (although the results of the two papers differ because of the different assumptions about dynamic modelling). Aoki (2003) showed that the effect of a credible quality commitment on social welfare and quality levels depends on the type of competition but not generally on the cost of quality function. Metrick & Zeckhauser (1996) suggested that the choice between quantity versus price competition may be endogenously determined in the presence of asymmetric information.

The timing of the game may affect the outcome of the model too. In this regard, the literature about vertical quality is divided between two type of models: simultaneous versus sequential actions. In the first group, firms decide their strategic behaviour at the same time. In the sequential model, there is a first mover who acts first. A variety of contributions found that the behaviour of firms and market equilibrium depend on the assumptions about timing of entry and/or quality choice. For example, quality level may differ between the models (Donnenfeld & Weber 1992) and strategic behaviour is possible by both incumbent firms (e.g., entry deterrence as in Lane 1980) and entrant firms (e.g., Noh and Moschini 2006).

A general conclusion of vertical quality models is that the firm offering the highest quality earns more profits (e.g., Motta, 1993; Aoki and Prusa, 1997; Lehmann-Grube, 1997; Aoki, 2003). As a consequence, the common understanding in the literature is that a first mover advantage exists. First movers provide high quality, leaving the lower market segments to the followers. However, models with endogenous timing of entry suggests that this advantage can dissipate when firms are free to choose the timing of entry and can compete for early entry positions (Lambertini 1999; Anderson & Engers 2001). In these cases, at the equilibrium all firms opt for simultaneous entry. However, other contributions imposing asymmetries on consumer preferences or on production costs found a possible late-entry advantage (e.g., Carpenter & Nakamoto 1990; Auer & Sauré 2017).

It can generally be noted that the assumptions regarding the nature of competition affect the predictions of economic models about the equilibrium in differentiated markets. As a consequence, the modelling choices (and their consequences) are consistently given attention in the literature. The conclusion has direct implications for the DC-SIP issue. The composition of the goods might reflect the different competition environment. For example, a firm might decide to adjust the composition of the goods depending on the strengths of competitors. Consequently, if the degree of rivalry differs across markets, differences in composition may emerge even if consumer preferences and production costs are homogeneous.

## **1.6 Regulation, Institutions, and Technology**

The strategic choice of quality is conditional on the institutional framework. There is an extensive literature that discusses the influence of regulation on food quality and safety, especially considering the increasing public interest in issues such as health, the environment, and ethics (Marette 2008). In general, public intervention has two aims: (i) resolve possible information asymmetries and (ii) prevent the trade of unsafe and/or low-quality products.

The first aim is usually associated with the adoption of labelling and certification systems so that experience or credence attributes are transformed into search attributes (e.g., Caswell & Mojduszka 1996). Because self-certification is generally not sufficient to guarantee correct consumer information, public intervention may be necessary to prevent market failure (Roe & Sheldon 2007). In general, the use of third-party independent certification can reduce the risk of negative consequences from mislabelling (Giannakas 2002, Giannakas & Fulton 2002, Hatanaka et al. 2005). In a DC-SIP context, certification and labelling might in theory be used to favour information disclosure,

providing the consumer with sufficient information for an unbiased choice. Yet, the efficiency of the regulation depends on the ability of the certification to provide the relevant information and the ability of the consumer to process the information (e.g., Rozan et al. 2004; Jahn et al 2005). The issue of quality cues and product choice will be addressed in Chapter 4.

The public regulator may choose to prevent unsafe or low-quality products from being traded. The result is usually obtained by imposing safety or minimum quality standard. The literature is also extensive in this regard (e.g. Henson & Caswell 1999; Henson & Reardon 2005; Hammoudi et al. 2009). Researchers investigated the impact on welfare (e.g., Bockstael 1984; Ronnen 1991; Saitone & Sexton 2010) and trade effects (e.g., Saitone 2012; Marette & Beghin 2017; Beghin et al. 2015; Swinnen 2017). Boom (1995) derives a result of particular interest for this study. The Author derives an equilibrium in a two-country model of vertically differentiated duopoly under a minimum quality standard regulation. She found that asymmetric standards may influence production and quality choice in both markets. Imposing quality regulation in a country may also affect welfare in the other. We will provide a detailed analysis of this point in a numerical model presented in Chapter 5.

Other institutional factors affecting quality choice concern the governance of the transaction. The quality choice of a collective enterprise (such as a cooperative or a PGI consortium) may differ from the one of a private corporation (Winfree & McCluskey 2005; Merél & Sexton 2011; Di Fonzo & Russo 2015). The literature suggests that the regulation of DC-SIP might consider the type of organisation.

Finally, technology can affect quality choice. As local weather condition such as temperature or humidity may affect the goods, firms may alter the recipe of their product in order to preserve organoleptic characteristics. This topic is not covered in the IO literature and it is not covered in this review.

## **1.7 Summary and conclusions**

Chapter 1 focuses on the objective component of the DC-SIP issue. The IO literature is reviewed to assess the economic rationale for differences in product composition across different Member States. Mere changes of the food recipe are not sufficient to claim a DC-SIP problem (the subjective component is also necessary). Nevertheless, the discussion of the key economic incentives for recipe differentiation supports relevant policy conclusions. In particular, it suggests that *a regulation willing to prevent DC-SIP by imposing homogeneity of recipes in the Single Market might be socially inefficient.*

The Industrial Organisation literature considers quality (and, therefore, composition) as an output of the solution of the profit maximisation problem firms have. In the standard IO setting, rational, selfish firms choose the product composition that maximises profits. The optimal product composition depends on several contingent factors including consumer demand, cost structure, competition, and institutions. This explains why firms might decide to provide products of different quality across the Single Market. If the factors vary, there is an incentive to adjust the quality of the products. As a consequence, different varieties of a product can be found different areas.



Economic theory noticeably concludes that such differentiation is socially efficient. As a consequence, a regulation imposing the same product composition across the Single Market would reduce social welfare if – as expected – local conditions differ across Member States. A degree of spatial differentiation in the assortments is necessary to consider differences in consumer taste, market structure, and even safety and quality regulations.

A regulation requiring firms to supply all existing varieties to all consumers might also prevent DC-SIP issues. In principle such a regulation is appealing because it allows consumers to compare recipes and then choose according to their preferences.

However, economic theory suggests that such regulation would also be socially inefficient. The authors agree that the benefits from supplying an additional variety decreases with the number of varieties that are marketed already. If firms incur non-decreasing marketing costs (such as slotting allowances, promotions, or advertising), there is a finite number of varieties that can be supplied profitably. As a consequence, differences in assortment may emerge across space because firms have an incentive to introduce the most profitable varieties first in each Member State.

These conclusions will be discussed further in Chapter 2 where multi-country models are discussed in detail. Chapter 5 provides an illustrative application of these principles and a more extensive discussion of the policy implications.

## 1.8 References

- Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: a review. *British food journal*, 111(10), 1140-1167.
- Allaire, G. (2018). Quality in economics: a cognitive perspective. In *Qualities of food*. Manchester University Press.
- Alptekinoğlu, A., & Corbett, C. J. (2008). Mass customization vs. mass production: Variety and price competition. *Manufacturing & Service Operations Management*, 10(2), 204-217.
- Anderson, S. P., & Engers, M. (2001). Preemptive entry in differentiated product markets. *Economic Theory*, 17(2), 419-445.
- Aoki, R. (2003). Effect of credible quality investment with Bertrand and Cournot competition. *Economic Theory*, 21(2-3), 653-672.
- Aoki, R., & Prusa, T. J. (1997). Sequential versus simultaneous choice with endogenous quality. *International Journal of Industrial Organisation*, 15(1), 103-121.
- Auer, R. A., & Sauré, P. (2017). Dynamic entry in vertically differentiated markets. *Journal of Economic Theory*, 167, 177-205.
- Beghin, J. C., Maertens, M., & Swinnen, J. (2015). Nontariff measures and standards in trade and global value chains. *Annu. Rev. Resour. Econ.*, 7(1), 425-450.
- Behrens, K., & Murata, Y. (2007). General equilibrium models of monopolistic competition: a new approach. *Journal of Economic Theory*, 136(1), 776-787.

- Berry, S. T. (1994). Estimating discrete-choice models of product differentiation. *The RAND Journal of Economics*, 242-262.
- Berry, S., Levinsohn, J., & Pakes, A. (1995). Automobile prices in market equilibrium. *Econometrica: Journal of the Econometric Society*, 841-890..
- Bilbiie, F. O., Ghironi, F., & Melitz, M. J. (2012). Endogenous entry, product variety, and business cycles. *Journal of Political Economy*, 120(2), 304-345.
- Bloom, P. N., Gundlach, G. T., & Cannon, J. P. (2000). Slotting allowances and fees: Schools of thought and the views of practicing managers. *Journal of Marketing*, 64(2), 92-108.
- Bockstael, N. E. (1984). The welfare implications of minimum quality standards. *American Journal of Agricultural Economics*, 66(4), 466-471.
- Bonanno, A., Russo, C., & Menapace, L. (2018). Market power and bargaining in agrifood markets: A review of emerging topics and tools. *Agribusiness*, 34(1), 6-23.
- Bonanno, G. (1986). Vertical differentiation with Cournot competition. *Economic Notes*, 15(2), 68-91.
- Bontems, P., Monier-Dilhan, S., & Requillart, V. (1999). Strategic effects of private labels. *European Review of Agricultural Economics*, 26(2), 147-165.
- Boom, A. (1995). Asymmetric international minimum quality standards and vertical differentiation. *The Journal of Industrial Economics*, 101-119.
- Brander, J. A., & Spencer, B. J. (2015). Endogenous horizontal product differentiation under Bertrand and Cournot competition: Revisiting the Bertrand paradox (No. w20966). National Bureau of Economic Research.
- Brécard, D. (2010). On production costs in vertical differentiation models. *Economics Letters*, 109(3), 183-186.
- Breton, M., Turki, A., & Zaccour, G. (2004). Dynamic model of R&D, spillovers, and efficiency of Bertrand and Cournot equilibria. *Journal of Optimization Theory and Applications*, 123(1), 1-25.
- Carpenter, G. S., & Nakamoto, K. (1990). Competitive strategies for late entry into a market with a dominant brand. *Management Science*, 36(10), 1268-1278.
- Carter, C., Krissoff, B., & Zwane, A. P. (2006). Can country-of-origin succeed as a marketing tool for produce? Lessons from three case studies. *Canadian Journal of Agricultural Economics/Revue Canadienne d'Agroeconomie*, 54(4), 513-530.
- Caswell, J. A., & Mojduszka, E. M. (1996). Using informational to influence the market for quality in food products. *American Journal of Agricultural Economics*, 78(5), 1248-1253.
- Cavusgil, S. T., Zou, S., & Naidu, G. M. (1993). Product and promotion adaptation in export ventures: an empirical investigation. *Journal of International Business Studies*, 24(3), 479-506.
- Celik Ates, H., & Ceylan, M. (2010). Effects of socio-economic factors on the consumption of milk, yoghurt, and cheese: Insights from Turkey. *British Food Journal*, 112(3), 234-250.



- Chamberlin, E. (1933). *The theory of monopolistic competition*, Cambridge: Harvard Univ.
- Cheng, Y. L., & Peng, S. K. (2014). Price competition and quality differentiation with multiproduct firms. *Journal of Economics*, 112(3), 207-223.
- Crespi, J. M., & Marette, S. P. (2001). How should food safety certification be financed?. *American journal of agricultural economics*, 83(4), 852-861.
- D'Aspremont, C., Gabszewicz, J. J., & Thisse, J. F. (1979). On Hotelling's "Stability in competition". *Econometrica: Journal of the Econometric Society*, 1145-1150.
- De Pelsmacker, P., Driesen, L., & Rayp, G. (2005). Do consumers care about ethics? Willingness to pay for fair-trade coffee. *Journal of consumer affairs*, 39(2), 363-385.
- Di Fonzo, A., & Russo, C. (2015). Designing geographical indication institutions when stakeholders' incentives are not perfectly aligned. *British Food Journal*, 117(10), 2484-2500.
- Dixit, A. K., & Stiglitz, J. E. (1977). Monopolistic competition and optimum product diversity. *The American economic review*, 67(3), 297-308.
- Donnenfeld, S., & Weber, S. (1992). Vertical product differentiation with entry. *International Journal of Industrial Organisation*, 10(3), 449-472.
- Eaton, B. C., & Lipsey, R. G. (1975). The principle of minimum differentiation reconsidered: Some new developments in the theory of spatial competition. *The Review of Economic Studies*, 42(1), 27-49.
- Eaton, B. C., & Lipsey, R. G. (1989). Product differentiation. *Handbook of industrial organization*, 1, 723-768.
- Ecchia, G., & Lambertini, L. (1997). Minimum quality standards and collusion. *The Journal of Industrial Economics*, 45(1), 101-113.
- Economides, N. (1984). The principle of minimum differentiation revisited. *European Economic Review*, 24(3), 345-368.
- Fraser, C., & Hite, R. E. (1990). Impact of international marketing strategies on performance in diverse global markets. *Journal of Business Research*, 20(3), 249-262.
- Gabszewicz, J. J., & Thisse, J. F. (1979). Price competition, quality and income disparities. *Journal of economic theory*, 20(3), 340-359.
- Gabszewicz, J. J., & Thisse, J. F. (1980). Entry (and exit) in a differentiated industry. *Journal of Economic Theory*, 22(2), 327-338.
- Gal-Or, E. (1983). Quality and quantity competition. *The Bell Journal of Economics*, 590-600.
- Gaur, V., & Honhon, D. (2006). Assortment planning and inventory decisions under a locational choice model. *Management Science*, 52(10), 1528-1543.
- Giannakas, K. (2002). Information asymmetries and consumption decisions in organic food product markets. *Canadian Journal of Agricultural Economics/Revue Canadienne D'Agroeconomie*, 50(1), 35-50.

- Giannakas, K. (2011). Consumer demand in vertically differentiated markets. In Lusk, J., Roosen J., & Shogren J. (editors) *The Oxford Handbook of the Economics of Food Consumption and Policy*. Chapter9, 243-259.
- Giannakas, K., & Fulton, M. (2002). Consumption effects of genetic modification: what if consumers are right?. *Agricultural Economics*, 27(2), 97-109.
- Gilbert, R. J., & Matutes, C. (1993). Product line rivalry with brand differentiation. *The Journal of Industrial Economics*, 223-240.
- Gwin, C. F., & Gwin, C. R. (2003). Product attributes model: A tool for evaluating brand positioning. *Journal of Marketing theory and Practice*, 11(2), 30-42.
- Hammoudi, A., Hoffmann, R., & Surry, Y. (2009). Food safety standards and agri-food supply chains: an introductory overview. *European Review of Agricultural Economics*, 36(4), 469-478.
- Hatanaka, M., Bain, C., & Busch, L. (2005). Third-party certification in the global agrifood system. *Food Policy*, 30(3), 354-369.
- Henson, S., & Caswell, J. (1999). Food safety regulation: an overview of contemporary issues. *Food policy*, 24(6), 589-603.
- Henson, S., & Reardon, T. (2005). Private agri-food standards: Implications for food policy and the agri-food system. *Food Policy*, 30(3), 241-253.
- Horstmann, I., & Slivinski, A. (1985). Location models as models of product choice. *Journal of Economic Theory*, 36(2), 367-386.
- Hotelling H. (1929). Stability in competition. *The Economic Journal* 39, 41-57
- Jahn, G., Schramm, M., & Spiller, A. (2005). The reliability of certification: Quality labels as a consumer policy tool. *Journal of Consumer Policy*, 28(1), 53-73.
- Katz, M. L. (1984). Firm-specific differentiation and competition among multiproduct firms. *Journal of Business*, S149-S166.
- Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *The American Economic Review*, 70(5), 950-959.
- Lancaster, K. (1966). A new approach to consumer theory. *Journal of political economy*, 74(2), 132-157.
- Lancaster, K. (1979). *Variety, equity, and efficiency: product variety in an industrial society* (Vol. 10). New York: Columbia University Press.
- Lancaster, K. (1990). The economics of product variety: A survey. *Marketing science*, 9(3), 189-206.
- Lane, W. J. (1980). Product differentiation in a market with endogenous sequential entry. *The Bell Journal of Economics*, 237-260.
- Lapan, H. E., & Moschini, G. (2004). Innovation and trade with endogenous market failure: The case of genetically modified products. *American Journal of Agricultural Economics*, 86(3), 634-648.
- Laroche, M., Kirpalani, V. H., Pons, F., & Zhou, L. (2001). A model of advertising standardization in multinational corporations. *Journal of International Business Studies*, 32(2), 249-266.

- Lehmann-Grube, U. (1997). Strategic choice of quality when quality is costly: the persistence of the high-quality advantage. *The RAND Journal of Economics*, 372-384.
- Lerner, A. P., & Singer, H. W. (1937). Some notes on duopoly and spatial competition. *Journal of Political Economy*, 45(2), 145-186.
- Levitt, T. (1983). The Globalization of Markets. *Harvard Business Review*, 61, 92-102
- Link, G.L. (1988), Global advertising: an update, *The Journal of Consumer Marketing*, Vol. 5 No. 2, pp. 69-74.
- Marette, S. (2017). Quality, market mechanisms and regulation in the food chain. *Bio-based and Applied Economics*, 5(3), 217-235.
- Marette, S., & Beghin, J. (2017). Are standards always protectionist?. In *Nontariff Measures and International Trade* (pp. 179-192)
- Mathur, S. (2017). Glocalization in Fast Food Chains: A Case Study of McDonald's. In *Strategic Marketing Management and Tactics in the Service Industry* (pp. 330-347). IGI Global.
- Melewar, T. C., & Vemmervik, C. (2004). International advertising strategy: A review, reassessment and recommendation. *Management Decision*, 42(7), 863-881.
- Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, 71(6), 1695-1725.
- Menapace, L., Colson, G., Grebitus, C., & Facendola, M. (2011). Consumers' preferences for geographical origin labels: evidence from the Canadian olive oil market. *European Review of Agricultural Economics*, 38(2), 193-212.
- Merél, P., & Sexton, R. J. (2011). Models of horizontal product differentiation in food markets. In Lusk, J., Roosen J., & Shogren J. (editors) *The Oxford Handbook of the Economics of Food Consumption and Policy*. Chapter 10, 260-291
- Mérel, P., & Sexton, R. J. (2011). Will geographical indications supply excessive quality?. *European Review of Agricultural Economics*, 39(4), 567-587.
- Metrick, A., & Zeckhauser, R. (1996). *Price versus quantity: Market clearing mechanisms when sellers differ in quality* (No. w5728). National Bureau of Economic Research.
- Moschini, G., Menapace, L., & Pick, D. (2008). Geographical indications and the competitive provision of quality in agricultural markets. *American Journal of Agricultural Economics*, 90(3), 794-812.
- Motta, M. (1993). Endogenous quality choice: price vs. quantity competition. *The Journal of Industrial Economics*, 113-131.
- Mussa, M., & Rosen, S. (1978). Monopoly and product quality. *Journal of Economic theory*, 18(2), 301-317.
- Nam, K. C., Jo, C., & Lee, M. (2010). Meat products and consumption culture in the East. *Meat Science*, 86(1), 95-102.
- Nevo, A. (2000). Mergers with differentiated products: The case of the ready-to-eat cereal industry. *The RAND Journal of Economics*, 395-421.

- Nicholson, W., & Snyder, C. (2011). *Microeconomic theory: Basic principles and extensions*. Nelson Education.
- Nocco, A., Ottaviano, G. I., & Salto, M. (2014). Monopolistic competition and optimum product selection. *American Economic Review*, 104(5), 304-09.
- Noh, Y. H., & Moschini, G. (2006). Vertical product differentiation, entry-deterrence strategies, and entry qualities. *Review of Industrial Organization*, 29(3), 227-252.
- Novshek, W. (1982). Equilibrium in simple spatial (or differentiated product) models. In *Noncooperative Approaches to the Theory of Perfect Competition* (pp. 199-212). Academic Press.
- Parenti, M., Ushchev, P., & Thisse, J. F. (2017). Toward a theory of monopolistic competition. *Journal of Economic Theory*, 167, 86-115.
- Peebles, D. M., Ryans Jr, J. K., & Vernon, I. R. (1978). Coordinating International Advertising: A programmed management approach that cuts through the 'standardized vs. localized' debate. *Journal of Marketing*, 42(1), 28-34.
- Pepall, L., Richards, D., & Norman, G. (2014). *Industrial organization: Contemporary theory and empirical applications*. Wiley.
- Perloff, J. M., & Salop, S. C. (1985). Equilibrium with product differentiation. *The Review of Economic Studies*, 52(1), 107-120
- Roe, B., & Sheldon, I. (2007). Credence good labeling: The efficiency and distributional implications of several policy approaches. *American Journal of Agricultural Economics*, 89(4), 1020-1033.
- Ronnen, U. (1991). Minimum quality standards, fixed costs, and competition. *The RAND Journal of economics*, 490-504.
- Ronnen, U. (1991). Minimum quality standards, fixed costs, and competition. *The RAND Journal of economics*, 490-504.
- Roos, E., Lahelma, E., Virtanen, M., Prättälä, R., & Pietinen, P. (1998). Gender, socioeconomic status and family status as determinants of food behaviour. *Social science & medicine*, 46(12), 1519-1529.
- Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. *Journal of Political Economy*, 82(1), 34-55.
- Rozan, A., Stenger, A., & Willinger, M. (2004). Willingness-to-pay for food safety: An experimental investigation of quality certification on bidding behaviour. *European Review of Agricultural Economics*, 31(4), 409-425.
- Ryans Jr, J. K., & Donnelly Jr, J. H. (1969). Standardized global advertising, a call as yet unanswered. *Journal of Marketing*, 33(2), 57-60.
- Saitone, T. L. (2012). Are Minimum Quality Standards Imposed by Federal Marketing Orders Acting as Nontariff Trade Barriers?. *Agribusiness*, 28(4), 483-504.
- Saitone, T. L., & Sexton, R. J. (2010). Impacts of minimum quality standards imposed through marketing orders or related producer organizations. *American Journal of Agricultural Economics*, 92(1), 164-18

- Saitone, T. L., & Sexton, R. J. (2010). Product differentiation and quality in food markets: industrial organization implications. *Annu. Rev. Resour. Econ.*, 2(1), 341-368.
- Sajeesh, S. (2016). Influence of market-level and inter-firm differences in costs on product positioning and pricing. *Applied Economics Letters*, 23(12), 888-896.
- Salop, S. C. (1979). Monopolistic competition with outside goods. *The Bell Journal of Economics*, 10(1), 141-156.
- Scherer, F. M. (1979). The welfare economics of product variety: an application to the ready-to-eat cereals industry. *The Journal of Industrial Economics*, 113-134.
- Schmalensee, R. (1978). Entry deterrence in the ready-to-eat breakfast cereal industry. *The Bell Journal of Economics*, 305-327.
- Seegebarth, B., Behrens, S. H., Klarmann, C., Hennigs, N., & Scribner, L. L. (2016). Customer value perception of organic food: cultural differences and cross-national segments. *British Food Journal*, 118(2), 396-411.
- Shaked, A., & Sutton, J. (1982). Relaxing price competition through product differentiation. *The Review of Economic Studies*, 3-13.
- Shaked, A., & Sutton, J. (1983). Natural oligopolies. *Econometrica: Journal of the Econometric Society*, 1469-1483.
- Smith, W. R. (1956). Product differentiation and market segmentation as alternative marketing strategies. *Journal of marketing*, 21(1), 3-8.
- Spence, M. (1976). Product selection, fixed costs, and monopolistic competition. *The Review of Economic Studies*, 43(2), 217-235.
- Spence, M. (1978). Product differentiation and performance in insurance markets. *Journal of Public Economics*, 10(3), 427-447.
- Stahl, K. (1982). Differentiated products, consumer search, and locational oligopoly. *The Journal of Industrial Economics*, 97-113.
- Swinnen, J. (2017). Some dynamic aspects of food standards. *American Journal of Agricultural Economics*, 99(2), 321-338.
- Swinnen, J. F., & Colen, L. (2011). Beer Drinking Nations: The Determinants of Global Beer Consumption (No. id: 4324).
- Symeonidis, G. (2003). Comparing Cournot and Bertrand equilibria in a differentiated duopoly with product R&D. *International Journal of Industrial Organisation*, 21(1), 39-55.
- Tirole, J. (1988). *The theory of industrial organization*. MIT press.
- Train, K. E. (2009). *Discrete choice methods with simulation*. Cambridge university press.
- Valli, C., & Traill, W. B. (2005). Culture and food: a model of yoghurt consumption in the EU. *Food quality and preference*, 16(4), 291-304.
- Vignali, C. (2001). McDonald's: "think global, act local" – the marketing mix. *British Food Journal*, 103(2), 97-111

- Waldman, D., & Jensen, E. (2016). *Industrial organization: theory and practice*. Routledge.
- Wiedmann, K. P., Hennigs, N., & Siebels, A. (2009). Value-based segmentation of luxury consumption behavior. *Psychology & Marketing, 26*(7), 625-651.
- Winfrey, J. A., & McCluskey, J. J. (2005). Collective reputation and quality. *American Journal of Agricultural Economics, 87*(1), 206-213.
- Wolinsky, A. (1984). Product differentiation with imperfect information. *The Review of Economic Studies, 51*(1), 53-61.
- Woo, C. K., Sreedharan, P., Hargreaves, J., Kahrl, F., Wang, J., & Horowitz, I. (2014). A review of electricity product differentiation. *Applied Energy, 114*, 262-272.
- Zago, A. M., & Pick, D. (2004). Labeling policies in food markets: Private incentives, public intervention, and welfare effects. *Journal of Agricultural and Resource Economics, 150*-165.
- Zander, K., & Hamm, U. (2010). Consumer preferences for additional ethical attributes of organic food. *Food quality and preference, 21*(5), 495-503.
- Zhelobodko, E., Kokovin, S., Parenti, M., & Thisse, J. F. (2012). Monopolistic competition: Beyond the constant elasticity of substitution. *Econometrica, 80*(6), 2765-2784.

## **2 Discrimination and strategic responses of firms to arbitrage: Implications for DC-SIP**

*Luisa Menapace*

*Technical University of Munich – TUM*

### **2.1 Introduction**

This section draws from the Industrial Organisation literature. Specifically, it reviews the literature on the following related topics:

- Quality discrimination
- Third-degree (price/quality) discrimination
- International market segmentation
- Parallel trade (or grey market trade or grey goods)

Before summarising the relevant findings of this literature, several notions are introduced to help understand how this literature relates to and can help in understanding DC-SIP.

Firstly, it is a widely accepted notion in the Industrial Organisation literature that a profit-maximising firm with market power will optimally set all decision variables in its control. These decision variables not only include price but also quality (e.g., product composition) and (quality-related) investments. It is also useful to remember that it is a common firm behaviour across industries to rely on intellectual property rights (brands, patents etc.) and trade barriers to charge different prices or deliver different qualities in different countries in response to different national market conditions. Consequently, when markets are separate (when arbitrage between markets is impeded for legal, institutional, strategic reasons - e.g., exclusive territories, and territorial supply restraints), a profit-maximising firm with market power will exploit such market segmentation opportunities to extract profits from consumers.



### **Discrimination versus market segmentation**

Discrimination and market segmentation are not synonymous. Discrimination refers to a firm exploiting differences in *demand* between different consumers/buyers. Because of discrimination, the consumers/buyers are charged different prices (or receive different goods). Market segmentation is the ability of the firm to divide the market in groups of consumers who are sold different goods or charged different prices. Price discrimination results in market segmentation. Nevertheless, market segmentation can also occur based on differences in marginal costs to supply different consumers (and is not limited to differences in demand).

The term *discrimination* is correctly used when the different national market conditions are due to differences in *demand* (and not in the cost structure). In particular, when firms are able to discriminate between different market segments or groups of consumers (as might be the case for consumers in different national markets), it is called third degree discrimination. The literature has investigated third-degree price discrimination extensively, that is, charging different prices to different groups of consumers for the same good. While the third-degree price discrimination literature is large, a smaller literature has considered (third-degree) quality discrimination, that is, selling different variations of the same good to *different* groups of consumers.

As already noted above, price and quality discrimination are only possible in the absence of arbitrage. For example, third-degree price discrimination between international markets occurs when it is not possible to buy the good at a low price in one country and resell at a higher price in another country. In other words, firms can only engage in discrimination across borders when it is possible to keep the national markets separate. The inability of firms to maintain price (or quality) differences across national borders can arise for a variety of reasons, among which parallel trade figures prominently.

Parallel trade (or grey market trade) is the resale of bona fide goods in a market (e.g., different country, a different market channel) other than that intended by the manufacturer of the good.<sup>13</sup> Parallel trade is a form of arbitrage. When parallel trade between countries is possible, firms are not able to engage in third-degree price discrimination across national borders. The result is a uniform price in all the markets that are supplied. With regard to quality, starting from a situation in which a firm sells country-specific variations, arbitrage would imply that the different variations are made available in markets other than that meant by the manufacturer of the good, and that different variations of the same good would coexist on the same markets. It is then conceivable that this coexistence would require the manufacturer to label the different variations to avoid generating confusion among consumers and negatively affecting its brand.

---

<sup>13</sup>The expression bona fide goods (i.e., "good faith" goods) is used to indicate authentic goods, i.e., as opposed to illegal counterfeits. Grey goods can be defined as products traded through channels other than those authorised by the manufacturer.

Beside arbitrage, a uniform price for otherwise separated markets could also be achieved through a policy that imposes uniform prices, that is, a policy imposing uniform prices for all markets would have the same implications of parallel trade (or other forms of arbitrage) on prices, but would possibly have different implications for the other decision variables considered by the firm (i.e. quality, composition). As long as the uniform-price policy does not otherwise constrain the separation of markets, a firm with market power would rationally continue exploiting the separation of the markets. In other words, a firm would use the other decision variables in its control, for instance quality, to maximise profits. As a result, a firm could find it profitable to offer different qualities in different markets.

Exclusive territories, territorial restraint, and territorial supply constraints represent strategies that a firm with market power can adopt to separate or segment markets, gaining degrees of freedom for profit maximisation. Moreover, with separated markets, a profit-maximising firm can set market-specific values for each of the decision variables under its control. For example, in the case of quality, if markets are separated, a firm can offer different qualities in different markets. If markets are not separated, either the firm offers only one quality or it offers more qualities that coexist in the same market. In other words, separated markets are a precondition for firms to be able to offer country-specific variations (as in the case of DC-SIP) that are *selectively* available only in the countries for which they are meant. If markets are not separated, the likelihood that more than one product variation is available in any given markets increases (provided that consumers in that market have heterogeneous preferences).<sup>14</sup>

In the case of the presence of different variations of the same product, the following three cases are possible:

- **If markets are separated**, country-specific variations may possibly emerge. DC-SIP is possible if barriers between national markets within the Single Market exist (such barriers could be due, for example, to territorial supply constraints and/or national laws).
- **If markets are not separated**,<sup>15</sup> country-specific variations are likely to be available in countries other than that for which they are originally intended. This means that different variations of a given product would coexist in a given national market. It might then be profitable for a firm to either remove

---

<sup>14</sup> It is in principle possible that preferences are such that only one variation is demanded in each market. Nevertheless, this case seems not to be empirically relevant as the only explanation for DC-SIP. As pointed out in section 1.2.2, the presence of marketing cost in the agri-food system to access supermarkets' limited shelf-space might limit the number of variations of the same good that are present in any given market.

<sup>15</sup>The following quote from Gallini and Hollis (1999) is instructive:

*"Many goods with identical TMs [trademarks] are produced in different locations under different specifications, vary according to local tastes, have different packaging and instructions, and comply with different safety standards. A common TM may be used because of economies of scale in brand development, or because information flows easily between countries through newspapers, television, and travel. However, if a common TM is used and prices differ between countries, then grey markets may emerge as unauthorised importers try to pass off one product for another. This undoubtedly will cause confusion and may cause distributors to reduce their investment. Hence, market segmentation is needed to ensure that their efforts will not be undermined by grey marketers."* (Gallini and Hollis, 1999, page 5).

differences (so that ultimately only one product variation is available) or label the different variations (e.g., to use labels/branding to allow the consumer to distinguish the different variations). The use of distinctive labels/brands is to be expected in order for the firm to avoid negative effects of consumer uncertainty regarding product quality.<sup>16</sup> It follows that DC-SIP is less likely to occur when markets are not separated (i.e., when the EU market is indeed a *single* market) and information on product quality is readily available or easy to acquire. DC-SIP could still emerge when preferences between different markets are significantly different and preference overlap is very modest. Likewise, DC-SIP could still emerge when arbitrage across countries is difficult (e.g., high transportation cost and low price-quality differential between countries).

A third case is possible at least from a theoretically point of view, that is, the introduction of national variations *causes* the emergence of a barrier between countries. In other words, there is a third case **if the introduction of variations helps a firm creating some sort of barriers between countries**. This would be the case if a firm manages to separate markets by introducing market-specific variations. A possible example of how the introduction of variations might contribute to create trade barriers between countries is the use of different languages on the package.<sup>17</sup> Another possible explanation is that retailers might be reluctant to place “similar” (although not identical) products from the same manufacturer (or with the same brand) on their shelves to avoid consumers dissatisfaction due to inconsistent quality. The author is not aware of any theoretical analysis of these cases in the Industrial Organisation literature and it is unclear whether they are empirically meaningful.

The legal analysis by Gallini and Hollis (1999) provides an example of how the introduction of small product differences has been exploited to create trade barriers.<sup>18</sup> Gallini and Hollis argue that if trademark law allows the banning of grey goods being made of trademarked goods that are at least slightly different (with the intent of protecting consumers from “getting the wrong good”), firms would have an incentive to produce slightly different variations to take advantage of the market separation that comes with a ban of grey goods.<sup>19</sup> A policy that bans grey goods that are slightly differentiated could incentivise firms to differentiate their products across countries –at least slightly. Therefore, “slight” product differentiation under the same trademark would be a way of disguising anticompetitive motives and behaviour aimed at eliminating competition between distributors. In footnote 39, Gallini and Hollis note that several grey goods have been prevented access to other markets under trademark law

---

<sup>16</sup> If the product features distinguishing the different variations are search attributes, they do not require branding, labelling, or certification, as consumers can establish the features of the product before purchase.

<sup>17</sup> This is not to be confused with the case in which consumer self-select by purchasing their preferred variation. See examples below.

<sup>18</sup> Note that the work by Gallini and Hollis (1999) consists of a legal analysis. As this paper falls outside the scope of the Industrial Organisation literature, it is not discussed in more detail in the remainder of this document.

<sup>19</sup> The analysis by Gallini and Hollis (1999) focuses on the US market. Given the US regime, grey goods are generally allowed. See the box on “Parallel trade” for further detail on grey good (parallel trade) regimes.

based on “small” differences. Gallini and Hollis provide the following examples (none of which refer to the European Union):

- Venezuelan Pepsi excluded from Puerto Rico because of different can size and product proportions;
- Several products have been excluded based on language or instruction language;
- Heinz ketchup was excluded from Canada because of a slightly different formula in the USA.

These examples suggest the theoretical possibility of introducing small differences (e.g., in composition, ingredients, size) as a tool to segment markets when trademark law would prevent trade in identical grey goods. Whether this possibility mentioned by Gallini and Hollis (1999) is relevant for DC-SIP in the European Union is a legal question and outside the scope of this literature review.<sup>20</sup>

Finally, it is also important to bear in mind that the Industrial Organisation literature displays a high degree of mathematical formalisation that limit the degree of sophistication regarding brands and/or branding decisions present in real-world business. It is often implicitly assumed in this literature that a product of a given firm corresponds to “a brand”. Brand and branding decisions in the Industrial Organisation literature are particularly relevant<sup>21</sup> in the context of asymmetric information between buyers and sellers regarding product quality and the role of firm reputation to overcome market failures due to such asymmetries of information. It is assumed in this literature that a firm has “reputation” if consumers believe its products to be of high quality. When product attributes that are relevant for consumers are difficult to observe prior to purchase (by definition, these are experience attributes/goods), consumers are expected to use the quality of the products produced by the firm in the past as an indication of the current quality of the products of that firms. Brands are then the instrument that allows consumers to identify the source of the product (i.e., the firm that produces a given product) and hence serve as “carriers” of the reputation of the firm (see Shapiro (1983) for an example).

## 2.2 Query of the Industrial Organisation literature

With this in mind, the authors of this paper searched for literature regarding manufacturers/firms with market power that are active in more than one market (e.g., multi-product or multi-market firms). Specifically, the literature analysing quality-related decisions taken by firms was examined.

One important focus in the literature searched is the topic of *discrimination*. This report makes clear that the relevant form of discrimination is third-degree discrimination, that is, discrimination occurring between groups of consumers that the firm can directly

---

<sup>20</sup> It would require a trademarked good imported from one to another Member Country to be seen as infringing the trademark rights of the “same” trademarked good in the importing country because the imported good is “similar” but not identical to the domestic good.

<sup>21</sup> In the sense that brands assume an important economic function.

separate because, as in the case of DC-SIP, they are located in different, separated national markets.

An alternative common case of discrimination is second-degree discrimination. When discrimination concerns the quality dimension, second-degree discrimination is also called "versioning" (Varian 1997). Following Varian (1997), "versioning" or "quality discrimination" is a form of differential pricing. Specifically, these are situations in which a firm produces different qualities (also called versions or variations) of a good that are sold at different prices. The motivation of versioning is to get consumers to self-select themselves into different groups according to their willingness to pay. This is used when a firm is unable to charge different prices to different groups of consumers based on observable characteristics of the consumers (e.g., age, student status). In this case, firms provide more than one quality and rely on consumers to (self-)select their preferred quality from those available based on their preferences. A firm engages in second-degree discrimination when it is not able to engage in third-degree discrimination, essentially because the firm cannot distinguish which consumers belong to which group/segment. This literature does not appear to be particularly useful in understanding DC-SIP because consumers in different countries typically do not have access to more than one variation of the product of the same brand/firm. In the case of DC-SIP, the coexistence of different variations of the same trademarked product within the same national market is not observed.

#### **Price-Quality discrimination (Mussa and Rosen 1978)**

Mussa and Rosen (1978) represent the classic paper in price-quality discrimination: emphasising that a firm with market power will act on both price and quality to maximise profits. This paper is also often cited for the utility structure that has been widely used in the literature since then. In contrast to the less cited article by Paroush (1978), Mussa and Rosen (1978) focus on a type of second-degree price discrimination. In principle all consumers have access to the different qualities placed on the market by the firm and they select their preferred quality based on their own preferences. This represents the main distinction from Paroush (1978), who in contrast focuses on third-degree price discrimination, a situation that is possible when markets are separated. Cremer and Thisse (1994) extend the Mussa and Rosen (1978) paper to an oligopolistic setting.

The most common case of third-degree discrimination in the literature is discrimination in terms of price. The literature addressing third-degree quality discrimination is very sparse.

### **Standard result of the third-degree price discrimination literature**

It is well known that third-degree price discrimination has ambiguous welfare effects. An extensive literature has analysed the necessary and sufficient conditions for third-degree price discrimination to have a positive or negative aggregate welfare effect. A classic case in which third-degree price discrimination increases welfare is one in which third-degree price discrimination results in serving new markets and achieving scale and learning economies. This is a static-framework result. The literature on third-degree price discrimination also considers dynamic settings where investments (e.g., in quality) play a significant role. Dynamic settings allow a wider range of possible firm strategies and welfare considerations.

In addition, the literature that addresses the strategic responses of firms to *policy changes* or *changes in the institutional environment* that affect discrimination was explored. Specifically, non-price responses in general and quality-related responses in particular were examined. The literature considers the case of a policy that imposes uniform pricing on separated markets and more generally the case of a policy that affects the ability of firms to engage in international arbitrage. A frequently encountered case is a change in the policy regime concerning parallel trade.

### **Parallel trade**

Parallel trade is a form of arbitrage that undermines the ability of a firm to engage in third-degree price discrimination. There are different doctrines concerning parallel trade. In the USA, the prevailing doctrine is the "first sale" doctrine. This means that once a product is sold, the original owner of the property rights over the product loses his/her rights to determine how the product is subsequently sold or distributed. The effect of this doctrine is preventing price discrimination against the consumers in the jurisdiction that applies this doctrine. The European Union has a regime called "Community Exhaustion". This means that once products have been sold in any Member State, the intellectual property right holder has lost the right to control/restrict any further movement of the products within the European Union. Nevertheless, this doctrine allows the original property holder to prevent products sold at low prices outside the European Union re-entering into the European markets. The reason for this regime is to promote the integration of the European Union market.

In addition, the literature on exclusive territories and territorial restraints was also scrutinised. Furthermore, the literature searching explicitly for "territorial supply

constraints” was also queried without any relevant academic work that uses this terminology being found.

The authors of this report also searched the literature discussing policies that affect discrimination in terms of quality. No paper addressing the imposition of a uniform quality across markets was found. Nevertheless, there are contributions that explore quality choices and quality-related investments made by firms in response to changes in the ability of a firm to set different prices.

As far as the authors of this report know, Paroush (1978) is the only paper that directly addresses third-degree quality discrimination. In order to extend the literature search regarding quality discrimination, the literature on bundling was considered. This literature is only relevant to quality discrimination to the extent to which it is appropriate to *interpret* bundling in terms of quality as is the case in Paroush and Peles (1981). It was found that in addition to Paroush and Peles (1981), other contributions to the bundling literature do not interpret bundling in terms of quality.

Finally, no literature looking at branding decisions in the context of third-degree discrimination was found.

### **2.3 DC-SIP-related questions that can be answered by the Industrial Organisation literature**

The Industrial Organisation literature does not directly address the issue of DC-SIP. Nevertheless, it addresses the following broad questions related to the “quality-related choices of a firm with market power active in more than one market”.

- Does such a firm engage in quality discrimination?
- Does such a firm adjust quality as a strategic response to a limitation in its ability to engage in price discrimination?

We will use the Industrial Organisation literature addressing the above questions to provide insights into the following questions regarding DC-SIP.

- Can DC-SIP be rationalised as the result of quality discrimination?
- Can DC-SIP be rationalised as the result of a possible strategic firm response in anticipation (or as a consequence) of a policy or an institutional change that limits the ability of the firm to engage in third-degree price discrimination (e.g., a potential limitation to their ability to impose “territorial supply constraints”)?

Specifically, a paper by Paroush (1978) specifically considers quality discrimination in a third-degree sense. This means that the firm is able to recognise which consumers belong to which “group/segment”. International quality discrimination is a form of third-degree discrimination where consumers located in a given country belong to a group (or segment). This paper shows that in general, quality and price of the “same” product differ across international markets. This is the outcome of the optimal behaviour of a profit-maximising firm that has two degrees of freedom, price and quality, for each independent market.

Similarly, the paper by Paroush and Peles (1981) considers international discrimination (discrimination between separated independent markets). It reiterates the result of



Paroush (1978) that quality can be used to discriminate between separated markets. This paper discusses “packaging” (also referred to as “blending”) as an implicit form of price discrimination between separated markets. Here the packaging decision can be interpreted as a decision taken by firms regarding the quality of the product.

There are many studies that consider second-degree quality discrimination, including the seminal paper by Mussa and Roosen (1978). These papers have not been included in the overview that follows because, as explained above, second-degree quality discrimination requires consumers to select the quality (product variations) they prefer. This does not match up well with the typical case of DC-SIP, where consumers in any given Member State are offered one product variation only (hence, consumers are not confronted with a choice between different variations of the same branded product).

Papers that answer the question of how firms strategically respond to a policy change that limits the ability of a firm to price discriminate were identified. Two papers (Szymanski and Valletti, 2005; Valletti and Szymanski, 2006) look at the incentives for firms to introduce a low-quality product variation (in addition to the original quality offered by the firm) to discriminate more effectively. A third (empirical) paper (Kyle, 2011) looks at the incentives for firms to change the features of the same product for different markets in order to maintain their ability to discriminate between markets.

In short, Szymanski and Valletti (2005) find that parallel trade does not provide incentives to introduce a low-quality product variation for the purpose of discrimination. Valletti and Szymanski (2006) find that the presence of competition from a generic brand provides incentives for firms to introduce a low-quality product variant. Under “regular” assumptions about preferences, these papers predict co-existence of different variations on the market, a fact that is at odds with DC-SIP. The implication is that ad hoc assumptions regarding preferences would be needed for “national” variations to be optimally introduced. Kyle (2011) provides evidence that firms in the pharmaceutical sector will indeed have an incentive to modify the features of products (i.e., to introduce national variations) with the intention of contrasting parallel trade and so maintaining their ability to discriminate between markets.

Two papers (Valletti, 2006; Alexandrov and Deb, 2012) look at the incentive to invest in quality when a policy or institutional change limits their ability to price discriminate. They show that when the ability to price discriminate is affected, investment in quality declines, with negative welfare effects. Unfortunately, these papers exclusively consider an “overall” quality investment while they do not specifically take into consideration the possibility of a firm offering different quality variations in different markets. Consequently, insights for DC-SIP from these papers are limited while the conclusion is that limiting the ability of firms to price discriminate (for example by preventing territorial supply constraints) might reduce overall investments in quality.

The literature reviewed considers two ways of incorporating quality into preferences and in the demand functions. The majority of the literature uses a preference structure based on Mussa and Rosen (1978). The Mussa-Rosen approach is based on unit demand where heterogeneous preferences for quality are captured by a parameter. Different assumptions can be made regarding the range and distribution of the preference-for-quality parameter. A second approach is that of Paroush (1978). This can be summarised as follows: a product,  $R$ , consists of different ingredients, for example,  $x$  and  $y$ . The ingredients differ by quality, that is,  $x$  is the better-quality ingredient.

Furthermore,  $x$  and  $y$  are perfect complements, specifically  $R = x + y$ . So the ratio  $x/R$  can be interpreted as the quality of the product.<sup>22</sup>

In what follows, the relevant contributions are briefly summarised and the limitations encountered in interpreting the result in terms of DC-SIP are explained. All papers described in what follows are theoretical papers with the exception of Kyle (2011) that consists of an empirical investigation.

### 2.3.1 Third-degree quality discrimination

#### **Paroush (1978)**

*Relevant question: Will a firm engage in quality discrimination? Can price discrimination be used as a strategic response to a uniform price policy?*

*Main message:*

A profit-maximising firm facing separated markets will adjust price and quality depending on the demand conditions in each market. A policy restricting one of the decision variables (e.g., price) might amplify the differences in the other decision variable between markets (e.g., quantity).

*General considerations and setting:*

Paroush (1978) belongs to the very few papers in the literature addressing third-degree quality discrimination. The relevant setting is one in which a firm with market power faces *separated* markets (i.e., there is no arbitrage between the markets). This corresponds to third-degree discrimination. With separated markets, a firm can sell *one good* in two different markets so that the good can have country-specific price and quality. In this context, "one good" is to be interpreted as "one brand name". Quality is costly to produce, but the cost for any given quality is the same irrespective of which market is served.

*Main results:*

There are two seemingly obvious but very important results. First, in general quality and price of the *same* product differ in separated markets. This is the outcome of the optimal behaviour of a profit-maximising firm that has two degrees of freedom: price and quality. These differences are not driven by cost conditions, but represent real discrimination: optimal differential treatment of consumers in different markets by firms is based on the features of demand.

A second result is that a profit-maximising firm optimally reacts to regulations that impose a constraint on the behaviour of a firm by adjusting the decision variables that are not subject to the regulation. This paper discusses price restrictions (i.e., a policy

---

<sup>22</sup> All contributions discussed in this review use a model of vertical product differentiation (i.e., consumer preferences are such that all consumers agree on the preferred quality variations when all variations are sold at the same price). Anglin (1992) has shown that there is a correspondence between models of vertical and horizontal product differentiation whenever the Single Crossing Condition is satisfied. That means that the decision rules of consumers in the horizontal and vertical differentiation models are the same so that the results derived from a setting carry over to the other setting.

that requires firms to charge the same price in all served markets) and shows that a price restriction encourages more quality discrimination. Specifically, this 'amplification' result is shown for the case of a market that is more sensitive to both quality and quantity, that is, a market where, at the optimum, the elasticities of demand regarding prices and quality are larger than in the other market. This translates into a case of a market characterised by higher quality and lower price. For this case, Paroush (1978) shows that a policy that reduces the degree of price differences between separated markets results in larger quality differences between markets.

#### *Lessons and limitations in understanding DC-SIP:*

##### Conclusions:

- Profit-maximisation leads to differences in quality (and price) for the *same product* (to be interpreted as the *same branded product*) in separated markets reflecting demand conditions in each market. This means that DC-SIP can emerge as the result of profit-maximising behaviour by firms taking advantages of differences in demand conditions when markets are separated.
- A firm can react to a policy that restricts its ability to discriminate based on a subset of decision variables analysed by a firm (e.g., price) by increasing the degree of discrimination obtained using the remaining decision variables (e.g., quality). This "amplification" result suggests that DC-SIP could emerge (or be exacerbated) as a consequence of a policy that limits the ability of a firm to price discriminate between consumers in different countries.

The main limitations to interpreting the results in terms of DC-SIP are the following:

- The specific parameter case for which the "amplification" result described above is shown is one in which a given market is characterised by higher quality and lower price. Whether this case is relevant for DC-SIP observed in the European Union is an empirical question. Other cases with regard to the price and quality elasticity of demand are not explicitly derived in Paroush (1978). Furthermore, the case of a restriction on quality across markets and the corresponding effect on price discrimination is not explicitly derived although the general setting of the paper leaves the possibility open that a restriction on quality might result in amplified price differences. Further modelling is required to confirm that the result is robust to other demand elasticity conditions.
- Third-degree discrimination between national markets is only possible when markets are separated. Accordingly, the analysis by Paroush (1978) is predicated on separated markets, that is, there is no arbitrage between markets: the firm can prevent consumers in either country having access to the product meant for the consumers in the other country. Whether national markets in the European Union for DC-SIP can do this is an empirical and legal question. As described in the general discussion in this Chapter, possible sources of separation of national markets are: (i) the persistence of territorial supply constraints, (ii) language differences on the packaging of the products etc.
- Relaxing the assumption of separated markets would also imply a change from third to second-degree discrimination. If the markets were not separated (in the presence of arbitrage), both product variations could be available in the same market and would stimulate the firm to use labels or brands that allow consumers to distinguish between the different qualities. The alternative of not doing so is

a situation in which firms offers stochastic quality to consumers (with implications for consumer quality expectations and quality choices). Whether a firm would offer different variations in case of non-separated markets would most likely depend on the assumptions made about the cost of producing and distributing quality. Some cost conditions (e.g., increasing marginal cost of quality) would be likely to yield a Mussa and Rosen (1978) result in which different qualities are offered by a firm in a given market and consumers select their preferred quality. Other cost conditions (e.g. costless quality or marginal or decreasing cost of quality) are expected to yield a result as in Szymanski and Valletti (2005) in which the firms do not have incentives to introduce more than one quality in a market.

- As is typical in the Industrial Organisation literature, the branding choice is not explicitly modelled. Implicitly, the “same” good sold by the firm in two markets is meant to be interpreted as a good with the same brand. This is a common feature in the Industrial Organisation literature. The fact that the branding assumption is “only implicit” does not compromise the ability to use this paper to interpret DC-SIP.

### **Paroush and Peles (1981)**

*Relevant question: Can “blending” (i.e., varying the feature of a given product) be used to discriminate?*

*Main message:*

Packaging is a way to implicitly price discriminate. Here packaging can be interpreted as “blending” (i.e., varying the feature of a given product). Therefore, blending is a way to implicitly price discriminate (make additional profits by extracting more of the consumer surplus).

*General considerations and setting:*

These Authors consider the conditions under which profit-maximising firms with market power will market a “package of two different commodities” even when the demand for and the cost of production of each commodity in the package are independent. They show that packaging is a tool for indirect price discrimination when outright price discrimination is not possible.

At first glance the topic addressed by this paper is at odds with the topic of this literature review. Indeed, the model assumptions are such that it is meaningful to interpret the ‘package’ as a good with a quality that depends on the relative content of the commodities included in the package. The authors themselves recognise this interpretation as they mention the case of different blends of coffee, where several grades of beans are mixed before sale.

The paper considers the case of two independent markets each dominated by one monopolist and analyses the case in which the two monopolists combine operations to sell packages of the products together. This analysis is isomorphic to the case of one monopoly selling two products to two separated markets. The paper further assumes that a firm cannot directly engage in price discrimination (i.e., price for any given quality is the same across markets).

### *Main results*

This paper shows that the monopolist makes more money by selling packages than by selling the goods separately. With a quality interpretation, this paper shows that the monopolist is better off by optimally selecting the quality of the product than by selling two products with two exogenously determined qualities. In other words, a firm with market power that can choose quality in addition to price has more degrees of freedom in maximising profits and, in any given market, this firm will select the “quality composition” that maximises its profits.

### *Lessons and limitations in understanding DC-SIP:*

This paper essentially offers the same insight as Paroush (1978). It emphasises that quality is a decision variable that a firm can use to extract surplus from consumers based on their demand. In the case of DC-SIP, this paper suggests that it make sense for a firm to optimise the composition of a product to extract as much consumer surplus as possible based on demand conditions. While this paper does not explicitly consider the case in which the monopolist chooses an optimal blend for *each* country/consumer group (rather it considers one optimal blend for all consumers), it is a straightforward extension to show that there is space for additional gains in profits by further exploiting the separation of the two markets.<sup>23</sup>

## **2.3.2 Incentives to introduce national variations in response to a policy or institutional change that limits price discrimination**

### **Szymanski and Valletti (2005)<sup>24</sup>**

*Relevant question: Will a firm introduce a lower-quality variation in order to discriminate as a response to parallel trade?*

This paper investigates whether a firm would react to parallel trade by introducing additional lower-quality variations in order to discourage international arbitrage. In the authors’ words (p.719):

*“Product differentiation by country is commonplace – Nescafé is sold at different strengths in different countries, the amount of sugar in Coca-Cola also varies. Companies may try to position a product to meet local tastes,*

---

<sup>23</sup>Motivated by the quality interpretation offered by Paroush and Peles (1981), the authors of this review screened the literature on ‘bundling’ to search for other papers that could offer further insight into interpreting dual quality. The issue of ‘bundling’ is covered by a large literature. It was found that this literature does not offer further insights due to being unable to interpret the ‘bundle’ as a good whose quality depends on the composition of the bundle. Following Adams and Yellen (1976), most papers on bundling assume that the marginal utility of a second unit of the unbundled goods is zero for all buyers. This implies that the demand of the two goods is independent of the product price of the other. Alternatively, in Armstrong (2013) the willingness to pay for the bundle is assumed to be at least as large as the maximum willingness to pay of the unbundled products. These assumptions are incompatible with the interpretation that the quality of the bundle changes depending up on the proportions of the input products.

<sup>24</sup>The Authors note at page 728: ‘under arbitrage they are ‘forced’ to get a global brand. If the local brands are kept, then the firm is damaging its overall profitability.’ This comment suggests that the authors take that different qualities would be associated with different brands as a fact. This contrasts with the case of DC-SIP.

*but this activity can also play a role in discouraging international arbitrage. This review considers this by developing a model of vertical product differentiation in which a seller can choose to introduce a product of inferior quality to meet demand at the 'bottom end' of the market, which is the demand that would typically be unmet under the threat of parallel trade when the willingness to pay of consumers in different countries is sufficiently dispersed."*

*Main message:*

In response to parallel trade (arbitrage), manufacturers have no incentive to introduce different variations of the same product in different countries.

*General considerations and setting:*

Two countries are considered: a rich domestic and a poor foreign country. A linear downward-sloping demand curve in each market is assumed. Consumer preferences are modelled according to Mussa-Rosen (1978). Investment in quality are possible. They lead to outward shifts of the demand curve in both countries. As in Valletti (2006), quality can be produced at a fixed cost (a quadratic function of quality), which is called investment. There is no variable cost in producing higher quality. Additionally, the producer is able to supply a lower-quality product at zero extra-cost as a by-product of the investment in quality. Quality is costless to produce (i.e., the marginal cost of quality is equal to zero).

*Main results:*

Firstly, this paper yields the standard result that parallel trade (i.e., arbitrage) reduces investments. The reduction in investments has a negative impact on the quality supplied and on consumer surplus and welfare. A new result of the paper is that the monopolist strictly prefers to sell the same quality in both markets. Depending on consumer preferences in the rich market, the monopolist either only prefers to sell the high-quality in both market or to abandon the foreign market and sell the high quality in the rich market only. This result is due to cannibalisation in the rich market: the structure of preference is such that it can never be the case that consumers in the rich country only consume the high-quality good if the low-quality good is available for sale in the poor country.

*Lessons and limitations in understanding DC-SIP:*

General conclusion:

- It is not profitable to introduce a lower-quality variation as a discrimination tool in response to arbitrage. In other words, a firm that offers a single product in the absence of parallel trade will also continue to do so in the presence of parallel trade (i.e., when it can no longer engage in international price discrimination). Whether or not quality is costless to produce (as explicitly modelled in the paper) or costly (as in Mussa and Rosen 1978), arbitrage does not provide incentives to introduce a lower quality variation.

The main limitations to interpreting the results in terms of DC-SIP are the following:

- *Second versus third degree discrimination:* The mechanism at work in this paper is self-selection of different product variations by consumers. Self-selection



works as a type of second-degree discrimination (similar to versioning). The underlying assumption is that the monopolist is not able to segment the markets directly due to arbitrage opportunities related to parallel trade: when it sells product A in country A and product B in country B, it cannot prevent consumers in country A (B) from having access to product B (A). In other words, the monopolist is unable to keep the two markets separated when parallel trade is allowed. The monopolist rather offers a menu of products (high and low quality) and the consumers buy their preferred variation (both consumers in country A and B have access to product variations A and B). In the case of DC-SIP, there is only one product variation present in each country. This might suggest that the markets are separated/segmented.

- *Low-price country is not served when the market cannot be segmented:* One of the welfare implications is linked to the firm dropping the low-price market under uniform pricing.<sup>25</sup> This concern is less applicable for regions with relatively small differences in income levels. DC-SIP is often referred to occur between high and low income countries in the EU. This suggests that differences in the willingness of consumers to pay in the countries could be sufficiently dispersed to the extent that one market would be dropped under uniform pricing.
- *The 'single product result' and costless quality:* The fact that the monopolist has no incentives to produce different variations of the quality hinges on the fact that quality is costless to produce (once the investment in quality has been made). The single product result follows when quality is costless or when there is a marginal cost that is constant or increasing at a decreasing rate with quality. Under these alternative costs specifications, the monopolist has no incentives to introduce a lower-quality variation, whether or not he faces the threat of arbitrage. In the presence of variable costs that increase at an increasing rate, the classic Mussa–Rosen (1978) results hold, that is, the monopolist may want to introduce two product variations to discriminate between heterogeneous consumers. The lesson here is that, in contrast to the degree of convexity of variable costs or competition, parallel trade *per se* is not a reason for the monopolist to offer multiple variations for the purpose of discriminating between consumers. These authors also note that *captive markets* can also be a reason for introducing a second product variation. For example, this would be the case if some consumers were not prepared to switch to the inferior variation no matter how cheap it is. In this case, the monopolist would supply the higher-quality variation to the captive market and the lower-quality variation to the 'elastic' segment of the market. This would be the case irrespective of the presence of parallel trade. Neither of the assumptions in Mussa-Rosen (1978) nor in Szymanski and Valletti (2005) seem to match up well with the observation that in the case of DC-SIP a firm only sells one variation in a given country. This again seems to suggest that the markets in which DC-SIP occurs are separated/segmented either because of restrictions (e.g. *captive markets*, national laws), or the strategic behaviour of firms aiming at engaging in third-

---

<sup>25</sup> This behaviour follows from the fact that parallel trade offers low quality in the poor country which implies offering low quality in the rich country too so that some consumers in the rich country can switch from high to low quality (cannibalisation). This switching is unprofitable for the monopolist.



degree price discrimination (i.e. via territorial supply constraints), or due to the combination of the two.

### **Valletti and Szymanski (2006)**

*Relevant question: Will a firm introduce a lower-quality variation in order to discriminate as a response to parallel trade when it faces competition from a generic product?*

*Main message:*

Competition from a generic good motivates a firm to introduce national variations. The low-quality variation serves as a “fighting” brand.<sup>26</sup>

*General considerations and setting:*

These authors consider international price discrimination when there is a generic good (i.e., a lower-quality variation). The setting of this paper is similar to that of Szymanski and Valletti (2005). The firm chooses quality (i.e., quality is endogenous). Quality can be produced at a fixed cost. The monopolist can supply more than one variant (i.e., different qualities) of the product. In contrast to Szymanski and Valletti (2005), here there is a generic product (that is a lower-quality variant) competing in the market. The key idea of this paper is that the introduction of a low-price alternative can be profitable when consumers in the high price country do not see the inferior quality as a substitute thereby eliminating the negative effects of arbitrage.

*Main results:*

Valletti and Szymanski (2006) show that a monopolist has an incentive to introduce a lower-quality good that works as a fighting brand. Additionally, they conclude that parallel trade (arbitrage) has good welfare property both ex-post but also ex-ante.<sup>27</sup> This is due to the fact that the incentives to invest in quality are preserved in this market setting. In the presence of a generic, the monopolist reacts to the presence of competition by extending the portfolio of variations. This paper shows that a firm produces different qualities in both markets. As in Szymanski and Valletti (2005), Valletti and Szymanski (2006) confirm that arbitrage does not cause additional product variations to be introduced. The key assumption is that quality is costless to produce as in Szymanski and Valletti (2005).<sup>28</sup>

*Lessons and limitations in understanding DC-SIP:*

General conclusion:

---

<sup>26</sup> A fighting brand is a brand that a firm introduces on the low end of the quality spectrum to contrast competition from lower quality competitors.

<sup>27</sup> In this context, ex-ante (i.e., when it is possible to resell a given product or product variation<sup>27</sup> from a low-price to a high-price market) means before the investment in quality is made and ex-post means after the investment in quality has been made.

<sup>28</sup> The papers by Szymanski and Valletti (2005) and Valletti and Szymanski (2006) focus on the case in which quality is costless to produce although quality requires an initial investment. This assumption is possibly best suited to pharmaceutical products, but is less so for food products whose higher quality ingredients typically imply higher production costs.

- Competition from a “generic” product provides an incentive to introduce a lower-quality version. Arbitrage (i.e., the lack of ability to engage in international price discrimination) does not provide incentives to introduce a lower quality variation.

The main limitations to interpreting the results in terms of DC-SIP are the following:

- While this paper explains why a firm might offer a low-quality variant, it also generally predicts the co-existence of different variations on the same market (a result that is at odds with DC-SIP). Only under specific assumptions regarding preference can it be expected that only one variation in any given market will be seen.
- The same as in Szymanski and Valletti (2005).

### **Kyle (2011)**

*Relevant question: Will a firm introduce national variations to maintain the ability to discriminate as a response to parallel trade?*

Main message:

In response to the threat of parallel trade (arbitrage), manufacturers strategically change the characteristics of products offered in different countries.

*General considerations and setting*

Kyle (2011) provides a setting that is useful in analysing/understanding how firms adapt to changes in the institutional/legal environment that alter their ability to engage in third degree price discrimination across countries. This paper clarifies the importance of considering the strategic options/reactions of firms in response to institutional/legal changes (here a change in the parallel trade regime) that affect the ability of firms to engage in international price discrimination. This paper focuses on the pharmaceutical sector and considers the product market strategies of pharmaceutical companies in response to the legalisation of parallel imports due to European integration. This paper makes use of the IMS Midas database on drug prices and sales across countries for a total of 30 countries and 36 therapeutic classes in 5 broad categories for the timeframe 1993 to 2004. In contrast to all of the other papers considered, this paper offers empirical evidence.

*Main results*

The main findings are that parallel imports (which are argued to favour market integration in the EU) have not led to a significant reduction in price dispersion across EU countries. Furthermore, this paper shows that only a small number of products are subject to parallel trade. Overall, the paper finds evidence that the behavioural response of firms to adjusting to the threat of parallel imports has reduced the impact of parallel trade. Based on these findings, **the main insights of this paper is that firms adopt non-price responses such as adjustment of products characteristics to maintain price difference across borders**. Firms have moved from using third degree price discrimination to increased product differentiation. In other words, this

paper finds that national variations were introduced in response to the threat of arbitrage due to parallel trade.<sup>29</sup>

A qualification is in order here. In the case of pharmaceutical companies, the introduction of national variations might be the **preferred behavioural response** because other forms of response (e.g., price responses, rationing, product withdrawal, etc.) might be illegal or unfeasible due to high political costs. For example, an increase in the price of a drug the withdrawals of a drug from a low-price market might be politically costly. The use of differentiation (different package sizes, per-package volume, or different brand names) can be used strategically by a pharmaceutical company to influence the entry decision of a parallel importer (by generating higher production costs and regulatory fees and licenses for the different variations). In other words, in the pharmaceutical sector, differentiation might be the only feasible instrument. The situation is expected to be different in the food sector, where a wider range of behavioural responses is feasible.

*Lessons and limitations in understanding DC-SIP:*

General conclusion:

- A change in institutional/legal environment that affects the ability of a firm to engage in third degree price discrimination (e.g., a ban of territorial supply constraints) could potentially trigger non-price responses and lead to increased product differentiation across countries and the introduction of national variations. Potentially this implies an increase in practices of DC-SIP. This general conclusion is to be considered only a theoretical possibility. No empirical evidence is available to confirm or negate this general conclusion for the food sector.

*The main limitations to interpreting the results in terms of DC-SIP are the following:*

The paper is an empirical investigation of the pharmaceutical sector and does not consider the food sector. Nevertheless, one might ask whether the forces that trigger differentiation as a response to a threat to firm's ability to discriminate carry over to the food sector. In the pharmaceutical industry the threat of parallel trade spurred product differentiation. Could the threat of making territorial supply constraint illegal spur DC-SIP in the food sector? While this seems to be possible, the use of DC-SIP as a strategic response to a ban in territorial supply constraints would require certain conditions to hold. For example, it would require retailers' willingness or ability to procure from the cheapest country to be undermined by the difference in product formulations. It is conceivable that a retailer might be unwilling to source a product with "inconsistent" quality (if the sourcing occurs from more than one country, so that different variations of the product would end up on a retailer's shelves) or with a "quality" that is different from the one consumers are used to. Ultimately, answering the question of whether DC-

---

<sup>29</sup> The effect of introducing national variations might be also due to the combination of other types of changes in the institutional/legal environment that have taken place at the same time as the legalisation of parallel imports (parallel trade) (e.g. price controls; politically costly withdrawals of a drug from the market), and might have played a role in affecting the pharmaceutical sector as examined by Kyle (2011).

SIP can be a strategic response to a ban to territorial supply constraints is an empirical question. This empirical question has not been addressed so far in the literature.

### **2.3.3 Incentives to invest in quality in response to a policy or institutional change that limits price discrimination**

#### **Valletti (2006)**

*Relevant question: What is the effect on the incentive for a firm to invest in quality in response to a policy that prevents price discrimination?*

*Main message:*

Allowing differential prices has a positive (negative) effect on investments in quality when price differential is demand-driven (cost-driven).

*Setting and assumptions*

This paper makes clear that different prices in different markets can arise from differences in consumer demand or from differences in the cost of supplying the different markets. In other words, this paper focuses on the case where markets are separated and can be segmented based on differences in marginal costs and/or consumer demand. This paper also considers the ex-ante investment by a firm in quality. An ex-ante investment means an investment made in anticipation of the different pricing regime. Two price regimes are considered: (1) price discrimination is possible; (2) perfect and costless arbitrage does not allow for price discrimination. The focus is restricted to the case in which both markets are served under both pricing regimes: uniform pricing and discrimination.

The paper uses a standard vertically-differentiated market setting according to Mussa and Rosen with unit demand; a continuum of types of consumers in terms of their preferences for quality but with quality ranking. A monopolist chooses one quality that depends on the investment in R&D: the higher the investment, the higher the quality. Taking the quality as given, the monopoly then sets the price based on the pricing regime.

*Main results:*

Ex-post (i.e., after the investment in quality is made), uniform prices improve (decrease) consumer surplus and welfare when price differentiation is purely demand-based (cost based). The (ex-post) quality level only affects price dispersion in the case of demand-based differential pricing. In the case of cost-based differential pricing, quality affects average price but not its dispersion.

Furthermore, the main results for welfare effects are:

- Ex-post: a regime that allows price discrimination is best for low quality; a regime that impose uniform pricing is best for high quality.
- Ex-ante: when market segmentation is due to demand (cost), uniform prices leads to lower (higher) investments. That is the equivalent of saying that:
  - Parallel trade has good ex-post welfare properties (for a given level of quality), but leads to lower investment ex-ante when differential pricing is demand based.

- Parallel trade has bad ex-post welfare properties (for a given level of quality), but leads to higher investment ex-ante when differential pricing is cost based

*Lessons and limitations in understanding DC-SIP:*

General conclusion:

- A policy that affects the ability of a firm to segment the market might have different effects on quality and welfare that depend on whether market segmentation is demand based (i.e., discrimination) or cost based (cost-based market segmentation).

The main limitations to interpreting the results in terms of DC-SIP are the following:

- Action by the monopolist is restricted to producing *one* quality for all markets. In addition, there is a one-time investment cost to produce quality. This is suitable for products that require a substantial fixed cost in R&D (drugs). For food products, a more reasonable assumption would probably be an increasing marginal cost of producing quality.

**Alexandrov and Deb (2012)**

*Relevant question: What is the effect on the incentive of a firm to invest in quality in response to a policy that prevents price discrimination?*

*Main message:*

In the context of a monopolist selling to two segments of consumers with different preferences for quality (e.g., when consumers differ in the importance they place on quality or quality improvements), if the firm is prevented from price discrimination, it will reduce the investment in quality.

*Setting and assumptions*

There are two different segments of consumers, but only one segment value quality. Consumers in this segment are referred to as high-quality type). Consumers who do not value quality are referred to as low-quality type) A monopolist can choose both price and quality (one quality). Quality can be produced with a fixed cost investment that is increasing with quality. The firm can distinguish between consumer segments (there is third rather than second degree price discrimination).

*Main result:*

The firm invests less in quality if is not able to price discriminate. Low-quality type consumers always suffer if price discrimination is not allowed. When price discrimination is allowed, the monopolist ensures that only the discerning segment (high-quality type consumers) pays more because of a higher investment. Without price discrimination, both segments pay for it through the uniform price and receive uniform quality. The driving force is that consumers have different relative valuation for quality (value quality similarly but have different price elasticities).

*Lessons and limitations in understanding DC-SIP:*

General conclusions are:

- By assumption the monopolist offers only one variation in both markets (segments).
- Quality available on the market might be reduced by a monopolist who is constrained in their ability to price discriminate.

The main limitation to interpreting the results in terms of DC-SIP are the following:

- The setting applies to environments in which a firm can offer only *one* quality level to consumers. Otherwise similar to Valletti (2006).

## 2.4 Conclusions

In this chapter, the authors attempted to provide answers to two questions:

1. Can DC-SIP be rationalised as the result of quality discrimination?
2. Can DC-SIP be rationalised as the result of a possible strategic firm response to limitations on its ability to engage in third-degree price discrimination?

The response to the first question is affirmative. The Industrial Organisation literature shows that firms with market power can engage in international quality discrimination (in addition to or as an alternative to price discrimination) when markets are separated (i.e., when there is no arbitrage between national markets). Based on the insights of this literature, DC-SIP can be rationalised as a optimal differential treatment of consumers by firms in separated national markets based on the demand conditions. For instance, the paper by Paroush (1978) specifically focuses on international quality discrimination. Perhaps obvious but important, one insight from this paper is that quality discrimination is the result of profit-maximising behaviour by firms taking advantage of differences in demand conditions when markets are separated.

Furthermore, the Industrial Organisation literature explains that firms with market power will optimally react to policies (or to changes in institutional/legal environment) that impose a constraint on firm behaviour by adjusting the decision variables that are not subject to the limitations that are imposed by the policy change. For instance, a policy that limits the ability of a firm to engage in price discrimination between national markets (e.g., ban on territorial supply constraints) may induce a quality response by a firm with market power, potentially leading to larger quality differences between national countries.

Specifically, while the theoretical paper by Paroush (1978) suggests that a reduction in the ability of firms to price discriminate internationally might exacerbate the quality differences existing between countries, the empirical paper by Kyle (2011) suggests the possibility of a reverse causality explanation. I.e., that quality differences (in the form of "national" product variations) could be introduced by firms to re-establish the ability of the firm to price discriminate internationally. In the context of the pharmaceutical sector, this paper finds that national variations were introduced in response of the threat of arbitrage due to the legalisation of parallel imports because of European integration. In other words, this paper states that new arbitrage opportunities between national markets induced firms to adopt non-price responses such as adjustment in product characteristics to maintain price difference across borders. The underlying assumption is that the newly introduced "national variations" are not as "movable" between

countries. While this reduced level of “mobility” might be a reasonable assumption for drugs (i.e., a new approval procedure might be required for a new variation), it is unclear whether the assumption is applicable to food products subject to DC-SIP. Several potential explanations for a reduced level of “mobility” could be hypothesised in the case of food. For instance, retailers might be unwilling to place products on their shelves that while similar/identical in appearance, have different qualities, fearing consumer dissatisfaction. Ultimately, whether DC-SIPs reflect the attempt of firms to maintain or gain ability to discriminate between otherwise well-integrated national markets remains an empirical question.

Overall, the results by Paroush (1978) and Kyle (2011) point to two possible interpretations. On the one hand, they suggest potential unintended consequences of new policies (or changes in institutional/legal environment) that restrict firm behaviour and could further favour the proliferation of DC-SIP. On the other hand, they might indicate that firms have already responded to past (e.g. EU integration) or expected (envisaged) future changes in institutional/legal environment (e.g., territorial supply constraints) by strategically changing the characteristics of products offered in different countries.

Szymanski and Valletti (2005) find that a reduction in the ability of a firm to engage in third-degree price discrimination does not generally provide incentives to introduce national variations. This is due to the fact that arbitrage would trigger cannibalisation of the high-quality variation by the lower-quality variation in the high-quality market. In other words, if markets were not separate, the different variations would move over the borders and ultimately co-exist in different markets. In the high-quality market, the low-quality variation (which is less profitable) would steal market share from the more profitable high-quality variation. This result found by Szymanski and Valletti (2005) is based on the assumption that the introduction of national variations does not create any impediments to arbitrage between countries. The opposite is true for Kyle (2011), where national variations do indeed represent an impediment to arbitrage between countries. Which assumption (a: national variations are a barrier to arbitrage between countries or b: national variations are not a barrier to arbitrage between countries) is best suited to describes the case of DC-SIP in the food sector remains an empirical question.

Other papers from the Industrial Organisation literature offer more limited insights for interpreting DC-SIP. The paper by Valletti and Szymanski (2006) suggests that competition from generic products represents an incentive for firms to introduced lower-quality variations, but it does not explain why different variations would be selectively present in different markets. Finally, the papers by Valletti (2006) and Alexandrov and Deb (2012) suggest possible negative consequences on limiting the ability of firms to price discriminate between different countries in terms of quality investments. Nevertheless, both papers are limited in their ability to explain DC-SIP as, according to the assumptions, firms are constrained to provide only one quality in all markets.

#### **2.4.1 References**

Akerlof, G. A. (1978). The market for “lemons”: Quality uncertainty and the market mechanism. In *Uncertainty in economics* (pp. 235-251). Academic Press.



- Alexandrov, A., & Deb, J. (2012). Price discrimination and investment incentives. *International Journal of Industrial Organisation*, 30(6), 615-623.
- Adams, W. J., & Yellen, J. L. (1976). Commodity bundling and the burden of monopoly. *The Quarterly Journal of Economics*, 475-498.
- Armstrong, M. (2013). A more general theory of commodity bundling. *Journal of Economic Theory*, 148(2), 448-472.
- Anglin, P.M., 1992. The relationship between models of horizontal and vertical differentiation. *Bulletin of Economic Research*, 44(1), pp.1-20.
- Bronnenberg, B. J., Dubé, J. P., & Moorthy, S. (2018). The Economics of Brands and Branding. Available at SSRN 3244180.
- Cremer, H., Thisse, J.-F., 1994. Commodity taxation in a differentiated oligopoly. *International Economic Review* 35 (3), 613–633.
- Gallini, N. T., & Hollis, A. (1999). A contractual approach to the grey market. *International Review of Law and Economics*, 19(1), 1-21.
- Kyle M. (2011) Strategic Responses to Parallel Trade, *The B.E. Journal of Economic Analysis & Policy*: Vol. 11: Iss. 2 (Advances), Article 2.
- Paroush, J. (1978). On quality discrimination. *Southern Economic Journal*, 592-597.
- Paroush, J., & Peles, Y. C. (1981). A combined monopoly and optimal packaging. *European Economic Review*, 15(3), 373-383.
- Shapiro, C. (1983). Premiums for high quality products as returns to reputations. *The Quarterly Journal of Economics*, 98(4), 659-679.
- Szymanski, S. & Valletti, T.; Parallel trade, price discrimination, investment and price caps, *Economic Policy*, Volume 20, Issue 44, 1 October 2005, Pages 706–749, <https://doi.org/10.1111/j.1468-0327.2005.00149.x>
- Valletti, T. M. (2006). Differential pricing, parallel trade, and the incentive to invest. *Journal of International Economics*, 70(1), 314-324.
- Valletti, T. M., & Szymanski, S. (2006). Parallel trade, international exhaustion and intellectual property rights: a welfare analysis. *The Journal of Industrial Economics*, 54(4), 499-526.
- Varian, H. R. (1997). Versioning information goods.

### **3 International standardisation versus adaptation of marketing: Globalisation versus Localisation**

*Luisa Menapace\* and Negin Fathinejad\*\**

*\*Technical University of Munich – TUM*

*\*\*University of Cassino and Lazio Meridionale*

#### **3.1 Introduction**

This section draws primarily from the international marketing and international business and management literature. This literature discusses whether the growing internationalisation of business is an indication of globalisation or rather an expression of regionalisation. Correspondingly, international firms need to find the right strategy to pursue an optimum balance between standardising and adapting their marketing strategies across national borders to regional/national peculiarities. Marketing strategies include product, pricing, distribution, and communication strategies. In the context of DC-SIP, the focus is primarily on product, including the product branding, and also encompasses considerations regarding communication strategies.

The discussion regarding the marketing mix standardisation/adaptation dates back to 1965 (Elinder, 1965). This literature expanded rapidly in the 1980s, following the publication by Theodore Levitt in 1983. According to Levitt (1983), when a firm is able to reduce costs (and consequently the final price for the consumer) and increase product quality (including reliability and suitability of the product for the consumers etc.), 'world-standardised' products are going to be preferred by consumers (over local products) regardless of consumer nationality and taste preferences (Levitt, 1983). Some authors (e.g., Levitt, 1983; Vignali, 2001) have suggested that firms, which have product lines instead of a single product, should standardise at least some products. Others authors (e.g., Boddewyn et al., 1986; Whitelock and Pimblett, 1997) disagree with the role of standardisation. Overall, two school of thoughts can be identified: those who stress the advantages of globalisation (i.e., standardisation) and those who support the advantages of internationalisation (i.e., localisation).

According to the first school of thought, firms should "go global" for many reasons. According to several authors (e.g., Buzzell, 1968; Levitt, 1983; Kreutzer, 1988; Elinder, 1965; Ryans, 1969; Peebles et al, 1978; Theodosiou and Leonidou, 2003; Pires et al, 2006) firms should pursue standardisation because of economics of scale and cost reduction. Donada and Dostaler (2005), Voss et al. (2008) and, more recently, Kreiter and Helm (2018) suggest that standardisation while helping firms enter a new market by saving financial resources required to later adapt in response to threats from competitors. Similarly, some authors (e.g., Szymanski et al, 1993; Navarro et al, 2010;

Kreiter and Helm, 2018) suggest that standardisation will increase the ability of a firm to allocate resources appropriately. According to Theodosiou and Leonidou (2003), with standardisation firms are in a better position to harmonize internal production and quality control, a fact that is particularly relevant with shorter product life cycles. Overall, several authors suggest that standardisation leads to a competitive advantage (Levitt, 1983; Ohmae, 1989; Kreutzer, 1988; Cavusgil et al. 1993; Poulis and Poulis, 2011).

Beside the benefits regarding cost reduction and improved resources allocation, Levitt (1983) suggested that: (i) consumer demand is becoming increasingly similar across different countries because of cultural convergence and (ii) global markets are becoming more and more homogeneous due to technology development. This idea is supported by several authors, including Quelch and Hoff (1986), Jain (1989), Heerden and Barter (2008), Schilke et al. (2009), Hartmann and Apaolaza-Ibáñez (2013), and Brei et al. (2011). Elinder (1965) and Levitt (1983) and Jain (1989) emphasise the role of border crossing and tourist activity. Wei and Yazdanifard (2014) argue that standardisation minimises consumer confusion among travellers. In addition, Meyer (2017) believes that the increasing degree of globalisation and large migration waves will lead to an increased role of standardisation. According to Kreutzer (1988) and Vignali (2001), standardisation increases global reputation.

The second school of thought, which is referred to here as 'go international', argues that cultural convergence and the development toward market homogeneity are very slow while a large degree of differences in consumer taste, needs, and preferences persist (Czinkota and Ronkainen, 1998; Vignali, 2001; Vrontis et al. 2009; Alimiene and Kuvykaite, 2008; Wei and Yazdanifard, 2014; Son et al. 2018). In addition, Griffith et al. (2014) emphasize the role of consumer behavioural differences. These behavioural differences are due to differences in culture, religion, and norms in different parts of the world (Vignali, 2001; Friedman, 1986; Douglas and Wind, 1987; Onkvisit and Shaw, 1987; Lannon, 1988; Cayla and Arnould, 2008; Vrontis et al. 2009; Moro et al, 2018). Due to all of these differences, supporters of the 'go international' school believe that adaptation to local market conditions is essential for a firm to succeed in new markets and also improves public relationships with local consumers (Vignali, 2001). In addition, (i) the presence of country-specific laws and customs (Levitt, 1983; Vignali, 2001; Vrontis et al., 2009; Alimiene and Kuvykaite, 2008), (ii) heterogeneous economic situations and consumer willingness to pay, and (iii) competitors (Kreutzer, 1988; Vignali, 2001; Leonidou et al., 2002), (iv) ecological differences (e.g. due to climate and geography) (Kreutzer, 1988; Vronits et al., 2009; Griffith et al., 2014) require some degree of adaptation.

Schilke et al. (2009) reports that standardisation reduces differentiation, therefore it reduces the competitive advantage of firms (the opposite is true for adaptation). Concerning the role of economies of scale, Thackray (1985), Harris (1988), and Whitelock and Pimblett (1997) support the idea that the proportion of production cost compared to the total cost is very small, so the cost saving generated by standardisation is often irrelevant. Overall, this group of scholars believe that sales, profits, and market shares increase with adaptation, and with adaptation, firms are more flexible and competitive (Rosen, 1990; Walters, 1986; Samiee and Roth, 1992; Alimiene and Kuvykaite 2008; Wei and Yazdanifard, 2014).

### 3.2 Think global, act local

A **third school of thought** has emerged more recently that supports the idea that firms engage in both internationalisation and globalisation. Ohmae (1989), Taylor (1991), and Vignali (2001) present the idea of “think global, act local”. In a similar vein, Sandler and Shani (1992) suggest “Brand globally, advertise locally”. Many other scholars suggest the need to combine elements of both standardising and adapting strategies (e.g., Brei et al. 2011) and that a ‘middle of the road’ approach is more feasible and appropriate (e.g., Ryans and Donnelly, 1969; Colvin et al. 1980; Whitelock and Chung, 1989; Whitelock and Pimblett, 1997 and Jain, 1989), overall highlighting the fact that there are positive relationships between both adaptation and standardisation with performance. Similarly, Alden et al. (1999) believe that globalisation and adaption are not mutually exclusive but rather are complementary approaches. Wei and Yazdanifard (2014) concluded that it “is illogical for companies to pursue complete homogenisation of the marketing mix, except under distinctly particular sets of situation and certain product categories”. They developed the so-called “AdapStand” approach, which encourages companies to standardise tactics where possible and adapt only where needed (Wei and Yazdanifard 2014; Vrontis et al. 2009).

The discussion about internationalisation versus globalisation has been phrased in terms of ‘points of view’. Venaik and Midgley (2018) studied 231 MNC (Multi National Corporations) subsidiaries: 23% of their sample pursue standardisation, 38% pursue adaptation, and 39% pursue hybrid configurations. Some authors use the parallelism “Is the world flat or curved” (Friedman, 2005; Ghemawat, 2007; Jullens, 2013; Venaik and Midgley, 2019): although it is known that the world is curved, for many purposes it is appropriate to consider it to be flat. In the context of this review, market conditions (specifically differences between countries) will determine whether internationalisation or globalisation is appropriate. For example, the study by Jeong et al. (2019) shows that the level of adaption depends on internal factors (the degree of internationalisation, R&D intensity, and firm size), and external factors (market similarity and market uncertainty).

Some papers debated whether or not the degree of standardisation varies in a given industry. Tan and Sousa (2013) report that the appropriate degree of standardisation depends on the industry and is more pronounced for industrial products (Samiee and Roth, 1992; Schilke et al., 2009; Kreiter and Helm, 2018). Other scholars observe that even within the same industry, there are firms with completely different strategies (Venaik and Midgley, 2019). With regard to the food industry, for example, Venaik and Midgley (2019) note that Nestlé largely standardised Nespresso coffee machines and capsules while PepsiCo developed country-specific snacks such as a spicy snack called “Kurkure” tailored to the Indian market. Rosen et al (1988) considers the nature of the product (durable or nondurable), with durable products being more suitable for standardisation.

*Table 3-1: Overview of reasons for pursuing globalisation or standardisation*

<b>Go Global (Standardisation)</b>	<b>Literature</b>
Economies of scale and cost reduction	Buzzell, 1968; Levitt 1983, Kreutzer 1988, Elinder 1965; Ryans 1969; Peebles, et al., 1978; Quelch and Hoff 1986; Theodosiou and Leonidou, 2003; Pires, et al., 2006;
Cultural convergence and homogeneous market	Levitt, 1983; Elinder 1965; Ryans, 1969; Peebles et al., 1978; Quelch and Hoff, 1986; Jain 1989; Brei et al., 2011; Heerden and Barter, 2008; Hartmann and Apaolaza-Ibáñez, 2013; Schilke et al., 2009
Technology development	Levitt, 1983; Jain, 1989
Competitive advantage	Levitt, 1983; Ohmae, 1989; Kreutzer, 1988; Cavusgil et al., 1993; Poulis and Poulis, 2011
Global reputation	Vignali, 2001, Kreutzer, 1988
Border-crossing and tourist activities	Elinder, 1965; Levitt, 1983; Jain, 1989;
Product life cycle is becoming shorter	Theodosiou and Leonidou, 2003
Better harmonisation through internal production and quality control	Theodosiou and Leonidou, 2003
Minimise consumer confusion among travellers	Wei and Yazdanifard, 2014
Saving financial resources (Slack resources)	Donada and Dostaler, 2005; Voss et al., 2008; Kreiter and Helm, 2018
Appropriate resource allocation	Szymanski et al., 1993; Navarro et al., 2010; Kreiter and Helm, 2018

Table 3-2: Overview of reasons for pursuing internationalisation or localisation

Go International (Localisation)	Literature
Cultural/Religion differences	Vignali, 2001; Friedman, 1986; Douglas and Wind, 1987; Onkvisit and Shaw, 1987; Lannon, 1988; Cayla and Arnould, 2008; Vrontis et al., 2009; Moro et al., 2018
Taste, needs, preferences	Czinkota and Ronkainen, 1998; Vignali, 2001; Quelch, 2003; Vrontis et al., 2009; Alimiene and Kuvykaite, 2008; Wei and Yazdanifard, 2014; Son et al., 2018
Law/Customs	Lavitt, 1983; Vignali, 2001; Vrontis et al., 2009; Alimiene and Kuvykaite, 2008
Heterogeneous economic situation, consumer willingness to pay, and competitors	Kreutzer, 1988; Vignali, 2001; Leonidov et al., 2002
Public relationship	Vignali, 2001
Ecological differences (resources, climatic condition)	Kreutzer, 1988; Vrontis et al., 2009; Griffith et al., 2014
Increasing sales, profit, and market share (being competitive)	Rosen, 1990; Walters, 1986; Samiee and Roth, 1992, Harris, 1985; Katsikeas and Samiee, 2002; Wei and Yazdanifard, 2014; Alimiene and Kuvykaite, 2008
Proportion of production cost compared to the total cost	Thackray, 1985; Harris, 1988; Braidwood, 1984, Douglas and Wind, 1987; Whitelock and Pimblett, 1997
Reduce differentiation (as a competitive advantage)	Schilke et al., 2009
Consumer behaviour	Griffith et al., 2014

According to Moro et al. (2018), cultural aspect influence consumer behaviour and reaction although this effect can be different in each country. They suggest that the product characteristics sometimes need to be localised, but sometimes communication localisation is needed. Effects on consumer behaviour “are driven by global and local cultures as well as the final outcome of the dual effects” (Cleveland et al. 2015; Moro et al. 2018). In addition, Son et al. (2018) studied the case of the retailer Tesco entering Japan. Tesco started business in Japan with the standard retail system that they have in other countries. Subsequently, they collaborated with a local partner, but kept the idea of supplying discounted products. The strategy failed and Tesco withdrew from Japan mostly because they failed to understand the role played by fresh food for local consumers. Son et al. (2018) concluded that “The success or failure of global retailers depends on their capability and willingness to adapt to local markets.” A similar conclusion can be found in Burt et al., (2003); Dawson and Mukoyama (2014); Dupuis and Prime (1996); Wood et al., (2016); Yoder et al., (2016).

Furthermore, Jeong et al., (2018) note that most studies “focus on companies based in United States, thus preventing the generalization of finding”. Duman and Poturak (2014) suggest the need for more studies concerning European firms. Jeong et al. (2018) conclude that the country of origin plays a big role in the globalisation versus internationalisation debate. Specifically, products from a country with a good reputation require a lower degree of adaptation.

In summary, the third school of thought supports the idea of a **hybrid strategy**. In other words, it is about the **degree of adaptation**, which depends on market conditions, industry, product, culture, and many other situational, internal, and external factors. Jeong et al. (2018) further develop and qualify this concept but put forward the idea of “**all marketing mix strategies must be fit**” (an idea which is mentioned by Porter, 1996). For example, this means that if a firm adapts the feature of a product, it should also consistently adapt the other elements of the marketing mix to avoid consumer confusion. This insight seems to be quite relevant for the case of DC-SIP where a firm adapts its product, but fails to adapt the package, advertising, and communication to consumers.

### **3.3 Conclusions and limitations of the literature on international marketing and international business**

The literature review by Schmid and Kotulla (2011) reports that more than 300 articles on the topic of internationalisation versus adaptation have been published in the domain of international market research as well as in business/management journals. A significant literature exists that considers the situations in which and why firms standardise or adapt their marketing across nations and why and how firms standardise or adapt their marketing to enhance performance. Of the marketing mix (product, place, price, promotion etc.), a large share of studies (65% of those reviewed by Schmid and Kotulla (2011) focus on product. This literature suggests simple but important conclusions:

*A frequently asked question (in research and for managers) is whether to adapt or to standardise a given product across countries.*

*Likewise, a frequently asked question is which elements of the marketing mix are to be standardised across countries and which are not to be (for instance, the brand could be standardised but not the product).*

This literature pursues two main research objectives:

- To describe how and/or to positively-theoretically explain why firms actually standardise/adapt on the basis of situational factors. These research questions are pursued by building on the contingency approach: managers make decisions depending on the situation of their firm. An overview of the situations considered in the literature is provided in Figure 1 (Figure 1 reproduces Table 2 in Schmid and Kotulla, 2011).
- To provide recommendations regarding standardisation/adaptation by firms and/or normative-theoretically ground, these recommendations are based on



performance. These research questions are pursued by building on the concept of 'fits' between the strategy of a firm and specific situations (better the fit – better the performance). Stated simply, the key question is: *In which situations is a specific degree of standardisation/adaptation likely to increase performance?*

While the topic has attracted significant attention resulting in very numerous published contributions, Schmid and Kotulla (2011) note that this literature suffers from significant limitations. These limitations have two sources. One is the almost exclusive reliance on logical-intuitive thinking or data mining, respectively for theoretical and empirical contributions, rather than on an underlying theory. The other is the missing integration of the concept of fit with a normative theory so that, according to Schmid and Kotulla (2011), it is not possible to derive performance-enhancing strategies for given situations. Other studies also support the idea that this literature lacks a theoretical foundation (Tan and Sousa, 2013; Helm and Gritsch, 2014; Wei and Yazdanifard, 2014; Kreiter and Helm, 2018; Larimo et al. 2018). This situation is complicated by the lack of clear definitions of marketing mix "globalisation" and "standardisation" (Rosen, 1990; Whitelock and Pimblett, 1997). Several related concepts are implicitly used in the literature.

Figure 3-1 Situational factors

Analyzed situational factors	Analyzed strategy elements	Analyzed performance variables
<i>Environment-related factors:</i> cross-national similarity in the economic, social, cultural, political, legal, physical, and technological environments	<i>Product strategy:</i> general product strategy; product name; product positioning; product features/characteristics; product design/style; product quality; product packaging; product branding; product labeling; product services; product warranty; items/models in product line	<i>Financial performance:</i> foreign profit; foreign sales; foreign market share; growth in foreign profit/foreign sales/foreign market share; return on sales; return on investment; return on assets; cash flow
<i>Market-related factors:</i> foreign market size; cross-national similarity in marketing infrastructure, distribution infrastructure, and advertising media availability	<i>Pricing strategy:</i> general pricing strategy; pricing method; retail price; wholesale price; profit margins; price discounts; sales/credit terms	<i>Non-financial performance:</i> goal achievement; satisfaction with performance; customer satisfaction; customer retention; customer referral; acquisition of new customers; foreign consumer attitude toward the firm/product; foreign consumer purchase intention
<i>Consumer-related factors:</i> cross-national similarity in consumer characteristics/behavior, tastes/preferences, and usage patterns	<i>Distribution strategy:</i> general distribution strategy; distribution channels; physical distribution; type/role of middlemen/retail outlets; sales force structure/management/role	
<i>Competition-related factors:</i> cross-national similarity in competition; structure, nature, and intensity of foreign competition	<i>Communication strategy:</i> general communication strategy; advertising; creative/execution style; message/theme; media allocation; sales promotion; public relations; personal selling; advertising/communication budget	
<i>Product-related factors:</i> product type; technological intensity; stage of the product life cycle		
<i>Organization-related factors:</i> country of origin; nature of ownership; organizational structure; firm size; foreign sales; foreign market share		
<i>Management-related factors:</i> EPRG orientation; international commitment; international experience; marketing experience; formalization of decision-making; centralization in decision-making; centralization in value-adding activities; generic strategy; foreign market entry mode		

Source: According to Theodosiou & Leonidou (2003, pp. 149-156), Bimik & Bowman (2007, pp. 308-311), complemented by own research.

Source: Schmid and Kotulla (2011)

### 3.4 Product adaptation: A theoretical approach by Schmid and Kotulla (2011)

To overcome these limitations, Schmid and Kotulla (2011) propose a framework that integrates normative-theoretical considerations and the concept of situation-strategic fit. Their framework is specifically applicable to the marketing dimension product, which seems to be most relevant in the case of DC-SIP. This framework explains the “foreign-product profit” and considers product name, product feature, product design, product quality, and product packaging. The framework is depicted in Figure 3-2 (Figure 2 reproduces Figure 3 in Schmid and Kotulla, 2011).

Based on the foreign product profit, Schmid and Kotulla (2011) theoretically derive “four situational fits” for a specific product: (a) cross-national homogeneity of demand; (b) potential for cross-national economies of scale; (c) cost of modification of the product; (d) foreign price elasticity of demand. The optimal degree of product standardisation/adaptation to achieve performance depends on these four situations. According to Schmid and Kotulla (2011), in contrast to the situational variables that were previously considered by the literature, the four situations included in the framework *directly* affect the relationship between standardisation/adaptation and foreign product profit. These elements of the framework are linked to the following components that determine the foreign-product profits: total cost per unit, price per unit, quantity of product sold. Based on this framework, four propositions are derived. Each of the four propositions states that: “A fit between a high [medium, low] X and a high [medium, low] degree of international product standardisation enhances foreign product profits,” where X means, respectively:

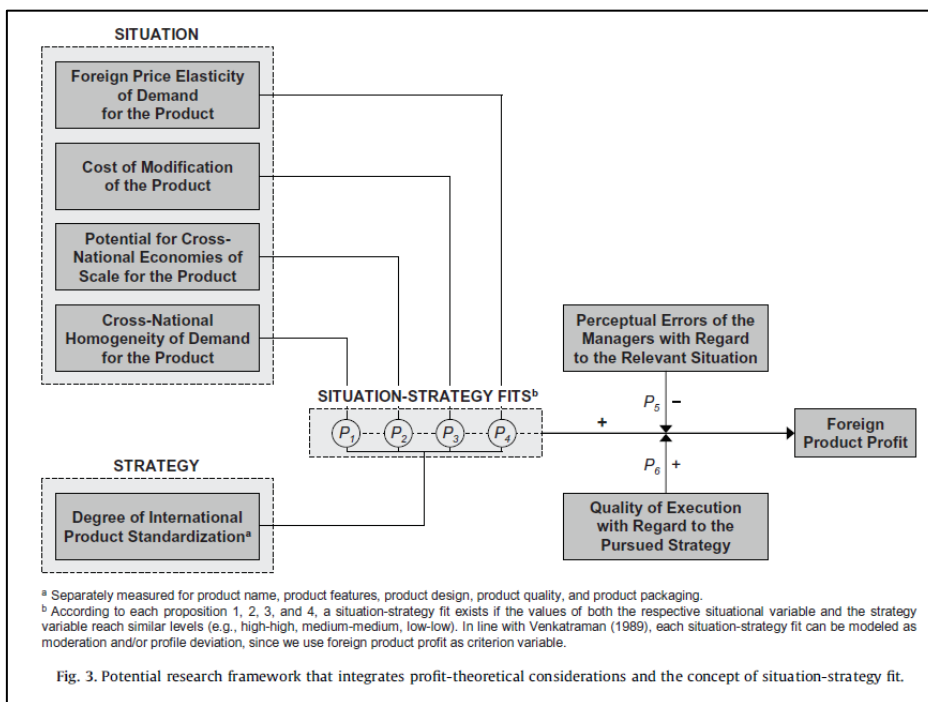
1. Cross-national homogeneity of demand for a specific product: (e.g., due to low cultural distance, cross-national image spill over effects, and supranational laws)
2. Potential for cross-national economies of scale (where the potential for mass production –and so economies of scale- differ greatly depending on the kind of product, centralisation of production number of similar foreign markets operated, and market size, etc.)
3. Cost of modification of a specific product (where the cost intensity of modification varies with the complexity of the product and the production facilities)
4. Foreign price elasticity of demand (where high elasticity requires low prices to be pursued, and so contain costs with standardisation)

The implications for DC-SIP are the following: DC-SIPs are more likely to occur when cross-national homogeneity of demand is low, potential for cross-national economies of scale are limited, the costs of changing the composition of the product are low, and the elasticity of demand in the foreign market is low. The latter condition might appear to be at odds with the demand in Eastern European markets (where high elasticity of demand is expected), where DC-SIPs have often been reported. The latter condition is predicated on the assumption that standardisation (i.e., a firm offering the same product variation in different markets) is less costly than adaptation (i.e., a firm offering different product variations in different markets) and so standardisation leads to lower prices than adaptation. In the specific case of DC-SIP, a lower-quality variation might on the other hand lead to a reduction in production costs and so the direction of condition #4 is reversed.

Additionally, the framework considers two moderators: (a) perceptual errors of the managers and (b) quality of execution. The first moderates the product-profit enhancing effects of the four situation-strategy fits negatively and the second positively.

The review of the literature by Schmid and Kotulla (2011) does not mention the case of adapting product features and internationalising product name/package/brand (the specific case of DC-SIP) although this possibility cannot be ruled out on the theoretical grounds offered by the review.

Figure 3-2



Source: Schmid and Kotulla (2011)

### 3.5 Conclusions

This chapter reviewed the international marketing, international business and management literature to explain dual quality. This literature analyses the marketing mix strategies pursued by international firms: standardisation versus adaptation (versus a balance of standardisation and adaptation) across national borders. The literature is very large but can be organised into three main schools of thought:

- (1) Go global: This school stresses the advantages of globalisation and so standardisation.
- (2) Go international: This school stresses the advantages of international adaptation and so localisation.
- (3) Hybrid strategy: This school stresses that the optimal degree of adaptation/standardisation depends on market conditions, industry, product, culture, and many other situational, internal, and external factors.

Main motivations of the 'Go Global' school are benefits regarding cost reduction, improved resources allocation, cultural convergence, and technology development.

Main motivations of the 'Go International' school are related to the persistence of a large degree of differences in consumer taste, needs, and preferences across markets, the existence of country-specific laws and customs, and heterogeneity in the ecological and competition environments.

A third school of thought has emerged more recently that supports the idea that firms engage in both internationalisation and globalisation as there are positive relationships between both adaptation and standardisation with performance.

With regard to the degree of adaptation versus standardisation of the marketing-mix-dimension "product", four "situational fits" play an important role: (a) cross-national homogeneity of demand; (b) potential for cross-national economies of scale; (c) cost of modification of the product; and (d) foreign price elasticity of demand.

Based on this literature, the authors of this report conclude that dual quality could be rationalised within the discourse concerning the optimal marketing mix strategy adopted by international firms.

As the literature reviewed covers different disciplines and methods (Industrial Organisation, international marketing, international business and management literature), it is an interesting question to ask whether and how the findings of the two chapters relate to each other and what can generally be learnt for the case of DC-SIP. Both literatures point to the fact that DC-SIP can be rationalised as the optimal strategy of a firm to maximise profits. A firm will adapt (or not adapt) the quality and composition of the product, and so offer (or do not offer) national variations depending on market conditions (characterising supply and demand) and on the ability of a firm to exploit differences and the separation in national markets. Differences in demand conditions can be exploited by firms to discriminate between consumers from different countries. But discrimination is only possible when barriers exist between national markets that prevent arbitrage (variations moving from one to another national market).

### 3.6 References

Adams, W. J., & Yellen, J. L. (1976). Commodity bundling and the burden of monopoly. *The Quarterly Journal of Economics*, 475-498.

Alden, D. L., Steenkamp, J. B. E., & Batra, R. (1999). Brand positioning through advertising in Asia, North America, and Europe: The role of global consumer culture. *Journal of Marketing*, 63(1), 75-87.

Alimienė, M., & Kuvykaitė, R. (2008). Standardisation/adaptation of marketing solutions in companies operating in foreign markets: An integrated approach. *Inžinerinė Ekonomika*, (1), 37-47.

Boddewyn, J. J., Soehl, R., & Picard, J. (1986). Standardisation in international marketing: is Ted Levitt in fact right?. *Business Horizons*, 29(6), 69-75.

Brei, V. A., d'Avila, L., Camargo, L. F., & Engels, J. (2011). The influence of adaptation and standardisation of the marketing mix on performance: A meta-analysis. *BAR-Brazilian Administration Review*, 8(3), 266-287.

- Bronnenberg, B. J., Dubé, J. P., & Moorthy, S. (2018). The Economics of Brands and Branding. Available at SSRN 3244180.
- Burt, S., Dawson, J., & Sparks, L. (2003). Failure in international retailing: research propositions. *The International Review of Retail, Distribution and Consumer Research*, 13(4), 355-373.
- Buzzell, R. D. (1968). Can you standardise multinational marketing? (pp. 102-113). Reprint Service, Harvard business review.
- Cavusgil, S. T., Zou, S., & Naidu, G. M. (1993). Product and promotion adaptation in export ventures: an empirical investigation. *Journal of International Business Studies*, 24(3), 479-506.
- Cayla, J., & Arnould, E. J. (2008). A cultural approach to branding in the global marketplace. *Journal of International Marketing*, 16(4), 86-112.
- Cleveland, M., Laroche, M., & Takahashi, I. (2015). The intersection of global consumer culture and national identity and the effect on Japanese consumer behaviour. *Journal of International Consumer Marketing*, 27(5), 364-387.
- Colvin, M., Heeler, R., & Thorpe, J. (1980). Developing international advertising strategy. *Journal of Marketing*, 44(4), 73-79.
- Czinkota, M.R. and Ronkainen, I.A. (1998), *International Marketing*, 5th ed., The Dryden Press, London.
- Dawson, J., & Mukoyama, M. (2014). Building international strategy with formats and formulae. *Global Strategies in Retailing: Asian and European Experiences*, 37-54.
- Donada, C., & Dostaler, I. (2005). Relational antecedents of organisational slack: an empirical study into supplier-customer relationships. *M@n@gement*, 8(2), 25-46.
- Douglas, S. P., & Wind, Y. (1987). The myth of globalisation. *Columbia Journal of world business*, 22(4), 19-29.
- Duman, T., & Poturak, M. (2014). Marketing Mix Standardisation/Adaptation and Export Performance. *European Researcher*, (2-2), 324-333.
- Dupuis, M., & Prime, N. (1996). Business distance and global retailing: a model for analysis of key success/failure factors. *International Journal of Retail & Distribution Management*, 24(11), 30-38.
- Elinder, E. (1965). How international can European advertising be?. *Journal of Marketing*, 29(2), 7-11.
- Friedmann, J. (1986). The world city hypothesis. *Development and Change*, 17(1), 69-83.
- Ghemawat, P. (2007). Why the world isn't flat. *Foreign policy*, 54-60.
- Griffiths, M. A. (2014). Consumer acquiescence to informed consent: The influence of vulnerability, motive, trust and suspicion. *Journal of Customer Behaviour*, 13(3), 207-235.
- Harris, G., (1985) "International Product Standardisation-Progression or Regression?" *Admap* Sept pp 420-422

- Hartmann, P., & Apaolaza-Ibáñez, V. (2013). Desert or rain: Standardisation of green advertising versus adaptation to the target audience's natural environment. *European Journal of Marketing*, 47(5/6), 917-933.
- Helm, R., & Gritsch, S. (2014). Examining the influence of uncertainty on marketing mix strategy elements in emerging business to business export-markets. *International Business Review*, 23(2), 418-428.
- Jain, S. C. (1989). Standardisation of international marketing strategy: some research hypotheses. *Journal of Marketing*, 53(1), 70-79.
- Jeong, I., Kim, E., & Seo, E. (2018). An empirical study of the relationship between marketing standardisation and performance of Japanese firms in international markets: the moderating role of product strategy. *International Journal of Marketing & Distribution*, 2(1), 15-24.
- Jeong, I., Lee, J. H., & Kim, E. (2019). Determinants of brand localisation in international markets. *Service Business*, 13(1), 75-100.
- Jullens, J. (2013). *The Flat World Debate Revisited: Strategy for Business*, Boozand Company, New York, NY.
- Kreiter, S., & Helm, R. (2018). Pricing Decisions in International Industrial Markets—The Link between Standardisation at Market Entry, Pricing Capability, and Price Reactions. *Business and Management Studies*, 4(3), 26-43.
- Kreutzer, R. T. (1988). Marketing-mix standardisation: an integrated approach in global marketing. *European Journal of Marketing*, 22(10), 19-30.
- Lannon, I., (1988), "The European Consumer in the Year 2000," *Admap*, Nov, pp 20-24
- Larimo, J., Zucchella, A., Kontkanen, M., & Hagen, B. (2018). Patterns of SME's marketing mix combinations and their characteristics in export markets. In *Advances in Global Marketing* (pp. 333-364). Springer, Cham.
- Leonidou, L. C., Katsikeas, C. S., & Samiee, S. (2002). Marketing strategy determinants of export performance: a meta-analysis. *Journal of Business research*, 55(1), 51-67.
- Levitt, T. (1983). The Globalisation of Markets," *Harvard Business Review* May—June. P92, 102.
- Meyer, M. (2017). Cultural Behaviour Determinants of the Global Consumer. *Handel Wewnętrzny*, 366(1), 230-239.
- Moro, S., Pires, G., Rita, P., & Cortez, P. (2018). A cross-cultural case study of consumers' communications about a new technological product. *Journal of Business Research*.
- Navarro, A., Acedo, F. J., Robson, M. J., Ruzo, E., & Losada, F. (2010). Antecedents and consequences of firms' export commitment: An empirical study. *Journal of International Marketing*, 18(3), 41-61.
- Ohmae, K. (1989). Managing in a borderless world. *Harvard Business Review*, 67(3), 152-161.

- Onkvisit, S., & Shaw, J. J. (1999). Standardised international advertising: some research issues and implications. *Journal of Advertising Research*, 39(6), 19-24.
- Peebles, D. M., Ryans Jr, J. K., & Vernon, I. R. (1978). Coordinating International Advertising: A programmed management approach that cuts through the 'standardised vs. localised' debate. *Journal of Marketing*, 42(1), 28-34.
- Pires, G. D., Stanton, J., & Rita, P. (2006). The internet, consumer empowerment and marketing strategies. *European Journal of Marketing*, 40(9/10), 936-949.
- Porter, M. E. (1996). What is strategy. Published November.
- Poulis, K., & Poulis, E. (2011). Promotional channels of FMCG firms and tourism: A standardisation/adaptation perspective. *EuroMed Journal of Business*, 6(1), 5-23.
- Quelch, J. A., & Hoff, E. J. (1986). Customizing Global Strategies. *Harvard Business Review*, June/July, 59-68.
- Rosen, B. N., Boddewyn, J. J., & Louis, E. A. (1988). Participation by US agencies in international brand advertising: An empirical study. *Journal of Advertising*, 17(4), 14-22.
- Rosen, B.N., (1990), "Global Products: When do they make strategic sense?" *Advances in International Marketing*. Vol. 4, pp 57-71
- Ryans Jr, J. K., & Donnelly Jr, J. H. (1969). Standardised global advertising, a call as yet unanswered. *Journal of Marketing*, 33(2), 57-60.
- Ryans, J. K. (1969). Is it too soon to put a tiger in every tank. *Columbia Journal of World Business*, 4(2), 69-75.
- Samiee, S., & Roth, K. (1992). The influence of global marketing standardisation on performance. *Journal of Marketing*, 56(2), 1-17.
- Sandler, D. M., & Shani, D. (1992). Brand globally but advertise locally?: An empirical investigation. *International Marketing Review*, 9(4).
- Schilke, O., Reimann, M., & Thomas, J. S. (2009). When does international marketing standardisation matter to firm performance?. *Journal of International Marketing*, 17(4), 24-46.
- Schmid, S., & Kotulla, T. (2011). 50 years of research on international standardisation and adaptation—From a systematic literature analysis to a theoretical framework. *International Business Review*, 20(5), 491-507.
- Son, J., Baek, J., Park, H., & Kim, C. (2018). The localised merchandising for international retailers: A study of Tesco's failure in Japan. *The Ritsumeikan Business Review*, 56(5), 1-20.
- Tan, Q., & Sousa, C. M. (2013). International marketing standardisation. *Management International Review*, 53(5), 711-739.
- Taylor, W.(1991). "The logic of global business". *Harward Business Review*, March/April, pp. 90-105
- Thackray, J. (1985). Much ado about global marketing. *Across the Board*, 22(4), 38-46.



- Theodosiou, M., & Leonidou, L. C. (2003). Standardisation versus adaptation of international marketing strategy: an integrative assessment of the empirical research. *International Business Review*, 12(2), 141-171.
- Van Heerden, C. H., & Barter, C. (2008). The role of culture in the determination of a standardised or localised marketing strategy. *South African Journal of Business Management*, 39(2), 37-44.
- Venaik, S., & Midgley, D. F. (2019). Archetypes of marketing mix standardisation-adaptation in MNC subsidiaries: Fit and equifinality as complementary explanations of performance. *European Journal of Marketing*, 53(2), 366-399.
- Vignali, C. (2001). McDonald's: "think global, act local"—the marketing mix. *British Food Journal*, 103(2), 97-111.
- Voss, G. B., Sirdeshmukh, D., & Voss, Z. G. (2008). The effects of slack resources and environmental threat on product exploration and exploitation. *Academy of Management Journal*, 51(1), 147-164.
- Vrontis, D., Thrassou, A., & Lamprinou, I. (2009). International marketing adaptation versus standardisation of multinational companies. *International Marketing Review*, 26(4/5), 477-500.
- Walters, P. G. (1986). International marketing policy: a discussion of the standardisation construct and its relevance for corporate policy. *Journal of International Business Studies*, 17(2), 55-69.
- Wei, S. Y. P., & Yazdanifard, R. (2014). Comparison on the impact of standardisation and adaptation on international marketing. *Global Journal of Management and Business Research*.
- Whitelock, J., & Chung, D. (1989). Cross-cultural advertising: an empirical study. *International Journal of Advertising*, 8(3), 291-310.
- Whitelock, J., & Pimblett, C. (1997). The standardisation debate in international marketing. *Journal of Global Marketing*, 10(3), 45-66.
- Wood, S., Coe, N. M., & Wrigley, N. (2016). Multi-scalar localisation and capability transference: exploring embeddedness in the Asian retail expansion of Tesco. *Regional Studies*, 50(3), 475-495.
- Yoder, S., Visich, J. K., & Rustambekov, E. (2016). Lessons learned from international expansion failures and successes. *Business Horizons*, 59(2), 233-243.

## 4 How DC-SIP influences the purchase intention? Analysis of factors affecting perceived quality

*Annarita Colamatteo, Maria Anna Pagnanelli, Marcello Sansone*

*University of Cassino and Lazio Meridionale  
Department Economics and Law*

### Summary

This project aims to identify factors affecting quality perceptions of agri-food products by consumers in order to analyse which cues/attributes should be considered regarding the issue of differences in composition of seemingly identical branded food products because they play a relevant role in the construction of perceived quality, and therefore in the purchase intentions and decisions taken by consumers.

Despite being a complex topic, the concepts of quality and perceived quality play a relevant role in European consumption dynamics due to the multidimensionality of the characteristics and attributes of each product, in particular, agri-food products.

From the point of view of marketing management and consumer behaviour, quality seems to be linked to complex factors related to the satisfaction of consumer preferences that determine the decision to buy or not buy. Consequently, these variables go beyond the intrinsic or technical characteristics of the product.

Therefore, the concept of quality cannot be traced back to an objective dimension only, but to a connection between objective and subjective variables that determines the competitiveness of the food product. Over time, different approaches have been used to study perceived quality and its role in consumer purchase choices: the information economy approaches, multi-attribute approaches, hierarchical approaches, and integrative approaches.

One of the first approaches, developed by Nelson in 1970, is the information economy theory that divides products into *search* and *experience* on the basis of the effort that each consumer makes to find information: the quality of *search* product is measurable before the purchase through the acquisition of information whereas measuring the quality of the *experience* goods before the purchase is objectively impossible.

The second approach - the multi-attribute one - is an evolution of the information economy approach and considers that consumer evaluation is based on quality cues. This approach involves a distinction between intrinsic and extrinsic attributes: intrinsic attributes concern physical aspects of the product, their modification leads to a physical

modification of the product; extrinsic attributes are not part of the physical product (e.g. price, packaging, or brand).

The third approach - hierarchical approach - studies the quality concept from a subjective point of view by using the means-end chain, a tool for understanding how consumers establish the links between what they perceive about the physical characteristics of the products and the reasons that lead them to purchase.

Considering the previous approaches (information economy, multi-attribute and hierarchical ones), the Total Food Quality Model uses two dimensions to measure the food quality: horizontal and vertical dimensions. In the horizontal dimension the model divides the perceived quality process into two times (before and after purchase); the vertical dimension considers a distinction between intrinsic and extrinsic quality cues.

Lastly, the integrative approach divides the qualitative characteristics that contribute to defining an overall judgment of the quality of a product in quality cues and quality attributes. A *quality cue* is an attribute of the food product which can be perceived before purchase and consumption and which is believed to be indicative of its quality; *quality attributes* are those product attributes used by consumers to determine the quality after the consumption of the food product and can be divided into *experience attributes* - determined before and during usage (e.g. taste) - and *credence attributes* - based on beliefs (e.g. the product is a healthy one) (Tijssens et al., 2001). This model is based on the distinction of two different moments for the formation of the perceived quality: before the purchase the consumer perceives an expected quality through the quality cues, after the purchase, the consumer has a perceived experienced quality that he or she estimates through quality attributes (experience and credence attributes). The acquisition of a quality cue depends on a number of factors including the availability of time and the ability of the consumer to process the information, for example, on the basis of the cultural and educational level of the consumer.

Therefore, in order to understand the process of consumer perception of quality, it is important also to consider studies about consumer behaviour and the factors that influence the purchase motivations. Because of the complexity of studying consumer behaviour, it is difficult to make an exhaustive list of all factors that affect the consumer buying process of foods product, but it is useful to consider the four main types of factor influencing consumer behaviour: cultural, social, personal, and psychological.

Considering what has been discussed so far on the perception of quality in agri-food, the most appropriate approach to studying the issue of DC-SIP and the main factors to be included in the analysis seems to be the integrative one as it fully considers the process of purchase or re-purchase and cues, attributes, and external factors.

Therefore, it is important to understand which key cues/attributes to consider in the purchase of agri-food products and in the issue of DC-SIP.

For this purpose, the literature was reviewed to analyse models and factors used by the prevailing literature to study the concept of perceived quality for food products. The search was made on the Web of Science, using the keywords "perceived quality" and "food" as the topic of the paper. The analysis of the first 50 search results by relevance in terms of citations led to the identification of 6 key elements in cues/attributes of perceived quality: price, packaging and labelling, brand, origin, healthy, organic, and intrinsic factors.

These six factors are quality cues (intrinsic and extrinsic) before the purchase of the product which the consumer, through an inference process, uses to formulate an expected perceived quality.

The role of these six factors does not end after the first purchase or consumption of the product: those that were cues become attributes to determine the perceived quality experienced before a possible re-purchase; the intrinsic factors (which before the purchase were mostly visual) become taste or organoleptic characteristics linked to the tasting; the other 5 factors (credence ones) continue to play a key role in the construction of consumer perception of quality, which despite being experienced, remains a subjective perception construction. At each purchase and on the basis of each consumption, the quality attributes can be transformed and the effect on the level of perceived quality can vary.

The complexity of this phenomenon is linked to the fact that the factors (cues and attributes) systematically affect the perception of quality and therefore the intentions to purchase/re-purchase because each factor is correlated to the others (for example the brand influence, and is influenced by the price or the country of origin).

It is important to understand the role of each factor in terms of DC-SIP and how the eventual consumer information of the double level of quality will affect each factor and therefore the decision to purchase. The non-information of the consumer essentially certainly affects the intrinsic factors of the product. On the other hand, the information of the DC-SIP will affect the trust in the brand and - *depending on the reasons for the purchase* - the tribe effect of the brand, the country of origin, and the halo effect of the country, and the perception of food as being healthy. In other words, it could affect all the main credence attributes.

## 4.1 Introduction

This study analyses the factors affecting quality perception of agri-food products by consumers. The aim is to understand what the factors that should be considered in the issue of DC-SIP are, because their role in the construction of perceived quality and, therefore, in purchase intentions is relevant.<sup>30</sup>

Considering this objective, the first part of this study explains the theoretical background of the themes of quality, perceived quality, and the different approaches/models used by scholars to analyse these themes (Information economy approach, Multi-attribute approach, Hierarchical approaches, Integrative approaches, and the Total Quality Model).

A specific review of the literature is then carried out with the aim of analysing models and factors used by the prevailing literature to study the concept of perceived quality of food products. In particular, research is carried out on the Web of Science using the keywords "perceived quality" and "food" as the topic of papers, the first 100 papers in terms of citations are analysed and 50 papers are selected for their pertinence in the

---

<sup>30</sup> For a more detailed analyses of the impact of DC-SIP on consumers' purchase choices and welfare see Colen et al. (2019).

research area). This methodology leads to the identification of the main factors influencing the perception of quality of food products.

The complexity of the food product purchasing process generates the need to introduce even the most important concepts about consumer behaviour, with the aim of understanding which characteristics influence the purchasing intention of consumer, that is, the characteristics related to the person (personal, social, cultural, and psychological factors), factors related to the macro environment, and the context, motivations, and nature of the need.

This has led to realising that it is not only the organoleptic characteristics and raw materials (intrinsic cues/attributes) of a food product that influence consumer perception of quality and intention to purchase, but that a system of factors is involved and used by consumer as cues/attributes to estimate the product quality. The literature underlines the impossibility of generating an exhaustive and complete list of factors that determine consumer perceptions of quality and the impossibility of quantitatively measuring the weight of each factor on the perception of quality, especially when considered individually. In addition, the effect of the factors on the purchase intention of the consumer being a systemic one, which means that the factors both influence themselves and directly affect the perception of quality.

However, the proposed methodology has led to the main critical factors influencing consumer perceptions in the DC-SIP issue being identified. Beyond the organoleptic characteristics, price, brand, country of origin, health, organic, packaging, and labelling have been considered. A paragraph on each of them is presented in order to understand the role it plays in consumer behaviour and in the process of building the quality perception. Finally, why this is relevant to the DC-SIP issue is discussed.

## **4.2 Quality, perceived quality, and models: theoretical background**

The quality topic plays an important role in competitiveness of agri-food companies and in the consumption trend of the European market.

The definition of quality is still complex although it is a topic widely discussed in the reference literature (Ertekin and Aydin, 2010; Baker, 1995; Sumutka and Neve, 2011; Flynn, Schroeder, and Sakakibara, 1994; Hitt and Hoskisson, 1997). The main problem arises from the multidimensional nature of the concept and of the features and attributes of each agri-food product. Going beyond the legislation, the concept of quality seems to be the summary of images and characteristics of a product or service which could satisfy consumer needs. So the quality is strictly linked to consumer preferences through the decision to buy or not to buy taken by the consumer. While contributing to a clarification of the concept, none of the definitions can be considered to be exhaustive. In fact, they are simply analysed from different perspectives. One of the main definitions of quality is by Deming (1994): "*A product or a service possesses quality if it helps somebody and enjoys a good and sustainable market*".

The concept of quality is analysed from objective and subjective perspectives in economic and management studies. The physical characteristics of the product and their agreement from engineers and food technologists defines the objective quality. The quality perceived by consumers is the subjective quality. The economic importance of

quality lies in the connection between the objective and the subjective quality. In fact, the ability of producers to make the physical characteristics of product meet the wishes of consumers and the possibility of consumers finding the wished for qualities in the product determine quality as a competitive parameter for food producers (Grunert, 2005). Over time, studying the purchase choices in agri-food made by consumers, scholars have used different approaches (Grunert, 1997): the information economy approach; multi-attribute approach; hierarchical approaches; and integrative approaches. Each approach considers a product as a set of attributes (Lancaster, 1966).

#### **4.2.1 The information economy approach**

The information economy approach is one of the key concepts explaining the structural changes in the modern economy. This approach can be used to measure quality as the intensity of the attributes of a product. The analysis focuses on the discovery of these attributes in the presence of asymmetric information. The Market may fail when consumers cannot evaluate the attributes perfectly.

One of the main contributions to the development of the Information Economy Approach has been made by Nelson (1970). His model derives in part from that of Stigler (1961) according to which the consumer is involved in a search process that presents costs related to information research. He argues that the consumer stops searching for information on the product when the cost of the research equals the expected return.

Nelson divides products in *search* and *experience* on the basis of the effort that each consumer makes to find information. The quality of the *search* product is measurable before the purchase through the acquisition of information. On the other hand, *experience* goods are products whose evaluation of the quality before the purchase is objectively impossible. For this kind of good, the quality is evaluable after consumption. This category of good also includes those whose cost, linked to the search for information, is very high until it exceeds the product price, and products whose quality evaluation process is very complicated. Many products have both search and experience attributes. For example, search attributes are the price, the colour, and the appearance while the taste and the freshness are experience attributes.

The Nelson theory was extended by Darby and Karni (1973) who introduced a third type of attribute. Credence attributes are those whose existence cannot be verified even after consumption. Two typical examples of credence attributes are related to the animal breeding system (Intensive/non-intensive) or to the type of feeding (example: biological feed) (Darby, Karni, 1973). It is possible to divide the characteristics of search, experience, and credence products on the basis of the amount of costs that the consumer has to assess the quality before and after the purchase of the product (Krouse, 1992; Moser et al. 2011).

#### **4.2.2 Multi-attribute approach**

An evolution of the previous approach is that consumer evaluation of the product is based on the quality cues.

Olson and Jacoby (1972) distinguish intrinsic and extrinsic attributes. The former differs from the latter because they concern physical aspects of the product; their modification leads to a physical modification of the product. Examples of intrinsic qualities are colour, appearance, and thickness. The extrinsic quality cues are, for example, the price, the brand, and the country of origin.

In one of their studies, the two authors examined the importance that consumers give to attributes in order to judge the quality of a brand (Olson and Jacoby, 1972). The study highlights the greater importance given by consumers to the intrinsic attributes of products. However, this model does not consider the possible relationships between the various attributes and the possibility that the consumer can notice the presence of an attribute through the observation of another (Grunert, 1989).

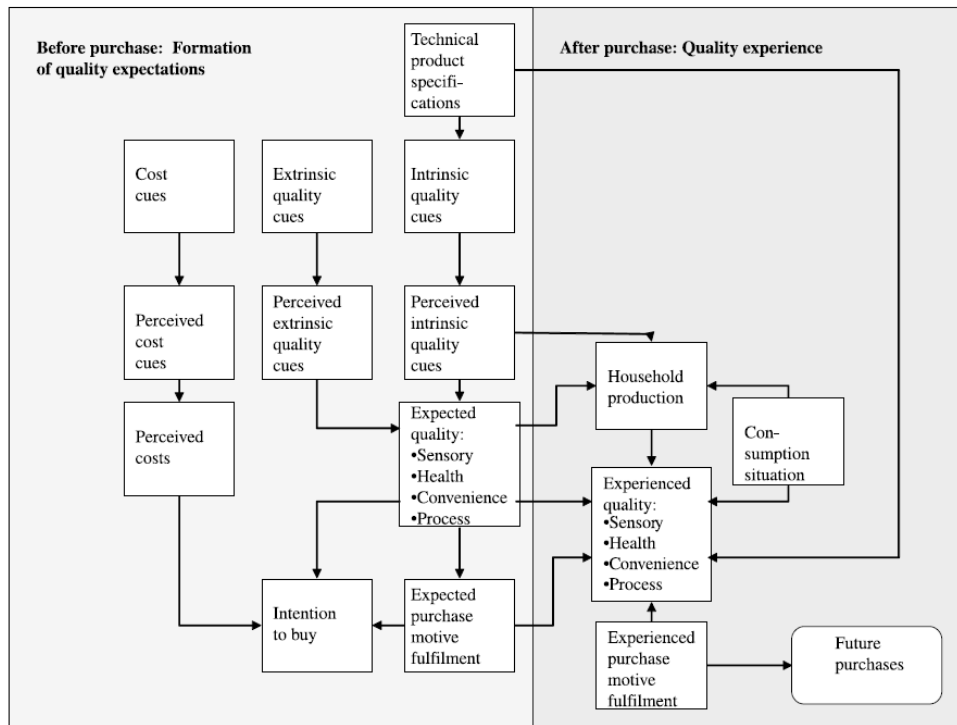
#### **4.2.3 Hierarchical approaches**

The previous approach provides insight into the quality perception process. The hierarchical approaches deepen the issue of quality perception and try to analyse quality from a subjective point of view. It is built on the *means-end chain*. The means-end chain is a tool for understanding how consumers establish the links between what they perceive the physical characteristics of the products to be and the reasons that lead them to purchase the product. More precisely, the construction of the hierarchical map of values requires the construction of the means-end chain, which highlights how "product characteristic (concrete or abstract) is linked to consequences (functional or psychosocial) of consumption, which in turn may be linked to the attainment of life values (instrumental or terminal)" (Grunert, 1997).

The means-end chain represents a conceptual model that interprets the decision-making process of consumers, relating product knowledge to self-knowledge, considered as the knowledge of the consumer needs by the same consumer (Gutman, 1982). The model assumes that consumers choose a product because of its ability to yield the desired effects, and indirectly to satisfy certain personal values. The attributes of the product represent the "means" that the consumer uses to reach a certain "end".



Figure 4-1: The Total Food Quality Model



Source: Brunsø et al. 2002

#### 4.2.4 Total Food Quality Model

The total Food Quality Model (Figure 4-1) is a model with two dimensions (horizontal and vertical), and was inspired by the approaches previously examined: the information economy approach, the multi-attribute approach, and the means-end chain.

In the horizontal dimension the model divides the perceived quality process into two times: before and after purchase.

Furthermore, it is important in this case to consider the distinction between experience and credence attributes. Focusing on repeatedly purchased agri-food products, it is therefore appropriate to make a distinction between two different conditions: first purchase and subsequent purchases. The two phases considered by the model – *before and after purchase* – represent a simplification. In fact, continuous purchasing may result in a change in quality perception by the consumer over time. The biggest change about quality perception occurs in connection with the first purchase. During the first purchase, consumer is influenced by informational cues only; it represents the first experience with the product and may cause changes in the perception of quality.

In the case of first purchase, the consumer considers the quality expectations through the observed characteristics (vertical dimension of the model). If the consumption experience corresponds to the expectations, there are the conditions for the consumer to repeat the purchase. In subsequent purchases, quality expectations originate from the consumer experience. The frequent consumption of a product results in the

activation of a learning process, which in fact allows for increasingly higher quality expectations.

About the experience attributes, they come from the situations of consumption that may change over the time. On the other hand, when the information about quality become available, the credence qualities attributes can always change causing a change in quality perception.

In the mind of a consumer quality has a dimension and a weight that change over the time. This quality dimension, affected by owner experience, acquires a greater weight through time. For example, the attributes of taste and healthiness in the pre-purchase phase may have the same weight in the mind of the consumer, but in the period after purchase and during consumption taste may have a higher weight than healthiness. The healthiness attributes are still conceptual and based on information.

The attributes defining perceived quality and the inference-making are also important in understanding the quality differentiation. Companies need to communicate the differentiated qualities to consumers; consumers need to evaluate quality by inferring from of several complex attributes.

#### **4.2.5 Integrative approaches**

These approaches are also based on the concept that the perceived quality of a product is a function of two distinct time phases: before and after purchase. Based on these two moments, Steenkamp (1989) divides the qualitative characteristics that contribute to defining an overall judgment of the quality of a product in quality cues and quality attributes. Before purchasing, individuals form an opinion of the quality of product, which is called 'expected quality', that is based on *quality cues* of the product. A *quality cue* is an attribute of the food product which can be perceived before purchase and consumption and which is used by consumers to build the perception of expected quality.

After purchasing and consuming the product, the quality perceived is called 'experienced quality'. In this case the quality perception is due by quality that can be divided into *experience attributes* - determined before and during usage (e.g. taste, freshness) - and *credence attributes* - based on beliefs (e.g. brand or country of origin).

The consumer proceeds to collect and categorise the quality cues (Steenkamp, 1989) that will serve to infer the quality attributes of the products. The quality cues are divided into intrinsic and extrinsic (Olson, Jacoby, 1972). The former differs from the latter because they concern the physical aspects of the product in the sense that their modification leads to a physical modification of the product.

The acquisition and categorization of quality cues depends on a number of factors including the availability of time and the ability of the consumer to process the information taken from the quality cues, which for example depends on the cultural and educational level of the consumer (Steenkamp, 1989).

The model of quality perception developed by Fernqvist and Ekelund (2014) combines the studies of Steenkamp and Van Trijp (1996), Steenkamp (1990), and Olson (1977), and clearly summarises what was previously observed. The model shows how the

product is perceived as a set of characteristics that are subdivided into intrinsic and extrinsic. Furthermore, it highlights how the "experiential" quality is formed, which is also influenced by quality expectations. Moreover, these expectations are formed through the process of inference of the intrinsic characteristics of the product, which occurs through the observation of the intrinsic quality cues, while the process of inference on the extrinsic characteristics occurs through the evaluation of extrinsic quality cues.

### **4.3 Consumer behaviour and purchase motivation**

Consumer behaviour is the research branch that studies the place, the reasons, and the manner in which people do or do not buy a product. Engel, Blackwell, and Miniard (2001) define consumer behaviour as 'those activities directly involved in obtaining, consuming, and disposing of products and services including the decision processes that precede and follow these actions'. Therefore, studying consumer behaviour is important for many reasons. It is important for any organisation before launching a product. It is also important to understand the constant changes in the standard of living, trends, fashions, technology, and consumer attitudes towards the purchase of products (Kumar, 2004). Understanding the variations in these factors is important because the marketing of a product mainly depends on these factors.

Before extending the models by including factors that influence consumer behaviour, it is useful to consider the role of consumer behaviour in the marketing process applied by companies. Companies use the information for example about the complex consumer decision making phase obtained through consumer behaviour studies to define marketing strategies, and then elaborate their sales forecasts. In general, companies study consumer behaviour in the market using a sensing process that helps them gain a competitive advantage (Rani, 2014).

Therefore, satisfying consumer needs and wants is the goal of organisations; this is one of the primary goals considered when in the realization of a product or a service, the organisation envisions that factors influencing consumer behaviour.

There are several factors that influence consumer behaviour in particular situation. Generally, consumers differ in age, income, instruction, tastes, and other factors. So consumers engaged in a purchase decision are influenced by these characteristics.

Consumer characteristics include four main factors that are mainly responsible for the different types of behaviours: education, gender, age, and income (Rani, 2014). However, it does not mean that consumers with the same education, gender, age, or income are similar because the influence of the psychological factors varies significantly from individual to individual.

So the four main factors influencing consumer behaviour are cultural, social, personal, and psychological one.

Cultural: Culture is the central factor in the wants and behaviours of an individual developed through socialisation processes with family and other key institutions. Cultural factors have a significant effect on the buying decision of an individual, such as religion or social class (De Mooij, 2010).

**Social:** Consumer behaviour is also affected by social factors such as family, reference groups, status, and social role (Rani, 2014).

**Personal:** Decisions taken by buyers are mainly influenced by personal characteristics such as age, gender, profession, income, and lifestyle (Rani, 2014).

**Psychological:** Psychological factors such as consumer perceptions, beliefs, motivation, and attitudes also have a significant impact on the buyer decision. Motivation is what will drive consumers to develop a purchasing behaviour. Perception is the process through which an individual selects, organises and interprets the information he receives in order to do something that makes sense, and belief is a conviction that an individual has about something. These general factors influence the choices of consumers during the purchasing process (Kassarjian, 1971; Schmitt, 2012).

Therefore, consumer behaviour is a complex, dynamic, and multi-dimensional process, and the environment where a person lives influences their consumer behaviour. So the external factors – such as cultural and social ones – do not affect the decision process directly but these are also instrumental and exert an influence on consumer behaviour. Studying the importance of the psychological process which the consumer goes through during the pre-purchase and post-purchase stages is emphasised by Engel et al. (2001), and it is important in a definition of marketing strategies. These authors study the buyer decision making process and the characteristics of individual consumers as well as groups trying to understand the wants and needs of people. Needs are what is necessary to survive; wants are things that are not necessary for survival but add comfort and pleasure to the life of consumers. The concept of consumer needs and wants is incorporated by Solomon (1996) into the definition of consumer behaviour: 'Consumer behaviour is the process involved when individuals or groups select, purchase, use, or dispose of products, services, ideas or experiences to satisfy needs and wants'. He introduces the idea that consumers may make purchase decisions to satisfy their needs and wants in groups, and not just simply as individuals. This is significant in understanding the role of consumer needs and wants in the purchasing process.

Focusing on the purchasing process of food products, many scholars identify other factors linked with those previously discussed, trying to complete the models on consumer purchase intentions. For example, Stávková and Turčínková (2005), in a study in the Czech Republic, state that routine behaviour (to satisfy the needs) is typical for purchases of breads, rolls, meat, milk, butter, eggs, and some beverages (mineral water, beer, tea, and coffee) while consumers seem to be influenced by other factors such as innovations and advertising when buying foods such as sweets and biscuits, yogurts, cheese, salami, canned meat products, semi-finished products, and some beverages (tea, wine, and mineral water). Consumers, who were strongly interested in their health, purchased cereal bakery products, fish, poultry, yogurts, cheese, and mineral water. When analysing the reasons for changes in consumption patterns, it was demonstrated that the reasons differed according to the affiliation with the individual groups of consumers. There were different reasons for individual social groups, individual age categories, and different localities. If it omits these identification groups, the most frequent reason for changes in consumption patterns in all categories of foods was a healthy lifestyle followed by a wider assortment.

However, because of the complexity of studying consumer behaviour, it is difficult to draw up an exhaustive list of all of the factors that affect the consumer buying process

for food products. Multiple factors are present and vary according to the reference context.

#### **4.4 Factors affecting perceived quality: review of the literature**

This paragraph reviews the literature while at the same time aiming to analyse models and factors used by the prevailing literature to study the concept of perceived quality for food products. In particular, a search was made on the Web of Science using the keywords "perceived quality" and "food" as the topic of the paper, the first 100 papers in terms of citations were analysed and 50 papers were selected on the basis of pertinence with the established research objective. The 50 papers analysed are grouped by factor of influence of perceived quality (Table 4-1).

Table 4-1: Factors affecting perceived quality

<b>Factors</b>	<b>Reference</b>	<b>Product</b>	<b>Effect</b>
<b>Price</b>	Hansen (2005)	shrimps, cheese	+
	Machin, Gimenez, Vidal, Ares (2014)	food	+
	Acebron, Dopico, (2000)	beef	+
	Gilg, Battershill (1998)	agrifood, direct sales	+
	Stavkova, Stejskal, Toufarova (2008)	commodity food	-
	Aschemann-Witzel (2018)	food	-
	Lusk, Crespi, Cherry, Mcfadden, Martin, Bruce (2015)	food	+
	Just, Sigirci, Wansink (2014)	food	-
	Grunert, Bredahl, Brunso (2004)	meat	+
	Grunert, Valli (2001)	beef and yogurt	+
<b>Packaging and labelling</b>	Achilleas, Anastasios (2008)	organic food	+
	Magnier, Schoormans, Mugge (2016)	raisins, ch. bars, coffee	+
	Caporale, Monteleone (2004)	beer	+
	Lange, Issanchou, Combris (2000)	orange juice	V
	Dorneyi et al. (2016)	food	V
	Altintzoglou, Heide (2016)	Norwegian fish	V
<b>Brand</b>	Soberman, Parker (2004)	private labels	+
	Ha, Jang (2010)	ethnic food	+
	Ness et al. (2010)	organic food	+
	Fernqvist, Ekelund (2014)	food	+
	Ozsomer (2012)	food	+
	Anselmsson, Bondesson (2013)	food	+
	Fandos, Flavian (2006)	olive oil and ham	-
	Aurier, De Lanauze (2012)	ice cream, frozen meals	+
	Grunert, Bredahl, Brunso (2004)	meat	+
	Grunert, Valli (2001)	meat and dairy	+
<b>Origin</b>	Aprile et al. (2016)	local food products	+
	Espejel, Fandos, Flavian (2009)	jamon de teruel (pdo)	V
	Bronnenberg, Dhar, Dube (2007)	local branding	+
	Krystallis et al. (2007)	Greek meat	+
	van der Lans et al. (2001)	extra virgin olive oils	+
	Acebron, Dopico (2000)	ternera gallega beef	-
	Chryssochoidis, Krystallis, Perreas (2007)	Greek food products	+

	Fernqvist, Ekelund (2014)	food	+
	Ozsomer (2012)	food and no food	+
	Moskowitz et al. (1997)	turkey	V
	Grunert, Bredahl, Brunso (2004)	meat	+
	Grunert, Valli (2001)	meat and dairy	+
<b>Healthy and organic</b>	Hansen (2005)	shrimps and cheese	+
	Fernqvist, Ekelund (2014)	food	+
	Krystallis, Maglaras, Mamalis (2008)	functional foods	+
	Barrett, et al. (2007)	organic tomatoes	+
	Olsen, Slotegraaf, Chandukala (2014)	green new products	+
	Lee, Hwang (2016)	organic food	+
	Hidalgo-Baz et al. (2017)	yogurt chocolate	+
	Williams, et al. (2012)	fruit and vegetables	+
	Lombardo, et al. (2017)	early crop potatoes	+
	Grunert, Bredahl, Brunso (2004)	meat quality	+
	Grunert, Valli (2001)	meat and dairy	+
<b>Intrinsic factors</b>	Espejel, Fandos, Flavian (2009)	jamón de teruel	+
	Krystallis, et al. (2007)	Greek meat	+
	Acebron, Dopico, (2000)	beef	V
	Jover, Montes, Fuentes (2004)	red wine	+
	Fandos, Flavian (2006)	pdo product	+
	Chamhuri, Batt (2015)	fresh meat and fruits	+
	Martinez-Carrasco et al. (2012)	tomatoes	+
	Coelho, et al. (2015)	fruits wine	+
	Ikeda, Nagai, Sagara (2004)	green tea beverage	+
	Gan, Yan, Linforth; (2016)	cheddar cheese	+
	Anacleto (2014)	bivalve molluscs	+
	Grunert, Bredahl, Brunso, (2004)	meat	+
	Grunert, Valli (2001)	meat and dairy	+

+ indicates a positive effect on perceive quality, -indicates a negative effect, V indicates an undetermined effect

Source: the authors

#### 4.5 Critical factors in the DC-SIP issue: how do they influence the purchasing process?

The analysis of the literature and the topics presented highlight the complexity of consumer behaviour in the purchase of food products. In fact, when the consumer decides to buy a specific product, he is primarily influenced by characteristics related to



the person (personal, social, cultural, and psychological factors). Furthermore, he is influenced by other factors related to the macro environment and the context. The role of the motivations that lead the consumer to the purchase is also important in understanding the nature of the need that determines the purchase (for example, within Maslow's hierarchy of needs) or what wants the consumer has and the advantages they seek.

All this makes it impossible to generate an exhaustive and complete list of factors that determine consumer perceptions and how perceived quality is constructed.

Certainly, the present research shows that even after the first purchase, consumer perception of the quality of a product is not only influenced by intrinsic attributes and the organoleptic characteristics of the product, but a series of credence attributes are involved that the consumer uses to estimate the product quality.

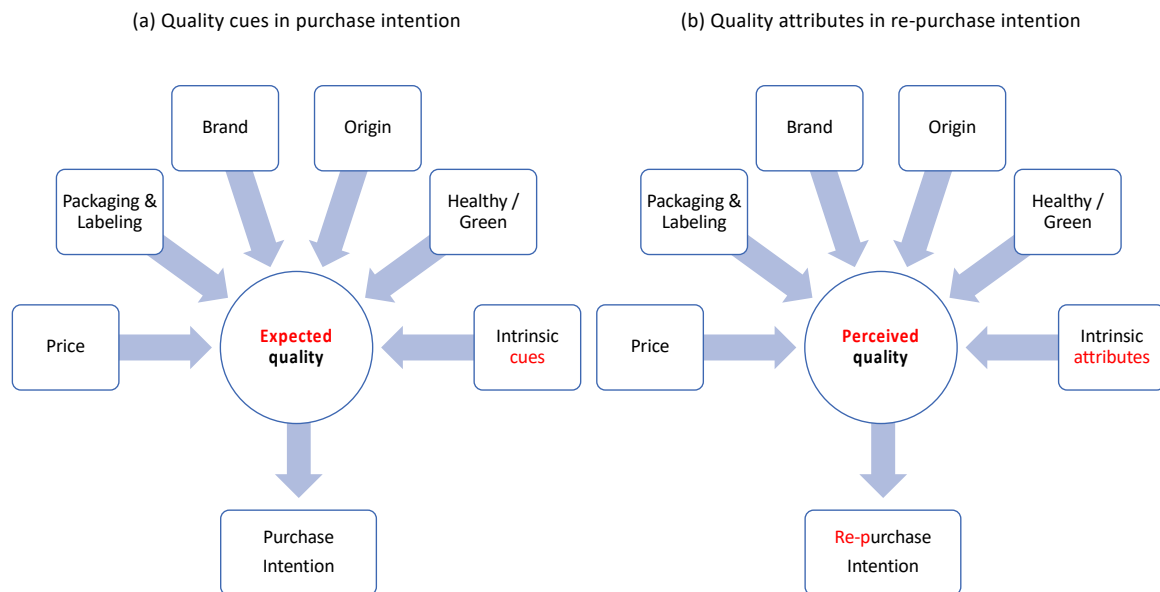
The methodologies used in the reference literature highlight the impossibility of quantitatively measuring the weight of each factor on the perception of quality, especially when taken individually. The effect of the factors on the purchase decision of the consumer is systemic, which means that as well as directly influencing the perception of quality, the factors influence themselves.

In analysing the problem of DC-SIP, it is important to consider what the main factors that influence the perception of quality by the consumer are, using the literature to understand the role they assume in the process of purchasing food products.

The literature review about the models to analyse the perceived quality (Tab. 1) is used to select the factors affecting the quality in agri-food products, in the first purchase, and in the re-purchase phases.

In the case of first purchase, the perceived quality is estimated by the consumer through intrinsic cues (mostly visual) and extrinsic cues (price, packaging and labelling, brand, origin, health, and organic) (Fig.2). In contrast, in the case of re-purchase, the quality perceived by the consumer becomes experienced, the intrinsic cues become intrinsic attributes such as taste or organoleptic characteristics linked to the tasting. The other 5 factors continue to play a key role in the construction of consumer perception of quality, which despite being experienced, remains a subjective perception construction (Fig. 3).

Figure 4-2: Quality cues for purchasing decisions and quality attributes for agrifood product re-purchasing decisions



#### 4.5.1 Price

The company uses the price to summarise the value built for the consumer. Having the consumer as a reference, the company should first reflect on price sensitivity and on the variation in demand when there is a price change. The setting and formulation of price policies related to the determination of consumer value must be based on a preliminary analysis of the value. The value is relative because it is continuously subject to comparison with competing product offerings; it is dynamic because the perceptions that determine it are subject to constant change; and it is multidimensional because it consists of a set of heterogeneous factors that are summarised in costs and benefits. From the point of view of the consumer, the price is a major factor impacting on purchases that also influences decisions in store (Dolekoglu et al., 2008; Batra, Sinha, 2000; Pauwels, Hanssens, Siddarth, 2002; Ailawadi, Pauwels, Steenkamp, 2008; Danziger, Hadar, Morwitz, 2014).

Perceived price is what the consumer sacrifices for the purpose of acquiring a product (Zeithaml, 1988). Consumers may know the exact price of a product purchased or just remember (encode) - *in relation to a past purchase* - whether it is expensive or inexpensive.

The consumer also assesses non-monetary costs to estimate the quality of product before paying the price asked. It is possible to categorise non-monetary costs in time, search costs, convenience, and brand image; the combination of these non-monetary costs and monetary costs affects the perceived sacrifice made by the consumer.

Studies of price and willingness to pay for food products can be divided into two branches: the econometric tradition and the consumer behavioural tradition.

The econometric tradition - *that represents an objective view on price and price reactions* - considers the price elasticity starting by analysing purchase statistics and measures the willingness to pay using the consumer responses to different price levels

(Lee, Hatcher, 2001). This approach can be used to investigate how consumers respond to changes in market conditions.

The consumer behavioural tradition is a subjective view of price and price perceptions. It is focused on consumer behavioural studies and it aims to find the reasons for consumer reactions to changes in market and price conditions.

The Total Food Quality Model (Grunert, 1997) considers the purchasing intention as effected by price perception and information processing. In fact, even if two consumers perceive the same cost cues in the market place, they may not infer the same cost from the cues; it is due to different factors such as brand loyalty, planning behaviour, and price involvement. Therefore, this model considers two features affecting the price information processing: cue perception process and price integration process. The first concerns price cognition (how the consumer perceives price), the second concerns the willingness to pay (how consumers evaluate perceived price).

Price is one of the attributes in which the systemic view and the self-influence of factors is very evident. Considering the DC-SIP, the sensitivity to price and the reaction of the demand to the price are certainly influenced by the purchase reasons: it can be assumed that if the consumer buys for *want* reasons, they are willing to pay a higher price. If the consumer buys a product not only for its intrinsic characteristics, but - for example - for the perception of the country of origin of the product, for the global values that the brand communicates, or for belonging to a tribe, the weight of the price on the intention purchase is reduced compared to the purchasing process of a consumer who buys the food product for *need* reasons.

#### **4.5.2 Packaging and labelling**

The role of packaging as a communication tool able to influence consumer purchasing behaviour is highlighted in various researches in the food sector (Pomarici, 2003, Bland, 2004). The packaging value perceived by the consumer is also based on a set of intangible elements - brand, information (advice for the preparation and use of the product, ingredients, etc.), service (recyclability or possibility of reuse of the packaging after use, mono-portion packs, etc.) - by which packaging assumes a fundamental role.

In its communicative function, packaging can be analysed from several perspectives. In the sociological field, some authors (Mauss, 1985, Levi-Strauss, 1979, 1992) recognising in the consumption a particular form of language and therefore also different purposes from that of the satisfaction of individual needs - have also interpreted packaging as a communication tool (Douglas and Isherwood, 1984; Di Nallo, 1984; Paltrinieri, 1998; Parmigiani, 1997; Floch, 1992, 1997; Codeluppi, 1992, 2002). Another important contribution comes from semiotics studies, which analyse the signs and related communication processes (Eco, 1975; Ferraresi, 1999; Pastore and Vernuccio, 2003) and whose application to packaging has recently been extended to market research, as in the case of tobacco (Musini, 2005) and wine (Violoni, 2004). In this context, packaging allows a multi-sensorial and bi-directional communication between an issuer and a receiver.

Even marketing studies not only highlight its technical-logistic role (containment, protection, transport, conservation), but also the communicative (Collesei and Ravà,

2004) during different times and places of the purchase and consumption activity. By using colours, images, dimensions, shapes, words, etc., the packaging can communicate to consumers before, during, and after the experience of purchase and consumption, influencing the quality perception of the consumer.

In general, the packaging has evolved from a stage when, while respecting certain aesthetic and functional characteristics, it was a mere container of the product to become a strategic driver of the marketing and sales policies of industrial and commercial enterprises. The packaging is one of the main factors promoting connection between product, brand, and the consumer. The capabilities of the package go beyond those of a simple container to include: effectiveness in communication; efficiency in size; impact resistance; sustainability; recyclability; and flexibility. The challenge for the consumer goods industries is to design effective and attractive packaging, taking into consideration the identity of the modern consumer and the dynamics of purchasing and then integrating the creation of the packaging into the process of product development (Silayoi, Speece, 2004; Kuvykaite, Wells, Farley, Armstrong, 2007; Dovaliene, Navickiene, 2015).

The packaging is strongly related to the product label. The modern consumer needs to access information related to production and/or distribution processes that are often not tangible (organic products, fair trade, product traceability, etc.). This kind of information allows the basket of characteristics that identify the product and the quality of the agri-food goods to be evaluated (Lancaster, 1971; Aprile, Annunziata, 2006). Without other information, during the purchasing decision process, labels become a tool of acquiring information and guiding purchase choices. In fact, there is a relationship between the objective characteristics indicated on the label and the reactions of consumers (Cavicchi, 2008, Bialkova, 2010; Grunert, 2011; Di Pasquale, 2011; Veneziani et al., 2012; Vianelli et al., 2012, Siriex et al., 2013).

Each label is composed of a set of characteristics that convey information about the product. However, the space available to companies is limited by the dimension of the package as well as by the current legislation.

Currently, in the modern globalised market, these kinds of uses can be partially overcome thanks to the possibility of using Mobile Marketing services such as QR codes (Quickly Response). It combines the possibility of providing information with that of promoting and enhancing the product and/or the brand. This system as applied to food labels becomes a tool for knowing all the information about the product and the company that could not be included on a label (e.g. place of origin, history of the producer, production/breeding/cultivation techniques).

In general, the information contained on the label influences the consumer perception of quality by using both the direct information required by law (e.g. place of production, ingredients, information on the production process), and additional information chosen by the manufacturer (e.g. organic, gluten free, fair trade, exclusion or inclusion of particular ingredients). These aspects certainly have a significant impact on the perceived quality level and, therefore, on the purchase decision. Again, the systemic correlation between the various cues that determine the perception of quality emerges. In the case of DC-SIP, the packaging and the label certainly have the role of communicating the intrinsic characteristics and raw materials of the product, the brand and the values it conveys (possibly to generate the effect of belonging to a tribe), the

nation of origin, and the production process. However, it also becomes important for the problem of perfect information: in fact, the packaging and the label can also be used to communicate any differences with the products marketed in other countries to the consumer (how? using specific marks or signals on the packaging?). In any case, it would be important to understand what would change in consumer purchase intentions in the case of perfect information. However, it seems complicated to imagine the effects without specific empirical analyses that directly involve consumers and that also include the contextual elements and the consumer purchase motivations. It can be assumed that if wants motivations linked for example to the halo effect (about COO) or to belonging to a tribe are being referred to, the communication of characteristics that make the product different from the original can modify consumer purchase intentions.

### 4.5.3 Brand

The growing importance and complexity of the concept of brand have been highlighted in recent decades by the large number of definitions proposed and research aimed at identifying the factors and the values of a brand. As defined by the American Marketing Association, the brand is "*[a] name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers.*" Kotler (2002) provides a definition of brand similar to that just described: "*a name, term, sign, symbol or design, or combination of the same, used to identify the products or services of a seller or group of sellers and distinguish them from those of their competitors,*" and twenty-five years ago Aaker (1991) defined the brand as "*[a] set of assets (or liabilities) linked to a distinctive sign (brand, name, logo) that is added (or subtracted) from the value generated by a product or service.*"

The brand is defined as a multidimensional and complex concept as it integrates the culture, corporate values, and the value proposition that should inspire every expression of the enterprise consistently and continuously (Arnold, 1992).

Brand identity is based on the brand core purpose and its core values, which provide a system of guiding principles (Collins, Porras, 1996). Aaker and Joachimsthaler (2000) identify three dimensions of brand identity:

- *brand essence*, which reflects the promise made to the consumer based on functional benefits, symbolic or emotional, and represents what the brand wants the market to identify;
- *core identity*, the identity composed of all values based on the mission and the strategic orientation;
- *extended identity*, the additional attributes that do not concern the core, but rather specify the meaning.

The relevance of the brand is in its function connecting consumer and enterprise. However, it can highlight features and benefits related to the company and the consumer. Through an appropriate strategy of brand management, the company obtains identification and protection of their products or services through differentiation and consumer recognition. A company uses its brand to capitalise on its investments which accumulate over time into significant asset value.

Considering the models aiming to analyse perceived quality, as previously stated the Total Food Quality Model asserts that before purchasing, consumers base their product expectations on available information. In many situations, consumers could benefit from more information about different quality aspects when they take decisions about purchasing or repurchasing food products. The possible ways consumers may find further information about a food product are the labelling, and generic marks and brand names; in fact, distinguishing between mandatory label, brands, or generic marks allows differentiation between many different labels.

Furthermore, the role of brands and generic marks derives from the degree of perceived risk associated with the purchase. Lastly, the brand or generic mark must be perceived as being reliable. The reliability of a brand is mainly related to its history (if it has been in existence for a long time) and its likelihood of being linked to a high level of quality. All of these elements can be summarised within the concept of brand reputation. In addition, the brand reputation plays an important role in the quality perception process. In fact, several studies demonstrate that international brand image or reputation is certainly related to quality (Bauer et al., 2007). Brand image is defined as the understanding an individual believes to be true about a certain brand (McDaniel et al., 2012). A good reputation is also built up through experience and the history of the brand.

Considering the DC-SIP issue, among all of the numerous and relevant functions that the brand carries out, it is important to highlight the role of the brand as a symbol of belonging to a "tribe". In fact, some consumers choose to purchase a specific product because it is marketed with a brand that allows them to belong to a community. In the literature various definitions are used to describe these groups of consumers, named brand communities, brand sub-cultures of consumption, or brand tribes (Fournier 1998; Cova and Pace 2006; Bazaki and Veloutsou 2010). Although brand tribes are not always so formal, their participants often have a sense of togetherness and belonging (Hamilton and Hower 2010).

In this case, the motivations for the purchase of the product by the consumer exceed the simple *need* to be satisfied and move towards the top of Maslow's hierarchy of needs, towards *want* reasons. It can be assumed that changing the characteristics of the product and the level of information of the consumer has an effect on the trust in the brand that is considered to be a global brand. Therefore, this could reduce the intention to purchase the product which no longer represents a product equal to all the others in the world and cancel the effect of belonging to a tribe.

#### **4.5.4 Origin**

Through the years the international economic and marketing literature has deepened the issue of the country of origin of the product as a variable influencing the decision-making processes of consumers during the purchase phase (country of origin effect) (Usunier, 2006; Rosenbloom and Haefner, 2009).

The first studies are characterised by a single-cue approach: they study the effects of the country of origin (COO) of the product on consumer choices without considering other variables of consumer behaviour.



Studies then moved on to a multi-cue approachable to assess the impact of the country of origin in relative terms. The variable country of origin encompasses a multiplicity of factors that influence the purchasing decisions made by consumers.

With the strengthening of the dynamics of global market in recent years (such as the growing competition from emerging economies and the research of cost savings through the standardisation of production processes), the concept of country of origin is used as a strategic key by the companies to gain competitive advantage.

Nowadays new research trends reformulate the concept of country of origin in more modern terms, that is, as *country image*, *brand origin*, and *place of origin*, offering ideas for further interesting branches of research.

Schooler (1965) is the first author who analysed and attempted to prove the tangible effects of country of origin of products on consumer behaviour.

However, the first studies of COO intensify the effects of these factors, the nation of origin of the product being the only suggestion (cue) on which the respondents based their evaluation. In fact, the more numerous the attributes included in the model, the more moderate the effect of the country of origin of the product is (Johansson et al., 1985; Ettenson et al. 1988).

Thanks to the meta-analysis developed by Peterson and Jolibert (1995) on 52 publications concerning the COO effect, it was possible to quantify the differences between the two different approaches. With regard to the assessment of consumers on the perceived quality of the product, the average effect of the country of origin in single-cue studies affects 30% while in multi-cue studies this effect is reduced to 16%. Furthermore, the result obtained considering the effect of the country of origin on purchase intentions is interesting because even in this case the effect is reduced from 19% to 3% when the origin is evaluated in combination with other attributes.

A more recent study (Usunier, 2002) explains the reasons why the COO effect is less significant than was initially assumed. In order to have some influence on the purchasing process of the consumers, the consumer has to consider relevant information on the origin of the product in relation to his choice (and this varies according to the category of product considered). Furthermore, the importance attributed to the origin of the product must be such as to induce the consumer into investing time in researching and comparing products with different origin. In other cases, when high psychological involvement in the purchase phase is lacking, information on the country of origin is often overshadowed by other characteristics such as price, brand, and warranty.

Even if the COO effect is reduced according to this second branch of studies, that the phenomenon is analysed in more depth. Studies have addressed the many variables related to the product, to the consumer, and the reference economic environment.

Obermiller and Spangenberg (1989) argue that the relationship between COO and behaviour of foreign consumers is due to three main components that interact with each other: the cognitive, the affective, and the normative spheres. In the cognitive component, the country of origin (or its image) acts as an indicator of the quality of the product and of its individual attributes (e.g. reliability, design, etc.). More specifically, information on the country of origin of the product can have two effects (Han, 1989): *the halo construct* and *the summary construct*. The halo effect acts when the consumer



has not gained any direct experience with goods coming from a country, they only have a generic image of that country (for example, information about the economy, social, and political situations, cultural status, etc.) on which they evaluate before purchasing.

The halo-effect corresponds to a process in which additional product information is disregarded or missing and where the impact of the COO on the overall product evaluation is indirect and relatively weak (Hossain, 2015). In this case the country of origin is defined as a halo that people are not familiar with and use it as an indicator for product evaluation. This shows that when people have little knowledge and information about products, they use country of origin as indirect evidence. So, consumers use country of origin as an alternative for the performance of the product while they their experience of products in a same country of origin is unsafe (Rezvani, 2012).

On the other hand, the summary construct is based on previous experiences with products from that country which, through a process of abstraction, allow the consumer to formulate a personal evaluation.

There is an emotional component when the country of origin of the product can evoke an affective value in the consumer (e.g. after a holiday spent in that country) or a symbolic value (e.g. when the image of the country is associated with a certain national identity or social status).

Finally, in the normative component, the purchase is linked to being willing or not willing to support the economy of a given country based on the level of sharing of its policies and conduct.

There are numerous variables that influence the intensity of the effects of COO. Valdani and Bertoli (2010) formulate a classification of different variables referring to various aspect:

- variables that qualify the consumer;
- variables that concern the product and/or the country of origin;
- variables linked to brand.

The aspects most investigated in the literature regarding the first category are the demographic and cultural characteristics of the consumer (age, sex, income, educational level, degree of ethnocentrism, etc.).

Many studies underline the relationship between income and education and the preference for foreign products but this relationship tends to reverse in terms of age. This can be explained by the greater propensity of young or more educated people to interact with different cultures than their own (Shimp and Sharma, 1987; Smith, 1993; Bailey, Pineres, 1997; Ahmed, d'Astorus, 2004).

There does not seem to be any unequivocal opinion on the effect produced by the consumer genre: some studies say that men prefer to buy domestic products (Johansson et al., 1985, Ettenson et al., 1988); other studies do not find any obvious correlation (Anderson, Cunningham, 1972).

Again, other researches deepen the role of patriotism (Han, 1988) and ethnocentricity (Shimp and Sharma, 1987; Brodowsky, 1998; Balabanis, Diamantopoulos, 2004) by consumers who tend to prefer national products over others regardless of other

features. This propensity can induce consumers to overestimate the quality of domestic products and to underestimate the quality of foreign goods (Watson, Wright, 2000).

Therefore, it is important to underline how the level of ethnocentrism of a country, greatly influences the marketing strategies that foreign companies have to adopt if they want to enter this market. If there are high levels of "resistance" to foreign products, companies that want to include the segment of ethnocentric consumers have to reduce the emphasis on the origin of the product and stress other qualitative characteristics in their offer. Other aspects studied in the literature concern the level of involvement and the perceived risk in the purchasing process. Some authors argue that the more the purchase is considered to be important, the less importance seems to be given to the country of origin of the product because more attention is given to all the other attributes of the good (Ahmed, d'Astous, 1993). With regard to the risk perceived in the purchasing process, the consumer perceives a lower risk if they buy goods from their own country (Lumpkin et al., 1985).

Finally, some studies highlight the relevance of the COO effect on consumer behaviour according to the phase of the decision making. In particular, as the qualitative perception of the product moves towards the real purchase intention, the importance of the country of origin tends to decrease. It is possible to explain these differences by considering the complexity of the concepts of perceived quality and purchase intention. In fact, the latter is influenced by a greater number of variables (e.g. price, guarantee, disposable income, availability, etc.) that reduce the effects of the COO (Verlegh and Steenkamp, 1999).

When the socio-demographic characteristics change, the results of the analysis on the intensity of the COO effect can change significantly, there by conditioning a possible generalisation of the totality of consumers in a country (Sharma et al., 1995; Wetzels et al., 1996).

From an economic, political, and cultural point of view, the image of a country is able to influence the purchasing intentions of a foreign consumer regardless of the judgment of the quality of the products (Wang and Lamb, 1983).

Regarding the image of a country, some studies argue that consumers express evaluations and judgments by using a "hierarchy between countries" built in their minds. This scale is constructed by considering the level of economic development of the country (Manrai et al., 1998; Ahmed and d'Astorus, 2004).

Furthermore, the effect is greater when referring to products of country with a particular production tradition (e.g. Italian fashion, French perfumes, Swiss chocolate, etc.) (Baumgartner and Jolibert, 1977; Roth and Romeo, 1992).

The effect of the COO is not equal for all types of products. Therefore, a country can be appreciated for some types of goods and not for others.

Several authors have noted how the effect of the country of origin increases as the technological complexity of the product increases (Kaynak and Cavusgil, 1983; Hadjimarcou and Hu, 1999; Ahmed et al., 2004).

However, companies can take advantage of the effects of the COO if they are combined with promotional and communication policies in order to enhance their image (Bradley, 2001).

Another theme concerns the relationship between country of origin and product life cycle. In marketing campaigns, the reference to the origin of the product produced by company is emphasised more often in the early stages of the life cycle, especially in the "go to market" phase while it tends to lose importance in the phases of growth and maturity (Niss, 1996).

The main reason to aim for a COO strategy compared to a brand-focused strategy in the "go to market" phase is due to focusing on the country of origin being more immediate and results in a quicker return on sales. Over time, once the product has become well known in the target market, the company will progressively move towards marketing using a brand strategy.

Another aspect that is discussed in the COO studies is the relationship between product brand and country of origin. The importance assumed by the brand in the consumer perception process induces scholars to investigate this issue from various perspectives. Han and Terpstra (1988), Wall et al. (1991), and Tse and Gorn (1993) argue that the country of origin has a greater impact than the brand in the purchasing process. However, other scholars (Ahmed et al., 1994; Verlegh et al., 1999) consider the effect of the brand to be more relevant than the COO effect.

This discussion on the role of the country of origin involves all of the other factors (brand, price, packaging, labelling), again demonstrating a close correlation between them. The research presented clearly shows that COO has an effect on the purchase intentions of the consumer; the effect may derive from real and direct knowledge of the country consumers have or from the halo effect that the country generates. Therefore, consistently with the other factors, it can be assumed that if in the case of DC-SIP, the product recipe, the raw materials, or even the entire country of production is modified and communicated to the consumer, the COO or halo effects change. On the other hand, if the consumer is not informed of the differences, he or she starts from a presumption of equality of the product linked to trust in the brand and to the values the country of origin evokes.

#### **4.5.5 Healthy and organic**

The perception of health is very extensive and can be approached from different scientific perspectives including psychological, social, nutritional, and medical ones. From a consumer point of view, health includes two main dimensions: eating healthily and staying away from unhealthy foods. The first dimension, eating healthily, is related to nutritional aspects such as a healthy diet, functional foods, less oily foods, and other factors related to health and nutrition. The second dimension, avoiding unhealthy foods concerns food security.

Both health dimensions express qualities of the food that consumers cannot evaluate or judge by themselves.

It is useful to present examples from several studies that explain the role of the perception of food health in the consumer perception of quality. A study of consumer perceptions of fish and motives for purchasing (Nielsen, Sørensen & Grunert, 1997; Valette-Florence, Sirieix, Grunert & Nielsen, 2000) highlights how *healthiness and physical well-being* is one of the most significant reasons why these consumers buy

fresh fish. According to these consumers, the fact that fresh fish is an *untreated product* (a natural product), contains *vitamins and minerals*, and is *low in fat* are all attributes which contribute to *healthiness and physical well-being*. In a study of apples (Bech-Larsen, 2001), respondents were asked to mention differences between apples and alternative foods. The results of the study demonstrate that *organic/not sprayed* and *vitamins* all contribute to the feeling of being *healthy* and *not ill*, leading to a *long, healthy life, a good feeling, and a high life quality*. The examples presented also underline the fact that health due to food is subjective.

As with the quality dimensions (health) presented above, organic cues of product also represent another factor that refers to perceived quality. Food safety, human health, and environmental concerns along with physical attributes such as nutritive value, taste, freshness, and appearance affect organic food consumer preferences. (Shafie & Rennie 2012). Consumers also associate organic food with ordinary processes, care about the environment and animal welfare, and the non-use of pesticides and fertilisers. Increasing attention to organic food has encouraged many studies to compare aspects of organic against conventional food in terms of human health, food safety, and environmental concerns along with other sensory attributes such as nutritive value, taste, freshness and appearance. (Barrett et al. 2007). Although physical estimations on whether organic food tastes better than conventional food have yielded inconsistent results (McEahern and McClean, 2002), many consumers believe that organic food tastes better (Roitner-Schobesberger et al, 2008). Therefore, consumer perceptions about organic food are highly subjective.

This factor is also important for DC-SIP because the variation of the ingredient or recipe by the company (and any communication to the consumer) can generate a variation in the perception of quality, health and safety, impacting on the purchasing intentions of the consumer.

#### **4.5.6 Intrinsic factors**

The selection of this factor aims to include the main intrinsic elements of the perceived quality of the food. In fact, most of the studies analysed considers specific organoleptic properties/ingredients depending on the category of product being analysed.

For example, in analysing the perceived quality of beef, Brunsø et al. (2002) found the following to be Intrinsic quality cues: cut (steak, roast, cubed, minced), colour (light red, medium red, dark red for roast and steak, lighter red and darker red for cubed and minced), fat lumps (major, minor), fat rim (yes, no), marbling (high, low), and fat content (high, low).

Therefore, these aspects are complex and cannot be generalised because they are closely related to the type of product that the consumer intends to purchase.

In any case, it is important to introduce a factor that summarises the intrinsic quality cues to highlight that the visual, olfactory, and tactile elements of the product in each specific case play an important role in the formation of quality perception and therefore in the possible evaluation of the DC-SIP.

## 4.6 Conclusions

As seen, discussion of the DC-SIP considers the literature and research on product standardisation and differentiation and on the cues/attributes that determine the concept of quality perceived by consumers.

In the hypothesis of different products in different countries, it is also necessary to reflect on the motivations that could cause a company to communicate or not communicate these differences.

Certainly, the first problem would be linked to "how" to communicate differences to consumers on product packaging or through institutional advertising. In any case it would be necessary to hypothesise a tool that can be applied easily.

In addition to the tool, the motivations that could exclude the will by companies to communicate differences between products and the effects of communication on cues and on perceived quality must also be evaluated.

The previous discussion on quality cues for purchasing decisions shows that providing consumers with information about the product not only affects the perception of intrinsic factors, but can also impact on all the credence cues and ultimately on the perceived quality.

In this process, the brand and the consumer purchase motivations play a primary role. For example, consider the case of a brand recognised by the consumer as a global brand, to which he associates values of belonging to a tribe that go beyond the spatial boundaries between territories. In this situation the company will have no interest in communicating that the ingredients or the recipe of the product are different in the different markets since what could be a simple variation linked to the strategies of differentiation of the company can also have a negative impact on the value of the brand and be interpreted as a betrayal by the company that proposes a global brand but not a global product.

Similar considerations can be made with reference to the attribute of origin. The COO of a product itself conveys values linked to the cultural aspects of the nation. Among these are certainly the recipes and methods of production of the products. Therefore, the communication of a variation of these can annul the halo effect of the country of origin and reduce trust in the brand and in the "made in" that it communicates.

Still, in the same way communicating differences to the consumer can impact on the perception of health of the product. In this case, the reduction or increase in the quantity of an ingredient or the change in one of the raw materials could be interpreted by the consumer as a variation that increases the danger or in any case reduces the wholesomeness of the agrifood product.

Therefore, in general, if it refers to wants-like purchase motivations in which the extrinsic attributes have a revealing role, the company could be unwilling to communicate to the consumer the variation of ingredients and recipe (intrinsic attributes). In fact, this can negatively impact on the perception of price, of health, of origin, of the values of the brand, and so on the perception of quality and therefore on the purchase intentions of the consumer. In fact, the attributes that determine the

perceived quality move in a systemic way and influence themselves: the variation of one can generate effects on all of the others.

## 4.7 References

- Aaker, D. (1991). Brand equity. *La gestione del valore della marca*, 347-356.
- Aaker, D. A., & Joachimsthaler, E. (2000). The brand relationship spectrum: The key to the brand architecture challenge. *California Management Review*, 42(4), 8-23.
- Acebrón, L. B., & Dopico, D. C. (2000). The importance of intrinsic and extrinsic cues to expected and experienced quality: an empirical application for beef. *Food Quality and Preference*, 11(3), 229-238.
- Achilleas, K., & Anastasios, S. (2008). Marketing aspects of quality assurance systems: The organic food sector case. *British Food Journal*, 110(8), 829-839.
- AHMED S.A., D'ASTOUS A. (2004), "Perceptions of countries as producers of consumer goods. A T-shirt study in China", *Journal of Fashion Marketing and Management*, 8, 187-200.
- Ailawadi, K. L., Pauwels, K., & Steenkamp, J. B. E. (2008). Private-label use and store loyalty. *Journal of Marketing*, 72(6), 19-30.
- Alba, J. W., & Hutchinson, J. W. (1987). Dimensions of consumer expertise. *Journal of Consumer Research*, 13(4), 411-454.
- Altintzoglou, T., & Heide, M. (2016). Fish quality and consumers: How do consumers' knowledge about and involvement in fish quality define factors that influence fish buying behaviour?. *Journal of Aquatic Food Product Technology*, 25(6), 885-894.
- Anacleto, P., Barrento, S., Nunes, M. L., Rosa, R., & Marques, A. (2014). Portuguese consumers' attitudes and perceptions of bivalve molluscs. *Food Control*, 41, 168-177.
- Anderson Jr, W. T., & Cunningham, W. H. (1972). The socially conscious consumer. *The Journal of Marketing*, 23-31.
- Anselmsson, J. O. H. A. N., & Bondesson, N. I. K. L. A. S. (2013). Put Your Brand to Work and Boost Revenues. *Lund Research Insight*, 201.
- Aprile, M. C., & Annunziata, A. (2006). Informazione, etichettatura e comportamento del consumatore: un'analisi sull'uso delle etichette alimentari. *Economia agro-alimentare*.
- Ariffin, S., Yusof, J. M., Putit, L., & Shah, M. I. A. (2016). Factors influencing perceived quality and repurchase intention towards green products. *Procedia Economics and Finance*, 37, 391-396.
- Arnold, D. (1992). *The handbook of brand management*. Basic Books.
- Aschemann-Witzel, J. (2018). Consumer perception and preference for suboptimal food under the emerging practice of expiration date based pricing in supermarkets. *Food Quality and Preference*, 63, 119-128.
- Aurier, P., & Séré de Lanauze, G. (2012). Impacts of perceived brand relationship orientation on attitudinal loyalty: An application to strong brands in the packaged goods sector. *European Journal of Marketing*, 46(11/12), 1602-1627.



- Baker, G. A. (1995). Health-related quality-of-life issues: optimizing patient outcomes. *Neurology*.
- Balabanis, G., & Diamantopoulos, A. (2004). Domestic country bias, country-of-origin effects, and consumer ethnocentrism: a multidimensional unfolding approach. *Journal of the Academy of Marketing Science*, 32(1), 80.
- Barrett, D. M., Weakley, C., Diaz, J. V., & Watnik, M. (2007). Qualitative and nutritional differences in processing tomatoes grown under commercial organic and conventional production systems. *Journal of Food Science*, 72(9), C441-C451.
- Bauer, H. H., Exler, S., & Bronk, L. (2007). Brand perception: is global always better?. *Marketing Theory and Applications*, 18, 307-309.
- Baumgartner, G. and Jolibert, A. (1977) 'The perception of foreign products in France', in H.K. Hunt (Ed.) *Advances in Consumer Research, Association for Consumer Research*, Vol. 5, pp.603-605.
- Bailey, W., & Pineres, S. A. G. D. (1997). Country of origin attitudes in Mexico: The malinchismo effect. *Journal of International Consumer Marketing*, 9(3), 25-41.
- Batra, R., & Sinha, I. (2000). Consumer-level factors moderating the success of private label brands. *Journal of Retailing*, 76(2), 175-191.
- Bech-Larsen, T., & Grunert, K. G. (2003). The perceived healthiness of functional foods: A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite*, 40(1), 9-14.
- Bialkova, S., & van Trijp, H. (2010). What determines consumer attention to nutrition labels?. *Food Quality and Preference*, 21(8), 1042-1051.
- Bland D. (2004). Hey, over here, look at me!. *Wine Industry Journal*, 19 (2), 49-50.
- Bronnenberg, B. J., Dhar, S. K., & Dubé, J. P. (2007). Consumer packaged goods in the United States: National brands, local branding. *Journal of Marketing Research*, 44(1), 4-13.
- Brunso, K., Fjord, T. A., & Grunert, K. G. (2002). Consumers' food choice and quality perception. *The Aarhus School of Business Publ., Aarhus, Denmark*.
- Caporale, G., & Monteleone, E. (2004). Influence of information about manufacturing process on beer acceptability. *Food Quality and Preference*, 15(3), 271-278.
- Cavicchi, A. (2008). Qualità alimentare e percezione del consumatore. *Agriregionieuropa*, 15(4), 10-13.
- Chamhuri, N., & Batt, P. J. (2015). Consumer perceptions of food quality in Malaysia. *British Food Journal*, 117(3), 1168-1187.
- Chryssochoidis, G., Krystallis, A., & Perreas, P. (2007). Ethnocentric beliefs and country-of-origin (COO) effect: Impact of country, product and product attributes on Greek consumers' evaluation of food products. *European Journal of Marketing*, 41(11/12), 1518-1544.
- Coelho, J. M., Howe, P. A., & Sacks, G. L. (2015). A headspace gas detection tube method to measure SO<sub>2</sub> in wine without disrupting SO<sub>2</sub> equilibria. *American Journal of Enology and Viticulture*, 66(3), 257-265.



- Codeluppi, V.(1992). *Consumo e comunicazione*. Milano: Franco Angeli.
- Codeluppi, V. (2002). *La sociologia dei consumi*. Roma: Carocci.
- Colen, L., Chrysochoidis, G. & Ciaian, P. (2019). Differences in composition of seemingly identical branded food products: Impact on consumer purchase decisions and welfare. JRC Technical Report, European Commission, Forthcoming.
- Collesei, U. & Ravà, V. (2004). *La comunicazione d'azienda*. Torino: Isedi.
- Collins, J. C., & Porras, J. I. (1996). Building your company's vision. *Harvard Business Review*, 74(5), 65.
- Darby, M. R., & Karni, E. (1973). Free competition and the optimal amount of fraud. *The Journal of Law and Economics*, 16(1), 67-88.
- Danziger, S., Hadar, L., & Morwitz, V. G. (2014). Retailer pricing strategy and consumer choice under price uncertainty. *Journal of Consumer Research*, 41(3), 761-774.
- Deming, "Quality analysis, and total behaviour management" (1994). Thumbnail.
- Erdem, T., & Swait, J. (1998). Brand equity as a signaling phenomenon. *Journal of consumer Psychology*, 7(2), 131-157.
- De Mooij, M. (2010). *Consumer behaviour and culture: Consequences for global marketing and advertising*. Sage.
- Di Nallo, E. (1984). Razionalità, simulazione, consumo. *Sociologia della comunicazione*, 6.
- Di Pasquale, J., Adinolfi, F., & Capitano, F. (2011). Analysis of consumer attitudes and consumers' willingness to pay for functional foods. *International Journal on Food System Dynamics*, 2(2), 181-193.
- Dolekoglu, C. O., Albayrak, M., Kara, A., & Keskin, G. (2008). Analysis of consumer perceptions and preferences of store brands versus national brands: An exploratory study in an emerging market. *Journal of Euromarketing*, 17(2), 109-125.
- Dörnyei, K. R., & Gyulavári, T. (2016). Why do not you read the label?—an integrated framework of consumer label information search. *International Journal of Consumer Studies*, 40(1), 92-100.
- Douglas, M. & Isherwood, B. (1984). *Il mondo delle cose. Oggetti, valori, consumo*. Bologna: Il Mulino.
- Eco, U. (1975). *Trattato di semiotica generale*. Milano: Bompiani.
- Ertekin, M., & Aydin, B. (2010). The Impact of National Identity and Culture on Customer Perception of Product Quality; The case of mobile phones in Sweden and Turkey.
- Espejel, J., Fandos, C., & Flavián, C. (2009). The influence of consumer involvement on quality signals perception: An empirical investigation in the food sector. *British Food Journal*, 111(11), 1212-1236.
- Ettenson, R., Wagner, J., & Gaeth, G. (1988). Evaluating the Effect of Country of Origin and the 'Made in the USA' Campaign: A Conjoint Approach. *Journal of Retailing*, 64(1), 85.

- Fandos, C., & Flavian, C. (2006). Intrinsic and extrinsic quality attributes, loyalty and buying intention: an analysis for a PDO product. *British Food Journal*, 108(8), 646-662.
- Fernqvist, F., & Ekelund, L. (2014). Credence and the effect on consumer liking of food—A review. *Food Quality and Preference*, 32, 340-353.
- Ferraresi, M. (1999). *Il Packaging. Oggetto e comunicazione*. Milano: Franco Angeli.
- Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 11(4), 339-366.
- Floch, J.M. (1992). *Identità visive*. Milano: Franco Angeli.
- Floch, J.M. (1997). *Semiotica, marketing e comunicazione*. Milano: Franco Angeli.
- Frewer, L. J., Scholderer, J., & Bredahl, L. (2003). Communicating about the risks and benefits of genetically modified foods: The mediating role of trust. *Risk Analysis: An International Journal*, 23(6), 1117-1133.
- Gan, H. H., Yan, B., Linforth, R. S., & Fisk, I. D. (2016). Development and validation of an APCI-MS/GC-MS approach for the classification and prediction of Cheddar cheese maturity. *Food Chemistry*, 190, 442-447.
- Gilg, A. W., & Battershill, M. (1998). Quality farm food in Europe: a possible alternative to the industrialised food market and to current agri-environmental policies: lessons from France. *Food Policy*, 23(1), 25-40.
- Grunert, K. G. (1997). What's in a steak? A cross-cultural study on the quality perception of beef. *Food Quality and Preference*, 8(3), 157-174.
- Groves, A. M. (2001). Authentic British food products: a review of consumer perceptions. *International Journal of Consumer Studies*, 25(3), 246-254.
- Grunert, K. G. (2005). Food quality and safety: consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369-391.
- Grunert, K. G. (2011). Sustainability in the food sector: A consumer behaviour perspective. *International Journal on Food System Dynamics*, 2(3), 207-218.
- Grunert, K. G., Bredahl, L., & Brunsø, K. (2004). Consumer perception of meat quality and implications for product development in the meat sector—a review. *Meat Science*, 66(2), 259-272.
- Grunert, K. G., & Valli, C. (2001). Designer-made meat and dairy products: consumer-led product development. *Livestock Production Science*, 72(1-2), 83-98.
- Ha, J., & Jang, S. S. (2010). Effects of service quality and food quality: The moderating role of atmospherics in an ethnic restaurant segment. *International Journal of Hospitality Management*, 29(3), 520-529.
- Hadjimarcou, J., & Hu, M. Y. (1999). Global product stereotypes and heuristic processing: The impact of ambient task complexity. *Psychology & Marketing*, 16(7), 583-612.
- Han, C. M., & Terpstra, V. (1988). Country-of-origin effects for uni-national and bi-national products. *Journal of International Business Studies*, 19(2), 235-255.

- Hansen, T. (2005). Understanding consumer perception of food quality: the cases of shrimps and cheese. *British Food Journal*, 107(7), 500-525.
- Hidalgo-Baz, M., Martos-Partal, M., & González-Benito, Ó. (2017). Assessments of the quality of organic versus conventional products, by category and cognitive style. *Food Quality and Preference*, 62, 31-37.
- Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of Management journal*, 40(4), 767-798.
- Hossain, A. (2015). Country of origin effect and consumer product evaluation process. *British Journal of Marketing Studies*, 3(2), 1-7.
- Ikeda, G., Nagai, H., & Sagara, Y. (2007). Development of food kansei model and its application for designing tastes and flavours of green tea beverage. *Food Science and Technology Research*, 10(4), 396-404.
- Jian, L. Z., & Yazdanifard, R. (2014). The Overall Review of Perceived Quality Determinants: Which are the Most Significant Indicators?. *Global Journal of Human-Social Science Research*.
- Jover, A. J. V., Montes, F. J. L., & Fuentes, M. D. M. F. (2004). Measuring perceptions of quality in food products: the case of red wine. *Food Quality and Preference*, 15(5), 453-469.
- Just, D., Sigirci, O., & Wansink, B. (2014). Lower buffet prices lead to less taste satisfaction (1019.16). *The FASEB Journal*, 28 (1\_supplement), 1019-16.
- Kaynak, E., & Cavusgil, S. T. (1983). Consumer attitudes towards products of foreign origin: do they vary across product classes?. *International Journal of Advertising*, 2(2), 147-157.
- Kassarjian, H. H. (1971). Personality and consumer behaviour: A review. *Journal of Marketing Research*, 8(4), 409-418.
- Kotler, P. (2002). *Marketing places*. Simon and Schuster.
- Krystallis, A., Chrysochoidis, G., & Scholderer, J. (2007). Consumer-perceived quality in 'traditional' food chains: The case of the Greek meat supply chain. *Appetite*, 48(1), 54-68.
- Johansson, J. K., Douglas, S. P., & Nonaka, I. (1985). Assessing the impact of country of origin on product evaluations: a new methodological perspective. *Journal of Marketing Research*, 388-396
- Lange, C., Issanchou, S., & Combris, P. (2000). Expected versus experienced quality: trade-off with price. *Food Quality and Preference*, 11(4), 289-297.
- Lee, K. H., & Hatcher, C. B. (2001). Willingness to pay for information: An analyst's guide. *Journal of Consumer Affairs*, 35(1), 120-140.
- Lévi-Strauss, C. (1979). *Il pensiero selvaggio*. Milano: Il Saggiatore.
- Lévi-Strauss, C. (1992). *Antropologia strutturale*. Milano: Mondatori.

- Lombardo, S., Pandino, G., & Mauromicale, G. (2017). The effect on tuber quality of an organic versus a conventional cultivation system in the early crop potato. *Journal of Food Composition and Analysis*, 62, 189-196.
- Lusk, J. L., Crespi, J. M., Cherry, J. B. C., Mcfadden, B. R., Martin, L. E., & Bruce, A. S. (2015). An fMRI investigation of consumer choice regarding controversial food technologies. *Food Quality and Preference*, 40, 209-220.
- Machín, L., Giménez, A., Vidal, L., & Ares, G. (2014). Influence of context on motives underlying food choice. *Journal of Sensory Studies*, 29(5), 313-324.
- Magnier, L., Schoormans, J., & Mugge, R. (2016). Judging a product by its cover: Packaging sustainability and perceptions of quality in food products. *Food Quality and Preference*, 53, 132-142.
- Manrai, L. A., Lascu, D. N., & Manrai, A. K. (1998). Interactive effects of country of origin and product category on product evaluations. *International Business Review*, 7(6), 591-615.
- Marks, L. J., & Olson, J. C. (1981). Toward a cognitive structure conceptualization of product familiarity. *ACR North American Advances*.
- Martínez-Carrasco, L., Brugarolas, M., Martínez-Poveda, A., Ruiz, J. J., & García-Martínez, S. (2012). Modelling perceived quality of tomato by structural equation analysis. *British Food Journal*, 114(10), 1414-1431.
- Mauss, M. (1965). Saggio sul dono. Forma e motivo dello scambio nelle società arcaiche. C. Lévi-Strauss (ed), *Teoria generale della magia ed altri saggi*. Torino: Einaudi.
- McDaniel, C., Lamb, C. W., & Hair, J. F. (2012). *Marketing essentials*. South-Western.
- Ness, M. R., Ness, M., Brennan, M., Oughton, E., Ritson, C., & Ruto, E. (2010). Modelling consumer behavioural intentions towards food with implications for marketing quality low-input and organic food. *Food Quality and Preference*, 21(1), 100-111.
- Mora, C., Menozzi, D., Faioli, G., Frewer, L., & van Rijswijk, W. (2007). Percezione dei consumatori della rintracciabilità dei prodotti alimentari: analisi delle catene mezzi-fini. *Produzioni Agroalimentari tra Rintracciabilità e Sicurezza. Analisi Economiche e Politiche d'Intervento, Atti del XLIV Convegno Sidea, Taormina*, 8-10.
- Moser, R., Raffaelli, R., & Thilmany, D. D. (2011). Consumer preferences for fruit and vegetables with credence-based attributes: a review. *International Food and Agribusiness Management Review*, 14(1030-2016-82774), 121.
- Moskowitz, H. R., Krieger, B., & Barash, J. (1997). The impacts of product acceptability, brand value and price on responses of foodservice professionals to bulk turkey. *Journal of Food Quality*, 20(6), 533-546.
- Musini, L. (2005). Semiotica del packaging. Studio dell'identità di marca nel mondo dellesigarette: il caso Camel. Retrieved May 31, 2005, from [www.musini.it/htm/semiotica/camel.htm](http://www.musini.it/htm/semiotica/camel.htm).
- Niss, H. (1996). Country of origin marketing over the product life cycle: A Danish case study. *European Journal of Marketing*, 30(3), 6-22.

- Obermiller, C., & Spangenberg, E. (1989). Exploring the effects of country of origin labels: an information processing framework. *ACR North American Advances*.
- Olsen, M. C., Slotegraaf, R. J., & Chandukala, S. R. (2014). Green claims and message frames: how green new products change brand attitude. *Journal of Marketing*, 78(5), 119-137.
- Olson, J. C., & Jacoby, J. (1972). Cue utilization in the quality perception process. *ACR Special Volumes*.
- Özsomer, A. (2012). The interplay between global and local brands: A closer look at perceived brand globalness and local iconness. *Journal of International Marketing*, 20(2), 72-95.
- Nebenzahl, I. D., & Jaffe, E. D. (1996). Measuring the joint effect of brand and country image in consumer evaluation of global products. *International Marketing Review*, 13(4), 5-22.
- Nelson, P. (1970). Information and consumer behaviour. *Journal of political economy*, 78(2), 311-329.
- Paltrinieri, R. (1998). *Il consumo come linguaggio*. Milano: Franco Angeli.
- Parmiggiani, P. (1997). *Consumo e identità nella società contemporanea*. Milano: Franco Angeli, Milano.
- Pastore A. & Vernuccio, M. (2003). Il ruolo del packaging tra marketing e consumo. Una lettura degli insiemi percettivi e dei vettori valoriali. *2nd International Congress Marketing Trends*. Venezia: ESCP-EAP – Università Ca' Foscari.
- Pauwels, K., Hanssens, D. M., & Siddarth, S. (2002). The long-term effects of price promotions on category incidence, brand choice, and purchase quantity. *Journal of Marketing Research*, 39(4), 421-439.
- Peterson, R. A., & Jolibert, A. J. (1995). A meta-analysis of country-of-origin effects. *Journal of International Business Studies*, 26(4), 883-900.
- Petrick, J. F. (2002). Development of a multi-dimensional scale for measuring the perceived value of a service. *Journal of Leisure Research*, 34(2), 119-134.
- Pomarici, E. (2005). Il mercato mondiale del vino: tendenze, scenario competitivo e dualismo tra vecchio e nuovo mondo. *Centro per la Formazione in Economia e Politica dello Sviluppo Rurale, working paper*, (7), 5.
- Rani, P. (2014). Factors influencing consumer behaviour. *International Journal of Current Research and Academic Review*, 2(9), 52-61.
- Rezvani, S., Dehkordi, G. J., Rahman, M. S., Fouladivanda, F., Habibi, M., & Eghtebasi, S. (2012). A conceptual study on the country of origin effect on consumer purchase intention. *Asian Social Science*, 8(12), 205-215.
- Rosenbloom, A., & Haefner, J. E. (2009). Country-of-origin effects and global brand trust: A first look. *Journal of Global Marketing*, 22(4), 267-278.

- Roth, M. S., & Romeo, J. B. (1992). Matching product category and country image perceptions: A framework for managing country-of-origin effects. *Journal of International Business Studies*, 23(3), 477-497.
- Schooler, R. D. (1965). Product bias in the Central American common market. *Journal of marketing research*, 394-397.
- Shimp, T. A., & Sharma, S. (1987). Consumer ethnocentrism: Construction and validation of the CETSCALE. *Journal of Marketing Research*, 280-289.
- Silayoi, P., & Speece, M. (2004). Packaging and purchase decisions: An exploratory study on the impact of involvement level and time pressure. *British Food Journal*, 106(8), 607-628.
- Sirieix, L., Delanchy, M., Remaud, H., Zepeda, L., & Gurviez, P. (2013). Consumers' perceptions of individual and combined sustainable food labels: a UK pilot investigation. *International Journal of Consumer Studies*, 37(2), 143-151.
- Schmitt, B. (2012). The consumer psychology of brands. *Journal of Consumer Psychology*, 22(1), 7-17.
- Stávková, J., Stejskal, L., & Toufarová, Z. (2008). Factors influencing consumer behaviour. *Zemědělska Ekonomika-Praha*, 54(6), 276.
- Steenkamp, J. B. E., & van Trijp, H. C. (1989). Quality guidance: a consumer-based approach for product quality improvement. *Marketing thought and practice in the 1990's*, 1191-1217.
- Stigler, G. J. (1961). The economics of information. *Journal of Political Economy*, 69(3), 213-225.
- Soberman, D. A., & Parker, P. M. (2004). Private labels: psychological versioning of typical consumer products. *International Journal of Industrial Organisation*, 22(6), 849-861.
- Sumutka, A., & Neve, B. (2011). Quality as a Competitive Advantage.
- Tam, J. L. (2008). Brand familiarity: its effects on satisfaction evaluations. *Journal of Services Marketing*, 22(1), 3-12.
- Tse, D. K., & Gorn, G. J. (1993). An experiment on the salience of country-of-origin in the era of global brands. *Journal of International Marketing*, 57-76.
- Usunier, J. C. (2002). Le pays d'origine du bien influence-t-il encore les évaluations des consommateurs?. *Revue Française du Marketing*.
- Usunier, J. C. (2006). Relevance in business research: the case of country-of-origin research in marketing. *European Management Review*, 3(1), 60-73.
- Valdani, E., & Bertoli, G. (2010). *Mercati internazionali e marketing*. Egea.
- Van der Lans, I. A., Van Ittersum, K., De Cicco, A., & Loseby, M. (2001). The role of the region of origin and EU certificates of origin in consumer evaluation of food products. *European Review of Agricultural Economics*, 28(4), 451-477.
- Veneziani, M., Sckokai, P., and Moro, D. (2012). Consumers' willingness to pay for a functional food. Congress



- Verlegh, P. W., & Steenkamp, J. B. E. (1999). A review and meta-analysis of country-of-origin research. *Journal of Economic Psychology*, 20(5), 521-546.
- Verbeke, W. (2005). Agriculture and the food industry in the information age. *European review of Agricultural Economics*, 32(3), 347-368.
- Verdù Jover, A. J. V., Montes, F. J. L., & Fuentes, M. D. M. F. (2004). Measuring perceptions of quality in food products: the case of red wine. *Food Quality and Preference*, 15(5), 453-469.
- Vianelli, D., & Marzano, F. C. (2012). L'effetto country of origin sull'intenzione d'acquisto del consumatore: una literature review.
- Violoni, M. (2004, Autumn). Analisi semiotica del packaging. I vini rossi. *L'assaggio*, 7.
- Vo, T. T., & Nguyen, C. T. (2015). Factors influencing customer perceived quality and purchase intention toward private labels in the Vietnam market: The moderating effects of store image. *International Journal of Marketing Studies*, 7(4), 51.
- Wang, C. K., & Lamb, C. W. (1983). The impact of selected environmental forces upon consumers' willingness to buy foreign products. *Journal of the Academy of Marketing Science*, 11(1-2), 71-84.
- Watson, J. J., & Wright, K. (2000). Consumer ethnocentrism and attitudes toward domestic and foreign products. *European Journal of Marketing*, 34(9/10), 1149-1166.
- Williams, H., Wikström, F., Otterbring, T., Löfgren, M., & Gustafsson, A. (2012). Reasons for household food waste with special attention to packaging. *Journal of Cleaner Production*, 24, 141-148.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *The Journal of Marketing*, 2-22.



## 5 Summary of the results and possible policy implications: an illustrative example.

*Carlo Russo*

*University of Cassino and Lazio Meridionale  
Department of Economics and Law*

In this Section, the main results from the review of the literature are summarised in a single economic model in order to discuss the possible effects of regulating DC-SIP based on the findings of the literature analysis. A standard IO setting was adapted to cover the main issues in DC-SIP. Of course, some of the modelling choices are arbitrary. A scenario was deliberately developed where the DC-SIP issue is taken to the extreme so that the policy implications are evident. As a consequence, the model is an illustrative example and is neither a simulation nor a prediction of actual policy outcome.

The analysis is based on a multi-country (Chapter 2), price-quality competition model (Chapter 1) where consumer demand follows a simplified total food quality model (Chapter 4). The discussion illustrates the adaptation of the marketing mix of a multinational company (Chapter 3). The computation of the market equilibrium allows the running of comparative statics exercises simulating the implementation of three types of regulation. Two policy options tackling the objective component of DC-SIP (i.e., preventing sales of product of different composition) are compared and one tackling the subjective components (i.e., providing information to consumers). The equilibrium under the three policy was computed and it is concluded that even if regulation can increase efficiency, there are still strong redistribution effects. Consequently, in the absence of compensation, no policy option is a Pareto optimal solution.

### 5.1 Building an 'extreme scenario' of DC-SIP

A scenario where DC-SIP is particularly severe is considered. Under such extreme assumptions the benefits from regulation are expected to be high. As a consequence, if the model finds that a policy is ineffective or even inefficient, the conclusion is expected to hold in other less extreme scenarios, *a fortiori*.

The model builds on vertical quality literature (Section 1.3.4) by assuming that consumers agree on a preference ranking of the available products in the model. It is assumed that under perfect information the DC-SIP product is perceived as inferior compared to the original variety by all consumers. Examples are the substitution of costly ingredients with cheaper ones or lower proportion of high-quality components (such as fruit or meat) in the recipe. Of course, this is not always true for DC-SIP

because differences in composition do not necessarily result in lower quality. However, it is argued that vertical quality implies a stronger demand for consumer protection.

Following Paroush (1978) (Chapter 2), the existence of two separated markets with no arbitrage is assumed.<sup>31</sup> Two countries (A and B) and three firms  $L_A$ ,  $L_B$  and M selling branded products are considered.  $L_A$ ,  $L_B$  are local enterprises selling only in country A and B respectively. Firm M is an international company originally based in country A, now selling in both countries. Firms can sell only one branded product per country.

The aim is to explain (i) why firm M may decide to sell different varieties of the product in A and B, (ii) whether informing consumers about the difference in composition is profitable, and (iii) what the effects of DC-SIP on welfare are. In addition, the model is used to assess what the possible unintended consequences of three regulation options are: (i) information disclosure (ID), (ii) product of reference (PoR), (iii) one-market, one-quality (1M1Q).

An ID policy eliminates the asymmetric information problem that is at the foundation of the subjective component of DC-SIP. It might include labelling, mandatory information on websites, advertising, or any other form of communication. Our key assumption is that the policy provides consumers with complete information for an unbiased choice (Section 1.3.6). PoR regulation forces firm M to sell a product in country B of the same quality as the one they originally sold in country A before going international. 1M1Q regulation stipulates that firm M sells a product of the same quality in both markets, whatever the quality level.

A three-stage game was used to model the policy outcome. In stage 1, the regulator chooses one off our possible alternatives: one of the three policy options or do nothing. In stage 2 firms set quality, and in stage 3 they compete on price.

### 5.1.1 Technology and cost functions

The setting follows the specification by Motta (1993) and Szymanski and Valletti (2005). Firms have a fixed cost of quality improvement that takes the form:

$$C_j = \frac{u_j^2}{2}$$

where  $C$  is the fixed cost of quality improvement,  $u$  is the quality level, and the subscript  $j = LA, LB, MA, MB$  refers to the products of local firm  $LA$ , of local firm  $LB$ , of the international firm selling in country A, and of the international firm selling in country B, respectively. Firms have a constant return to scale technology with constant unit production cost. Without further loss of generality, these costs are taken to be zero. The profit functions of the firms are obtained by subtracting the cost of producing quality from the revenues.

---

<sup>31</sup> According to Szymanski & Valletti (2005), arbitrage might reduce the incentive to differentiation (Chapter 2). We expect firms to be more willing to indulge in DC-SIP when no arbitrage is assumed.

In order to simplify the presentation, it was assumed that firm M supplies goods of higher expected quality than the local firms in each country. This assumption is consistent with a strong reputation of the international firm.

### 5.1.2 Consumer behaviour

DC-SIP was modelled by introducing an adaptation in the standard Mussa-Rosen (1978) demand functions. In the standard Mussa-Rosen model, each consumer at most buys exactly one unit of only one variety among those available (they can decide to buy nothing). Consumer preferences are represented by the following monetary indirect utility function:

$$U_{i,j} = \sum_j b_j (\theta_i u_j - p_j)$$

Where  $U_{i,j}$  is the utility expressed in monetary terms of the  $i^{th}$  consumer buying product  $j$ ,  $b_j$  is a binary variable that is equal to 1 if the consumer buys product  $j$  and zero otherwise, and  $\theta_i$  is an individual taste parameter measuring the marginal willingness to pay for quality. The higher  $\theta_i$  is, the higher the price that a consumer is willing to pay for a good of a given quality level. The parameter can be interpreted as the marginal rate of substitution between income and quality, so that higher values of  $\theta_i$  are associated with lower marginal utility of income (and higher income). Consumers differ only in  $\theta_i$ , which is distributed uniformly between  $[0, v_k]$  with unit density and  $k=A,B$ . The utility of a consumer who does not buy any product is zero. Each consumer chooses the brand that provides the greatest indirect utility. Note that in each country only two products are available: the one by the local firm (LA or LB) and that by the international firm (MA or MB). If both products yield a negative utility, the consumer does not buy.

In order to model DC-SIP, the following modifications are introduced to the standard model. It is assumed that the motivation of consumers to purchase is their willingness to enjoy a given attribute X.

In order to build the extreme scenario, it was assumed that X is an *experience* attribute (Chapter 4) and that there is no repeated purchase. The experience nature of the attribute implies that the quality of the good is revealed after consumption and therefore the consumer is able to assess the quality difference perfectly. Therefore, consumers experience full disappointment (they know they receive a lower quality product) and at the same time, the possible incentive for DC-SIP strategies is not attenuated by reputation concerns.

The absence of repeated consumption is a heroic assumption in food markets. The proposed model is such that the consequences of DC-SIP are severe and there are no market incentives preventing opportunistic behaviour by firm M.

The variable  $u_{MB}$  measures the presence and the intensity of the attribute in a product *that is supplied by firm M in market B* (which is defined as 'quality'). Following the total quality model (Grunert 2005, Chapter 4), it was assumed that consumers cannot observe  $u_{MB}$  perfectly. Their purchasing decision is driven by the expected quality  $e_{MB}$ , which is the estimation of utility from consumption based on internal and external quality cues (Chapter 4). For simplicity, it was assumed that the set of extrinsic quality cues is summarised by the quality level  $u_{MA}$  that is the quality that firm M supplies in

country A (meaning that consumers in country B expect a product of the same quality level as in country A). The intrinsic quality cues in the quality level  $u_{MB}$  the actual quality that firm M supplies to consumers in country B is summarised. The model is consistent with a *halo effect* (Chapter 4) so that the quality assessment is clouded by the reputation of the international brand. The following estimator of the expected quality is assumed:

$$e_{MB} = \alpha u_{MA} + (1-\alpha)u_{MB}$$

where  $e_{MB}$  is the expected quality and  $\alpha \in [0,1]$  is a parameter defining the magnitude of the halo effect. For  $\alpha = 1$ , consumers in country B expect a quality that is equal to that supplied in country A. Their purchasing decisions are based on the expectation that the quality in the two countries is the same. For  $\alpha = 0$ , consumers are perfectly informed about the actual quality of the goods before purchasing. For any value  $\alpha \in (0,1)$ , consumers use both extrinsic and intrinsic quality cues for their purchasing decision. By construction, for any  $\alpha > 0$ ,  $u_{MB} < e_{MB} < u_{MA}$ , which means that consumer purchasing decisions are based on an overestimate of quality.<sup>32</sup>

This simple setting allows two important variables to be measured: the disutility of DC-SIP and the impact on consumer choice.  $D_{i,j}$  is the measurement of the *ex-post disappointment* that a consumer experiences when buying a product  $j$  that is different from the expected one. It is measured as the difference between the experienced utility  $U_{i,j}(u_j)$  and the expected utility  $U_{i,j}(e_j)$ . The disappointment of consumer  $i$  from the consumption of product M in country B is:

$$D_{i,MB} = \theta_i(u_{MB} - e_{MB}) = \theta_i \cdot \alpha \cdot (u_{MB} - u_{MA})$$

$D_{i,MB}$  is a monetary measure of the loss of utility due to the consumption of a product of lower quality than expected. It is always non-positive.  $D_{i,MB} = 0$  for either  $\alpha = 0$  (perfect information) or  $u_{MB} = u_{MA}$  (no difference in composition). In this perspective  $\alpha$  can be interpreted as the subjective component of DC-SIP and  $u_{MB} - u_{MA}$  as the objective component.

A key point in DC-SIP is that the consumer must change purchasing decision if perfectly informed. In order to measure this effect, a binary variable  $\omega_{i,MB}$  was defined that is equal to 1 if:

$$U_{i,MB}(e_{MB}) > U_{i,LB} > U_{i,MB}(u_{MB})$$

where  $U_{i,LB}$  is the indirect utility that the consumer derives from purchasing the local product in country B. A unit value of  $\omega_{i,MB}$  implies that (i) consumer  $i$  buys product MB because its expected utility is greater than that of product LB and (ii) if perfectly informed, consumer  $i$  prefers LB because the experience utility of the local good is greater.

The value of  $\omega_{i,MB}$  depends on the equilibrium prices of the goods. On the other hand,  $D_{i,MB}$  is price-independent.

---

<sup>32</sup> The fixed cost of providing quality of MB and the profits of firm M are computed based on the actual quality  $u_{MB}$ .

Following Mussa & Rosen (1978) and Motta (1993), it is possible to compute  $q_{h,k}$  which is the demand functions for the products supplied by firm  $h$  in country  $k$ , with  $h=L,M$  and  $k=A,B$ . Table 5-1 reports the specifications of the demand functions.

Table 5-1: Demand functions for the multinational firm M and the two local firms LA, LB

	Country A	Country B
Firm M	$q_{MA} = v_A - \frac{p_{MA} - p_{LA}}{u_{MA} - u_{LA}}$	$q_{MB} = v_B - \frac{p_{MB} - p_{LB}}{e_{MB} - u_{LB}}$
Local Firms	$q_{LA} = \frac{p_{MA} - p_{LA}}{u_{MA} - u_{LA}} - \frac{p_{LA}}{u_{LA}}$	$q_{LB} = \frac{p_{MB} - p_{LB}}{e_{MB} - u_{LB}} - \frac{p_{LB}}{u_{LB}}$

The expected quality  $e_{MB}$  instead of the actual quality  $u_{MB}$  is used in the demand functions for Country B, meaning that the purchasing decisions are affected by the DC-SIP problem. For simplicity, it was assumed that there is no DC-SIP problem in country A.

### 5.1.3 Modelling two markets

In the illustration example, it is assumed that no arbitrage is possible between the two markets A and B, that is, it is not possible to buy goods in one market and then sell it in the other. A discussion of this hypothesis can be found in Chapter 2.

It is assumed that consumers in Market A have a greater willingness to pay for quality than those in market B. For simplicity  $v_A = 4$  and  $v_B = 2$ . In Section 5.7 the effects of a change in the numerical calibration are discussed.

Finally, it is assumed that Country A is the 'home country' of firm M. Products sold by firm M in country A are perfectly known by local consumers. In addition, consumers in country B expect the products supplied by firm M to be of 'high quality'. This expectation is rational because of the higher willingness of consumers in A to pay.<sup>33</sup>

## 5.2 Equilibrium under perfect information

As a benchmark, the computation of the market equilibrium under perfect information was presented. Consumers are perfectly informed about the quality of the goods in all markets (i.e.,  $\alpha = 0$ ). Table 5-2 reports the equilibrium in the two countries.

<sup>33</sup> A model of perfect information (no DC-SIP) with similar assumptions was solved by Motta (1993, p. 116-117).

Table 5-2 Equilibrium under perfect information.

Country	$v_k$	$u_{Mk}^*$	$u_{Lk}^*$	$p_{Mk}^*$	$p_{Lk}^*$	$q_{Mk}^*$	$q_{Lk}^*$	$q_{0k}^*$	$y_{Mk}^*$	$y_{Lk}^*$	$CS_{Mk}^*$	$CS_{Lk}^*$	$SW_k^*$
A	4	4.053	0.772	6.890	0.656	2.100	1.050	0.850	6.255	0.391	10.638	0.425	17.709
B	2	1.013	0.193	0.861	0.082	1.050	0.525	0.425	0.391	0.024	0.665	0.027	1.107
A+B									6.646				18.816

where  $CS_{Mk}^*$  and  $CS_{Lk}^*$  indicates the surplus that consumers obtain from the product of the international and local firms in country  $k$ , respectively. The columns  $y_{Mk}$  and  $y_{Lk}$  refer to the profits of firms M and L in country  $k$ . The column  $q_{0k}^*$  reports the demand gap, that is, the quantity that is not produced because consumers refrain from buying any products. The column  $SW_k^*$  reports the social welfare. Where meaningful, the table provides the aggregate value for the two countries.<sup>34</sup>

The model predicts that the international firm M supplies products of different quality in the two countries because of the different marginal willingness of consumers to pay for quality. Of course, the difference in quality does not imply a DC-SIP problem because consumers are perfectly informed about the quality of the product.

### 5.3 Equilibrium under DC-SIP

In this section the unregulated market equilibria in countries A and B are computed. Consumers use the extrinsic cue (the quality in market A) to estimate the expected quality so that  $e_{MB} \geq u_{MB}$  by construction. Table 5-3 reports the equilibrium in country B as a function of the parameter  $\alpha$  (equilibrium in country A remains as in Table 5-3).

---

<sup>34</sup> Following Mussa and Rosen (1978), consumer surplus is computed as the integral of the utility function over the interval of  $\theta$  where consumers buy the product. Social welfare is computed as the summation of profits of firms in both countries, and all consumer surpluses.

Table 5-3: Equilibrium in country B under imperfect information

$\alpha$	$e_{MB}$	$U_{MB}^*$	$U_{LB}^*$	$p_{MB}^*$	$p_{LB}^*$	$q_{MB}^*$	$q_{LB}^*$	$q_{0B}^*$	$y_{MB}^*$	$y_{LB}^*$	$CS_{MB}^*$	$CS_{LB}^*$	$SW_B^*$	$SW_{A+B}^*$
0.0	1.013	1.013	0.193	0.861	0.082	1.050	0.525	0.425	0.391	0.024	0.665	0.027	1.107	18.817
0.1	1.223	0.909	0.202	1.065	0.088	1.043	0.521	0.436	0.698	0.025	0.290	0.027	1.041	18.750
0.2	1.455	0.806	0.209	1.293	0.093	1.037	0.518	0.445	1.016	0.026	-0.013	0.028	1.058	18.767
0.3	1.709	0.704	0.215	1.542	0.097	1.033	0.516	0.451	1.344	0.027	-0.514	0.029	0.886	18.596
0.4	1.983	0.603	0.219	1.813	0.100	1.029	0.515	0.457	1.684	0.027	-0.944	0.029	0.796	18.505
0.5	2.277	0.502	0.223	2.106	0.103	1.025	0.513	0.462	2.033	0.028	-1.394	0.029	0.696	18.405
0.6	2.592	0.401	0.226	2.419	0.106	1.022	0.509	0.469	2.393	0.028	-1.862	0.030	0.589	18.299
0.7	2.927	0.301	0.229	2.752	0.108	1.020	0.508	0.472	2.762	0.029	-2.350	0.030	0.471	18.180
0.8	3.282	0.200	0.231	3.106	0.109	1.018	0.510	0.472	3.141	0.029	-2.857	0.030	0.343	18.053
0.9	3.658	0.100	0.233	3.480	0.111	1.016	0.507	0.476	3.531	0.029	-3.384	0.030	0.207	17.916
1.0	4.053	0.000	0.235	3.874	0.112	1.015	0.509	0.477	3.931	0.029	-3.931	0.030	0.059	17.768

### 5.3.1 Equilibrium quality levels

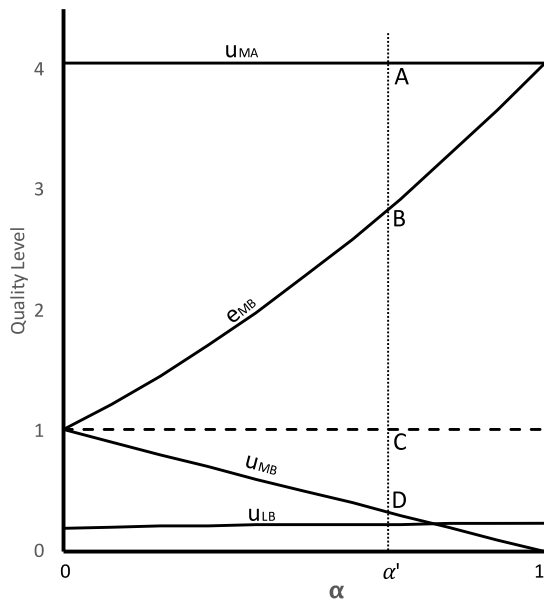
As  $\alpha$  increases, consumers increasingly rely on the exogenous quality expectation and less and less on the actual product attributes. The simulation concludes that as  $\alpha$  increases, the actual quality  $U_{MB}^*$  decreases and the perceived quality  $e_{MB}$  increases. This implies that the composition of MA and MB diverges, that is, the difference between  $U_{MA}$  and  $U_{MB}$  increases with  $\alpha$ .<sup>35</sup>

Figure 5-1 illustrates the results. For  $\alpha = 0$ , there is no DC-SIP problem, and the equilibrium quality levels are equal to the case of perfect information. As  $\alpha$  increases, the weight of the quality level  $U_{MA}$  in Country A in the predictor of the quality in Country B increases. Therefore,  $e_{MB}$  converges to  $U_{MA}$ . Eventually, for  $\alpha = 1$ ,  $e_{MB} = U_{MA}$ , meaning that consumers of the multinational firm in Country B expect a quality that is equal to that in Country A.

<sup>35</sup> The value of  $U_{MA}$  is constant (equal to 4.053, from Table 5-2) while  $U_{MB}$  decreases as  $\alpha$  increases.



Figure 5-1: Equilibrium quality levels as a function of  $\alpha$



The experienced quality of MB ( $u_{MB}$ ) decreases with  $\alpha$ . In fact, firms have an incentive to provide a quality product if by doing so they can charge higher prices and/or sell more. As  $\alpha$  increases, the marginal benefit of providing quality decreases while the marginal cost is unchanged.<sup>36</sup> As a consequence, the optimal quality level decreases with  $\alpha$ . For  $\alpha = 1$ , consumers expect quality  $u_{MA}$  regardless of the actual quality of MB. In this case, there is no benefit in providing a positive quality level.

Noticeably, for a high level of  $\alpha$  it is possible for  $u_{MB} < u_{LB}$ , meaning that firm M provides a product of lower quality than firm LB. All the same, consumers consider MB as the high quality good because of the high expected quality due to the international reputation of firm M.

The quality of good LB increases slightly with  $\alpha$ . This is because under DC-SIP, the multinational firm is positioned as a high quality – high price brand, selling to the market segment with the highest willingness to pay. As  $\alpha$  increases, firm M increases prices and therefore there is the possibility for LB to attract consumers with average willingness to pay by increasing its own quality and price too.

Figure 5-1 provides a clear illustration of the consequences of DC-SIP. Consider  $\alpha'$ , an arbitrary value of  $\alpha$ . For any given  $\alpha'$ , the vertical distance between  $u_{MA}$  and  $u_{MB}$  is the difference in composition between the products sold in Country A and B, respectively, by firm M (the distance between point A and point D in Figure 5-1). This is the objective

<sup>36</sup> The partial derivative of demand  $q_{MB}$  for the actual quality  $u_{MB}$  is:

$$\frac{\delta q_{MB}^*}{\delta u_{MB}} = (1 - \alpha) \frac{p_{MB} - p_{LB}}{[\alpha u_{MA} + (1 - \alpha)u_{MB} - u_{LB}]^2}$$

which is equal to zero for  $\alpha = 1$ .

organoleptic difference. Noticeably, this difference can be broken down into two parts. The segment from point A to point C in Figure 5-1 is the difference in composition that is due to the different willingness to pay for quality in the two countries. The dashed horizontal line indicates the equilibrium quality level of product MB under perfect information. As a consequence, the difference between A and C is not due to market imperfection. Because consumers in Country B are not willing to pay as much those in Country A, firm M provides a good of lower quality. On the other hand, the difference between point C and point D is the strategic reduction in quality caused by the DC-SIP problem. Because the estimation of the expected quality is affected by the value of  $u_{MA}$ , profit maximisation requires firm M to reduce quality below the perfect-information level. Consequently, firm M takes full advantage by the fact that consumers still consider MB to be the high quality good even if actual quality is low.

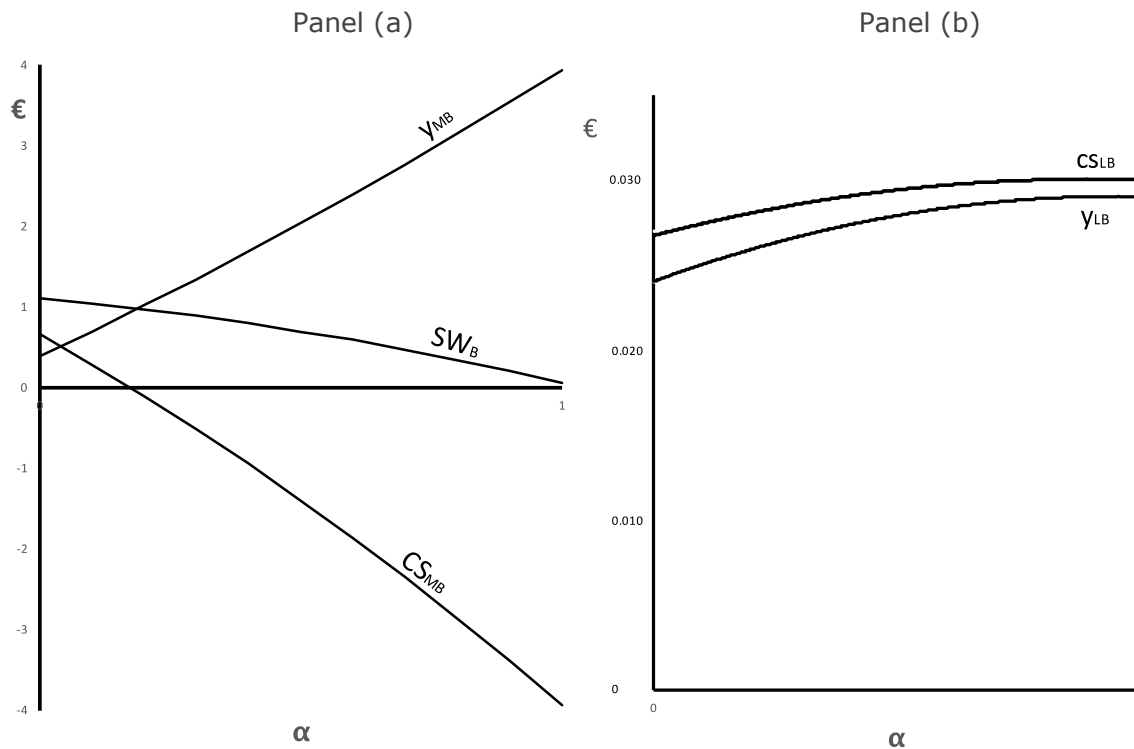
The distance between  $e_{MB}$  and  $u_{MB}$  (points B and D in Figure 5-1, respectively) measures the difference between consumer expectation (based on the international reputation) and the quality they experience after consumption. Given the assumptions of the model,  $e_{MB}$  is lower than  $u_{MB}$ , meaning that consumers in Country B expect a product that is not exactly equal to the one that is sold in Country A. For any  $\alpha < 1$ , consumers are aware that a difference exists. Nevertheless, they expect high quality from the international firm. Noticeably  $e_{MB} - u_{MB} = (u_{MA} - u_{MB}) \leq u_{MA} - u_{MB}$ , meaning that the mere comparison of ingredients might overestimate the deviation from consumer expectations.

In summary, the model suggests that the quality difference between the goods in the two country  $u_{MA} - u_{MB}$  might overestimate the magnitude of the DC-SIP problem. In fact, (a) part of the differentiation might be the consequence of standard product adaptation, and (b) consumers might be aware that differences are possible and adjust their expectations accordingly.

### 5.3.2 Welfare effects of DC-SIP

The illustrative model concludes that DC-SIP may have non-negligible welfare effects. Figure 5-2 illustrates the results of the numerical simulation. As expected, the profits of firm M increase with  $\alpha$  ( $y_{MB}$  in Figure 5-2, panel a). The multinational firm benefits from consumer overestimation of the provided quality. The surplus of consumers who buy good MB decreases with  $\alpha$ . The result is driven by the disappointment caused by the experience of a lower level of quality than expected. As  $\alpha$  increases, consumer expectations increase while actual quality decreases. Therefore, the disappointment increases. Noticeably,  $CS_{MB}$  becomes negative for high levels of  $\alpha$ . The actual quality of the good is so low that the benefits from consumption are not worth the price.

Figure 5-2: Welfare effects of DC-SIP



The model supports the possibility of a DC-SIP deadweight loss. The decline in  $CS_{MB}$  is steeper than the increase in  $y_{MB}$ . As a consequence, social welfare decreases with  $\alpha$ .

The consumer surplus of consumers of LB and the profits of the local firm increase with  $\alpha$  (Figure 5-2, panel b. Note that the y-axis scales of panel a and b are different). Firms and consumers benefit from the increase in quality and price of the local good.

In summary, the model suggests that DC-SIP is socially inefficient and has strong redistribution effects. Surplus is transferred from the consumers of good MB to the international firm M and – to a much lesser extent- to producers and consumers of the local good.

### 5.3.3 Changes in consumer purchasing decisions.

According to the European Commission, DC-SIP is an issue if

*'[...the variation in quality] has the potential to alter the economic behaviour of the average consumer who would take a different purchasing decision if he/she were made aware of such difference.'* (commission notice C(2017) 6532 final).

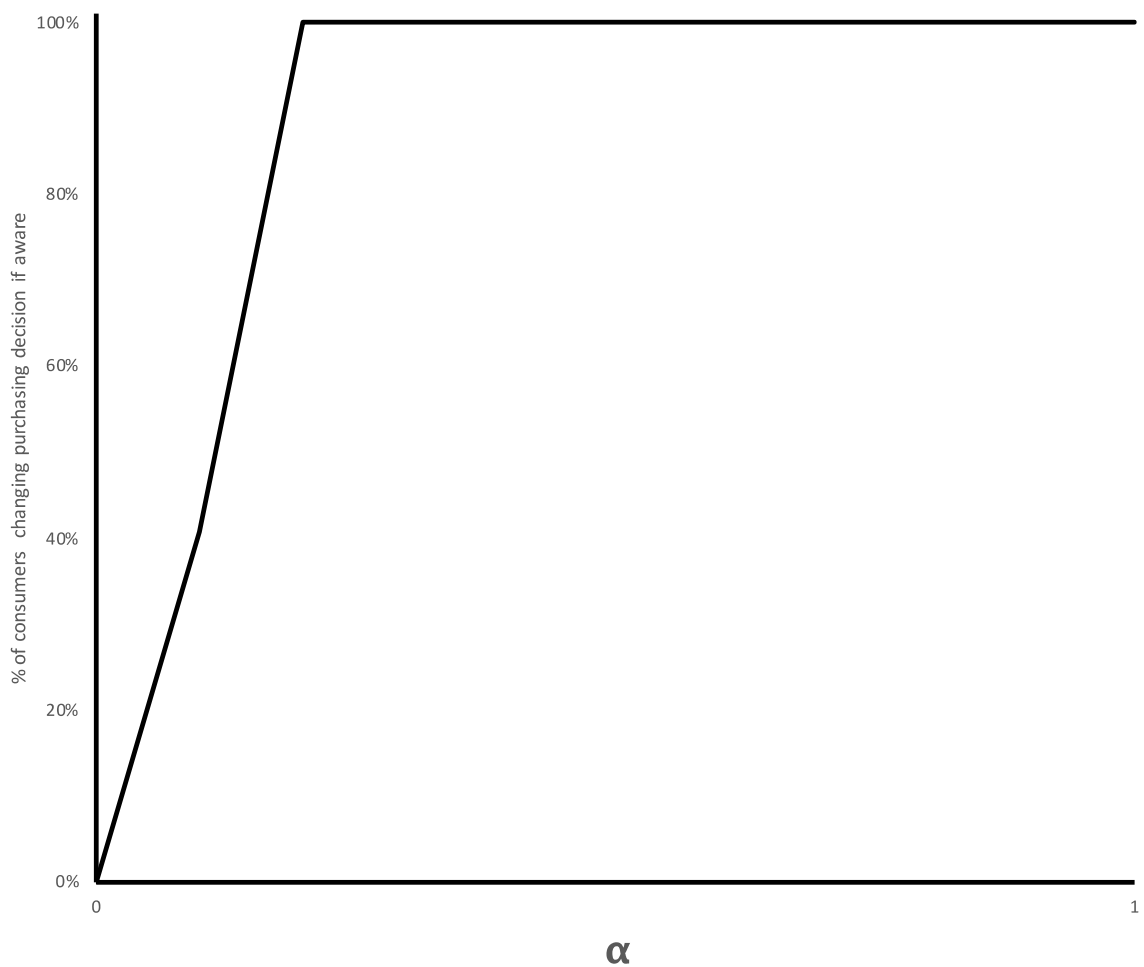
Our illustrative model provides insights into consumer purchasing decision. A rational consumer changes their purchase decision after information disclosure if  $U_{i,MB}(e_{MB}) > U_{i,MB}(u_{MB})$ . The condition requires the utility from the consumption of

good LB to be lower than the expected utility from good MB and higher than the experienced utility from MB.

Figure 5-3 reports the percent share of consumers with  $\omega_{i,MB} = 1$  (i.e., who would buy LB instead of MB if aware of the difference of composition with respect to MA, Section 5.1.2). The model predicts that for any  $\alpha \geq 0.2$ , all consumers would change their purchasing decision. For  $\alpha = 1$ , the share of consumers who would like to change is 41%. The result is driven by the modelling choice of building an 'extreme DC-SIP' scenario. The consequences of DC-SIP are so severe that information disclosure triggers a change in purchase even if the bias is small.

The estimate ignores all possible 'trust-breach' effects. Consumers do not change behaviour because they feel bad about being cheated by the multinational company. Their decision is driven by quality and price assessment only.

Figure 5-3: Percent share of consumers changing purchasing decision if aware of difference in composition. Market prices are given.



The function  $\omega_{i,MB}$  is computed by assuming that information is revealed after purchase. This implies that consumers take quality and price of all product as given. Firms set

their strategy by considering the imperfect evaluation of MB quality by consumers, as reported in Table 5-3. Consumers buy the product, experience the actual quality of the goods, and are then asked if they want to change, given the price-quality combinations they observe at the moment of the purchase. Figure 5-3 shows that the share of consumers who would regret the purchase is large.

The function  $\omega_{i,MB}$  is a simple way to assess the impact of DC-SIP on consumers. However, it cannot be used to predict the effects of information disclosure or other changes in the market because it does not refer to an equilibrium situation. For example, if firms knew that products can be returned after purchase, they might decide to set price and quality as if  $\alpha = 0$  in order to avoid the cost of taking back the product. At the equilibrium,  $\omega_{i,MB}$  would be equal to zero for all  $i$ . In the next Section 5.4 measurement of policy effect is discussed.

## 5.4 Information disclosure regulation

A qualitative assessment of the impact of information disclosure (ID) regulation is provided in this section. ID regulation is defined as any form of public intervention aiming at providing consumers with sufficient information to assess the differences in composition of seemingly identical products across the Single Market. ID regulation may consider several measures such as labelling, mandatory information disclosure on websites, consumer information/education programs, or any other way of informing consumers. ID regulation is expected to alter the market equilibrium through a change in consumer behaviour. Because informed consumers behave differently, firms adjust their strategies accordingly.

In the illustration example, ID regulation is modelled as an exogenous decrease in the parameter  $\alpha$ .<sup>37</sup> A perfect policy imposes  $\alpha = 0$  while imperfect intervention arbitrarily reduces the parameter. Table 5-3 and the discussion in Section 5.3.2 illustrates the simulated effects of ID regulation.

ID is expected to result in lower prices, lower expected quality, and higher experienced quality of product MB compared to the unregulated market. Firm LB supplies cheaper and lower quality goods.

The policy is socially efficient, as social welfare is monotonically decreasing in  $\alpha$ . It determines a redistribution of surplus: the surplus of consumers buying MB increases, all other groups suffer from a reduction in welfare. From a policy perspective, this point is relevant because a new regulation might harm third parties (the local firm and its consumers) who were not responsible for the DC-SIP issue.

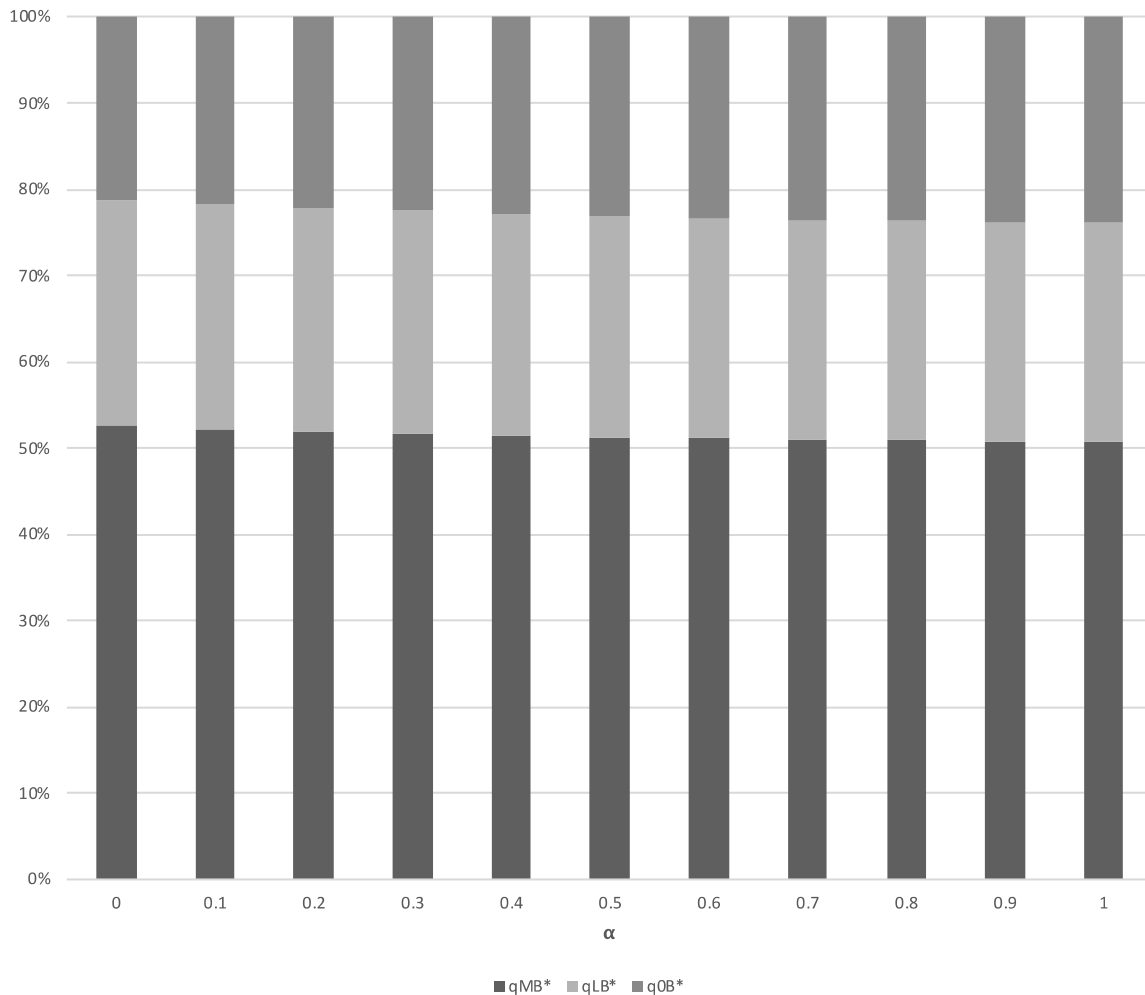
The model predicts that if an ID regulation is implemented, the market shares of both the international and the local firms increase ( $q_{MB}^*$  and  $q_{LB}^*$  in Table 5-3). The number of consumers who decide to buy no product decreases in a regulated market. Figure 5-4 reports firm market shares and the demand gap in country B as a function of  $\alpha$ . In the illustrative numerical example, the market share of product MB is 50.8% for  $\alpha = 1$  and

---

<sup>37</sup> It is assumed in the entire discussion that ID regulation provides unbiased and correct information.

52.8% for  $\alpha = 0$  (i.e., under a perfect ID policy). The demand gap (the share of consumers who do not buy anything) is 23.9%, 50.8% for  $\alpha = 1$  and 21.3% for  $\alpha = 0$ .

Figure 5-4: Market shares in Country B as a function of  $\alpha$



The illustration example suggests that ID regulations might have a limited impact on market shares, resulting in remarkable adjustments in prices and quality instead. This finding does not contradict the results from Figure 5-3. In fact, the variable  $\omega_{i,MB}$  was computed by fixing prices and quality. On the other hand, in the policy simulation presented in this review, firms are allowed to adjust their strategy.

In an unregulated market, consumers have higher quality expectations from product MB. As a consequence, firm M can charge higher prices. The firm focuses on the consumers with the highest willingness to pay for quality and extracts the largest surplus possible from them. As a result, the market share of firm M increase under the ID regulation.

The strategic reaction of firm LB to the strategy of firm M for the unregulated market is to attract consumers who find MB too expensive and so prefer a cheaper product. In

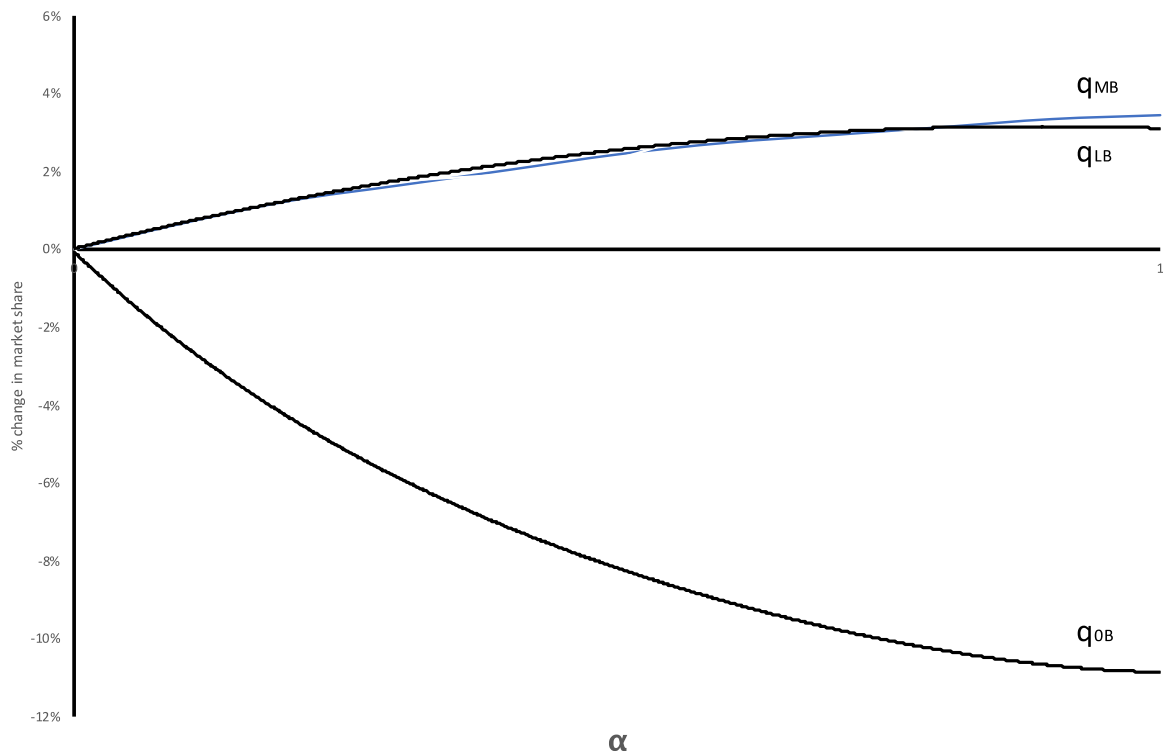
the absence of regulation, firm LB chooses higher prices and higher quality than it would under perfect information. As a consequence, the market share of LB slightly increases under the ID regulation.

Under the policy, the lower prices of firm LB gains consumers who are not willing to pay high prices for the product. As a result, the share of consumers who are not buying either MB or LB increases.

In this model, DC-SIP results in firms focusing on smaller and more profitable segments. The apparent paradox of ID regulation increasing the market shares of firm M is explained by the joint determination of price and quality. The effect of the price decrease offsets the market share loss due to lower perceived quality.

The result has strong policy implications. Despite the magnitude of consumer disappointment (as in Figure 5-3), it is not necessarily true that implementing ID regulation determines a major change in consumer choices. Firms are expected to adjust prices and quality in order to keep their market. The illustrative model provides an example of possible increase in the share of firm M. In addition, the model suggests that ID policy might favour market access for consumers who were previously excluded. Figure 5-5 illustrates the percentage changes in market share from the illustrative model.

Figure 5-5: Percent change in market share due to the adoption of a perfectly efficient ID regulation as a function of  $\alpha$





## 5.5 Product of reference (PoR) regulation

A regulator willing to maximise the aggregate surplus of the two countries ( $sw_{A+B}$ ) may consider a policy imposing that the quality of product MB must be equal to that firm M supplies to country A under perfect information. In the numerical example presented in this Chapter, this regulation requires  $u_{MA}=u_{MB}=4.053$  (from Table 5-3).

Table 5-4: Equilibrium under a 'product of reference' regulation

Products	$u_{MB}^*$	$u_{LB}^*$	$p_{MB}^*$	$p_{LB}^*$	$q_{MB}^*$	$q_{LB}^*$	$q_{0B}^*$	$y_{MB}^*$	$y_{LB}^*$	$CS_{MB}^*$	$CS_{LB}^*$	$SW_B^*$
M & LB	4.053	0.235	3.874	0.112	1.015	0.509	0.477	-4.282	0.029	2.207	0.030	-2.016
LB only		1.000		1.000		1.000	1.000		0.500		0.500	1.000

Table 5-4 illustrates the outcome of the model under the product of reference regulation (country A is not affected by the regulation). The first row of the table reports the computation of the equilibrium under the assumption that both firms stay in the market. Compared to the perfect information equilibrium, firms provide higher quality for higher prices. Consumers benefit from the regulation. However, firm M makes a negative profit because they are forced to overprovide quality in a market where the marginal willingness to pay for it is low. Firm M has no incentive to sell in country B once the regulation is in place. Therefore, at the equilibrium the local firm is a monopolist. Row two of Table 5-4 illustrates the monopolistic equilibrium. The numerical example concludes that the regulation is only socially efficient if the value of  $\alpha$  exceeds 0.2. In this case, the social welfare in the regulated market is higher than the unregulated one. Noticeably, if the bias is very low (i.e., for  $\alpha$  equal or less 0.1), the regulation also harms consumers. The policy is always beneficial for the local firm.

The numerical example stresses the unintended consequences of a strict regulation on quality. If the costs for providing the imposed quality are too high compared to consumer willingness to pay, the outcome of the policy is a reduction in trade. Noticeably, the demand gap increases in the monopoly outcome, meaning that a group of consumers is driven out of the market. In fact, the monopolistic local firm increases quality and price in order to supply consumers who have a high willingness to pay. Consequently, the local product is too expensive for those consumers who have low willingness to pay.

## 5.6 One-market, one-quality (1M1Q) regulation

In this policy scenario, the international firm is constrained to choose one level of quality for all countries, that is,  $u_{MA} = u_{MB}$ . In contrast to the PoR regulation, the firm is free to choose any quality level. Table 5-5 reports the outcome of the model.

Under the regulation, the international firm chooses a quality level (in this case 2.4) that is between the unconstrained perfect information values of the two countries (4.053 and 1.013). Firm M achieves negative profits in country B for this quality level. Therefore, the equilibrium is a monopoly of the local firm in country B and an unconstrained duopoly in country A (just as in the PoR case, see Table 5-4, row two for

the computation of welfare effect in Country B at the equilibrium). Although the 'one-market, one-quality' regulation is less binding than the 'product of reference' one, it can still result in a trade reduction. Just as for the PoR case, the policy is socially efficient only if  $\alpha$  exceeds 0.2. The effect on consumers depends on the level of  $\alpha$  too. In this example, for  $\alpha < 0.2$  the loss in consumer surplus from DC-SIP is lower than the one from firm B's monopolistic market power.

Table 5-5: Outcome of a 'one-market, one-quality' regulation

Country	$u_{Mk}^*$	$u_{Lk}^*$	$p_{Mk}^*$	$p_{Lk}^*$	$q_{Mk}^*$	$q_{Lk}^*$	$q_{0k}^*$	$y_{Mk}^*$	$y_{Lk}^*$	$CS_{Mk}^*$	$CS_{Lk}^*$	$SW_k^*$
A	2.400	0.649	3.755	0.508	2.146	1.072	0.783	5.177	0.334	6.974	0.372	12.857
B	2.400	0.224	2.228	0.104	1.024	0.513	0.463	-0.599	0.028	1.375	0.029	0.833
A+B								4.578				13.690

The results of the policy analysis are driven by the assumptions in the model. In particular, the choice of the numerical values of the parameters  $v_A$  and  $v_B$  determines the outcome. A sensitivity analysis is illustrated in the next section.

## 5.7 Sensitivity analysis.

In this section, a sensitivity analysis was run and the model outcome was computed with a different parameter choice. If the differences between the two countries is attenuated (i.e., if the difference between  $v_A$  and  $v_B$  gets smaller), the policy options become more efficient. The following discussion presents the results of the model assuming that  $v_B = 3$  instead of 2.

Table 5-6: Equilibrium under perfect information ( $v_B=3$ )

Country	$u_{Mk}^*$	$u_{Lk}^*$	$p_{Mk}^*$	$p_{Lk}^*$	$q_{Mk}^*$	$q_{Lk}^*$	$q_{0k}^*$	$y_{Mk}^*$	$y_{Lk}^*$	$CS_{Mk}^*$	$CS_{Lk}^*$	$SW_k^*$
A	4.053	0.772	6.890	0.656	2.100	1.050	0.850	6.255	0.391	10.638	0.425	17.709
B	2.280	0.434	2.907	0.277	1.575	0.786	0.638	1.980	0.124	3.366	0.135	5.605
A+B								8.235				23.314

Table 5-6 reports the equilibrium assuming perfect information and no regulation. Compared to the case of  $v_B = 2$  (Table 5-2), the equilibrium in country B exhibits higher product quality, prices, profits, and consumer surpluses for all products. As a consequence, social surplus is also higher.

The qualitative outcome of imperfect information is robust to the parameter values. Table 5-7 reports the calculation. The parameter change affects the magnitude of the percent variation of profits and surplus. In general, the percent variation (positive or negative) of each variable due to an increase in  $\alpha$  is smaller in module as  $v_B$  increases.

Table 5-7: Equilibrium in country B under imperfect information ( $v_B=3$ )

$1-\alpha$	$e_{MB}$	$u_{MB}^*$	$u_{LB}^*$	$p_{MB}^*$	$p_{LB}^*$	$q_{MB}^*$	$q_{LB}^*$	$q_{0B}^*$	$y_{MB}^*$	$y_{LB}^*$	$CS_{MB}^*$	$CS_{LB}^*$	$SW_B^*$	$SW_{A+B}^*$
0.0	2.280	2.280	0.434	2.907	0.277	1.575	0.786	0.638	1.980	0.124	3.366	0.135	5.605	23.314
0.1	2.252	2.052	0.433	2.867	0.275	1.575	0.790	0.635	2.410	0.123	2.636	0.134	5.304	23.013
0.2	2.270	1.824	0.434	2.892	0.276	1.575	0.789	0.636	2.891	0.124	1.801	0.135	4.951	22.660
0.3	2.332	1.595	0.437	2.983	0.279	1.573	0.788	0.638	3.421	0.124	0.861	0.135	4.542	22.251
0.4	2.441	1.366	0.442	3.141	0.284	1.571	0.787	0.643	4.000	0.126	-0.182	0.136	4.080	21.789
0.5	2.595	1.137	0.448	3.366	0.291	1.568	0.783	0.650	4.631	0.127	-1.326	0.138	3.570	21.279
0.6	2.795	0.909	0.456	3.658	0.298	1.564	0.783	0.654	5.307	0.129	-2.569	0.139	3.006	20.716
0.7	3.041	0.681	0.463	4.020	0.306	1.559	0.780	0.661	6.037	0.131	-3.912	0.141	2.398	20.107
0.8	3.333	0.453	0.472	4.449	0.315	1.555	0.778	0.667	6.815	0.134	-5.353	0.145	1.741	19.450
0.9	3.670	0.226	0.479	4.948	0.323	1.551	0.775	0.674	7.647	0.136	-7.646	0.146	0.283	17.992
1.0	4.053	0.000	0.487	5.515	0.331	1.546	0.774	0.680	8.527	0.138	-8.528	0.146	0.283	17.992

The outcome of the policy options changes when the difference between the two countries is small. The table below reports the outcome of the product-of-reference policy. For  $v_B=3$ , firm M achieves positive profits in country B under the regulation. In this case, public intervention does not result in a monopoly by the local firm.

Table 5-8: Outcome of the 'product of reference policy' ( $v_B=3$ )

Products	$u_{MB}^*$	$u_{LB}^*$	$p_{MB}^*$	$p_{LB}^*$	$q_{MB}^*$	$q_{LB}^*$	$q_{0B}^*$	$y_{MB}^*$	$y_{LB}^*$	$CS_{MB}^*$	$CS_{LB}^*$	$SW_B^*$
LB & MB	4.053	0.487	5.515	0.331	1.546	0.774	0.680	0.315	0.138	2.207	0.146	2.805

In this scenario, the outcome of the policy is an increase of the quality of both products in country B compared to the case of perfect information (country A is unaffected). Prices are also higher and quantities are lower. The regulation reduces the profits of the international firm and increases those of the local firm. The measure is always beneficial for consumers of product LB while the surplus of consumers of product MB only increases if  $\alpha$  exceeds 0.1. The policy is only socially efficient if  $\alpha$  is at least 0.7.

For  $v_B=3$ , the policy 'one-market, one-quality' allows firm M to gain positive profits in country B. Consequently, M is expected to trade in both countries.

Table 5-9: Equilibrium under a 'one-market, one-quality' regulation ( $v_B=3$ )

Country	$u_{Mk}^*$	$u_{Lk}^*$	$p_{Mk}^*$	$p_{Lk}^*$	$q_{Mk}^*$	$q_{Lk}^*$	$q_{0k}^*$	$y_{Mk}^*$	$y_{Lk}^*$	$CS_{Mk}^*$	$CS_{Lk}^*$	$SW_k^*$
A	3.051	0.710	4.972	0.578	2.123	1.063	0.814	5.901	0.362	8.495	0.383	15.142
B	3.051	0.464	4.034	0.307	1.559	0.779	0.662	1.636	0.132	4.273	0.141	6.182
A+B								7.537				21.323

Table 5-9 reports the results of the simulation. As expected, the policy results in lower quality (for both products) in country A. In country B, firm M always provides higher quality while the local firm only provides higher quality under the regulation if  $\alpha$  is greater than 0.7. Consumers in country A are harmed by the regulation while consumers of product MB are benefited and consumers of product LB are harmed if  $\alpha$  is below 0.7. The policy is socially efficient for any  $\alpha$  equal to 0.5 or higher.

## 5.8 Results and policy implications

Our numerical simulation identified possible unintended consequences of public regulation of the DC-SIP issue. Without careful analysis, the policy may result in trade reduction, harm to consumers (especially in country A), and profit loss even for the local firm in country B. These negative effects are caused by two factors. They are the consequences of constraints imposed on the international firm forcing overprovision of quality in country B (1M1Q and PoR policies) and under-provision in country A (1M1Q only). In addition, the local firm in country B may be induced to lower the quality of product LB to the detriment of local consumers and its own profits (ID and 1M1Q).

The first-best option is an ID policy that is able to eliminate the information bias completely. This approach restores market efficiency and maximises social surplus. However, the policy may be difficult to design as the information requirements may be complex and may differ from consumer to consumer (Chapter 4).

Enforcement of specific quality levels such as the 'PoR' or the '1M1Q' policies is only socially beneficial if the difference between the two markets are sufficiently small (i.e., if the difference between  $v_A$  and  $v_B$  is small) and if the information bias is sufficiently large. The condition for avoiding welfare-reducing regulation are stricter for the 'product-of-reference' policy than for the 'one-market, one-quality' policy.

## 5.9 References

- Grunert, K. G. (2005). Food quality and safety: consumer perception and demand. *European review of Agricultural Economics*, 32(3), 369-391.
- Motta, M. (1993). Endogenous quality choice: price vs. quantity competition. *The Journal of Industrial Economics*, 113-131.
- Mussa, M., & Rosen, S. (1978). Monopoly and product quality. *Journal of Economic Theory*, 18(2), 301-317.
- Paroush, J. (1978). On quality discrimination. *Southern Economic Journal*, 592-597.
- Szymanski, S., & Valletti, T. (2005). Parallel trade, price discrimination, investment and price caps. *Economic Policy*, 20(44), 706-749.

### **List of abbreviations**

DC-SIP	Difference in Composition of Seemingly Identical Branded Product
EU	European Union
ID	Information disclosure
IO	Industrial organisation
PoR	Product of reference
US	United States
1M1Q	One-market, one-quality

## List of figures

FIGURE 0-1: THE STRUCTURE OF THE REVIEW .....	12
FIGURE 1-1: DRIVERS OF PRODUCT DIFFERENTIATION AND IMPLICATIONS FOR DC-SIP .....	15
FIGURE 3-1 SITUATIONAL FACTORS .....	68
FIGURE 3-2 .....	70
FIGURE 4-1: THE TOTAL FOOD QUALITY MODEL .....	82
FIGURE 4-2: QUALITY CUES FOR PURCHASING DECISIONS AND QUALITY ATTRIBUTES FOR AGRIFOOD PRODUCTRE-PURCHASING DECISIONS .....	90
FIGURE 5-1: EQUILIBRIUM QUALITY LEVELS AS A FUNCTION OF $\alpha$ .....	117
FIGURE 5-2: WELFARE EFFECTS OF DC-SIP .....	119
FIGURE 5-3: PERCENT SHARE OF CONSUMERS CHANGING PURCHASING DECISION IF AWARE OF DIFFERENCE IN COMPOSITION. MARKET PRICES ARE GIVEN. ....	120
FIGURE 5-4: MARKET SHARES IN COUNTRY B AS A FUNCTION OF $\alpha$ .....	122
FIGURE 5-5: PERCENT CHANGE IN MARKET SHARE DUE TO THE ADOPTION OF A PERFECTLY EFFICIENT ID REGULATION AS A FUNCTION OF $\alpha$ .....	123

## List of tables

TABLE 3-1: OVERVIEW OF REASONS FOR PURSUING GLOBALISATION OR STANDARDISATION .....	65
TABLE 3-2: OVERVIEW OF REASONS FOR PURSUING INTERNATIONALISATION OR LOCALISATION .....	66
TABLE 4-1: FACTORS AFFECTING PERCEIVED QUALITY .....	87
TABLE 5-1: DEMAND FUNCTIONS FOR THE MULTINATIONAL FIRM M AND THE TWO LOCAL FIRMS LA, LB .....	114
TABLE 5-2 EQUILIBRIUM UNDER PERFECT INFORMATION .....	115
TABLE 5-3: EQUILIBRIUM IN COUNTRY B UNDER IMPERFECT INFORMATION .....	116
TABLE 5-4: EQUILIBRIUM UNDER A 'PRODUCT OF REFERENCE' REGULATION .....	124
TABLE 5-5: OUTCOME OF A 'ONE-MARKET, ONE-QUALITY' REGULATION .....	125
TABLE 5-6: EQUILIBRIUM UNDER PERFECT INFORMATION ( $v_B=3$ ) .....	125
TABLE 5-7: EQUILIBRIUM IN COUNTRY B UNDER IMPERFECT INFORMATION ( $v_B=3$ ) .....	126
TABLE 5-8: OUTCOME OF THE 'PRODUCT OF REFERENCE POLICY' ( $v_B=3$ ) .....	126
TABLE 5-9: EQUILIBRIUM UNDER A 'ONE-MARKET, ONE-QUALITY' REGULATION ( $v_B=3$ ) .....	126



## GETTING IN TOUCH WITH THE EU

### In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: [https://europa.eu/european-union/contact\\_en](https://europa.eu/european-union/contact_en)

### On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by electronic mail via: [https://europa.eu/european-union/contact\\_en](https://europa.eu/european-union/contact_en)

## FINDING INFORMATION ABOUT THE EU

### Online

Information about the European Union in all the official languages of the EU is available on the Europa website at:

[https://europa.eu/european-union/index\\_en](https://europa.eu/european-union/index_en)

### EU publications

You can download or order free and priced EU publications from EU Bookshop at:

<https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see [https://europa.eu/european-union/contact\\_en](https://europa.eu/european-union/contact_en)).

## The European Commission's science and knowledge service

Joint Research Centre

### JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



**EU Science Hub**

[ec.europa.eu/jrc](https://ec.europa.eu/jrc)



@EU\_ScienceHub



EU Science Hub - Joint Research Centre



EU Science, Research and Innovation



EU Science Hub

