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Marketing Barriers Facing Developing Countries

Essays on Product Differentiation, Discrimination and Brand Naming in the Market for Clothing

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Abstract:

Based on a statistical discrimination approach, in *Market distortions due to compulsory labelling of origin,* it is argued that labelling improves the match between consumers and producers to the extent that country of origin is an indicator of quality, while labelling reduces the incentives for third world producers to improve their quality. By implementing several experiments, in *Country of origin - a signal of product quality,* it is found that the consumers have negative perceptions of products from developing countries, while price is used as the main screening device of product quality. Adopting a property rights perspective on the firm, in *Property rights, investment in product differentiation and branding strategies in the market for clothing,* several control regimes are introduced and compared in order to secure that the party which invests in differentiation is able to reap the profit of such (unverifiable) investments.

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Introduction and general overview

> "Conventional analysis of exporting, by ignoring information gaps and transaction costs of various kinds, neglects the role of marketing barriers to new entrants" Lall (1991:137)

1. Two observations and two general questions

Bangladesh was extremely successful in the export of garments during the 1980s, and clothing has become by far the most important export sector. At present, the value of the clothing exports are around US$1,600 mill. annually. Bangladesh is the 7th largest supplier of clothing to the United States (US) and the 10th largest supplier to the European Union (EU). In 1990 Bangladesh was the largest supplier of shirts to EU. The clothing sector constitutes 1,650 registered production units, and almost 800,000 employees. All production is for export, whereas almost all fabrics are imported. Woven shirts, T-shirts and trousers are at the present the most important export items (see chapter 4, appendix 1 and Wiig, 1990a, for details).

Two observations drawn from the case of garment exports from Bangladesh form the basis for the following work on "information gaps" and "transaction costs", to use the terms from Lall (1991), as general and important constraints when developing countries try to differentiate their exports.

i) The exporters are reluctant to enter into new markets.
ii) Almost all design and marketing are undertaken by foreign distributors or buyers.

Both observations illustrate the significance of modelling the behaviour of the *distributors* in international trade analysis. Even though a distinction between producers and distributors is made in theories of vertical restraints and vertical integration (see Katz, 1989; and Tirole, 1988, for an overview), recent theories of international trade and general theories of product differentiation, neglect such a distinction. To remedy this deficiency, an analytical distinction is made between the production unit and the distributing agency marketing the product. I focus on the incentives for third world producers to differentiate their products through quality upgrading or brand naming of their products, and, furthermore, the problems of developing countries in capturing the increased profit opportunities

created by product differentiation in clothing markets. Traditional trade theories are hardly mentioned in this work. My focus is not on why trade occurs, nor on the welfare effects of trade.[1]

Since the two briefly mentioned observations constitute the starting point for this work, they deserve some further elaboration. The first observation is related to the exporters' *reluctancy to enter into new markets.* In 1985 the above described export miracle in an aid-depended low-income country faced a big obstacle. With the legacy of the Multi-Fibre Arrangement, the US imposed quota restrictions on important categories of exports from Bangladesh (Spinanger, 1987). The producers' response was to diversify to non-quota items to the US, but as shown in Wiig (1990a), this diversification was not successful. The growth in these categories was followed up by new US quota restrictions, which at that time imported 80 per cent of the total exports of garments from Bangladesh.[2] A transition period followed, where the exporters tried to penetrate the European clothing market. Faced by quotas in the US, one would *have expected that the exporters had made even greater efforts either to penetrate new non-quota markets as Europe or change into exporting high quality goods for the US* market so as to increase value added per quota unit. Even though the exports to Europe increased in the late 1980s, especially for basic items like shirts, 71 per cent of the factories visited during my early field work perceived the quality requirement by the Europeans, and marketing as the main problems in penetrating the European market (Wiig, 1990b). In my interviews with the managers of 34 production units, almost all complained about the lower mark-up when selling to Europe compared to the US. One reason is, of course, the quota premium by selling to the US. Another possible reason, discussed in Wiig (1990b), is related to 'information gaps', or – to use the terminology of the theory of industrial organisation literature – the *reputation* of a particular firm. Reputation as a high quality producer acts as an information signal to new customers through different sets of diffusion

[1] An alternative approach to the study of rent capturing is theories of strategic trade policy. These theories analyse how domestic firms may capture rents through *policy interventions.* However, producers of clothing in developing countries are generally small and numerous, trade is between structurally very different economies based on comparative advantage, and governments generally do not have the required information to implement the 'right' policy. Apart from chapter 2, policy interventions are hardly addressed in this work. I refer to Krugman (1989), Rodrik (1988) and Helleiner (1992, especially part two) for a discussion of the significance of new trade theories for developing countries.

[2] The trade restrictiveness of the Multi-Fibre Arrangement (MFA) has been studied by several researchers. The most recent analysis, which also discusses the Bangladesh case, is by Anderson and Neary (1994). Welfare effects in exporting countries, including Bangladesh, of the MFA are analysed by Trela and Whalley (1990).

mechanisms, and at the same time previous customers are motivated to repeat their purchases.

Consumers do not possess complete information on the true quality of clothing products in terms of stitching, durability and colour protection (Wiig, 1992). In the absence of experience with new producers and imported products, the consumers will, *inter alia*, base their expectations about product quality on extrinsic characteristics of the products such as country of origin, price, brand name, retailer's reputation and marketing efforts. The signal feeds back to the producer's choice of entry strategy. Producers stand the risk of deriving no profits from their investments in increased quality if they do not have an established reputation. If this is the case, a strategy that aims at quality improvement is unpropitious, and the producers may get caught in a quality trap. Hence, according to this approach the observed phenomenon is a rational response, and a reflection of the firms' weak incentives to produce high quality goods.

The *first* question raised in my work is related to such incentive effects. In chapter 2, I assume that the consumers are using the reputation of the country of origin as a screening device, or as a crucial element in drawing inferences about product quality (Chiang and Masson, 1988; Ericson et al., 1984; Choi, 1992). More specifically, I analyse the *efficiency and distributive effects of compulsory labelling of origin.* In Norway such rules exist only for clothing products. The theoretical approach is a model based on *statistical discrimination theory* (Phelps, 1972; Stiglitz 1973, 1975).

The theoretical model in chapter 2 is followed up by a comprehensive empirical analysis in chapter 3. Here, the focus is on whether the consumers are using information of country of origin in their actual buying behaviour. *Do the consumers use origin as a signal of quality, or as a value in and of itself,* a so-called affective or emotional value?

While country of origin is an inherited characteristic of a "product", alternative signals may be used strategically by the producer or by his distributors. When such alternative signalling activities occur, one would expect that the consumers pay less attention to origin as a signal of quality.[3] Do the consumers use country of origin, price, the brand name of the distributor, or a combination of these signals when they form or adjust their quality perceptions of a particular clothing product? I focus on these signals since there exists a huge theoretical literature on

[3] The theory of the firms' choice between alternative or complementary signals is elaborated in Engers (1987).

the role of price and brand name in addition to country of origin, as signal of product quality.[4]

The second observation is that almost all *design and marketing are undertaken by the distributor or buyer* (Wiig, 1990b).[5] As argued by Keesing and Lall (1992), production to buyer's orders is a general phenomenon in developing countries in markets where design changes rapidly. Like Egan and Mody (1992), Lall (1991) and Rhee (1990) focus on institutional mechanisms supporting a close relationship between the buyer, usually located in a developed country, and the seller located in a developing country. One such link is direct contact where the buyer makes the design and provides quality control assistance. Even though these analyses seem to provide good reasons for a close relationship between the buyer and the seller (see appendix 1 in chapter 4 for an illustration), such theories can hardly explain the circumstances under which the buyer will invest in design making and in marketing of the final product. Furthermore, these theories are unable to explain general conditions facilitating the creation of producer-oriented brand names as a strategy to circumvent the present buyer-initiated type of differentiation. Rather, they focus on one specific governance structure, characterised by a bilateral relationship between the buyer and the seller.

In chapter 4, the second question is addressed: *Under what conditions is it reasonable to expect that the distributor (buyer), or, alternatively, the producer (seller) will invest in differentiation?* Why is it that brand names in the clothing sector are only secondarily related to the producers? When differentiation is primarily related to marketing of a particular brand with a specific design, the producer is, in fact, exporting a homogenous product, namely sewing. As such it is a spot market for suppliers competing in capacity and the suppliers face perfect competition. Thus, what the consumer perceives as product differentiation (e.g. shirts of different designs) is a homogenous product (namely sewing) from the buyer's (distributor's) point of view. Hence, differentiation does not necessarily lead to increased producer profit. The theoretical framework is based on transaction costs analysis (Williamson, 1985), and the property right perspective on the firm (Grossman and Hart, 1986), while the application part is inspired by the analysis of Lyons and Bailey (1991).

[4] Prices as a signal of product quality is analysed by Alcaly and Klevorick (1970); Scitovszky (1945); Stiglitz (1987); Tellis and Wernerfelt (1987); Bagwell (1987; 1992); Bagwell and Riordan (1991). Brand name as a signal of product quality is analysed by Wernerfelt (1988; 1991); Paba (1991).

[5] Distributor and buyer are used as synonyms, and also producer, supplier and seller are all used as synonyms.

Closer investigation of these two observations shows that they are interrelated. Both illustrate the importance of well qualified buyers in the development of a country's exports of differentiated products. First, the distributor, rather than the country of origin may provide the quality reputation of a particular clothing product (see chapters 2, 3 and 4). Second, the distributor usually has more knowledge of the final demand and therefore has a cost advantage in marketing. The producers are not facing the consumer market directly and, hence, require a distributing agency for marketing their products (see chapter 4). Since marketing costs assumed to be unverifiable, costs arise when a producer in a third world country try to control the activity of the distributor. Third, the buyer transfers technical knowledge and information to the production unit (see chapter 4, especially appendix 1).

2. Theoretical approaches

Three different theoretical approaches are used in this work: First, the "address" model of product differentiation; particularly the Lancaster approach to utility maximising consumers. Second, theories of moral hazard and adverse selection problems arising in situations where consumers have asymmetric information of product quality. My focus is on the consumers' use of statistical discrimination as a tool for updating their quality perceptions, and the resulting incentives for third world producers to enter new markets. Third, theories of transaction costs and the limits of the firm. The focus is on how the distribution of property rights may influence the incentives to invest in product differentiation. These approaches are followed up by comprehensive empirical analyses in chapters 3 and 4 (section 5 and appendix 1). The following gives a brief overview of the theories mentioned above.

Theories of product differentiation (location) - "Address" models. Generally, product differentiation increases profit if the strategic effect of one's own differentiation is larger than the effect of reaching a smaller market (Tirole, 1988). If competitors increase their prices as a result of a particular firm's product differentiation, price competition is relaxed. Fudenberg and Tirole (1984) have termed this phenomenon "puppy dog" strategy. By locating far away from the neighbouring firms, one looks soft and thereby induces competitors to be soft. I have given an overview of different approaches to product differentiation and circumstances under which product differentiation increases profit in Wiig (1990c), and therefore only give a brief overview of the literature here.

Archibald, Eaton and Lipsey (1986) distinguish between "address" and "non-address" models of product differentiation. In address models, products have an

address in a *n* dimensional space of characteristics, while non-address models have no objective measures with which to compare different products (e.g. products of different qualities). Under vertical product differentiation, consumers agree on the ranking of the goods, but since they have decreasing returns on the consumption of other goods, their willingness to pay for quality increases with their income. Consumers buying low quality products must therefore be compensated through lower prices for their *a priori* preferences for high quality products. Under horisontal product differentiation, the consumers' preferences for an ideal good may vary even though the consumers have the same income.

When the differentiation is horisontal, the concept of quality is subjective and related to the distance between the consumer's ideal good and the product which is closest to his ideal good. In contrast to models of vertical product differentiation, an increase in the size of the market will increase entry and thereby induce more competition. When distance costs, or transport costs in Hotelling's[6] model, are convex, the consumer's loss is an increasing function of the distance to his ideal good, and the competition is localised. Products or brands are only competing with their neighbours (if the space of characteristics has only one dimension, a particular firm has two neighbours) even though the number of firms is infinite. Thus, market demand is not perfectly elastic, and a change in prices may induce changes in the overall market structure. If the differentiation is vertical and the entry costs are fixed (natural oligopolies), price competition implies that a limited numbers of entrants (two) are penetrating the market (Shaked and Sutton, 1983). When quality improvement is related to the variable costs, additional firms may enter the market (Shaked and Sutton, 1982).

The characteristics model of Lancaster (1966, 1971, 1979) represents an analytical approach to product differentiation which may subsume the above "address" models based on both horisontal and vertical product differentiation. The analysis in chapters 2 and 3 are both inspired by this particular approach. Products can be differentiated physically and objectively by character attributes such as durability, sun resistance, design, types of fabrics, producer country, retailer, marketing, etc. Brands are in this manner given an address in the character space. Quality improvements will similarly to prices have an impact on all consumers. Consumers will, however, react differently to quality changes based on different weighing of the attributes (represented by the shadow prices on various characteristics). In

[6] Hotelling (1929) assumed linear transport costs. His main conclusion was that firms tend to locate in the centre to reach a bigger market, and thus standardisation was the expected market outcome. However, as argued by d'Aspremont, Gabszewicz and Thisse (1979), Hotelling underrated price cutting strategies.

chapter 2, I concentrate on the single cue case where the consumers achieve utility through one characteristic only; namely quality. Quality is, however unknown to the consumers. They must therefore rely on an imperfect indicator of true quality in their quality perceptions. In chapter 3, a multi-cue context is analysed in order to estimate the consumers' relative weighing of the different characteristics influencing the consumers' choice of a particular clothing product.

Theories of asymmetric information - entry and statistical discrimination. When the goods in question are experience goods, the price competition among firms will induce the prices to be identical to the marginal costs corresponding to the expected quality in the market (Akerlof, 1970). Without an established reputation for quality, producers may risk low returns on their investments in higher quality, making a strategy for quality improvements a highly unsound one.

In an early study, Bain (1956) analysed information failures as an entry barrier. Akerlof (1970) pointed out that asymmetric information may in the ultimate instance lead to complete market disappearance. Akerlof (1970), Grossman and Horn (1988), Bagwell and Staiger (1989), and Esfahani (1991) all argue that the entry problem related to asymmetric information is particularly relevant for developing countries. Based on Bagwell and Staiger (1989) and Shapiro (1983), the following problems discussed in Wiig (1990b) confirm this conclusion: high discount rates (the future is given low emphasis); few repeated purchases; high probability of low quality production; and low mark-up of quality products from developing countries.

Intuitively, one would expect that in a competitive market, there is no space for investments in reputation. Klein and Leffler (1981) distinguish between sunk firm-specific assets and production costs which are salvageable. As long as prices are sufficiently above salvageable production costs, firms may be disciplined to produce high quality products. Shapiro (1983) has also shown that it is possible to acquire a quality premium under perfect competition. In his model the quality premium represents a normal return on an investment in reputation (see also the model by Grossman and Horn, 1988). While the above literature is dealing with moral hazard problems arising in a world of asymmetric information, the signalling literature (e.g., Spence, 1973; Kihlstrom and Riordan, 1984; Milgrom and Roberts, 1986) deals with how firms may reduce adverse selection problems. In this literature it is commonly assumed that firms choose the level of their signals to maximise their profits, and if a separating equilibrium exists, the signal is a perfect indicator of quality. I treat both types of theories as common knowledge, and refer to Wiig (1990b) for an overview and an application related to the first observation described above.

My specific approach in chapter 2 is a statistical discrimination model. The model is presented as a framework for studying the consumers' quality perception adjustments. I focus on a situation where the signalling cost is the same for all firms, and the signal is therefore not a choice variable. Hence, incentive effects, such as whether a firm should signal its quality and the choice of the most cost-effective signal, are not addressed. In this particular world of imperfect information, all products are entering the market place, and by using the results from the statistical discrimination theory, the consumers are screening products of different qualities.

This approach is based on labour market models of discrimination founded on gender and race, where the employers do not have full information on the productivity of the individual employee (Aigner and Cain, 1977; Lundberg and Startz, 1983; Lundberg, 1991). Discrimination is commonly considered as a consequence of either *prejudice* or of statistical discrimination. The first approach assumes that the consumers (or employers) dislike certain groups. This would in our case imply that country of origin enters as an independent attribute of a product. Stereotypes were studied early in the marketing literature. Gaedeke (1973) focused in particular on how such a bias in perception affects products from developing countries. While the marketing literature is using the term *stereotypes*, traditional labour market analysis, using the term *taste based discrimination* (e.g., Becker, 1971; Arrow, 1972; Welch, 1987). Statistical discrimination provides an alternative approach, on which origin is considered a carrier of information on product quality analogous to gender and race being carriers of information on productivity. *Statistical discrimination* means that consumers (or employers) use average attributes for a group in order to estimate individual attributes. In situations where the employers cannot fully observe the productivity of the individual employee, they may use an attribute of the employee's group as a basis for wage determination. This theory has contributed to explaining wage differentials between individuals despite their equal productivity and why certain groups underinvest in education and training (Lundberg and Startz, 1983; Schwab, 1986). The theory has also been used in migration studies to explain why certain groups achieve higher wages in one particular country than in an other (Kwok and Leland, 1984; Katz and Stark, 1984), and it has been used to test the existence of adverse selection problems in insurance markets (Dahlby, 1983). I argue that this theory has a much wider range of application. A *new* field is discrimination on the basis of information on origin. Furthermore, the general model developed in chapter 2, represents a new approach in order to analyse consumers' updating of their quality perceptions in cases where they do not possess information of group membership. This particular analysis may in future research be applied in e.g.,

labour market analysis dealing with welfare effects of laws which intend not to discriminate against any group.

Theories of transaction costs and the property rights perspective on the limits of the firm. Investments in differentiation have a cost which I assume is observable, but not verifiable. Parties to a deal or contract are therefore unable to go to court to handle disputes concerning their investments in differentiation. The distributor invests in marketing, while the producer invests in a quality upgrade. Such incomplete contracts give rise to transaction costs which may be reduced by alternative institutional settings. Williamson (1985) focuses on procedures and institutions (governance structures) to handle situations which are not foreseeable by contracts. The property rights school, by introducing the notion of authority or residual control and claims, argues that the difference in governance structure is a residual right. The firm has power to do things not foreseen in a contract.[7] Residual rights in terms of residual control influence the ex post bargaining position of the parties and their division of ex post surplus. The division in turn influences the actors' investments in a relationship. Similar to the property rights school, I emphasise the role of ownership to a specific asset (the brand name). To put it simply: The observed pattern of buyer initiated differentiation in the market for clothing may be explained by the needs to give the distributor incentives for marketing of the final product. For producers, there is a cost, but no return of controlling the activities undertaken by the distributors. The property rights perspective is applied in chapter 4.

3. Trapped forever?

The experience of Bangladesh is not unique. Japan and the New Industrialised Countries (NICs) of East Asia went through periods where their products had a reputation for bad quality. These countries have been able to dispel this reputation through a successful industrialisation based on export-oriented growth with gradual product and market differentiation. Electronics, computers, cars and car parts from the NICs are today fully substitutable with similar products made in the traditional industrialised countries. Hence, the reputation of firms in a specific country, e.g., Bangladesh, may change over time (Roth, 1987; Lillis and Narayana, 1974).

Textiles and garments are still the most important manufactured exports for developing countries, including South Korea, a fact which should warn one from excluding the possibility of investments in quality improvements within this sector.

[7] Grossman and Hart, 1986; Hart and Moore, 1990; Hart, 1989. See also the refinements by Milgrom and Roberts, 1990, and Kreps, 1990.

Quality improvements through systematic quality controls are regarded as one of the most important prerequisites to innovation and economic progress within the Japan-oriented business literature (Imai, 1986; Deming, 1986; Mizuno, 1988). Porter (1990), representing a Western-oriented perspective, also emphasizes how innovation and quality improvements lead to product differentiation and market power through market segmentation. Porter focuses on the vulnerability of comparative advantage based on wage costs in the face of new actors (cf. competitive pressures on the NICs from Thailand and Malaysia), and the importance of deepening and creating comparative advantages. Quality improvements is a chain in a process of maintaining and deepening *comparative* advantages. The vulnerability to new low cost producers, price competition in markets for standardised products, and higher quality consciousness on the buyer's side, all underline the importance of quality improvements. By investments in quality upgrading, the producer may also increase his capabilities and the probability for maintaining a long term relationship with a buyer (see chapter 4, especially appendix 1).

However, origin effects may distort the incentives for third world producers to improve the quality of their products. In chapter 3, it is found that origin effects are mainly related to stereotypical attitudes while price is used as a signal of quality. From the consumer point of view, the effect of origin indicates the existence of a factor distorting competition. This factor is connected to stereotypical attitudes to products emanating from different countries. Hence, the producers are faced with prejudices on the part of the consumers. One implication is that marketing should be tailored towards changing such attitudes, rather than using informative marketing of product quality. But, as discussed in chapter 2 (see also Wiig, 1990 b), an individual producer does not take into account the group effect in terms of better quality reputation for the country, and a prisoners dilemma situation may arise. Such a dilemma may be solved more easily by intervention in marketing by the government in the exporting country or by firms coordinating their behaviour. From the perspective of the distributor or the producer, the fact that price acts as a signal of quality may increase their incentives to operate with higher prices. However, the producer does not face the consumers directly and this strategy is therefore only feasible for the distributor. From the point of view of the importing country government, there are sound reasons to override perceptions based on stereotypical attitudes by removing rules of compulsory labelling of origin.

Quality improvements are but one of many kinds of product differentiation. If producers in a developing country like Bangladesh are able to change the quality reputation of their products, like the Koreans were able to, it will be far more

difficult to create their own *brands* in the market for clothing.[8] South Korea is one of the few developing countries that have managed to establish its own international brands. However, South Koreans have created brands in the market for electronics and automobiles – not in the market for clothing. As argued in chapter 4, producers cannot successfully create a new consumer label in the clothing market without also controlling a distribution channel for the marketing of the product. But, as long as producers are unable to control the activities undertaken by the established distributors, the rational strategy is to separate production and distribution decisions. An alternative, but costly strategy is to create their own distribution network. But, entry costs are high, producers generally lack the required knowledge of marketing and the control problem is severe. Those who are familiar with the market, do not get the right incentives in marketing of the final product.

On the other hand, to the extent that production in many markets are standardized, it would be easier for producers in developing countries to produce on a subcontract basis - even though they presumably do not capture any rent by such a strategy.

What is attainable in the short run is to make investments to increase producer's capabilities, reduce costs and to invest so as to increase one's value to particular buyers. Whether such investments increase long-term profits is another question, but they are definitely necessary to keep their comparative advantage and capacity in a world of rapid transition. In fact, those firms which have undertaking such investments are performing better than the others (see chapter 4, appendix 1).

4. Summary of the results

In chapter 2 three kinds of distortions are analysed and compared under two different policies: First, differences in the price of products with equal quality. Second, differences in investment incentives to improve quality. Third, differences in the matching between a particular buyer and a seller. Statistical discrimination theories are used in order to analyse the distributive and efficiency effects of compulsory labelling of origin. The benchmark is a policy where products purchased by the consumers are not labelled by origin. It is argued that labelling has two opposite efficiency effects. On the one hand, it improves the match between consumers and producers to the extent that origin is an indicator of quality. On the other hand, it reduces the incentives for third world producers to

[8] To some extent the recent success in entering the European market, at least as the standard garments are concerned, indicates that the reputation of Bangladesh has improved.

improve their quality. Thus, compulsory labelling may catch these producers in a "low quality trap".

In chapter 3 I analyse the attitudes of Norwegian consumers and their responses to information about the country of origin of clothing. Do they use information about a product's country of origin to guide their actual buying decisions? The study is based in large part on a consumer survey and on two different experiments, making use of conjoint and regression analyses. It is found that the consumers have negative perceptions of products from developing countries, while price is used as the main signal of quality. The negative perceptions can be compensated by branding their products, or by other positive attributes.

In chapter 4, I distinguish between four general phenomena of product differentiation. Both the distributor and the supplier may invest in "brand" differentiation or "product" differentiation. Four control regimes are introduced and designed to secure that the party which invests is able to reap the profit of such investments. The organisation of property rights has both efficiency and distributive effects which, due to transaction costs, cannot be substituted by a contract between the two parties. The applied model shows that the actor which makes non-verifiable investments in differentiation (DI) is able to obtain the residual profits of the investments, provided that he controls the differentiation. In markets where DI is undertaken primarily by the buyers (e.g. the distributor invests in marketing and design), the buyer must have the control. On the other hand, in those markets where DI is undertaken by the supplier (through the choices of appropriate technology, capital equipment and product quality), the supplier must have the control. In cases where there are externalities, as when the buyer's investment influences supplier's costs, or the supplier's investment influences the buyer's product value, buyer control and supplier control, respectively, these are second-best solutions. However, these solutions are better than a purely competitive market. The model developed is applied to the market for clothing.

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Chapter 2

Market distortions due to compulsory labelling of origin

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Abstract:

Three kinds of distortions are analysed and compared under two different policies: First, differences in prices of products with equal quality. Second, differences in investment incentives to improve quality. Third, differences in the match between a particular buyer and a seller. The analytical framework is based on theories of statistical discrimination in labour markets and matching theories in product markets. This new approach is used to analyse the distributive and efficiency effects of compulsory labelling of origin. The benchmark is a policy where products purchased by the consumers are not labelled by origin. It is argued that labelling has two opposite efficiency effects. On the one hand, it improves the match between consumers and producers to the extent that country of origin is an indicator of quality; on the other hand, it reduces the incentives for third world producers to improve their quality. Thus, compulsory labelling may catch these producers in a "low quality trap".

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1. Introduction

A distinction should be made between *rules of origin* and *labelling of origin.* Whereas rules of origin mainly determine a state's tariff and quota structures towards preferential or non-preferential trading partners (Asakura, 1993; Hoekman, 1993), compulsory labelling of origin results from consumers' tastes or preferences with respect to products of different origin. Furthermore, when consumers have imperfect information about product quality, they may use an extrinsic characteristic of the good as a screening device or proxy for quality. This article deals with the use of country of origin (CO) as such a proxy.[1]

As opposed to the economic effects of rules of origin, which are well documented in the literature (Vermulst and Vaer, 1990; Palmeter, 1990; Hoekman, 1993), studies of the economic effects of labelling of origin are lacking in economic journals.[2] This can be remedied by extending the concept of statistical discrimination used in labour market analysis to the analysis of discrimination in product markets. Two policies are compared. First, a policy regime characterised by compulsory labelling of origin (CCO) whereby firms are required to label their respective products by CO (e.g., by way of a CO sticker or label attached to each product). Second, a regime where such discriminating rules do not exist (NCO), and the firms are not required to label their products by CO. Elimination of rules about compulsory labelling of origin does not prevent individual producers from continuing with labelling. But, in this article I do not consider cases where CO labels are used as a marketing device. According to GATT rules of origin, under both policies firms have to label a *category* of products (e.g., by way of labelling the package or cartons as opposed to individual product).

If the consumer preferences for a group of products are independent of the product's origin, and the consumers have perfect quality information, there is no reason for implementing CCO. Some countries like Norway have implemented CCO for specific categories of products such as clothing. The EU views CCO as a distortive policy influencing the structure of competition among firms of different country origin. The main objective of this article is to discuss whether such rules distort international competition. On the one hand, CCO entails better

[1] Rules of origin and labels of origins have at least one thing in common - the definition of CO. In an international environment where parts of the product are made in country A while other parts are made in country B, serious problems may arise. This question was addressed in the Uruguay Round, even though the emphasis there was on harmonisation of CO rules. In this article I take a rather pragmatic approach - CO refers to the country where the product is made.

[2] However, in marketing journals there is a huge empirical literature analysing consumers' reaction towards information about CO labels.

information to the customers. On the other hand, better information may influence both resource allocation and distribution among producers. Specifically, I want to provide answers to two questions.

Under what conditions does CCO have a distributive effect only? I will study the distributive effects among *individual* producers, i.e. that a typical producer in one country receives a higher price than an identical producer in another country. Second, I will analyse the distributive effects among groups of producer *countries*. Even though CCO may imply individual distortions of competition, it does not follow that the country in question would suffer. Third, distributive effects among intra-country *groups* of producers are analysed. Low-quality producers in developing countries would gain from being regarded as an average of their group while high-quality producers would probably lose.

Under what conditions can CCO influence the allocation of resources? Two opposing effects are discernable with regard to resource allocation. First, the incentive effects of CCO may lead producers in developing countries not to undertake a quality upgrade. CCO may thus contribute to creating a vicious circle in the sense that countries with a poor reputation maintain this reputation by producing low-quality products. Distortion of competition would in this case mean that labelling contributes to freezing the prevailing distribution of labour among countries. Second, CCO may lead to a better matching between producers and consumers. Studying the problem of matching will be limited to situations where the consumers exhibit differential willingness to pay for quality (vertical product differentiation). CCO may in this situation make it easier for high-quality producers to sell their products to consumer groups with high willingness to pay for high quality.

These two main questions are related to situations where origin is used as a screening device for product quality. The theoretical approach is based on labour market models of discrimination founded on gender and race where the employers do not have full information on the productivity of the individual employee (Aigner and Cain, 1977; Lundberg and Startz, 1983; Lundberg, 1991). Discrimination is commonly seen as a consequence of *prejudice* or of statistical discrimination. The former assumes that the consumers (or employers) dislike certain groups. Applied to our case this would mean that country of origin enters as an independent attribute of a product. In the second case, origin is a carrier of information on product quality analogous to gender and race being carriers of information on productivity. Statistical discrimination means that consumers (or employers) use average attributes for a group in order to estimate individual attributes. These theories are used in labour market economics to explain wage differentials by

gender and race. In those situations where the employers cannot observe fully the productivity of the individual employee, they may use an attribute of the employee's group affiliation as a basis for wage determination. This theory has contributed to explaining wage differentials between individuals despite their factual equal productivity and why certain groups underinvest in education and training (Lundberg and Startz, 1983; Schwab, 1986). I will argue that this theory has a wider range of application. A new field of application is discrimination on the basis of information on origin (CCO). Furthermore, the models by Phelps (1972), Aigner and Cain (1977) and Lundberg and Startz (1983) may be analysed as special cases of the model developed below.

In order to use a discrimination model for the analysis of the two main problems set out above, I have selected two sectors of production or groups of countries. In each group of countries there is a range of firms producing goods of varying quality. Each firm produces one particular product, and I assume that the number of firms and quantities produced in each sector is given. Industrialised countries constitute, on the one hand, a sector with a presumed good reputation (high quality products) and developing countries, on the other hand, represent a sector with a presumed poor reputation (low quality products). As I want to concentrate on consumers' use of country of origin as a screening device, I assume perfect competition on the producer side. I would thereby evade complicating factors related to strategic adjustments by the firms. As an example, under imperfect competition producers may signal product quality in their introductory offers, or work as subcontractors for recognised brand names. I assume that the firms will incur increasing marginal costs from upgrading the quality of their products and that the market price thus is a positive function of quality. To simplify my approach, I analyse a small part of the clothing market where consumers are risk neutral and prices correspond to consumers willingness to pay. Quality is regarded as a vertical attribute so that consumers agree on the ranking of the individual goods. There is an infinite number of consumers. All consumers have imperfect information about product quality. However, the consumers' subjective perception of quality is identical to the distributive function of true quality (Weizsächer, 1980).

A general model is developed in section 2, and two special cases are analysed in the two following sections. In order to concentrate on distributive effects among producers, I make the assumption in section 2 that consumers are identical and that quality is an exogenous variable. Concentrating on distributive and allocative effects tied to producers' quality decisions, I will maintain the assumption of identical consumers in section 3, but quality decisions are endogenised. In section 4 the efficiency loss is tied to the matching of producers and consumers in an

ideal context. The latter analysis is based on the presence of two consumer groups with different willingness to pay for quality. The producer quality is, however, given. I only consider static and partial equilibrium models.

2. Distributive welfare effects of compulsory labelling

In this section I analyse short-term distributive effects among the producers under the two policies described above. The firms' supply of quality and quantity are assumed to be fixed.[3] In sub-section 2.1 the traditional statistical discrimination model is presented as a framework for studying the consumers' quality perception adjustment. I focus on a situation where firms cannot signal quality.[4] Hence, incentive effects, such as whether a firm should signal its quality and the choice of the most cost-effective signal, are not addressed. In this particular world of imperfect information, all products are entering the market place, and by using the tools of statistical discrimination theory, the consumers are screening between products of different qualities. Based on a partial equilibrium analysis, sub-section 2.2 analyses the price determination in the market. In sub-section 2.3 the analysis is extended in two directions. At the supply side, additional production sectors are included in the analysis. At the demand side, I discuss the screening process and the resulting price determination under NCO. On the basis of this analysis, I discuss welfare effects of a policy change in sub-section 2.4.

2.1 Conditional quality perceptions. A one sector model

I focus on one particular market segment of clothing products. There exists a given population of production units in this market, each producing a product of different quality. The products are described by their attributes Q which has only one dimension; true quality. Each firm produces one unit of a product with a given quality. True quality is unknown to the consumers who must rely on an observed, but imperfect indicator Y of the true quality. Y is a summary measure of all the information the consumer acquires during the buying process, and I have termed this information as a test score. The test measures the firm's true quality with a

[3] The assumption of a given quality may be based on high fixed costs in changing quality or that the producers are faced with quotas on their products.

[4] In the signalling literature (e.g Spence, 1973, Kihlstrom and Riordan, 1984; Milgrom and Roberts, 1986) the signalling costs vary between firms, and firms choose the level of their signals (or indicators) to maximise their profit. In a separating equilibrium the signal is a perfect indicator of quality. As opposed to the analysis by Mason and Sterbenz (1994) and by Dahlby (1983), in my analysis the imperfect indicator of quality has no incentive effects on whether one should sell the products or remove them from the marketplace.

random error. Clothing is tested both by the producer and the importer, and is usually labelled by a certificate informing of fabric contents and washing instructions. Furthermore, tests are presented in consumer reports. Here, I assume that these tests (both the characteristics of the test and the test results) are common knowledge, and the test serves as an indicator of true quality.[5] Based on this indicator, the consumers adjust their quality perceptions according to a Bayesian adjustment process (see lemma 1).

A high score on Y is either a result of random disturbance U or the product's true quality is high. The relationship between Y and Q is given by:[6]

(2.1) $Y = Q + U$

Q and U are drawn from a bivariate normal distribution with known parameters: $EQ = \alpha$, $EU = 0$, $VarQ = \sigma_q^2$, $VarU = \sigma_u^2$. Since Y is a sum of two uncorrelated (and independent) normal distributions, the distribution of Y is given by: $Y \sim N(\alpha,\sigma_y^2)$; where $\sigma_y^2 = \sigma_q^2 + \sigma_u^2$. The joint distribution of Q and Y is a linear function of the joint distribution of Q and U, and therefore has a bivariate normal distribution with known parameters:

(2.2) $\alpha, \sigma_q^2, \sigma_y^2, \rho$

where $\rho = \sigma_q/\sigma_y$ is the coefficient of correlation between Q and Y and $\alpha = EQ = EY$.[7] The marginal distributions of Q and Y are normally distributed.

Consumers are unable to observe Q, but all consumers observe the same imperfect indicator Y. *A priori* the consumer's expected value of a product's true quality is given by α. However, consumers condition their expectation on all available information and the test is used to update and readjust these expectations (Bayesian inference). Let $E(Q|Y) = \int Qg(Q|Y)dQ$. The parameters of the joint density function are public knowledge.

[5] An alternative interpretation of the model is the following: Each consumer undertakes a test and the distribution of the individual tests is identical for all individuals. If these distributions vary by individuals, the analysis is more complicated.

[6] For convenience I exclude subscript indicating individual products i in section 2 and 4.

[7] Reexpressing (2.1) U is equal to Y - Q. Taking the variance of these expressions, it follows that: $\sigma_{qy} = \sigma_q^2$ where σ_{qy} is the covariance between Q and Y. Since $\rho = \sigma_{qy}/\sigma_q\sigma_y$, it follows that $\rho = \sigma_q/\sigma_y$.

Lemma 1. (Statistical discrimination) When consumers condition their expectation of Q on all available information Y, and Q and Y have a bivariate normal distribution given by (2.2), then $E(Q|Y) = (1- \beta)\alpha + \beta Y$; where $\beta = \sigma_q^2/\sigma_y^2$

Proof: When Q and Y have a bivariate normal distribution by (2.2), it follows from DeGroot (1989; see relation 6, section 5.12 p. 303) that the conditional quality expectation is given by $E(Q|Y) = EQ + \rho\sigma_q(Y - EY)/\sigma_y$. Letting $\beta = \rho\sigma_q/\sigma_y$, while $\rho = \sigma_q/\sigma_y$ (by footnote 7) one obtains lemma 1. Q.E.D.

Remarks: If Q and Y are drawn from a bivariate normal distribution with known parameters, given by (2.2) in the above case, the conditional expected quality is a weighted average of an individual effect represented by the score on a test and a group effect (a priori expected value). The weight β measures the reliability of our test score. The conditional expectation ($E(Q|Y)$) is an *unbiased* estimator of true quality. The conditional distribution of Q has a normal distribution where $E(Q|Y)$ is given by lemma 1 and its variance is given by $Var(Q|Y) = (1 - \rho^2)\sigma_q^2$; where $(1 - \rho^2)$ is the coefficient of indetermination. $Var(Q|Y)$ is independent of Y, and the difficulty of predicting true quality is therefore the same for a product with a high score, a low score or a product with a medium score. However, it is easier to predict true quality if the product is chosen from a population in which true quality and its indicator are highly correlated. Since the coefficient of correlation between Q and Y is less than one, the variance of the conditional expectation is less than the *variance* of the unobserved true quality. Hence, Bayesian inference reduces the consumers' uncertainty.

2.2 *The price mechanism*

The market segment on which I focus is a *small* part of the clothing market, as for example the market of green shirts. Different types of green shirts are close substitutes, but differ in terms of quality. Consumers have no preferences for a particular colour of shirts. Since a minor part of income is used on green shirts, there are no income effects of a change in prices. Each consumer is *risk neutral.* A representative consumer's (marginal) willingness to pay for green shirts is an affine function of true quality:

$$V(Q) = k + \Theta Q \qquad k \geq 0 \tag{2.3}$$

Θ, a positive real number, reflects the marginal willingness to pay for quality, and may also be interpreted as a taste parameter expressing the intensity in the consumer's preferences for quality. In this section, the taste parameter is assumed

identical for all consumers, and k is a fixed parameter. The representative consumer is unable to observe Q, but observes the indicator Y and estimate Q by its conditional quality expectation E(Q|Y).

The consumer's outside opportunities and the prices of close substitutes, as for example red shirts, are assumed constant throughout the partial equilibrium model discussed below. That means: We are only analysing a partial policy change in this market segment of green shirts - not the whole market for clothing.

There is an infinite number of consumers. The assumption of an infinite number of consumers may seem unrealistic, but it does facilitate the adaptation of a traditional discrimination model to our field of analysis as it simplifies in this way the determination of prices. Furthermore, the attention of the analysis is concentrated on analysing the effects on the producers' profits due to a policy change.

Lemma 2. In a small market where quantity (supply) is fixed and there are an infinite number of identical consumers, the equilibrium prices are equal to consumers' marginal willingness to pay. If consumers' willingness to pay is an affine function of true quality (consumers are risk neutral), then the equilibrium prices are $P(Y) = k + \Theta E(Q|Y)$.

Proof: All consumers observe the same test score Y_i on product i and each consumer faces given market prices of the products in question. If $P_i > k + E(Q|Y_i)$, product i is not sold to any consumer. Consumers rather buy a close substitute like red shirts. If $P_i < k + E(Q|Y_i)$, an infinite number of consumers want to buy, while the supply is fixed. In a partial equilibrium model the only price vector which secures that all products are sold, or the equilibrium market prices, is given when prices are identical to the consumers' willingness to pay which in this article is assumed as an affine function of true quality.[8] Q.E.D.

Remarks: Two products having the same conditional quality expectation achieve common prices. The equilibrium prices are linear in the expected conditional

[8] If consumers have linear utility functions, as adopted by Akerlof (1970), Mussa and Rosen (1978) and Tirole (1988; see section 2.1.1), given by $U(Q,P) = \Theta Q - P$, and the representative consumer buys the particular product which maximises expected utility $\Theta E(Q|Y) - P$, it may be shown that lemma 2 may be derived from utility maximising behaviour. Then perfect elastic *market* demand follows from utility maximizing behaviour. Here, I rather go straight ahead, and my approach differs from Mussa and Rosen (1978), who on their part close the model by assuming that prices is determined on the supplier side (zero profit condition). However, they assume perfect information and free entry.

quality. A similar approach is taken in labour market models presuming wages reflect expected average productivity (Lundberg and Startz, 1983). From lemma 2 it follows that consumer's surplus is zero under both policies and consumers are neither loosing nor winning due to a policy change. However, the conditional quality expectation may vary between the two policies.

2.3 *Conditional quality perceptions and prices under two different policies. A two sector model*

In this sub-section, the analysis is extended by assuming there are two production sectors in our stylized economy. Sector one represents developed countries, while sector 2 represents developing countries. The number of firms in each sector is fixed and given by n_j (j =1,2). Since each firm produces one unit, total quantity is $n_1 + n_2$, and sector 1 sells a part f while sector 2 sells 1-f (where $0 < f < 1$). First, I express the conditional quality expectation and the general price functions under the two different policies. I start by analysing the CCO case. On the basis of these price functions, in sub-section 2.4, I proceed with analysing two particular cases where CO labelling has a distributive effect on firms' profits.

For j ε {1,2}, let the joint distribution of Q and Y in sector j have a bivariate normal distribution. These joint distributions are independent with public known parameters:

(2.2') $\quad \alpha_j, \sigma_{qj}^2, \sigma_y^2, \rho_j \qquad j = 1,2$

where $EQ_j = EY_j = \alpha_j$, while $\rho_j = \sigma_{qj}/\sigma_y$. Note that $\sigma_{y1}^2 = \sigma_{y2}^2 = \sigma_y^2$.

In the following analyses, I assume that the variance of the indicator is identical across sectors. If the reliability of the test varies between the sectors, this means that the variance of true quality and the variance of the error term vary between the sectors, but their sum ($\sigma_y^2 = \sigma_q^2 + \sigma_u^2$) is identical across sectors (see (2.1)). Letting the variance of the indicator be identical across sectors, the analysis is made more transparent without changing the general results of the model.

For j ε {1,2}, let $g_j(Q,Y)$ denote joint density of Q and Y in sector j. Let $g_j(Y) = \int g_j(Q,Y)dQ$. Let $E_j(Q|Y) = \int Qg_j(Q|Y)dQ$ denote the conditional quality expectation in sector j. Let $P_j(Y)$ denote market prices on products produced in sector j.[9]

[9] Under CCO, note that each sector is faced by a separate price schedule.

Furthermore, as a simplification, note that in sections 2 and 3 quality is scaled by letting:
(1) $\Theta = 1$ while $k = 0$

Lemma 3. (Prices CCO) If the joint distribution of Q and Y in sector j has a bivariate normal distribution given by (2.2'), then the equilibrium prices are linear in Y. $P_j(Y) = \Theta E_j(Q|Y) + k = \Theta((1- \beta_j)\alpha_j + \beta_j Y) + k$
If (1), then $P_j(Y) = E_j(Q|Y) = (1- \beta_j)\alpha_j + \beta_j Y$

Proof: From lemma 1 and (2.2') it follows that $E_j(Q|Y) = (1- \beta_j)\alpha_j + \beta_j Y$. From lemma 2 it follows that $P_j(Y) = \Theta E_j(Q|Y) + k$ and the first part of the conclusion follows. Then, the second part is self evident. Q.E.D.

Remarks: Individual products produced in the two sectors achieve identical prices only when their conditional expected quality is the same (by lemma 2). At a common value of the test score in the two sectors, the conditional expected quality and prices vary between the sectors either if the sectors' expected quality or the reliability of the test differs. When the conditional quality expectation is linear in the test score Y, P is linear in Y and $\partial P_j(Y)/\partial Y = \Theta\beta_j$. If (1), the equilibrium prices are equal to conditional quality expectation, and the conditional expected quality 'per dollar' is equal for all products. Since $EY_j = \alpha_j$, the expected price in sector j under CCO corresponds to expected quality, or $E_C(P|j) = \int E_j(Q|Y)g_j(Y)dY = \alpha_j$ (see sub-section 2.4), while the variance in prices is given by: $\sigma_{pj}^2 = \beta_j^2\sigma_y^2 = \beta_j\sigma_{qj}^2$.

When the *policy is NCO*, the joint distribution of Q and Y is a mixture of two bivariate normal distributions.[10] The mixture is not (bivariate) normal, and some calculus is required to characterise its distribution. First, I present an intuitive presentation of the conditional expected quality of this mixture. Then, I proceed with a formal proof.

Under NCO an observed product is drawn from a population which have two independent sub-populations (two sectors), each having a bivariate distribution with known parameters. Thus, the consumers know β_j and α_j and they observe a test score under both policies. The same test is applied under both policies, but the expected value of the score under NCO may differ from the expected score under

[10] See Johnson and Kotz (1972), chapter 36. A mixture distribution is a superposition of component distribution or a compound distribution. The authors give some examples where the mixture is normally distributed. Everitt and Hand (1981) give an overview of the literature of mixture distributions.

CCO. True quality is unknown under both policies, while sector is unknown under NCO. f and (1-f) represent the prior probabilities that a randomly drawn product comes from sector 1 and 2 respectively. Consumers adjust these prior probabilities according to a Bayesian procedure. When drawing a product with high score on Y, then it is likely to come from a sub-population having high expected quality. Let Pr(Y| j) represents the probability of observing Y when the product is drawn from sector j (j = 1,2). Since the indicator has a normal distribution in both sectors, these probabilities are given by the density functions $g_j(Y)$. The probability of observing Y, or Pr(Y) is given by a weighted average of these density functions. By using Bayes law, the conditional probability that a randomly drawn product with a given test score Y is drawn from sub-sector j is given by:

$$\Pr(j = 1 | Y) = f\Pr(Y | j = 1)/\Pr(Y) = \lambda(Y)$$
$$\Pr(j = 2 | Y) = (1-f)\Pr(Y | j = 2)/\Pr(Y) = 1 - \lambda(Y)$$

Each sub-population has a known conditional quality expectation $E_j(Q|Y)$ and $\lambda(Y)$ is determined below (see lemma 4).

For $j \in \{1,2\}$, $g_j(Q,Y)$ denotes joint density of Q and Y in sector j. Let $g_0(Q,Y)$ denote joint density of Q and Y when sector is unknown.

For $j \in \{0,1,2\}$, let $g_j(Y) = \int g_j(Q,Y)dQ$, and $E_j(Q|Y) = \int Qg_j(Q|Y)dQ$. Note that:

(2.4) $$g_0(Q,Y) = fg_1(Q,Y) + (1-f)g_2(Q,Y)$$

(2.5) $$g_0(Y) = fg_1(Y) + (1-f)g_2(Y)$$

Lemma 4. (The mixture) When consumers condition their expectation of true quality on all available information, and it is public information that an observed product with a test score Y is randomly drawn from a population which has two independent sectors with conditional quality expectations, then $E_0(Q|Y) = \lambda(Y)E_1(Q|Y) + (1-\lambda(Y))E_2(Q|Y)$; where $\lambda(Y) = fg_1(Y)/g_0(Y)$ and $0 < \lambda(Y) < 1$.

Proof: Since $g_j(Q|Y) = g_j(Q,Y)/g_j(Y)$, then (2.4) implies that:

$$E_0(Q|Y) = \int \frac{Qg_0(Q,Y)}{g_0(Y)}dQ = (f\int Qg_1(Q|Y)g_1(Y)dQ + (1-f)\int Qg_2(Q|Y)g_2(Y)dQ)/g_0(Y)$$
$$= (fg_1(Y)E_1(Q|Y) + (1-f)g_2(Y)E_2(Q|Y))/g_0(Y)$$

Since $(fg_1(Y) + (1-f)g_2(Y))/g_0(Y) = 1$ (by (2.5)), the conclusion follows. Q.E.D.

Lemma 4 is obtained in order to analyse the price function under NCO. In the proof of lemma 4, note that no assumptions are made on the joint distribution of Q and Y in sector j. Hence, *lemma 4 is not limited to cases where each sector has*

a bivariate normal distribution. Lemma 5 determines the price function under NCO while lemma 6 analyses the shape of this function. Let $P_0(Y)$ denote market prices when sector is unknown.

Lemma 5. (Prices under NCO) If both sectors have a bivariate normal distribution given by (2.2'), then the equilibrium prices under NCO are
$P_0(Y) = E_0(Q|Y) = \lambda(Y)\alpha_1(1-\beta_1) + (1-\lambda(Y))\alpha_2(1-\beta_2) + (\lambda(Y)\beta_1 + (1\ (Y))\beta_2)Y$

Proof: The structure of the proof is similar to the proof of lemma 3. For $j \in \{1,2\}$, $E_j(Q|Y) = (1-\beta_j)\alpha_j + \beta_j Y$ (by lemma 1). Thus, $E_0(Q|Y) = \lambda(Y)\alpha_1(1-\beta_1) + (1-\lambda(Y))\alpha_2(1-\beta_2) + (\lambda(Y)\beta_1 + (1-\lambda(Y))\beta_2)Y$ (by lemma 4). Since prices are equal to consumers willingness to pay (by lemma 2), lemma 5 is obtained. Q.E.D.

Let L(Y) denote the likelihood ratio. Note that:
(2.6) $\sigma_y^2 = \sigma_{y1}^2 = \sigma_{y2}^2$ (see (2.2'))
(2.7) $L(Y) = g_1(Y)/g_2(Y) > 0$
where Y has a normal distribution in both sectors.

Lemma 6. (Posterior probabilities - NCO)
i) If $\alpha_1 = \alpha_2$, then $\lambda(Y) = f\ \forall\ Y$. This also means that the marginal density functions of Y are equal in all sectors ($g_1(Y) = g_2(Y) = g_0(Y)$), and the posterior probabilities are equal to a priori probabilities.
ii) If $\alpha_1 > \alpha_2$, then $\lambda(Y)$ is increasing in Y.

Proof: Since $1/\lambda(Y) = 1 + (1-f)/fL(Y)$, it follows that $\lambda(Y)$ is increasing in Y if L(Y) is increasing in Y. On the other hand, if L(Y) = 1, then $\lambda(Y) = f$.

Since Y has a normal distribution with a common variance (see (2.6)) in both production sectors, it follows that $g_1(Y) = g_2(Y)$ when $\alpha_1 = \alpha_2$. In this case L(Y) = 1 (by (2.7)) and $\lambda(Y) = f$. Since the marginal densities are common in both sectors, it follows from (2.5) that these densities are equal to the marginal density of the mixture $g_0(Y)$, and the first part of the conclusion follows.

To prove the second part of the conclusion one has to show that if $\alpha_1 > \alpha_2$, then L(Y) is increasing in Y. The probability density function (p.d.f) of a normal distribution is well defined, and (2.6) and (2.7) imply that:
$L(Y) = \exp(-(Y-\alpha_1)^2/2\sigma_y^2)/\exp(-(Y-\alpha_2)^2/2\sigma_y^2) = e^{V(Y)} > 0$;
where $V(Y) = -(\alpha_1-\alpha_2)(\alpha_1+\alpha_2-2Y)/2\sigma_y^2)$. Thus, the derivative $L'(Y) = de^{V(Y)}$;
where $d = V'(Y) = (\alpha_1-\alpha_2)/\sigma_y^2$.

If $\alpha_1 > \alpha_2$, then $L'(Y) > 0$ and the second part of the conclusion follows. Q.E.D.

Remarks: If Y increases and expected quality is higher in sector 1 than in sector 2, it is more and more likely that a randomly drawn product is drawn from sector 1. Thus, the mixture is generally not a linear function of the test results. If $\alpha_1 > \alpha_2$, then lim $(P_0(Y) - E_1(Q|Y)) = 0$ when $Y \rightarrow \infty$ (in this case $\lambda(Y) \rightarrow 1$). On the other hand, when $Y \rightarrow -\infty$, then lim $(P_0(Y) - E_2(Q|Y)) = 0$. If $\alpha_1 = \alpha_2$, then $\lambda(Y) = f$, and the price function is linear in Y. In this case $\partial P_0(Y)/\partial Y = \beta_0 = f\beta_1 + (1 - f)\beta_2$.

Two special cases of the general model are considered in sub-section 2.4. The first one represents one interpretation of the traditional discrimination model by Aigner and Cain (1977), but where welfare effects of policy changes are considered. The second case represents one interpretation of the discrimination model by Lundberg and Startz (1983), but where quality is exogenous. In both cases, consumers are using Bayesian inference along the lines described in this section, and I only consider cases where $\alpha_1 \geq \alpha_2$ and $\beta_1 \geq \beta_2$. The analysis in section 3 and 4 represent extensions of these special cases, but where I focus on efficiency effects.

2.4 *Welfare effects of compulsory labelling*

Since quality and quantity are assumed to be fixed in both sectors under both policies, a firm's profits are measured by the market price (revenue). Costs are assumed identical under both policies, and profits increase when market prices increase. Since the conditional quality expectation is a stochastic variable, prices are stochastic. Some producers achieve higher prices than their expected quality while others receive less. I focus on distributive effects, in terms of expected profits, at the sector level of a policy change. The market shares constitute the different sectors' weight in the aggregate profit function, and profits are used as my welfare indicator. Note that the model does not generate any consumer surplus in any of the two regimes. The consumers will neither lose nor win and consumers are indifferent to a policy change. Since consumers are identical and both quality and quantity are fixed under both policies, only distributive effects arise in this section: What the producers in one sector win due to a policy change, the producers in the other sector lose.

For $j \in \{1,2\}$, note that consumers observe Y in sector j and the price functions are given by lemma 3. Under NCO, note that consumers observe Y, but not sector, and the price function is given by lemma 5. Even though products having a common test score achieve the same prices under NCO, note that their expected prices (with regard to the test result) vary across sectors as long as the probabilities of observing Y when the sector is j (Pr(Y|sector j) vary across sector. Let $E_C(P|\, j)$ denote expected prices in sector j under CCO (when consumers know

sector). Let $E_N(P|\ j)$ denote expected prices in sector j under NCO (when the sector is unknown to consumers, but known to producers), while $E_N(P)$ denotes expected prices under NCO. Under both policies prices correspond to expected conditional quality. Let ΔR_j denote expected change in revenue in sector j when the policy is changed from CCO to NCO. If $\Delta R_j > 0$, that means the sector's expected profits are higher under NCO than under CCO. Note that:

$$
\begin{aligned}
(2.10) \qquad & E_C(P|\ j) = \int P_j(Y)g_j(Y)dY = \alpha_j \\
& E_N(P|\ j) = \int P_0(Y)g_j(Y)dY \\
& \Delta R_j = E_N(P|\ j) - E_C(P|\ j) = \int (P_0(Y) - P_j(Y))g_j(Y)dY \\
& E_N(P) = \int P_0(Y)g_0(Y)dY
\end{aligned}
$$

Under CCO, by using the sentence of double expectation $E_C(P|\ j) = EQ_j = \alpha_j$. *The expected price is identical to the expected quality in each sector.* In the CCO case, these expectations are independent of the reliability of the test.[11] If the score is higher than α_j, price is higher than its expectation while the opposite is the case for lower scores. *On average, prices reflect expected quality in each sector.* The expectation of the price difference between the two sectors reflects a priori differences:[12] $E_C(P|\ j = 1) - E_C(P|\ j = 2) = \alpha_1 - \alpha_2$.

2.4.1 Same reliability in the two sectors

The joint distribution of Q and Y in sector j has a bivariate normal distribution. These distributions are independent with public known parameters:

$$(2.2'') \quad \alpha_j,\ \sigma_q^2,\ \sigma_y^2,\ \rho \qquad\qquad j = 1,2$$

where $EQ_j = EY_j = \alpha_j$ and I assume that $\alpha_1 > \alpha_2$. Note that the covariance and variances (including the variance of the random error σ_{uj}^2) are assumed to be identical in both sectors. Thus, $\beta_1 = \beta_2 = \beta$.

[11] If consumers are risk adverse, it can be shown that the expected values are influenced by the reliability of the test result for the two groups. Aigner and Cain (1977) have showed this in a situation where employers are risk adverse and have imperfect information about the productivity of employees. Rothschild and Stiglitz (1982) have also showed this based on a "matching model" where the productivity of employees are higher if they work in the right place ((un)qualified workers in (un)qualified jobs). In section 3, where quality is endogenous, the expected value is influenced by the reliability of the test instrument.

[12] Hence, we do not have discrimination towards a specific sector (Aigner and Cain, 1978; Cain, 1986). However, according to Phelps (1972) even when expected wage (price) reflects expected productivity (quality), the notion of discrimination towards a group is used.

Under CCO, the market prices are given by lemma 3 (by letting $\beta_1 = \beta_2 = \beta$).

(2.11) $P_j(Y) = E_j(Q|Y) = (1- \beta)\alpha_j + \beta Y$ $j = 1,2$

Since products from sector 1 have a higher expected quality than products from sector 2, it follows from (2.11) that at a common test score under CCO, *individual products* made in developing countries achieve a lower price than counterpart products made in developed countries. In this sense, CCO creates a 'distortion' among individual products with the same score on our indicator of true quality. Naturally, this type of distortion does not exists under NCO. *The individual price differences are independent of the level of the common test score,* and only in the case where $\beta = 1$ (complete information), will products from the two sectors achieve the same price at a given level of the test score. The price functions have identical slopes and are given by the straight lines drawn in figure 1.

Similarly, *under NCO,* market prices are given by lemma 5.

(2.12) $P_0(Y) = E_0(Q|Y) = (\lambda(Y)\alpha_1 + (1-\lambda(Y))\alpha_2)(1- \beta)+ \beta Y$

The consumers are substituting the expected quality in the two sectors by a weighted average. The observed test result for a given product is common under both policies. At a common score on Y, the price differential in sector j due to a policy change is derived from (2.11) and (2.12):

(2.13) $P_0(Y) - P_j(Y) = (1 -\beta)(\lambda(Y)\alpha_1 + (1 -\lambda(Y))\alpha_2 - \alpha_j)$ $j = 1,2$

Proposition 1. If $\alpha_1 > \alpha_2$ and $\beta_1 = \beta_2$, then $\Delta R_1 < 0$ while $\Delta R_2 > 0$. That is, on average the producer's profit in developing (developed) countries are higher (lower) under NCO than under CCO.

Proof: Since $0 > \lambda(Y) < 1$, while $\alpha_1 > \alpha_2$, (2.13) implies that:
i) $P_0(Y) - P_1(Y) = (1 -\beta)(1 -\lambda(Y))(\alpha_2 -\alpha_1) < 0$ $\forall Y$
ii) $P_0(Y) - P_2(Y) = (1 -\beta)\lambda(Y)(\alpha_1 -\alpha_2) > 0$ $\forall Y$

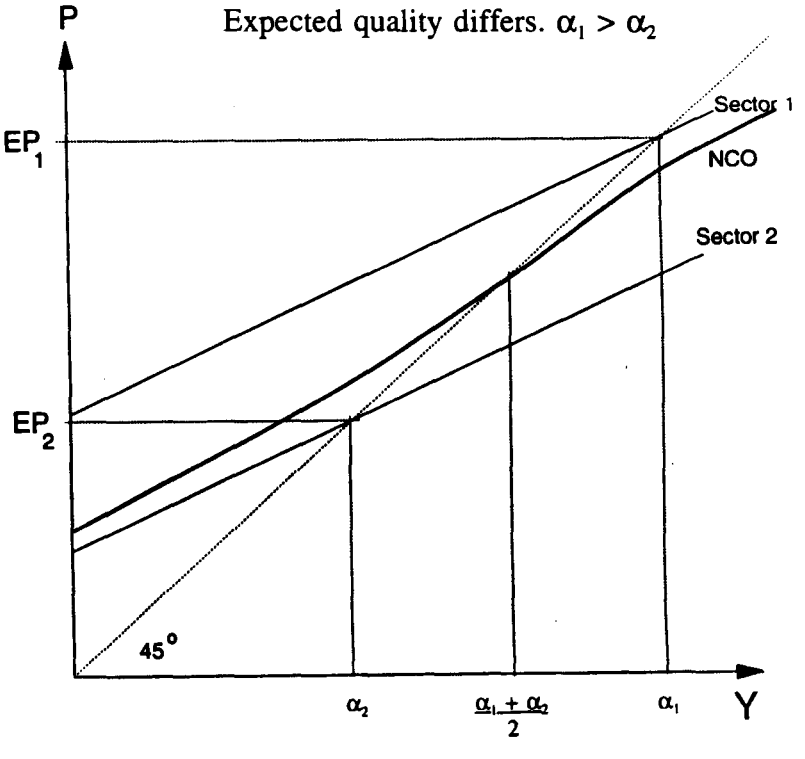
Since $\Delta R_j = \int (P_0(Y) - P_j(Y))g_j(Y)dY$, proposition 1 follows. Q.E.D.

Proposition 2. If $\alpha_1 > \alpha_2$ and $\beta_1 = \beta_2$, then the loss of implementing NCO is highest for low quality producers in developed countries, while the gain is highest for high quality producers in developing countries.

Proof: By i) and ii) in the proof of proposition 1, it follows that the loss in sector 1 is high if $\lambda(Y)$ is low. Since $\lambda(Y)$ is increasing in Y (by lemma 6), the loss in sector 1 is highest for low scores on Y. Similarly, the gain in sector 2 is high if λ is high (for high scores on Y). Q.E.D.

I close this sub-section by illustrating propositions 1 and 2. In this effort, I have in figure 1 drawn the price function under NCO in addition to the price functions under CCO. The shape of this price function is determined by $\lambda(Y)$ which in term influences the distributive effects on producers, or more specifically, which group in a sector gains (lose) most when a policy change occurs. Taking the first order derivative of (2.12), one obtains that $\partial P_0(Y)/\partial Y = \beta + (1 - \beta)(\alpha_1 - \alpha_2)\lambda'(Y) > 0$ (by lemma 6). Since the price function is increasing in Y and it does not intersect the conditional quality expectations in the two sectors (by proof of proposition 1), it has a S-shape as in figure 1. That means, especially high quality producers in developing countries gain while low quality producers in developed countries lose by implementing NCO (see propositions 1 and 2). In figure 1, note that $E_C(Pl\ j)$ is denoted by EP_j and that both sectors have the same size.[13]

Figure 1
Same reliability of the test in both sectors. $\beta_1 = \beta_2$
Expected quality differs. $\alpha_1 > \alpha_2$



[13] If f = 1/2, it can easily be shown that the price function under NCO increases at an increasing rate as long as L(Y) < 1. When L(Y) = 1, the function has a turning point (given by $(\alpha_1 + \alpha_2)/2$).

2.4.2 Test reliability is higher in sector 1

The joint distribution of Q and Y in sector j has a bivariate normal distribution. These distributions are independent with public known parameters:

(2.2''') $\alpha_j, \sigma_{qj}^2, \sigma_y^2, \rho_j$ $\quad j = 1,2$

where $EQ_j = EY_j = \alpha_j$ and $\sigma_{q1}^2 > \sigma_{q2}^2$. By construction, σ_y^2 is identical in both sectors and therefore, $\sigma_{u1}^2 < \sigma_{u2}^2$. Note that β measures the ratio of variation in true quality (σ_q^2) to testing error (σ_y^2) (by lemma 1). The reliability of the test is therefore higher in sector 1, a sector with which the consumer is familiar, than in sector 2.[14] Keeping in mind that Y reflects acquired information, I find it reasonable to believe that the reliability of such information decreases by distance to the final producer.

First, I analyse welfare effects of CCO among different types of producers (high quality producers versus low quality producers) in a sector. Then, I proceed with analysing welfare effects of a policy change.

Proposition 3. If the policy is CCO and $\beta_1 > \beta_2$, then statistical discrimination favours high quality producers in developed countries and low quality producers in developing countries.

Proof: The price function under CCO is given by lemma 3. Suppose $Y_1 = Y_2 = Y$, then the price differentials between products with the same score in the two sectors are given by: $P_1(Y) - P_2(Y) = (1- \beta_1)\alpha_1 - (1- \beta_2)\alpha_2 + (\beta_1 - \beta_2)Y$. When $Y > Y' = ((1-\beta_2)\alpha_2 - (1 - \beta_1)\alpha_1)/(\beta_1 - \beta_2)$; producers in developed countries achieve higher prices than similar producers in developing countries. On the other hand, when $Y < Y'$, producers in developing countries achieve higher prices. In the special case where $\alpha_1 = \alpha_2 = \alpha$, then $Y' = \alpha$. Q.E.D.

Remarks: When the reliability of the test is highest for sector 1 products, at a common test score CCO is favouring low quality producers in countries in which we are not familiar with (e.g., developing countries) at the cost of low quality producers in the other sector. Similarly, CCO favours high quality producers in developed countries at the costs of high quality producers in the other sector. If

[14] Kwok and Leland (1984) are arguing that high productivity workers of Taiwanese origin educated in the US achieve higher wages in the USA than in Taiwan since firms in the US are more familiar with the American education system. However, see Katz and Stark (1984; 1987) for an alternative position.

the price curves intersect, there is a threshold level of the test score, where products from sector 1 achieve a higher price than products from sector 2. As opposed to the analysis in sub-section 2.3.1, the individual price differences are dependent of the level of the common test score. However, on average both production sectors achieve a price which reflects the expected quality.

Welfare effects, at the sector level, of a policy change from CCO to NCO may be analysed along the lines discussed in the last sub-section. It can be shown that producers in sector 1 lose, while producers in sector 2 gain. I therefore restrict the analysis to a special case where expected quality is equal in both sectors, but the reliability of the test is highest in sector 1. In this case a policy change does not effect the expected prices in the two sectors, only their intra sectorial distributions.

Let $\alpha_1 = \alpha_2 = \alpha$. For j ε {1,2,}, note that:
(2.14) $P_j(Y) = E_j(Q|Y) = (1-\beta_j)\alpha + \beta_j Y$ (by lemma 3)

Under NCO, note that the price function is given by:
(2.15) $P_0(Y) = E_0(Q|Y) = fE_1(Q|Y) + (1-f)E_2(Q|Y)$ (by lemmas 2,4 and 6)

Proposition 4. If $\alpha_1 = \alpha_2 = \alpha$ and
i) $\beta_1 \geq \beta_2$, then the expected prices in the two sectors are equal under both policies, that is, $E_N(P|\, j)) = E_N(P) = E_C(P|\, j) = \alpha$.
ii) $\beta_1 > \beta_2$, then NCO favours low (high) quality producers in developed (developing) countries at the cost of low (high) quality producers in the other sector.

Proof. By taking the expectation of (2.15), one obtains $E_N(P) = f\alpha + (1-f)\alpha = \alpha$. By lemma 6, $g_1(Y) = g_2(Y) = g_0(Y)$. Thus, it follows from (2.10) that $E_N(P|\, j) = E_N(P) = \alpha$. By taking the expectation of (2.14) it follows that $E_C(P|\, j) = \alpha$. Thus, expected prices are equal under both policies in both sectors and one obtains the first part of proposition 4. From proposition 3 (see the proof), recall that for scores above α, producers in developed countries achieve higher prices than their counterparts in developing countries. Since consumers under NCO substitute β_j by a weighted average (by lemma 5), these high quality producers lose. The analysis is similarly for the other groups. Q.E.D

The main conclusions drawn in section 2 are the following: When quantity and quality are fixed and consumers are infinite and identical, an elimination of a CCO policy has only a distributive effect. There are no effects on the allocation of resources, and consumers are neither losing nor winning. However, producers in

sector 2 gain at the costs of producers in sector 1. When the welfare of the producers in developing countries are valued higher than that of producers in developed countries, this distributive effect may act as a separate reason for changing the policy. In the following sections, I analyse two cases where CCO has efficiency effects in addition to its distributive effects.

3. Distributive effects and efficiency loss due to the firms choice of quality

The model developed in the following section represents one extension of the model in section 2.4.2, but where the quality decision of the firm is endogenous. I am particularly focusing on efficiency effects in terms of the firms' incentives to improve their quality in a situation where their "history" is the same. However, when the test reliability differs between products produced in the two sectors, diverse price incentives to invest in a quality upgrade arise in the two sectors. Why such reliability differences occur are discussed in sub-section 2.4.2, and also in this section I presume that the reliability of the test is higher in sector 1 than in sector 2. In sub-section 3.1 below, my reference point is a CCO policy, while a comparison of welfare effects under the two policies is undertaken in sub-section 3.2.

3.1 Price functions and quality determination under CCO

Price functions. Each firm i in sector j is producing a product of true quality Q_{ij}. The true quality depends on the firm's initial quality A_{ij} and a quality increase which is acquired through investment in higher competence Z_{ij}. As opposed to the signalling model a la Spence (1973), I assume that acquired competence increases the quality of the product. In line with Lundberg and Startz (1983), true quality is assumed to be a linear function of initial quality and acquired competence.[15]

$$(3.1)\quad Q_{ij} = A_{ij} + b_j Z_{ij} \qquad j = 1,2$$

As in section 2, true quality, both initial and acquired competence, is not observed directly. However, consumers know the producers' maximising problem and they observe an imperfect indicator Y of true quality in each sector.

[15] In this section quality is endogenous and therefore Q_j, Y_j and U_j may differ from the analysis in section 2. However, of typing reasons I use the same symbols as in section 2, but I include subscript i indicating individual products (firms).

(3.2) $Y_{ij} = Q_{ij} + U_{ij}$ $\quad j = 1,2$

The indicator measures true quality with a random error. In sector j, A and U are drawn from a bivariate normal distribution with known parameters:

$\bar{a}_j, \sigma_{aj}^2, \quad \bar{U}_j = 0, \sigma_{uj}^2$ $\quad j = 1,2$

These joint distributions are assumed to be independent. As in section 2, consumers are conditioning their quality expectations on all available information Y. If Z is a non-stochastic variable, the joint distribution of Y and Q in sector j is a linear function of the joint distribution of A and U. In this case Q and Y have a bivariate normal distribution in sector j. These distributions are independent. Since consumers know the producers' maximising problem, they thereby know the equilibrium values of Z in sector j even though these investments cannot be observed. I restrict the analysis of the firm's investment decision to a situation where both sectors have the same initial average quality, or the same "history" ($\bar{a}_1 = \bar{a}_2 = \bar{a}$), and where $b_1 = b_2 = b$. I focus on a situation where the incentives are distorted even though the sectors are identical in the first 'period'. There is a continuum of firms numbered (indexed) between 0 and 1. Let $Z_j = {}_0\int^1 Z_{ij}di$ be average investments in competence in sector j. Hence, Z_j is independent on Z_{ij} and as shown below (in 3.6), the equilibrium values of Z_j are not randomly distributed. In equilibrium,[16] the joint distribution of Q and Y in sector j have the following known parameters:

(3.3) $\alpha_j, \sigma_{qj}^2, \sigma_y^2 \quad \rho_j$ $\quad j = 1,2$

where $EQ_j = EY_j = \bar{a} + bZ_j = \alpha_j$ (see (3.7)) and $\sigma_{qj}^2 = \sigma_{aj}^2$. As in section 2, the variance of Y is assumed common in both sectors ($\sigma_y^2 = \sigma_{qj}^2 + \sigma_{uj}^2$), but $\sigma_{q1}^2 > \sigma_{q2}^2$ (see sub-section 2.4.2).

Note that all products i are tested. In sector j, the expectation of Q conditional on Y follows by lemma 1, while the price functions in equilibrium reflect the conditional expected quality of the products (by lemma 3):

(3.4) $P_j(Y) = (1 - \beta_j)\alpha_j + \beta_j Y$ $\quad j = 1,2$

where $\beta_1 > \beta_2$ (by lemma 1 and (3.3)).

Each firm i in sector j is faced by the price schedule (3.4) when deciding its investments, and the parameters of this schedule are public knowledge.

[16] The joint distribution of Q_j and Y_j out of equilibrium is unknown.

The firms investment decisions. As in Lundberg and Startz (1983), I assume that the cost functions of acquired competence are given by:

$$(3.5)\quad C_{ij} = cZ^2_{ij}/2 \qquad j = 1,2$$
$$MC_{ij} = cZ_{ij} \qquad j = 1,2$$

The cost functions are the same in both sectors and I neglect fixed costs. c is a constant. The marginal cost of increased competence is assumed independent of the firm's initial quality, and is an increasing function of acquired competence. At a given level of desired acquired competence, the marginal cost of increasing competence (and quality when $b_1 = b_2 = b$) is identical for all firms. However, when the marginal revenue of increasing quality varies, the desired competence may vary between the two sectors.

An individual firm in sector j choose the competence level which maximise profits and in optimum marginal revenue is equal to marginal costs. Since quantity is given, revenue is measured by the market prices. Inserting (3.1) in (3.2) it follows by (3.4) that $P_j(Y_{ij}) = (1 - \beta_j)(\bar{a} + bZ_j) + \beta_j(A_{ij} + bZ_{ij} + U_{ij})$. A marginal change in acquired competence by one particular firm i increases the quality and test score by b. Since Z_j is independent on Z_{ij}, marginal revenue is given by $b\beta_j$.[17] The competence which maximises the profit of the individual firm is found when the marginal revenue is equal to marginal costs. Hence, in optimum $cZ_{ij} = b\beta_j$. All firms in a sector face the same maximising problem, and invest the same amount in competence. Thus, the symmetry of the problem implies that $Z_{ij} = Z_j$. By solving for Z_j, the equilibrium values are given by:

$$(3.6)\quad Z_j = b\beta_j/c \qquad j = 1,2$$

When the reliability of the test is higher in sector 1 than in sector 2, the net revenue of investments is highest in sector 1, and all firms in sector 1 are therefore investing more in quality improvement than firms in sector 2. However, in each sector all firms invest the same amount. Since β_j is a constant in each sector, Z_j is not randomly distributed. Thus, in equilibrium consumers' expectations are confirmed and Q and Y have a bivariate normal distribution in sector j. In equilibrium it follows from (3.6) and (3.3) that:

[17] The same results are obtained by assuming a competitive market, where an individual firm does not take into account the group effect in terms of increased average expected quality when he invests in quality upgrading. Due to this externality, an allocation loss arises (Akerlof, 1970). Since the firms decisions are not coordinated, also in this case the firm's marginal revenue of increasing quality is given by $b\beta_j$. However, by assuming there is a continuum of firms, each firm's investments have no effects on Z_j.

(3.7) $E_C(P| j) = EQ_j = EY_j = \bar{a} + b^2\beta_j/c = \alpha_j$ $\quad j = 1,2$

A firm in sector 1 is investing $(\beta_1 - \beta_2)b/c$ more in acquired competence than a firm in sector 2. Hence, labelling of origin creates a distortion in the incentive structure for quality improvement between the two sectors.

Total investments in competence under CCO (Z_{CCO}) are a weighted average of the two sectors' investments in competence, and by weighting the individual firm's investment given by (3.6) with f and (1-f) respectively and adding the two expressions, the total competence improvement is given by:

(3.8) $Z_{CCO} = \beta^* b/c$; where: $\beta^* = f\beta_1 + (1 - f)\beta_2$

3.2 Welfare effects of compulsory labelling

First, I analyse distributive effects, or more specifically effects on the two sectors' revenue, and then I proceed with analysing efficiency effects.

For $j \in \{1,2\}$, let ΔR_j denote expected change in revenue in sector j when the policy is changed from CCO to NCO. If $\Delta R_j > 0$, that means expected revenue in sector j increases if NCO is implemented. Let Z_j^0 denote investments in competence in sector j under NCO. Note that in both sectors, under both policies, a marginal change in acquired competence by one particular firm increases the quality and test score by b.

Proposition 5. If $\beta_1 > \beta_2$ and the cost functions are equal in both sectors, then $\Delta R_1 < 0$ while $\Delta R_2 > 0$, where $\Delta R_j = (\beta_0 - \beta_j)b^2/c$ and $\beta_0 = f\beta_1 + (1 - f)\beta_2$. That means, NCO decreases expected revenue in sector 1, while expected revenue in sector 2 increases. Under NCO both sectors' investments in competence are equal to $Z^0 = \beta_0 b/c$.

Proof: By assumption, both sectors have the same initial average quality $a_1 = a_2$ and variance $\sigma_{y1}^2 = \sigma_{y2}^2 = \sigma_y^2$ (see 3.3). Ex ante (before investments in competence), the joint distribution of Q and Y in sector j has a bivariate normal distribution. Y has therefore a normal distribution in both sectors. Hence, the ex ante density functions are equal, that means, $g_1(Y) = g_2(Y)$ $(= g_0(Y))$. If both sectors' investments in competence are equal, the ex post density functions in the two sectors are also equal. If this is the case under NCO, the expected quality is identical across sectors along the lines analysed in sub-section 2.4.2 (see

proposition 4; $E_N(P| j = 1) = E_N(P| j = 2) = E_N(P)$.[18] Since both the cost function (by (3.5)) and the expected change in revenue are common in both sectors, both sectors face the same incentives to invest under NCO. Their investments in competence are therefore equal. Since a marginal change in acquired competence by one particular firm increases the quality and test score by b, quantity is given and each firms decisions have no effects on the group averages, it follows from lemma 6 (see the remarks) that the firm's marginal revenue of increasing quality is given by $b\beta_0$, while marginal costs is cZ_{ij}^0 (which are equal in both sector). Due to the symmetry of the problem, $Z_{ij}^0 = Z^0 = \beta_0 b/c$.[19] In both sectors the expected revenue under NCO is therefore: $a + b^2\beta_0/c$, while expected revenue in sector j under CCO is given by (3.7). The change in expected revenue is given by: $\Delta R_j = (\beta_0 - \beta_j)b^2/c$. In sector 1, the change in revenue is given by: $-(1-f)(\beta_1 - \beta_2)b^2/c < 0$. Since the consumers' welfare are identical under the two policies, the same effects arise in sector 2, but with an opposite sign. Q.E.D.

Remarks. Expected revenue for producers in sector 1 (2) is reduced (increased) by implementing a NCO policy. Since $b^2(\beta_1 - \beta_2)/c$ reflects the expected quality difference (and price difference) between the two sectors under CCO, the loss decreases when the quality difference between the sectors decreases. However, as opposed to the model in section 2, in this section a quality difference between the sectors arises due to the distorted incentive structure in the market. This distorted incentive structure is caused by a specific policy - not due to *a priori* differences between the two sectors.

However, costs differ between the two policies. The symmetry on the revenue side is not followed by a corresponding symmetry on the costs side of the economy. If a change in policy implies that inexpensive quality improvements are replaced by expensive quality improvements, an efficiency effect arises in addition to distributive effects analysed above. Hence, our welfare indicator must be able to take this efficiency effect into account. A necessary condition for efficiency in the production of a given "total" quality is that quality is produced by the most cost-effective firms. Hence, when total welfare is maximised, marginal costs should be identical in the two sectors. However, since the cost functions are the same in both sectors, while in equilibrium the desired competence varies, this is not the case.

[18] The assumption that the density functions are common for both racial groups implies that the mixture in the Lundberg and Startz (1983) model is linear in the test score (see lemmas 5 and 6 above).

[19] Note that the aggregate improvement of competence is equal under both policies (see (3.8)). Expected quality are therefore equal under both policies, but its distribution may vary between sectors.

$C_j(Z_j)$ denotes total costs in sector j (under CCO). Let $C_0(Z^0)$ denote total costs under NCO. Since the cost functions are equal in both sectors, and both sectors invest the same amount in competence (by proposition 5), the costs are common in both sectors under NCO. Let ΔW_j denote the change in expected profits, or welfare change, in sector j between the two policies. Total welfare change in the economy (the aggregate change in profits) is denoted by ΔW, and is a weighted average of the net welfare changes in the two sectors. Note that in equilibrium the following statements are true:

(3.9)	$C_0 = b^2\beta_0^2/2c$	(by proposition 5 and (3.5))	j = 1,2
(3.10)	$C_j = b^2\beta_j^2/2c$	(by (3.6) and (3.5))	j = 1,2
(3.11)	$\Delta R_j = (\beta_0 - \beta_j)b^2/c$	(by proposition 5)	j = 1,2
(3.12)	$\beta_0 = f\beta_1 + (1 - f)\beta_2$	(by proposition 5)	

Proposition 6. (Efficiency effect) If $\beta_1 - \beta_2 > 0$, and the cost functions are equal in both sectors, then $\Delta W = b^2f(1 - f)(\beta_1 - \beta_2)^2/2c > 0$. That means, CCO leads to an efficiency loss in terms of the firm's quality decisions - CCO induces a distorted incentive structure in the market.

Proof. By (3.9) and (3.10), the cost difference in sector j between the policies is:
i) $\Delta C_j = b^2(\beta_0^2 - \beta_j^2)/2c$

Since $\Delta W_j = \Delta R_j - \Delta C_j$, where ΔR_j is given by (3.11) and ΔC_j is given by i), then the welfare change in sector j is:
ii) $\Delta W_j = b^2((\beta_0 - \beta_j)(1 -(\beta_0 + \beta_j)/2)/c$

The total welfare change (ΔW), in the economy is a weighted average of the net welfare changes in the two sectors, that is,
iii) $\Delta W = f\Delta W_1 + (1 - f)\Delta W_2$. By inserting ii) in iii), and substituting for $\beta_0 - \beta_1 = -(1-f)(\beta_1 - \beta_2)$ and $\beta_0 - \beta_2 = f(\beta_1 - \beta_2)$ (by 3.12), one obtains: $\Delta W = b^2f(1 - f)(\beta_1 - \beta_2)((\beta_0 + \beta_1)/2 - 1 + 1 -(\beta_0 + \beta_2)/2)/c$ and proposition 6 is obtained. Q.E.D

The main conclusions drawn in section 3 are the following: If the quality test is more reliable for sector 1 products than for sector 2 products, CCO implies that sector 1 is overinvesting in quality improvement while sector 2 is underinvesting. The model generates the same aggregate investments under the two policies, but the costs differ. By changing the policy from CCO to NCO, high cost marginal quality improvements in developed countries are replaced by low cost quality improvement in developing countries. Pareto improvements are attainable through reasonable lump-sum distributions. For efficiency reasons there are good reasons to change the policy towards NCO.

4. Matching and efficiency gains

As opposed to the model in sub-section 2.4.1, in this section consumers vary according to their willingness to pay. A policy change may in this case have an efficiency effect. The gain achieved by one of the production sectors does not correspond to the loss in the other sector.

The analysis reflects a situation characterised by vertical product differentiation, and hence, it is distinctly different from the matching models in Pissarides (1990) which focuses on horizontal product differentiation. The main difference to other matching models is the assumption of perfect competition. Rosén (1992) assumes that the price reflects a bargaining solution, while Maskin and Riley (1984) are analysing quality discrimination arising when there are different numbers of consumers in each group.

If the consumers vary according to their willingness to pay, the producers may achieve a net gain by selling the product to the group of consumers which have the highest marginal valuation of the product. I assume two different groups of consumers; one group has a higher intensity in their preferences for quality than the other. I intend to show that compulsory labelling of origin improves the matching between the consumers and the producers. A NCO policy generates switching problems, and efficiency effects may therefore arise. The producers do not capture all the potential consumer's willingness to pay when the policy is NCO.

To simplify the analysis, quality is assumed to be exogenous. When quality is endogenous and the policy is NCO, the efficiency loss of mismatching has to be compared to the efficiency gains in terms of the firms' quality decisions. Net effects depend on the level of the parameters in the model. Since the efficiency gains are discussed in full depth in sub-section 3.2, the analysis in the following section omit that part of the study by treating quality in the two sectors as given.

4.1 The price functions

As in sub-section 2.2, I make the assumption that consumers' willingness to pay is an affine function of true quality. However, there are two different groups of consumers. Those in group 2 have a higher intensity in their preferences for quality than the counterparts in group 1 ($\Theta_2 > \Theta_1$). All consumers in a group are assumed to be identical and there are an infinite number of consumers in each group. To eliminate the possibility that consumers in group 2 may 'preempt' purchases by consumers in group 1 for all levels of quality, I analyse a situation

where the willingness to pay for high quality products is highest for consumers in group 2, while consumers in group 1 have the highest valuation of low quality products.

For $g \in \{1,2\}$, the groups' willingness to pay for green shirts are given by:

(4.1) $V_g = k_g + \Theta_g Q$ where $k_g \geq 0$; $\Theta_2 > \Theta_1$ and $k_1 > k_2$

By scaling quality such that $k_1 = 0$, the willingness to pay are given by:

(4.1') $V_1 = \Theta_1 Q$
$V_2 = \Theta_2 Q - m$ where $m > 0$

By (4.1) it follows that there is a critical level of the price such that when quality is above this level, consumers in group 2 are purchasing, while at values below consumers in group 1 are purchasing the commodities. The critical level of the price (expected quality) is given by:

(4.2) $\bar{E}Q = m/(\Theta_2 - \Theta_1) \geq 0$

When $EQ > \bar{E}Q$, consumers in group 2 have a higher willingness to pay for green shirts than consumers belonging to group 1, and are thereby able to 'preempt' consumers in group 1.[20] When $EQ < \bar{E}Q$, consumers in group 1 have a higher willingness to pay. In the following analysis, I examine a separating equilibrium where both groups are buying the products. Hence, I assume that $\bar{E}Q > 0$.

Consumers are unable to observe Q directly, but for $j \in \{1,2\}$ they know that the joint distribution of Q and Y in sector j has a bivariate normal distribution given by (2.2''). These distributions are independent. The analysis is limited to the case where the reliability of the test is the same in both sectors, but where expected quality is highest for products produced in sector 1 (see sub-section 2.4.1 for details).

As in previous sections, consumers conditioning their expectation on all available information and are estimating EQ by $E(Q|Y)$. For $j \in \{0,1,2\}$, $E_j(Q|Y)$ denote the

[20] When m decreases towards zero or the difference in the groups' preferences for quality increases towards infinity, the limit value of $\bar{E}Q$ is zero. Both cases imply that consumers in group 1 are preempted. The analysis in section 2 is a special case of the model described in this section, but where $m = 0$.

conditional quality expectation in sector j. The critical levels of these expectations are given by:

$$(4.3)\quad \bar{E}_j(Q|Y) = m/(\Theta_2 - \Theta_1) > 0 \qquad j = 0,1,2$$

The critical levels of the conditional quality expectations do not vary by sector, but the critical level of the test scores vary between sectors. For $j \in \{1,2\}$, it follows by lemma 1 that $E_j(Q|Y) = (1-\beta)\alpha_j + \beta Y$ and by inserting in (4.3), one obtains the corresponding critical levels of the test scores $\bar{Y}_j$ in the two sectors.

$$(4.4)\quad \bar{Y}_j = \frac{m}{\beta(\Theta_2 - \Theta_1)} - \frac{(1-\beta)\alpha_j}{\beta} \qquad j = 1,2$$

What is the corresponding adjustment problem under a *NCO* policy? For j = 0, it follows by (2.12) that $E_0(Q|Y) = (1-\beta)(\lambda(Y)\alpha_1 + (1-\lambda(Y))\alpha_2) + \beta Y$. Thus, by inserting in (4.3), the corresponding critical value $\bar{Y}$ under a NCO policy is given by:

$$(4.5)\quad \bar{Y} = \frac{m}{\beta(\Theta_2 - \Theta_1)} - \frac{(1-\beta)(\lambda(Y)\alpha_1 + (1-\lambda(Y))\alpha_2)}{\beta}$$

By comparing (4.5) and (4.4), it follows that *producers from sector 1 (2) need a higher (lower) score under a NCO policy than under a CCO policy to be able to sell to the consumers which have the highest valuation of high quality products.* In sector 1 the required difference in test score is given by:

$$(4.6)\quad \bar{Y} - \bar{Y}_1 = \frac{(1-\beta)(1-\lambda(Y))(\alpha_1 - \alpha_2)}{\beta} > 0$$

The corresponding difference in the required test results for sector 2 is given by:

$$(4.7)\quad \bar{Y} - \bar{Y}_2 = \frac{(1-\beta)\lambda(Y)(\alpha_2 - \alpha_1)}{\beta} < 0$$

In equilibrium, as in section 2, consumers' willingness to pay is equal to market prices (by lemma 2), but the price function is discontinuous and for $j \in \{1,2\}$ (under CC0), it is given by:

$$(4.8)\quad P_j(Y) \begin{cases} = \Theta_1 E_j(Q|Y) & \text{when } E_j(Q|Y) < \bar{E}_j(Q|Y) \quad \text{e.g. } Y < \bar{Y}_j \\ = \Theta_2 E_j(Q|Y) - m & \text{when } E_j(Q|Y) > \bar{E}_j(Q|Y) \quad \text{e.g. } Y > \bar{Y}_j \end{cases}$$

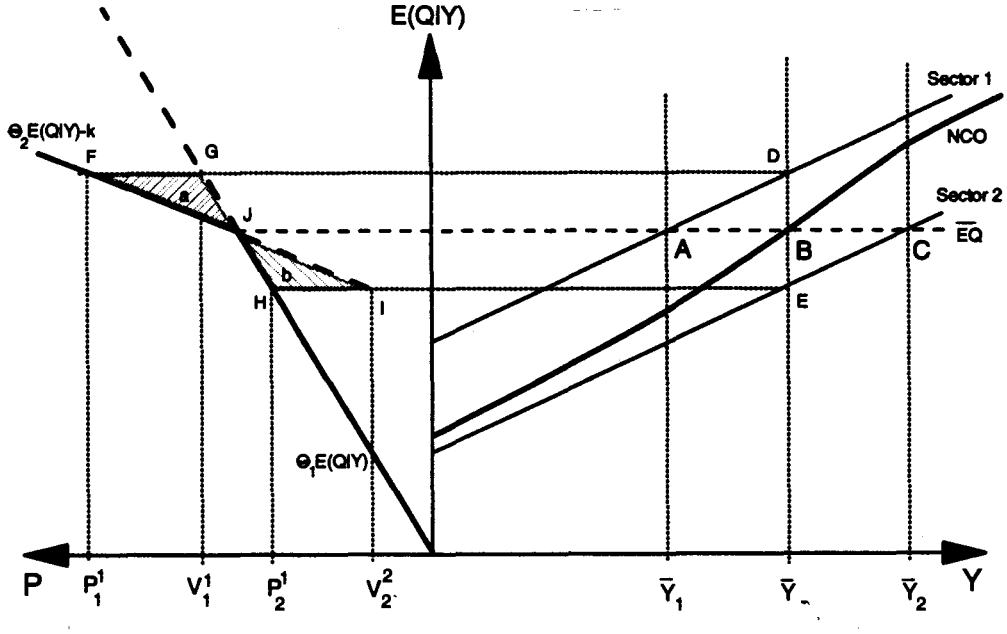
The corresponding price function under NCO is given by:

$$(4.9)\quad P_0(Y) \begin{cases} = \Theta_1 E_0(Q|Y) & \text{when } E_0(Q|Y) < \bar{E}_0(Q|Y) \quad \text{e.g. } Y < \bar{Y} \\ = \Theta_2 E_0(Q|Y) - m & \text{when } E_0(Q|Y) > \bar{E}_0(Q|Y) \quad \text{e.g. } Y > \bar{Y} \end{cases}$$

By comparing (4.9), (4.8) and (4.6), a policy change from CCO to NCO implies a reduction in the sales from sector 1 to consumers in group 2 and a corresponding increase to group 1 consumers. By comparing (4.9), (4.8) and (4.7), a policy change from CCO to NCO implies an increase in the sale from sector 2 to consumers in group 2 and a corresponding reduction in the sales to group 1.

The price schedules are illustrated in figure 2 where I have assumed that the sectors have the same size (f = 1/2). Furthermore, by letting $\bar{E}Q$ be equal to a weighted average of expected quality in the two sectors, the analysis is made more transparent without changing the general character of the results.[21]

Figure 2
Efficiency loss and matching



[21] A potential vertical shift of $\bar{E}Q$ in figure 2, implies the same type of efficiency loss as the shaded areas a and b, even though it may influence the level of the loss.

The right part of the diagram corresponds to figure 1. Under a *CCO* policy, consumers in group 2 have the highest willingness to pay for products with scores to the right of A (along $E_1(Q|Y)$; or the straight line intersecting A and D) and C (along $E_2(Q|Y)$; or the straight line intersecting E and C), while group 1 has the highest willingness to pay for products which have scores to the left of these points. The points A and C in figure 2 reflect the critical values of the test score in the two sectors when the policy is CCO. Consumers in group 2 are buying all products from sector 1 when $Y_1 > \bar{Y}_1$ (e.g., to the right of A along $E_1(Q|Y)$), and all products from sector 2 when $Y_2 > \bar{Y}_2$ (e.g to the right of C along $E_2(Q|Y_2)$). Their willingness to pay are given by $\Theta_2 Q$ - m. Correspondingly, consumers in group 1 purchase all products with a lower score on the test than those referred to above (e.g., to the left of A and C). In this case their willingness to pay is given by $\Theta_1 Q$. The bold S-shaped curve at the right part of the diagram reflects the conditional quality expectation of the mixture. Under NCO, consumers in group 2 (1) are buying all products having a test score higher (lower) than $\bar{Y}$.

The kinked and bold line at the left part of the diagram illustrates the discontinuous price function. The two dotted and bold lines at the left part reflect the willingness to pay for that group which for some values of the observed test results are 'preempted' under CCO (e.g. the dotted line from J intersecting G reflects group 1 willingness to pay while the dotted line from J intersecting I reflects the corresponding willingness to pay for group 2.

First, I illustrate the main mechanism of the model on the basis of figure 2. Then, I proceed with a formal analysis. The points A, B and C represent $\bar{Y}_1$, $\bar{Y}$ and $\bar{Y}_2$, respectively. By comparing (4.9) and (4.8) four cases are appropriate.

1) $Y < \bar{Y}_1$. To the left of A, only consumers in group 1 are purchasing the goods, and their purchase is independent of the present policy. Hence, a policy change has only distributive effects between the production sectors along the lines analysed in sub-section 2.4.1. What one sector gains, the other is loosing.

2) $Y > \bar{Y}_2$. To the right of C, only consumers in group 2 are purchasing the goods, and as in case 1, they are purchasing the goods under both policies. The same type of effects arise as described in case 1, but the consumers' willingness to pay differ from the case discussed above.

3) $\bar{Y}_1 < Y < \bar{Y}$. In between A and B, a policy change has distributive effects along the lines discussed in the above cases. In addition an allocation loss arises. By changing the policy from CCO to NCO, firms in sector 1 sell their products to consumers in group 1, not group 2 as was the case under CCO. Group 1 has a

lower marginal valuation of high quality products than group 2. Hence, additional quality products from developed countries are sold to the consumers which have a low marginal valuation of quality. When expected quality is highest for the substituted products, made in developed countries, the producers' gain in developing countries are less than the loss in developed countries. The efficiency loss is indicated by the area a in figure 2.

4) $\bar{Y} < Y < \bar{Y}_2$. In between B and C, a policy change has the same type of distributive effects as in the above cases. However, a policy change from CCO to NCO implies that sector 2 is selling their products to consumers in group 2, while under CCO they sold their products to group 1. Additional "lemons" produced in developing countries are sold to the consumers which have a high marginal valuation of quality. Since consumers in group 2 have a lower marginal valuation of low quality products than the counterpart consumers in group 1, an efficiency loss arises as indicated by the area b in figure 2.

I finalise this section by calculating the level of the efficiency loss. Welfare is measured by the aggregate consumers willingness to pay. The limits of integration, or $\bar{Y}_1$, $\bar{Y}$ and $\bar{Y}_2$ are of typing reasons symbolized by A, B and C respectively. Let ΔW denote total welfare change by changing the policy from NCO to CCO.

Proposition 7. If there are two groups of consumers and the willingness to pay for high quality products is highest for consumers in group 2, while consumers in group 1 have the highest valuation of low quality products, then CCO improves the matching between consumers and producers and implies an efficiency gain given by:

$$\Delta W = W_{CCO} - W_{NCO} = {}_A\int^B ((\Theta_2 - \Theta_1)E_1(Q|Y) - m)g_1(Y)dY + {}_B\int^C ((\Theta_1 - \Theta_2)E_2(Q|Y) + m)g_2(Y)dY > 0$$

Proof: Under both policies consumers pay a price which corresponds to their willingness to pay (by lemma 2). Since quantity and quality are fixed, the only efficiency effect that may arise is that products are not sold to that group which has the highest willingness to pay for them. To the left of $\bar{Y}_1$ and to the right of $\bar{Y}_2$, a policy change has no switching effects and only distributive effects arise. In between $\bar{Y}_1$ and $\bar{Y}_2$, both distributive and efficiency effects arise. The efficiency effects arise because consumers under NCO do not know from which sector the products are produced. They thereby adjust their prior probabilities by the observed test results. The probabilities that products are drawn from sector 1, a sector having a high quality reputation, is reduced under NCO. In between $\bar{Y}_1$ and $\bar{Y}$, this adjustment process implies that these products are sold to group 1

consumers. Point D reflects the conditional quality expectation of a product from sector 1 having a test score given by $Y_1 = \bar{Y} - \varepsilon$; where ε is a small number greater than zero. By drawing a horisontal line from D to the price function in the left part of the diagram, one obtains F. Under CCO, such a product is sold to group 2 and it achieves a price given by $P_1^1 = \Theta_2 E_1(Q|Y = \bar{Y} - \varepsilon) - m$. Under NCO, such a product is sold to group 1. If they know from which sector the product is drawn, their willingness to pay is $V_1^1 = \Theta_1 E_1(Q|Y = \bar{Y} - \varepsilon)$. The difference, $P_1^1 - V_1^1 = \Theta_2 E_1(Q|Y) - m - \Theta_1 E_1(Q|Y) = (\Theta_2 - \Theta_1)E_1(Q|Y) - m$, represents an efficiency gain as a result of CCO. The net difference in consumers' willingness to pay, or the aggregate gain for developed countries, is found by integration over Y in sector 1. The first term in proposition 7 shows the efficiency gains arising from the fact that high quality products from developed countries under a CCO policy are sold to consumers which have the highest valuation of these products. The efficiency gain is indicated by *a* in figure 2 (see also case 3).

Since $\lambda(Y)$ is increasing in Y, consumers assume that a high score on Y is because products are produced in sector 1. Because of this adjustment process, in between $\bar{Y}$ and $\bar{Y}_2$, these products are sold to group 2 consumers. Points E and H reflect the conditional quality expectation of a product from sector 2 having a test score given by $Y_2 = \bar{Y} + \varepsilon$. H is found by drawing a horisontal line from E to the price function in the left part of the diagram. Under CCO, such a product is sold to group 1 and achieves a price given by $P_2^1 = \Theta_1 E_2(Q|Y = \bar{Y} + \varepsilon)$. Under NCO, such a product is sold to group 2. If they know from which sector the product is drawn, their willingness to pay is $V_2^2 = \Theta_2 E_2(Q|Y = \bar{Y} + \varepsilon) - m$. The difference, $P_2^1 - V_2^2 = \Theta_1 E_2(Q|Y) - (\Theta_2 E_2(Q|Y) - m)$, represents an efficiency gain as a result of CCO. The efficiency gain for developing countries are found by integration over Y in sector 2. The last term in proposition 7 reflects the fact that consumers in group 1 have a higher valuation of (low quality) products produced in developing countries than consumers in group 2. The efficiency gain is indicated by *b* in figure 2 and refers to case 4. Q.E.D.

5. Conclusion

In this paper I started with the assumption that consumers do not have perfect information about product quality. All consumers do, however, know the value of an indicator of the quality of the product. The products are made in two different sectors (countries), and the consumers know the joint distribution (bivariate normal) of true quality and its indicator (the test result). Through labelling of origin, the consumers are using a weighted average of the value of the indicator and the expected quality in each separate sector to readjust their quality perceptions. Origin is accordingly used as a screening device for product quality.

Furthermore, I studied a situation where the consumers agree on the ranking of the individual products (vertical product differentiation).

In section 2, I showed that labelling of origin only has distributive effects in a situation where all consumers are identical and the quality is given. Labelling of origin implies a distortion of competition for individual producers, for groups of producers, and between sectors. However, one producer's gain matches another's loss. In situations where test reliability is identical across sectors, but where sector 2 (developing countries) have a lower expected quality than sector 1 (developed countries), I showed that all producers in developing countries would receive a higher price if the labelling of origin rules are removed. *This distributive aspect may be an argument in its own right for changing the rules about labelling of origin.*

In section 3, I showed based on a simple model for quality decisions of producers, that labelling of origin may lead to an efficiency loss. That may constitute another reason to remove the rules about labelling of origin of garments. Labelling of origin implies a distortion of competition in the sense that the incentives of enterprises to undertake a quality upgrade vary between sectors. The marginal costs do not vary across sectors for a given quality upgrade, but profits will. Since marginal costs were increasing in quality, by removing the rules about labelling of origin, the analysis showed that expensive quality upgrades in sector 1 could be substituted by inexpensive quality upgrades in sector 2 without affecting the level of total quality. The loss of one sector may accordingly be more than compensated for by the gain of the other sector. *According to my model, enterprises in developing countries underinvest in quality upgrades. Labelling of origin does in this way contribute toward freezing the prevailing division of low and high quality production countries.*

In section 4, I showed based on a simple matching model under the presumption of vertical product differentiation, that labelling of origin may lead to better matching of producers to consumers. Better matching means that the products are sold to the consumer group with the highest willingness to pay for the product. By removing the rules about labelling of origin, the producers in sector 2 are gaining less than the producers in sector 1 are losing. The distortion of competition has in this case a distributive as well as an efficiency aspect. *Without labelling of origin the producers would not be able to grab the maximum willingness to pay, and an efficiency loss arises.*

From the consideration about whether or not to remove rules about labelling of origin, given the assumptions taken in this article, it follows that *the allocation*

loss tied to matching would have to be balanced against the enterprises' investments in quality. Considerations of distribution and the fact that consumers prefer products made in specific countries are relevant factors in this balancing act. Regarding the latter factor, I show in chapter 3 that these preferences are tied in with stereotyped perceptions (negative attitudes toward products made in developing countries). It may therefore be sound reasons for governments to *override* these perceptions by removing rules about labelling of origin.

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Chapter 3

Country of Origin- a Signal of Product Quality?

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Abstract:

This paper analyses the attitudes of Norwegian consumers and their reactions towards information about the country of origin of garments. It is found that the consumers have negative perceptions of products from developing countries, while price is used as the main signal of product quality. The negative perceptions can be compensated by branding their products or by other positive attributes, while marketing should be tailored so as to change such attitudes. The study is based in large part on a consumer survey and on two different experiments, while making use of conjoint and regression analyses.

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1. Introduction

The main objective of this paper is to analyse consumer perceptions of and reactions towards clothing made in LDCs. Do they use information about a product's country of origin (CO) to guide their actual buying decisions? If so, is such information used as a signal of product quality or as an emotional (affluent) characteristic of the product? What is the value of such a signal; that is, are consumers willing to accept a higher price for products made in developed countries than for products of equal quality made in LDCs? For producers in developing countries, the answers to these questions are important as to their choice of entry strategies in new markets. For importers, answers may affect their screening process among suppliers. If consumers have negative perceptions of products made in LDCs, independent of their present quality, and in addition reduce their quality perceptions due to the labelling of origin, then the producers are faced with a 'dual' discrimination regime. Such a negative bias against products made in LDCs creates huge difficulties in the process of diversifying LDC exports by means of quality enhancement. This may exacerbate existing LDC export problems such as quotas on clothing.

That CO has an effect on consumer preference is acknowledged by the existence of regulations demanding CO labelling. Legally enforced labelling of origin for clothes reflects the fact that the authorities want consumers to have the opportunity to take CO into account when making their choices. The effect is underscored further by the prominence given to CO in many advertisement campaigns. The use of CO for marketing purposes is a sign that CO affects consumer choice; otherwise such advertisement campaigns would not have been undertaken (Head, 1988). The effect is also well documented in international academic literature (Bilkey and Nes, 1982). In that literature, however, opinion is divided as to how strong and universal the effect is (Olsen, 1990). Whether there is a connection depends on product type, brand, price, etc. In addition, the effect may vary over time. According to Obermiller and Spangenberg (1989), this variation in the effect of CO labelling stems from the fact that the literature is mostly empirical.

Theoretically speaking there are, in particular, two areas in which CO is relevant for consumer choice. Both effects may act as entry barriers for developing countries. When the consumers have imperfect information of product quality, the consumers may use information about CO as a crucial element in drawing their *inferences* about product quality (Chiang and Masson, 1988; Ericson et al., 1984; Obermiller and Sprangenberg, 1989). According to Cox (1962), the consumer's use of a cue is basically determined by its predictive and confidence values. It is generally assumed that the predictive value of CO increases when there are large

quality differences between countries and small quality differences between companies within countries (Heimback et al., 1989; Obermiller and Sprangenberg, 1989; Johansson, 1989). However, different positions are taken concerning the confidence value of CO (the product familiarity measured by the consumers' level of information and their experience). In the early studies presented below, it was generally argued that the novices used CO as a signal of product quality while Johansson, Douglas and Nonaka (1985) argued to the contrary.

Most of the studies referred to above do not analyse the behaviour of the firm. While CO is nearly fixed, alternative signals may be used strategically by the producer or by his distributors. When such alternative signalling activities occur, one would expect that the consumers pay less attention to CO as a signal of quality. However, from a developing country point of view, the main point is the following: In the absence of experience with new producers and products, the consumers will, inter alia, base their notions about product quality on *extrinsic characteristics* of the products such as CO, price, brand, retailer's reputation and marketing effort. The signal employed feeds back to the producer's choice of entry strategy. For example, *producers stand the risk of deriving no profits from their investments in increased quality if they do not have an established reputation,* and if so, a strategy that aims at quality improvement is unpropitious and the producers may get caught in a quality trap.

In addition to this cognitive function, CO may have value in and of itself, a so-called *affective* value. The affective value reflects an emotional response to country stereotypes; the consumers' attitudes and preferences for products from different countries may vary. These different attitudes are purified in cases where the consumers have perfect information of product quality. Hence, a possible CO effect would not stem from using CO as an indicator of quality, but from attitudes (stereotypes). However, it is outside the scope of this paper to analyse the basis, source or contents of such kinds of stereotypes. To the extent that a relationship between attitudes and behaviour obtains, one may get biased consumer choice. Stereotypes were studied early on in marketing literature.[1] Gaedeke (1973) focused, in particular, on how such a bias in perception affected products from developing countries.

This paper is organised along the two effects of CO labels referred to above, the cognitive effect (as a signal of product quality) and the affective value (stereotypes), or more precisely -whether information of CO is used as a signal of

[1] Schooler, 1965; Nagashima, 1970, 1977; Lillis and Narayana, 1974; Bannistar and Saunders, 1978; Morello, 1984.

product quality or as a stereotype? In section 3 the affective value of CO is analysed, while in section 4 the signal effects are elaborated in more detail. I am particularly concerned with the extent to which consumers use CO as a signal of quality and the extent to which they use other cues in their judgements as to quality. The methodology and surveys are presented in section 2.

Let me make a brief comment about the methodology. Two different approaches, the semantic differentiation method (Osgood, 1952) and conjoint analysis (Green and Srinivasan, 1978 and 1990; Louviere 1988 a,b) are used in order to estimate weights in the utility function for clothing. A weakness in the semantic differentiation method is that it measures attitudes - not buying behaviour. Respondents are asked to indicate the importance of different characteristics of a clothing product on a (Likert) scale of importance. It is furthermore difficult to distinguish between the two above-mentioned effects of origin. In contradistinction to the conjoint analysis of Ettenson, Wagner and Gaeth (1988), my experiments are designed so that it is possible to separate the two above effects of origin labelling. By controlling for quality information I am able to test whether the weights of CO vary in a statistically significant way in accordance with the consumers' level of quality information.[2] The main weakness of conjoint analysis is, however, that it measures the consumers' buying intentions and not their actual buying behaviour. Hence I have, in addition, analysed if consumers, in their actual buying behaviour, take into account the CO of their purchased products.[3]

2. The surveys

Let the following (indirect) utility function of the Lancaster type describe the i'th consumer's preference for clothing:

$$(1) \quad U_i = U_i(\mathbf{Z}) \qquad Z = Z_1 ... Z_6$$

Z is a vector of the characteristics of the goods. The utility function has normal properties; it is strictly concave and I assume it is additively separable in all arguments. In line with Sproles (1979, 1981), and Ettenson, Wagner and Gaeth (1988), the following six characteristics are assumed as arguments in the utility function: brand, CO, price, quality, design and fabric. The last three are intrinsic characteristics of the product while CO is an extrinsic characteristic. Within such

[2] In this paper, the main results from the experiments are presented while in Wiig (1992) the results based on the semantic differentiation approach are elaborated in more detail.

[3] See the final section.

a compensatory model a potentially low partial utility of the product's CO may be compensated through lower price, higher quality or more appealing brand.

The empirical problem is, in the last instance, reduced to finding *weights* in the consumer's preference function. If the weight of CO changes in response to the consumer's level of information regarding product quality, e.g. the weight of being produced in Bangladesh is higher in absolute numbers when consumers do not have quality information, then that is an indication that consumers use origin or possibly other characteristics as a basis for drawing an inference about the product's quality. In situations of complete information about product quality there is no rational basis for using origin as a signal of quality. The weight assigned to origin in such cases can be labelled the affective value of CO. Such affective value is a sign that consumers have stereotypical perceptions of various countries. Through comparing weights attached to origin in situations of complete and of incomplete information, I seek to test whether origin has a signal effect. As far as consumers' level of information is concerned, I make only the crude distinction between whether or not they have information about product quality.

Weights are estimated using both direct and indirect methods. Weights based on the semantic differentiation method are compared with those based on conjoint analysis. Conjoint analysis is based on *decompositional preference structure measurement* (Louviere, 1988b). Use of such methods to determine weights makes it, first of all, possible to better quantify what we really want to measure (attitudes, buying intentions and actual buying behaviour) since the various methods may be applied for different purposes. Second, we can compare results obtained from the various methods so as to improve the predictive value of our estimates. Third, the results of one type of survey may be used in another kind of survey. The direct method has, among other things, been used to determine which characteristics consumers value when buying clothes. This was then used to select variables for the conjoint analysis.

In order to map out behaviourally oriented attitudes to different countries of origin, I used the *semantic differentiation method.* This method is commonly used in the literature in order to determine each country's reputational profile (Cf. Lillis and Narayana, 1974; Nagashima, 1970, 1977; Johansson and Thorelli, 1985; Morello, 1984). Data collection took place in large departmental stores among customers who had actually bought clothes.[4] I use the term survey to separate this data

[4] The sample is composed of 105 respondents of which 75 have been processed statistically. The rest have been used in connection with a pilot investigation. Despite a relatively small sample, I am convinced that the results of this investigation give us a valuable supplement to the

collection procedure from the other approach based on experimental data. In order to test the signal effect of origin I performed two experiments among random households. In both of the experimental situations the respondents are presented with identical product profiles, but in one of the experiments no information about quality is given.[5] The discussion below refers to these experiments.

2.1 The design of the experiments

Our approach is based on metric conjoint while using a rating scale. Such a functional measurement is based on information integration theory (Anderson, 1981, 1982). Furthermore, the approach presupposes some hypothesis of the distribution of residuals (usually exhibiting normal distribution) which makes it possible to test hypotheses. By assuming that there is a monotonous relationship between the consumers' preferences (utility functions) and their assignments of scores, we can, in this indirect manner, uncover the strengths of their preferences for the different characteristics.

The respondents assign points on a scale to different products (pairs of trousers). The scale ranges from 1 ("completely useless") to 10 ("perfect"). A specific product profile is presented on a card. The respondents are asked to sort the different products that make up our design in three stacks (positive, negative and intermediate) before they assign points to each product in the positive group, thereafter the negative group and, finally, the intermediate group. The approach is a variant of the so-called *full profile* in which all cards are judged simultaneously (and not pairwise). By sorting into stacks, however, I increase the chances that the respondents make use of the entire scale. This creates more variation in our data and thereby enhances the reliability of our estimates.

conjoint analysis. The ultimate survey is presented in appendix 1.

[5] The experiment with known quality involved 169 respondents and the experiment with unknown quality involved 31 respondents. The survey format for known quality is presented in appendix 2.

Figure 1 illustrates such a card and figure 2 gives an overview of attributes (characteristics) as well as the values of these attributes.

Figure 1
Product profile. Card 4

Brand	Unknown brand
Fabric	100 % cotton
Design	Below average
Country of origin	Italy
Price	500
Quality	Average

Figure 2
Characteristics and their values

Brand:	**Fabric:**
Retailer brand	100 % cotton
Internationally reputable	Synthetic
Unknown brand	
Design:	**Country of origin:**
Above average	Italy
Below average	Bangladesh
	Portugal
Price	
200	**Quality:**
350	Very good
500	Average
750	Below average

Let me discuss briefly the choice of values on some of the variables incorporated into the analysis.[6] As far as price is concerned, the values must reflect the actual price variation for a pair of trousers (either for leisure or work), and I therefore let the price vary between NOK 200 and NOK 750 which I think is a realistic price variation.[7] In a situation where quality is known I expect the scores assigned by the respondents to decrease when price increases. As far as country of origin is concerned, I operate with three categories. I have, consciously, avoided the

[6] Our choice of values on the other variables appear in the next subsection.

[7] US$1 = NOK 7.5.

inclusion of Norway as a value in order to eliminate patriotism as a factor in evaluations of origin. Italy is used as a proxy for industrialised countries with a solid reputation. Portugal is a proxy for Southern European countries with a reputation for quality which is inferior to that of the first group. This group of countries is, furthermore, characterised by having low production costs and are therefore potential and actual competitors with the developing countries. Bangladesh is used as a proxy for products from developing countries, and constitutes a relatively new entrant on the Norwegian clothing market. Apart from the case of Portugal, the analysis in Wiig (1992) showed that these countries were representative of the respective groups. I have not specified brand names, but have chosen to distinguish between three main categories of brands. The distinction mirrors to some degree the expected losses the brands sustain by selling low-quality products. The extreme cases are, respectively, completely unknown brands and international brands. Retailer-brands occupy an intermediary position. The choice reflects the fact that some brands have an international reputation, while others are either completely unknown or linked to the retailers. Unknown brands have, of course, less to lose by way of established goodwill if they sell products of low quality. Ceteris paribus I would, for example, expect consumers' scores to be reduced if the product is sold under an unknown brand rather than a well-established one.

The design is orthogonal factorial without interaction effects. If, in addition to the main effects of the six variables in figure 2, we were to analyse all interaction effects, our design would have consisted of $3^3*2^2*4 = 432$ combinations or cards. Experience tells us that 16 to 20 profiles is the largest number respondents are willing to consider. By limiting ourselves to the estimation of major effects, we can reduce the presentation of stimuli to 16 profiles. I have, in addition, included a holdout card for use in deciding the internal validity of our data. Different orthogonal designs were, consistent with the recommendations of Moore and Holbrooks (1990), pre-tested. Designs with many potentially very good (or very bad) profiles have been eliminated.

Conjoint analysis has been used in the estimation of aggregated preferences, for segments of the population and for individuals. If respondents are very heterogeneous, such that for instance one-half prefers a low price while the other half prefers a high price, an aggregated model will estimate that consumers prefer medium prices which, incidentally, none of the respondents actually prefer. The reason is that the weights, or the part-worth utilities estimated in an aggregated conjoint analysis, are identical with the average of the individual part-worth utilities. On the other hand, disaggregated analyses are more useful when a firm is identifying different strategies towards distinct target groups (Sands and Warwick, 1981;

Haley, 1968). Segmental models fall into an intermediary position between individually-based models and aggregated models in the sense that they try to utilize the best traits of both individually-based models and aggregated models. An overview of different segmental models is presented in Wind (1978) and Green (1977). In accordance with the Green and Srinivasan (1978, 1990) and Srinivasan and Hagerty (1991) tests for the choice of model, I have tested the predictive value of different aggregated models on the basis of R^2 and the model's predictive value on a holdout card. A priori segmentation on the basis of background variables would, however, enhance the presentation. In the choice among different model specifications, a mixed model is selected. In this model, different characteristics are assumed to be linear while others are assumed to be ideal or discrete.

Estimation method. In a regression model the attributes are the independent variables and scores (proxies for utility) are the dependent variable. We obtain 17 observations for every individual and this corresponds to the respondent's scores on the different cards. As a consequence of this method we obtained more observations for every individual than we do by direct methods, and this is one of the inherent strengths in our approach. Beyond this there is no theoretical reason to expect that a score on one card would influence a score on another card. I therefore assume that the observations are independent.

The parameters contained in the model are estimated according to the least squares method. I will, briefly, touch upon various problems that may influence the characteristics of our estimates. Because I employ an orthogonal design there is no problem of multicollinearity. It is also unnecessary, for each single individual, to discuss autocorrelation since the cards have not been ordered in any systematic way. In our experiment based on unknown quality I leave out the quality variable. Because quality influences the scores, a kind of false autocorrelation may take place in our reduced model. In such case our estimates will continue to be unbiased and consistent, but they will no longer be the estimates with the least variance. By using histograms and normal probability plots for the residuals I found that the assumption for normality seem justified. The results of the regression analyses are presented in section 3 and 4.

3. Stereotypes

In Wiig (1992) I grouped Bangladesh, Hong Kong and China in one category (proxy for developing countries) and Denmark, Italy and Norway in a different category (proxy for industrialised countries). By applying the semantic differentiation method and t-tests, we rejected our null hypothesis, i.e., that appraised quality on trousers are identical among these groups ($p = 0.000$; $t = 15.08$) - a result that suggests *a negative bias against developing countries.* This bias is an expression of the fact that consumers have different attitudes to products from different countries. By controlling for other variables that I assume are important for consumer choice, I asked our respondents which pair of trousers they would choose given different price alternatives, an Italian or a Portuguese? Because of the manner in which this question is phrased it is clear that the trousers are identical with respect to design, fabric and quality. 20 per cent of respondents reported that they were willing to pay extra for origin. An additional 20 per cent would prefer an Italian item if prices were the same. Since I have controlled for third variables, the preferences for Italian trousers and the derived willingness to pay must reflect an affective relationship to origin - and not a preference or willingness to pay so as to reduce uncertainty.

In this section the corresponding stereotypes are analysed based on an experiment where the importance of each of the 6 characteristics described in section 2 are estimated. Potential interaction effects are discussed in subsection 4.2. The consumers are given correct information about product quality and, hence, there is no reason for rational consumers to use origin as a signal of quality. I therefore argue that any effect attributed to origin must be due to some form of affective relationship or stereotype. Hence, the affective value of CO is studied in a multicue context. The information on quality given to the respondents is, however, limited to whether the different product profiles have, respectively, "very good", "medium" or "below medium" quality. Even though it may be argued that this information is, for a given value specification of quality, open to uncertainty and subjective assessment -and therefore that a possibility exists that the consumers do use origin as a signal, I nevertheless see this as of lesser consequence compared to a situation in which the respondents have no quality information at all.

In subsection 3.1, I present the results of the experimental analysis based on an aggregated regression analysis in which the consumers are segmented according to age, sex and income. The corresponding results based on the conjoint analysis are presented in subsections 3.2 and 3.4. In subsection 3.3 I undertake a comparison of the results based on direct and indirect methods.

3.1 A regression model

In this section I will present the results at the aggregate level where I control for income and the demographic factors of sex and age. As far as price is concerned I expect a negative linear relationship between price and scores.[8] The other variables included in the analysis are treated as dummy variables. The final regression model is specified as follows:

$$(2) \quad S_i = \alpha + \Sigma_k \beta_k D_{ki} + \beta_{12} P_i + \varepsilon_i \qquad k = 1 \ldots 11$$

S_i denotes score on each card for person i.[9] β_k indicates regression coefficients for dummy variables D_k. Those category variables that have three values (brand, quality and country) are recoded as 2 dummies in order to avoid problems with multicollinearity. *The base levels* for these variables have been determined, respectively, as retailer brand, below medium quality and Portugal. For the other variables please refer to specifications in appendix 3. If, for example, β_1 is statistically significant and has a positive sign, this must be interpreted so that scores increase if the brand is an international one as opposed to a situation in which the brand is a retailer brand and all else is held constant. In both sections 3 and 4 I assume, in addition, the stochastic residual ε_i to be normally distributed with an expected value equal to 0. The left two columns in table 1 give an overview of regression coefficients in the above model. T-values for each variable is given in parentheses. To enhance the usefulness of the overview I have specified the dummy variables.

[8] Other models have also been tested. For example, price has been used as a discrete variable by recoding the different price alternatives to indicator variables. In this model design, however, the multiple correlation coefficient increases by only 0.1 in comparison to our chosen model. Apart from the price increase from NOK 200 to NOK 350, the other price alternatives have been judged significantly lower than the base alternative of NOK 200.

[9] In order to make the presentation easier I have not included separate subscripts for each card.

Table 1
Regression coefficients and T-values. Price linear. Two models

Model design	Known quality		Unknown quality	
Main variables:				
Design	-1.48	(-18.1*)	-1.73	(-8.6*)
Price	-0.00198	(-9.7*)	-0.0009	(-1.9**)
Fabric	0.60	(7.4*)	0.91	(4.6*)
Unknown brand	-0.46	(-3.9*)	-0.47	(-1.6)
International brand	0.30	(3.0*)	0.61	(2.5*)
Italy	0.58	(4.9*)	0.48	(1.7**)
Bangladesh	-0.08	(-0.8)	-0.25	(-1.0)
Very good quality	2.27	(19.3*)	-	-
Average quality	1.23	(12.3*)	-	-
Background variables:				
Sex	-0.16	(-2.0*)	0.13	(0.6)
Age	0.08	(0.87)	-0.78	(-3.4*)
Income	-0.30	(3.4*)	0.24	(1.1)
Constant (α)	5.1	(26.8*)	5.7	(13.1*)
R^2	0.25		0.21	

* significant at 0.05 level. ** significant at 0.10 level.
T-values in parentheses.

The multiple correlation coefficient (R^2) has been estimated as 0.25 in the model. The explained variance of the model is, hence, not very high. This may, inter alia, be due to chance factors in the respondents' scores or errors in the specification of the model (e.g., left-out variables). As far as the question of wrongly specified model is concerned, I tested many different types of model (linear, quadratic and dichotomous), but the above-mentioned model gave the highest explained variance of our data. All variables except age and Bangladesh (versus Portugal) are significant. For the six product-specific variables both the significance level and direction (+/- sign) corresponds to our predictions in subsection 3.1. Design and quality are the two most important variables in the model. They alone explain about 18 per cent of the variance in our data.

Since the effect of Italian origin in our model is significantly different from the effect of Portuguese origin, it is implied by the model that *respondents undertake a positive discrimination* of Italy. If respondents are rational and, also, do not arbitrarily select bits of information from the total information package received

about the individual product profiles,[10] this is a sign that consumers have stereotypical attitudes to origin. Even though these stereotypical views vary between Portugal and Bangladesh, this difference is not significant. Consumers prefer clothing products from modern, Western, industrialised countries rather than from Southern European or developing countries. However, the most important divide seems to be between the two former groups. By a F-test (see Koutsoyiannis, 1988 chapter 8.5.1) I tested the improvement of fit from using the full model (12 explanatory variables as in (2)) compared to a model excluding the regressors D_5 and D_6. F was found equal to 22.6 with 2 and 2860 degrees of freedom. Hence, by introducing both indicator variables of origin simultaneously, origin is found to be statistically significant. Origin is therefore included as an independent attribute in the consumer's preference function.

3.2 Conjoint analysis

In this subsection I present the results of a corresponding conjoint analysis on an aggregated level. This analysis adds little to the analysis in subsection 3.1 since the parameters are based on the same data and same, that is, least squares, method of estimation. However, it supplies a better overview of how stereotypical views may be compensated through lower price, better quality, etc. I still use a mixed model in which all variables except price are discrete. Table 2 gives an overview of the estimated part-worth utilities.[11] These utilities can be interpreted as analogous to the regression coefficients in subsection 3.1. Our left-hand variable is, however, utility, not score. The model provides a good fit between estimated and actual scores: the Pearson correlation coefficient is estimated at 0.99. Furthermore, the chosen model has the highest internal validity. The correlation coefficient between the model's estimated score for the holdout card and actual scores is estimated at 0.48.

[10] If the respondents fail to distinguish between origin and quality and assume that a pair of trousers made in Bangladesh is of low quality even if it appears on the card that the pair of trousers is of good quality, we have by employing this method, however, not been able to distinguish between the effect of stereotyping and the effect of origin signalling. Whatever the source of the discrimination, we have at least established that such discrimination takes place.

[11] As estimated by the SPSS module Conjoint.

Table 2
Part-worth utilities

Part-worth utilities	Characteristics	Value
	Brand	
.0518		Retailer brand
.3521		International
-.4038		Unknown
	Fabric	
-.2996		Synthetic
.2996		Cotton
	Design	
.7404		Above average
-.7404		Below average
	Country of origin	
.4162		Italy
-.2495		Bangladesh
-.1667		Portugal
	Quality	
1.1050		Very good
.0621		Average
-1.1672		Below average
	Price	
-.3961		200
-.6932		350
-.9902		500
-1.4853		750
β = -.0020 (Regression coefficient of price)		

It appears from table 2 that quality is the most important variable to the consumers. If quality increases from below medium to very good, expected score will, ceteris paribus, increase by about 2.2 points (1.105 + 1.116) for the average respondent. Similarly, scores will be reduced by an average of 0.65 if a pair of trousers is produced in Bangladesh rather than Italy. This difference in scores (utility) for origin is an expression of a form of stereotyping or *discrimination* against Bangladesh. The discrimination is, however, not so serious that it cannot, for instance, *be compensated for by delivery to international brand-name*

producers. The difference in part-worth utilities from producing international brands rather than unknown brands is about 0.75 points (0.40 + 0.35), which is sufficient to compensate fully for the effect of origin. Similar analyses can be made for the other variables.

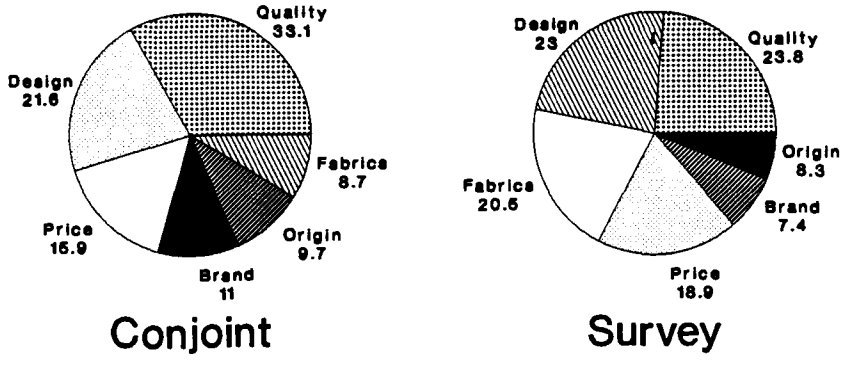
As an indicator of the individual variable's relative importance, I use the difference between the lowest and the highest part-worth utility for every variable as a fraction of the total difference in utility. Total difference in utility appears by adding the difference between the lowest and the highest part-worth utilities for every single variable.

If the importance of the six variables add up to 100 per cent, then the importance of CO is estimated at about 10 per cent. Hence, origin is about as important as is brand or fabric. On their part, the relative weights for quality and design are about 54 per cent. It is, moreover, surprising that price does not matter more in the consumers' assessment of different product profiles than what in fact this analysis suggests. This could be the result of respondents in this experiment being presented with an hypothetical situation rather than an actual one in which they would have to buy the product, or it could be due to the price variation - NOK 200 -NOK 750 - not being big enough for consumers to care very much about the price difference.

3.3 The relative importance of the characteristics. A comparison

In figure 3 I compare the weights of our six attributes based on conjoint analysis and the survey. The importance of the attributes as measured by the latter method is calculated on the basis of respondent scores on a scale of 1 to 7 where 1 means "of no importance" and 7 means "very important". From the figure it appears that there is a good fit between the estimates based on the different approaches except as far as quality and fabric content are concerned. Quality is of greater importance in the conjoint analysis, while fabric is more important in the survey. As far as origin and brand is concerned there are inconsequential differences between the estimates arrived at by using the two alternative methods. Both the direct and the indirect methods have, thus, indicated that the effect of origin is in the range of 6-10 per cent; that is, about as important as is the brand effect. Both approaches point to consumers' undertaking a significant positive discrimination of industrialized countries.

Figure 3
Importance of different attributes. Two methods



Conjoint known quality. N=169. Semantic differentiation. Likert scale N=75

4. Stereotype and signal?

In this section, I present the results of an experimental investigation where quality is unknown. The basis for comparison is the analysis presented in section 3 based on known quality, but the design is altered by leaving out one variable - information about the quality of the different product profiles. In this situation origin may also act as a signal for quality and this latter effect I intend to purify. In subsection 4.1, I will account for expected changes in weights resulting from leaving out one variable. I will, in particular, focus on the expected change in direction for weights if one or more variables are used as a signal of quality. In subsection 4.2, I discuss potential interaction effects between various signal variables. I next present the estimation results based on unknown quality in subsection 4.3. In that subsection I test whether the effects of the different variables are altered as a result of changes in the respondents' access to information. In subsection 4.4 I further elaborate the analysis using conjoint analysis.

4.1 Change of weights as a result of leaving out quality?

Conjoint analysis is based on respondents integrating in their scores the type of information available to them at a particular point in time. Leaving out a key variable introduces greater uncertainty into the model. In this case, estimated weights may consequently mirror respondent attitudes to uncertainty. In the case

of risk aversion one would expect the weights assigned to known characteristics to increase.[12] In addition, leaving out a key variable may lead the respondent to make an inference about lacking attributes based on the attributes which are known to him. If so, we no longer have full control over the independent variables in the experiment, and it can be difficult to distinguish the changes in weights due to risk aversion from those changes which result from inference decisions.

However, if the attributes are *substitutes* and, as a consequence, there is a trade off (or an inverse relationship) between the part-worth utilities of existing and left-out variables, an attribute will have less effect if it is presented alone (without information about quality) than if it is presented together with information about quality. For instance, there is an expectation that the positive effect of low price is neutralized by the fact that such low price may indicate low quality (Johnson and Levin, 1985; Huber and McCann, 1982). Tellis and Gaeth (1990) have shown that such a reduction in the weight of a competing attribute, for instance price, cannot be explained by risk aversion, but has to be due to the consumer using price as a signal of quality. The inference decision leads therefore to the underestimation of competing attributes. Because, however, I only measure the "net effect" I cannot say how large the contradictory effects are.

For *complementary*[13] attributes one would, however, expect that the numerical value of the weight is adjusted upwards if only one of the attributes are presented to the respondents. The increased importance of such an attribute stems both from consumer attitudes towards risk and from consumers using that attribute as a signal of quality. It is, however, more difficult to distinguish between changes resulting from risk aversion and inference decisions — both lead in the same direction. Brand and CO are such examples of complementary attributes. In this case, however, the inference decision may lead to the overestimation of the attribute concerned.

4.2 Interaction effects and inference

If we assume that possible interaction effects between two or more independent variables produce effects through a third variable - perceived quality - then

[12] In marketing research, models based on consumer preference functions as a convex combination of the values of the independent variables have been shown to have high predictive value (cf. Johnson and Levin, 1985). In such so-called "averaging models" the weight of a left-out variable will be set equal to 0 while the weights of the known variables will increase if we leave out a variable as compared to a situation where all important characteristics are presented to the respondents.

[13] The sign of the marginal utility is the same for two attributes.

problems connected to interaction effects are largest in the case where quality is unknown. I limit myself to discussing potential interaction effects of, at most, the second order. There are, in particular, two main types of interaction effects that are central to our problem. First, the significance of a brand may depend on country of origin or vice versa. A brand with a good reputation may see a weakening of that reputation if it is produced in a developing country with a low quality image (Gaedeke, 1973; Han and Terpstra, 1988; Johannson and Nebenzahl, 1986; Jaffe and Nebenzahl, 1991; Morganovsky and Lazarde, 1987). On the other hand, a brand effect may increase if consumers use brand as a signal of quality above all in cases where CO is a country with a weak quality image (see Chao, 1989).

Second, an interaction effect may occur between price and origin. For example, the part-worth utility of high price may be lower in a situation where CO is a country with a bad quality image. If the respondent uses price as a signal of quality, then a high price may not be credible as signal of high quality in this case. Chao (1989) has shown for high prices on TV sets and stereo equipment that perceptions of quality are conditioned upon country of production — while there is less variation in quality perceptions when price is low. The inference effect of increased price will, in this case, be reduced if country of origin has a bad quality image. On their part, White and Cundiff (1978) find no interaction effect between price and origin in the case where quality is assessed.

The problem of interaction effects is particularly serious if left-out interaction effects are correlated with those effects one wishes to estimate. On the other hand, estimating interaction effects involves the estimation of more attributes which, when seen in isolation, give a lower predictive value for our parameters. Hagerty (1985) and Green (1984) have shown that predictive value is weakened more than what we gain through greater realism in our model. Louviere (1988b) maintain, moreover, that 80 per cent of the variance in data may be attributed to main effects. Interaction effects of the second order can usually not explain more than about 2-3 per cent of the variation. Leaving out such effects is, thus, not likely to be a serious problem. In addition, it should be stressed that if such effects were to be estimated — where in this subsection I have focused on some of these, the respondents would be presented with additional product profiles. Furthermore, the above-mentioned studies are not altogether conclusive with respect to which interaction effects of the second order are the most important or the size of these. However, both brand, country of production and price can be bases for an independent effect on the quality perceptions of respondents. The analysis is

restricted to such interaction effects of the first order or how information about price, brand or CO affects perceived quality.[14]

4.3 A dummy variable approach to pooled data

Let us for a start assume that our regression model for unknown quality has the same form as in subsection 3.1. In order to distinguish between parameters that are estimated on the basis of the two different designs, the different parameters (in reduced form) have been given the subscript * and the estimation result is given in the two right-hand columns of table 1.

$$(3) \quad S_{i*} = \alpha_* + \Sigma_k \beta_{k*} D_{ki} + \beta_{12*} P_i + \varepsilon_{i*} \qquad k = 1 \ldots 6;\ k = 9, 10, 11$$

As can be seen from the last two right columns of table 1, neither price, Italy (versus Portugal) nor unknown brand (versus retailer brand) are no longer significant at the 0.05 level. The two former variables are, however, significant at the 0.10 level. Of the product specific variables, design, fabric and international brand (versus retailer brand) are significant.[15] Thus, it seems like the respondents *do not distinguish between country of origin* despite the fact that they have no information about the quality of the products.[16] If country of production is no longer significant, it points in the direction of consumers putting the emphasis on *other* characteristics than origin in a situation where they do not have information about quality. However, when using a F-test for the improvement of fit, similar to the approach taken in sub-section 3.1, origin is significant even though both indicator variables of origin are insignificant (F is found equal to 4.38 with 2 and 514 degrees of freedom).

If we compare the numerical values of the regression coefficients for design, fabric and international brand in the two models, we see that the absolute numbers of the coefficients are greater in the model based on unknown quality than in the corre-

[14] The literature presents different results of empirical tests of this relationship. As far as price is concerned, Jacoby (1971) has shown that price is an indicator of quality as long as price is the only attribute. In a context where price is one of several attributes it has, however, a lower validity. The relationship is, nevertheless, not clearcut (Monroe, 1973, Olson, 1977) and may be conditioned by brand (Jacoby, Olson and Haddock, (1971).

[15] Age is the only background variable which is statistically significant.

[16] However, Italy is significant (at the 0.05 level) in a stepwise regression. This may indicate that there is a correlation between country of origin and the other variables. Most likely there is a correlation between country of origin and those variables that are not significant in a stepwise regression - for instance, price. Even if our design has eliminated this type of correlation effects, it is possible that respondents are not consistent in assigning scores. This may give rise to spurious relationships.

sponding model presented in section 3. The t-values are, however, lower. This is probably a consequence of a more restricted sample size. Furthermore, these three attributes are complementary. On the basis of the theoretical model I discussed in subsection 4.1, the increased emphasis on these variables could indicate that consumers are either risk-averse or that they use the variables as a basis for an inference decision. On the other hand, the reduction in absolute numbers of the coefficient for price indicates that the consumers are use price as a signal of quality.

In spite of the fact that a variable is only significant in one of the designs (price, for instance), it is possible that this variable has a *significantly* different effect in the two samples. It is, vice versa, also possible that even if a variable is significant in both samples, the difference in effect between the two samples may not be significant. In addition to a potential difference in the slope of the regression lines,[17] there may be a difference in the level of the regression lines (as measured by the constant α_2 in (4)). Because I am interested in the extent to which brand, origin or price function as signals of quality, I wish primarily to test whether the effects of these variables is significantly different in the two samples. For this purpose I take an approach based on the use of indicator variables (Koutsoyiannis, 1988, chapter 12.3). I introduce a new indicator variable M for method and pool all the data in the two samples and then estimate a general model. M is defined as follows:

M = 0; unknown quality
M = 1; known quality

For M = 1 and M = 0, we thus find, respectively, the regression equations for samples based on known and unknown quality as special cases of the same general model.[18] Let our pooled regression model be specified as follows:

(4) $S_i = \alpha_1 + \alpha_2 M_i + \Sigma_k \beta_k D_{ki} + \beta_{12} P_i + \beta_{14}(M_i P_i) + \beta_{15}(M_i D_{5i}) + \beta_{16}(M_i D_{1i}) + \varepsilon_i$
where k = 1 ..11

[17] Strictly speaking, the regression "line" is a plane because we have more than two variables. We nevertheless use line as a term. It should also be noted that the slopes of the regression lines can be different only for covariables (the price). For indicator variables we can only calculate shifts in curves.

[18] In this approach there is a problem connected with the quality variable. This variable only appears in the case of respondents in the sample based on known quality. If we leave out this variable, the mean value of our estimates will be biased, since we have already found that this variable has a strong effect on scores. If we keep this variable in a form as specified in subsection 3.1, we will, on the other hand, get many empty cells when we undertake the estimation.

The indicator variables $D_1...D_{11}$ are defined in subsection 3.1. The three last items in the regression equation are intended to test whether the regression coefficients for price, Bangladesh or international brand vary significantly between the two designs.[19] The results of the estimation are presented in table 3.

Table 3
Regression coefficients and T-values. Price linear. Pooled model

Model design	Full model	
Main variables:	β	T
Design	-1.51	(-20.0*)
Price	-0.00096	(-1.98*)
Fabric	0.65	(8.5*)
Unknown brand	-0.45	(-4.1*)
International brand	0.61	(3.1*)
Italy	0.57	(5.1*)
Bangladesh	-0.21	(-1.04)
Very good quality	1.06	(11.3*)
Average quality	1.95	(17.6)*
Background variable:		
Sex	-0.11	(-1.4)
Age	-0.06	(-0.6)
Income	-0.21	(-2.5*)
Sample effects		
Method	0.72	(2.4*)
Method/Bangladesh	0.11	(0.56)
Method/Int. brand	-0.32	(-1.5)
Method/Price	(-0.001)	(-1.94*)
Constant (α_1)	4.6	(14.7*)
R^2	0.24	

* Significant at 0.05 level. T-values in parentheses. 200 respondents, 17 observations each = 3400 cases.

[19] I have also tested whether the regression coefficients for the other value specifications of brand and country of origin vary significantly between the methods. However, for neither Italy nor unknown brand have we found such significant differences. Furthermore, F-tests reject that the effect of origin or brand vary significantly between the methods.

On the basis of table 3 we may draw the following conclusions:

Main variables:
- All product specific main variables except Bangladesh (versus Portugal) are significant. Thus, respondents undertake a positively significant discrimination of products produced in Italy, but no significant discrimination between Portugal and Bangladesh. *I can therefore reject the hypothesis that the respondents do not use origin when assigning scores.* The signs of the effects are the same as in section 3.

Background variables:
- Groups with high income assign significantly lower scores than do other income groups. For the other background variables I find no significant differences. Notice that while age was significant in the experiment based on unknown quality, it is not when pooling the data. The main idea behind including background variables is to control for third variables, and for this reason I do not find it necessary to explain the reasons for the observed difference.

Sample-affected variables
- α_2 or our method of data analysis is significant. Not unexpectedly, the respondents assign significantly higher scores in the design based on known quality. In other words, we can *reject the hypothesis that the two regression models are alike.* As measured by t-values our method is still a secondary explanatory variable in comparison to the variables design and fabric. Since the constant α_2 is significant and in this manner contributes to the horizontal shift of the regression lines, the expected value of being produced in Bangladesh will be different in the two samples.

- Neither the effect of being produced in Bangladesh (β_5) nor the effect of being an international brand (β_1) vary significantly between the two samples because β_{15} and β_{16} are not significant. The signs of these coefficients nevertheless correspond to the analysis in subsection 4.1 about changes in weights. Since α_2 is significant with a positive sign, the respondents assign significantly lower scores for products from Bangladesh in the design based on unknown quality. This effect is, however, not directly tied to use of origin as signal of product quality, but represents an effect of the method employed.

- The regression coefficient for price is changed significantly. We can therefore reject the hypothesis that β_{14} is the same in the two samples. The slope of the regression line in the sample based on unknown quality will therefore be lower in

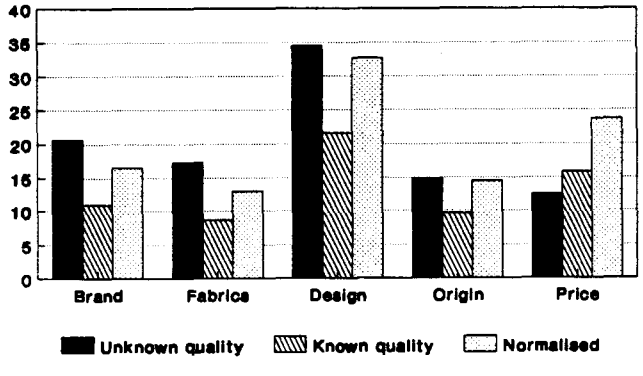
absolute numbers, and price receives a significantly positive additional effect in the sample based on unknown quality.

On the basis of the theoretical discussion in subsection 4.1 - especially the discussion about changes in weights for competing attributes plus the empirical test above for comparisons of two regression models, we can draw the following two main conclusions: First, we are able to reject the hypothesis that the consumers' use of price are the same in the two samples. According to the discussion in sub-section 4.1, hence, we are unable to reject the hypothesis that consumers use price as a signal of product quality. Second, even if consumers discriminate between products on the basis of information about CO and brand name, we can nevertheless not reject the hypothesis that the coefficients are the same in the two samples. We therefore *do not have a basis for stating that respondents use either brand or origin as a signal of quality.*

4.4 Conjoint analysis

The importance of each single attribute has been measured through an aggregated conjoint analysis and are presented in figure 4. In contradistinction to subsections 4.3 and 3.2, I used an ideal model as far as price is concerned in the two different designs. Because the importance of the different designs add up to 100 per cent, leaving out one variable will automatically result in the other variables having an increased importance. So as to take this into consideration, I have in figure 4 normalised total effect by computing the importance of each single variable on the basis of total effect exclusive of quality.

Figure 4
Importance of various attributes. Percentage distribution of two designs



Unknown quality N=31. Known quality N=169

As it appears from figure 4, the importance of price is reduced in the design based on unknown quality. The importance is particularly reduced if we take into account that the elimination of quality leads to an increase in the importance of the other variables. The increased importance of country of origin is, on its part, not greater than one would expect when we leave out the quality variable. The conjoint analysis therefore supplies little ground for believing that respondents use origin as a signal of quality. The conjoint analysis and especially figure 4 further illustrate, however, that price is used as a signal of quality. From Wiig (1992) it appears that respondents prefer higher prices up to a certain point (the stated ideal price). The model backs up the analysis in subsection 4.3 in the sense that because increased price is preferred up to a certain limit, this has to be explained as a consequence of price being used as a signal of quality. For low prices the model furthermore indicates that the positive signal effect of increased price is greater than the negative main effect of increased price. However, for high prices the signal effect of increased price is not sufficient to compensate for the negative main effect of increased price. Beyond this, I refer to subsection 4.3 in which I tested this relationship.

5. Conclusions

Based on a consumer survey and two experiments, the two most important conclusions are the following: First, origin has an independent *emotional (affective) effect*, but the signal effect of origin is not significant. On the basis of our data we therefore reject the hypothesis that consumers use origin as a signal of quality, but we cannot reject the hypothesis that consumers have different attitudes towards products from different countries. This attitudinal effect is estimated to be 6 per cent in the consumer survey while it is almost 10 per cent in the approach based on the use of experimental data. By using our experimental methods we find a significantly positive discrimination of products made in modern industrialised countries such as Italy versus low cost countries such as Portugal, but no significant discrimination between products made in Portugal, on the one hand, and developing countries like Bangladesh on the other. From our consumer survey we find a significantly negative discrimination of products made in developing countries. As seen from the point of view of the consumer, the effect of origin thus indicates the existence of a factor distorting competition, a factor which is connected to stereotyped attitudes to products emanating from different countries. Hence, the producers are faced with prejudices on the part of the consumers along the lines analysed in the early literature concerning country of origin effects. Rather than using informative marketing of product quality, marketing should be tailored towards changing such attitudes.

Second, *only price has a significant signal effect* as far as quality is concerned. The hypothesis that brand and origin are used as signals of quality is rejected on the basis of our data. The results of the empirical survey therefore weaken theories that CO is used as a signal of quality. On the other hand, the results conform to theories about use of price as a signal of quality (Bagwell and Riordan, 1991). *As seen from the perspectives of the distributor or the producer, this may increase their incentives to operate with higher prices.* However, as argued in chapter 4, the producer does not face consumers directly. He depends on a distributor marketing his product. Hence, only the distributor may be able to reap the profits of such a price increase.

In addition, I would like to draw attention to the estimated *importance of the characteristics*. Design and quality are the most important attributes for the consumers. The importance of these attributes is in the area of 46-51 per cent. Price is of relatively low importance, around 16-19 per cent. Hence, competitive advantage on the basis of price alone is not so important as commonly assumed. This would mean that producers in developing countries should, to a greater extent, concentrate on changing design and quality instead of basing their entire marketing strategy on price alone. The effect of origin is about the same as the effect of brand. A favourable brand can thus compensate for unfavourable origin. Furthermore, the weights are relatively autonomous from choice of method. However, the weights in the experimental methods are significantly dependent on the respondents' level of information.

While in our sample of consumers that had recently bought an item of clothing, 24 per cent knew its country of origin, 36 per cent said that they usually looked at the CO label or otherwise got hold of information about origin. Even though these scores for attention to origin may seem low, they do still indicate that consumers care about country of origin in making their choices. However, as argued above, the basis for this is mainly connected to attitudes - not to using origin consciously as an informational signal of quality. In that regard, price is a more important signal.

In order to study strategies that developing country producers could follow, we would have to explicitly model the whole market. A natural follow-up would be to include producer behaviour in the analysis together with distributors and brand-name producers at home and exporters in developing countries. Our results could represent a valuable element in such an analysis. In addition, the results are relevant to the rationale behind the regulations for labelling of origin and to what extent such labels distort competition. As far as clothing is concerned, the analysis has shown that consumers use information about origin primarily to confirm

stereotyped attitudes towards products from developing countries. In this situation there are good grounds for enquiring about the legitimacy of forced labelling of origin for clothing.

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Appendix 1:
Survey

Spørreskjema 20.12 1991[1]: Konsumenters handleadferd.
Utføres for Chr. Michelsens Institutt.

Prosjektansvarlig: Forsker Arne Wiig tlf 57-43-73

Formål: Kartlegge hva forbrukere legger vekt på ved kjøp av klær.

A. Tidspunkt og intervjuer..... Sted..... Nr.....

B. Vi har noen spørsmål vedrørende din handleadferd ved kleskjøp.

2. En bukse kan karakteriseres ved bl.a. følgende 6 kjennetegn **pris**, **merke** (eks Levis og Hennes og Mauritz), **stofftype** (fiberinnhold eks bomull og syntetiske stoffer), **design** (stil og snitt: mote), **kvalitet** (holdbarhet, slitasjestyrke og søm) og **produksjonsland**.

Dersom du skal kjøpe en bukse, hvordan vil du vurdere betydningen av hver av disse egenskapene langs en skala fra 1 til 7. Skalaen øker med grad av betydning for ditt buksevalg fra 1 'av ingen betydning' til 7 'særdeles viktig'.

	1	2	3	4	5	6	7
Design	☐	☐	☐	☐	☐	☐	☐
Pris	☐	☐	☐	☐	☐	☐	☐
Merke	☐	☐	☐	☐	☐	☐	☐
Kvalitet	☐	☐	☐	☐	☐	☐	☐
Produksjonsland	☐	☐	☐	☐	☐	☐	☐
Stofftype	☐	☐	☐	☐	☐	☐	☐

3. Har **du** på egen hånd forutsetninger til å vurdere kvaliteten på klær? Angi svaret på en skala fra 1-7. 1 betyr at du overhodet ikke har noen forutsetninger og 7 at du har svært gode forutsetninger.

	1	*2*	*3*	*4*	*5*	*6*	*7*
Stoff, slitasje holdbarhet	☐	☐	☐	☐	☐	☐	☐
Vasking, krymping og fargekthet	☐	☐	☐	☐	☐	☐	☐

[1] Det opprinnelige spørreskjema inneholdt flere spørsmål. Vi har imidlertid valgt å presentere det endelige skjema.

Søm	☐	☐	☐	☐	☐	☐	☐	81

4. Ved kjøp av klær, hvor ofte innhenter du informasjon om følgende egenskaper:

	1. Sjelden eller aldri	2. En gang i mellom	3. Ofte eller alltid
Stoffinnhold	☐	☐	☐
Vaskeanvisning	☐	☐	☐
Søm	☐	☐	☐

6 b) Du har valget mellom å kjøpe en bukse fra Italia og Portugal. Buksen fra Portugal koster 300 kr. Buksen fra Italia har sikker kvalitet, men det er en sjanse ut av 10 for at buksen fra Portugal er ubrukelig. Buksene har forøvrig samme design og stoffinnhold.

Vil du velge den italienske buksen dersom? (Etter ja, avslutt)

	1. Ja	2. Nøytral/Vet ikke	3. Nei
Buksen fra Italia koster kr. 600	☐	☐	☐
Buksen fra Italia koster kr. 450	☐	☐	☐
Buksen fra Italia koster kr. 350	☐	☐	☐
Buksen fra Italia koster kr. 330	☐	☐	☐
Buksen fra Italia koster kr. 320	☐	☐	☐

7. Dersom du skulle vurdere kvaliteten på bukser langs en skala fra 1 'svært dårlig' til 7 'svært god', hvordan vurdererer du kvaliteten på bukser lagd i:

	1	2	3	4	5	6	7
Portugal	☐	☐	☐	☐	☐	☐	☐
Norge	☐	☐	☐	☐	☐	☐	☐
Hong Kong	☐	☐	☐	☐	☐	☐	☐
Danmark	☐	☐	☐	☐	☐	☐	☐
Bangladesh	☐	☐	☐	☐	☐	☐	☐
Italia	☐	☐	☐	☐	☐	☐	☐
USA	☐	☐	☐	☐	☐	☐	☐
Kina	☐	☐	☐	☐	☐	☐	☐

8. For et og samme merke, mener du at kvaliteten varierer ubetydlig eller vesentlig mellom ulike produksjonsland? (tenker oss at et merke kan produsere i alle land)?

1. Ubetydlig ☐
2. Noe ☐
3. Vesentlig ☐
4. Vet ikke ☐

9. I hvilken grad har du noen erfaringer med kjøp av klær fra de ovennevnte produksjonsland?

	Ja 1	Nei 2	Vet ikke 3
Portugal	☐	☐	☐
Norge	☐	☐	☐
Hong Kong	☐	☐	☐
Danmark	☐	☐	☐
Bangladesh	☐	☐	☐
Italia	☐	☐	☐
USA	☐	☐	☐
Kina	☐	☐	☐

10. Dersom norske klær og importerte er identiske (vi tenker oss at det finnes norske produkter), vil du kjøpe norsk dersom: (etter ja, avslutt)

	1.Ja	2 Nøytral/vet ikke	3.Nei
1. Norske klær over 15 % høyere pris	☐	☐	☐
2. Norske klær 11-15 % høyere pris	☐	☐	☐
3. Norske klær 1-10 % høyere pris	☐	☐	☐
4. Samme pris	☐	☐	☐

12. Når du kjøper klær for deg selv, legger du merke til hvor produktene er laget?

1. Aldri eller tilfeldig ☐
2. Noen ganger ☐
3. Alltid eller som regel ☐

13a. Kjøpstidspunkt:

1. Nå ☐
2. Inget kjøp nå/ siste kjøp ☐

13b. Kjenner forbrukeren til hvor sist kjøpte klesplagg er produsert?

1. Produksjonsland kjent ☐
2. Produksjonsland ukjent ☐

C. Demografi

14. Kjønn 1. M ☐ 2. K☐

15. Alder 1. 15-25 ☐ 2. 26-50 ☐ 3. 51 og over ☐

16. Inntekt 1. 0-150 ☐ 2. 151-250 ☐ 3. 251 og over ... (hovedforsørger)

Appendix 2:
Experiments

1. Informasjon til respondenten[20]

Bukser kan adskille seg mhp pris, design (stil, mote og snitt), kvalitet (holdbarhet, slitasjestyrke og s¢m), produksjonsland, merke, stoffinnhold og pris. Vi tar utgangspunkt i en situasjon hvor disse egenskapene kan inndeles som f¢lger:

Merke:
- Butikkmerke
- Internasjonalt anerkjent
- Ukjent merke

Stoff:
- 100 % bomull
- Blandingsprodukt/syntetisk

Design:
- Over gjennomsnitt
- Under gjennomsnitt

Produksjonsland:
- Italia
- Bangladesh
- Portugal

Pris:
- 200
- 350
- 500
- 750

Kvalitet:
- Meget god
- Middels
- Under middels

[20] Informasjon til utvalg 1 (kjent kvalitet).

2. *Spørreskjema 1*

Først stiller vi noen spørsmål om vurdering av ulike **bukser**.

Tenk deg at du står i en butikk og skal kjøpe en bukse til bruk i fritid eller på arbeid (ikke fest/selskap). Hvordan vil du da vurdere de 17 buksene som er beskrevet på vedlagte "kort"? Bruk en karakterskala fra 1 til 10, der 1 betyr at buksen er helt "ubrukelig" og 10 betyr helt perfekt. Vi vil at du aller først sorterer kortene i tre bunker; en bunke (3-6 kort) med bukser med positive egenskaper; en bunke (3-6 kort) med bukser som har negative egenskaper og en mellomgruppe. Gi deretter poeng for hver enkelt bukse i den positive gruppen, deretter i den negative gruppen og avslutningsvis for mellomgruppen.

Bukse 1
1 2 3 4 5 6 7 8 9 10

Bukse 2
1 2 3 4 5 6 7 8 9 10
.....
.....

Bukse 17
1 2 3 4 5 6 7 8 9 10

La oss avslutningsvis stille noen spørsmål om bakgrunnsvariable

3. Kjønn
1. M ☐
2. K ☐

4. Alder
1. 15-25 ☐
2. 26-50 ☐
3. 51 og over ☐

5. Inntekt
1. 0-150 ☐
2. 151-250 ☐
3. 251 og over .. ☐

6. Metode:
1 Med kval. ☐
2 Uten kval. ☐

Appendix 3:
Dummy variables

Let D_k (for k = 1 ... 11) be specified as follows:

Brand

D_{1i} = 1 international; 0 else

D_{2i} = 1 unknown; 0 else

Fabrics

D_{3i} = 1 cotton; 0 synthetic

Design

D_{4i} = 1 below average; 0 above average

Country of origin

D_{5i} = 1 Bangladesh; 0 else

D_{6i} = 1 Italy; 0 else

Quality

D_{7i} = 1 very good; 0 else

D_{8i} = 1 average; 0 else

Sex

D_{9i} = 1 men; 0 women

Income

D_{10i} = 1 above NOK 150,000; 0 below NOK 150,000

Age

D_{11i} = 1 above 25 years; 0 below 25 years

Price

P_i = price i = 200, 350, 500 and 750

Chapter 4

Property rights, investment in product differentiation and branding strategies in the market for clothing

Arne Wiig*

Abstract:

I distinguish between four general phenomena of product differentiation. Both the distributor and the supplier may invest in "brand" differentiation or "product" differentiation. Four control regimes are introduced designed to secure that the party which invests is able to reap the profit of such investments. My main hypothesis may be stated as follows: In circumstances characterised by incomplete contracts between a distributor (buyer) and a producer (supplier), the actor which makes non-verifiable investments in differentiation (DI) is able to obtain the residual profit of the investments, provided that he controls the differentiation. In markets where DI is undertaken primarily by the buyers (e.g., the distributor invests in marketing and design), the buyer must have the control. On the other hand, in those markets where DI is undertaken by the supplier (through the choices of appropriate technology, capital equipment and product quality), the supplier must have the control. In cases where there are externalities, as when either buyer's investment influences supplier's costs, or supplier's investment influences the buyer's product value, buyer control and supplier control, respectively, these are second-best solutions. However, these solutions are better than a purely competitive market. This model is applied to the market for clothing, and I also draw some policy lessons concerning brand name strategies in the clothing market in general, and for exporters of apparel from Bangladesh in particular.

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1. Introduction and theoretical framework

> "The owner is allowed to exclude all, and is accountable to no one but him", Holmes (1881/1946; p. 246. Quoted from p. 694 in Grossman and Hart, 1986)

1.1 General introduction

Almost the entirety of Bangladesh's exports of garments are designed by foreign buyers (Wiig, 1990 and appendix 1). Bangladeshi exporters have still not created any brand names in the apparel market, and the products are marketed under the umbrella of the *buyer's* (distributor's) *brand* name. Are there any reasons to be surprised by these facts? What are the economic reasons why the country's producers do not design and brand their own products? Three general and common explanations would be risk aversion, satisficing behaviour and lack of knowledge.[1] In this paper, I will develop and elaborate a forth perspective, based on the notion of property rights.

In the clothing market brands are in general only secondarily related to the unit of production. Instead, brand names are either internal brands of local and international distributors/importers or international brands like Levi's, Wrangler, Lee, Hugo Boss, Van Heussen, etc. The products of these international (top) brands are usually sold by independent distributors. Both the sales volume of such brands and the fact that they sell *standardised* shirts and trousers in addition to their more famous products (e.g., jeans), may have led to a greater share of their products being put out rather than made in-house. There are also examples of brand names related *both* to the distribution channel and the production units like Benetton (Italy), Marks and Spencer (UK), Rodier (France) as well as French fashion brands like Haute Couture, Yves St. Laurent, Pierre Cardin, etc. In these latter cases, some parts of the production are undertaken in-house (usually the most advanced parts), and the rest is usually subcontracted to independent firms. However, the distributing agency possesses strong control over its suppliers.[2] However, the market shares of the international brand names mentioned above are only minor. In Norway this share is about 10 per cent of the total imports and consumption of apparel. Furthermore, as argued above, a large part of this fraction is subcontracted. As in the rest of Europe, especially the northern parts, the multiple retail chains dominate the market. The eight largest distributors in

[1] See appendix 1, sub-section 3.2 for a discussion of these alternative explanations

[2] In the case of Benetton production is undertaken by firms either owned by Benetton or under contracts to deliver products exclusively to Benetton.

Norway have a market share of about 30 per cent. These distributors put out all the production and are usually marketing their own brands. *Hence, it is a striking feature that in the clothing market, production is conducted by independent firms in the sense of legal ownership structure between the core brand and the production unit.*

NIKE is primarily a brand name in the market for shoes, but its history and business concept serves as an example clarifying my main point concerning the characteristics of international brand names in the clothing industry. In essence NIKE is only a distributor with the primary purpose of designing and marketing products. All production is based on subcontracting with independent firms under the auspices of the brand (Donaghu and Barff, 1990). In the market for durable consumer (white) goods a similar phenomenon existed in the 1960s when Italian brands like Zanussi entered the European market under the umbrella of the buyers' brand name (such as Electrolux). By temporarily using the brand name of the buyer, in this case a manufacturer's brand name, the final seller provides the quality reputation of the product (Paba, 1986; 1991).

By contrast to the market for apparel, in the market for cars, brand names are related to the name of the *producer* (like Toyota or Volkswagen) — not the brandname of the distributor. While it seems likely that the buyers are the driving force in the diversification of garments exports, the producer seems to be the driving force in the market for automobiles. If so is the case, why? Or to frame the question in another way: *Under which conditions is it reasonable to expect that the buyer or, alternatively, the seller (producer) invests in differentiation?* As shown in the following analysis, when marketing and design constitute the main inputs into differentiation, as in the market for clothing, the distributor will make investment in such differentiation provided that he has exclusive distribution rights (buyer control) to the result of differentiation. Conversely, when differentiation is primarily related to product development and inherent product characteristics of the product (horsepower etc.), such as is the case with automobiles, the seller will undertake investments in differentiation (DI) provided that he has exclusive production rights (supplier control). *These different governance structures are in this paper related to the different characteristic of the two types of products.*[3]

[3] There are by and large three reasons for contrasting two such outlays which possibly are distinctly different in terms of other variables as well as those studied in this paper (e.g. economics of scale and scope and the resulting concentration ratios). First, with the exception of those cases mentioned above, I can hardly find any segment of the clothing industry where the manufacturer is the driving force in the differentiation process. Second, the car industry represents an archetype used to illustrate my main point. Third, data is easily available. However, the main focus is on branding strategies in the clothing market.

Following such a perspective, the observed pattern of design making by the distributor is not country-specific, rather it is product specific. While R&D in the textile and apparel sector in the US was approximately 0.4 per cent of sales, in the automobile industry the corresponding figure was 8 per cent.[4] On the other hand, companies like Levi's, K mart and J.C. Penney are together with the tobacco and liquor industry among the heaviest advertisers in the US (Rothschild, 1987 p.24).[5]

The present paper tries to explain the distribution of property rights as a result of the investment made in differentiation (DI) by either producer or distributor. As indicated by Grossman and Hart (1986), some distributions of property rights are more likely to arise and survive. The importance of analysing such issues is underscored by the fact that differentiation could be a strategy to reduce competition and thereby increase profit (Porter, 1980). Who controls differentiation therefore determines who profits the most from the production and sale of a good. When the distributor controls the differentiation, the producer is not likely to achieve profit by differentiation *even* when there is competition among the distributors. This problem arises *in addition to* the well-known problems due to monopsony power on the buyer side, risk aversion on the supplier side or asymmetric information concerning the quality of products. Also in these cases, the producer has difficulties in achieving any pure profit through product differentiation. However, my focus is on control problems e.g., under which conditions is it reasonable to expect that the producer controls the distributor or vice versa?

1.2 Theoretical framework

The theoretical framework of this analysis is inspired by two sets of concepts. The first set of concepts, and the most important one, revolves around the notion of an *incomplete contract* between the parties involved in a transaction. The subsequent *transaction costs* which arise in such a deal are essential to understanding the proper distribution of *property rights* (Williamson, 1985; Klein et al., 1978; Alchian and Demzetz, 1972; Coase, 1937). As opposed to Williamson (1985), who focuses on vertical integration (joint profit maximising firms) or long term relationship between the two agents as strategies for reducing transaction costs, I follow the property rights school which emphasises the role of ownership to a

[4] Scherer (1980) and Katz et al. (1987). These figures relate to different sources and methodology and reflect non-comparable time periods. The main point is, however, that R&D is significantly greater in the automobile industry than in most industries including the garment sector. Unfortunately, I have no disaggregated figures concerning the R&D which is undertaken by individual brands in the clothing sector. Lower concentration ratios in the clothing sector than in the automobile industry may also explain the low share of R&D in the clothing sector.

[5] However, in absolute terms General Motors (GM) is the second leading advertiser in US.

specific asset – not the whole firm (Grossmann and Hart, 1986; Hart and Moore, 1990). In the context of the market for apparel, let me sketch the relationship between these theories and the approach taken in this paper.[6]

Initially, one particular buyer and one seller write a contract. After contract is signed, both parties may invest in DI. However, accounting is too inadequate in verifying these investments. Because of moral hazard problems (both parties would argue that they invested a lot) and unpredictable contigencies, the initial contract does not specify a transfer price which depends on their ex post investments. I therefore assume there are no possibilities in obtaining an optimal incentive scheme or contract ex ante where the parties' transfer (internal) price depends on their ex post investments.[7] Rather, the contract is incomplete: The ex post investments in differentiation made by the two parties are uncovered. In terms of the distributors' investment, the incompleteness is primarily related to the distributor's investments in marketing (Marvel, 1982). Further, the distributor usually modifies the design after an initial (incomplete) contract has been signed due to unpredictable market demand. Concerning the investments made by the seller, the incompleteness is primarily related to quality specification. When there are many quality attributes which are difficult to verify, transaction cost problems arise in specifying a comprehensive ex ante contract covering all possible contingencies. Alternative institutional settings may reduce such transaction costs. In situations where the parties have long term relationships, one branch of economic theory focuses on reputation mechanisms or the use of dual sources to minimise transaction costs. Williamson (1985), on the other hand, focuses on procedures and institutions (governance structures) to handle situations which are not foreseeable by contracts. The optimal choice of governance structure is related to the type of transaction, characterised by the degree of asset specificity, uncertainty and frequency on the one hand and characteristics of the actors (like bounded rationality) on the other hand. However, this approach is unable to give a precise statement of the boundaries of the firm. The property rights school, by introducing the notion of authority or residual control and claims, argues that the difference in governance structure is a residual right. The firm has power to do things not foreseen in a contract.[8]

[6] Hart and Holmstrom (1987) give an overview of the theory of incomplete contracts while Hart (1989) gives a broader overview of the theory of the firm.

[7] I only consider linear transfer prices.

[8] Grossman and Hart, 1986; Hart and Moore, 1990. See also the refinements by Milgrom and Roberts, 1990a and Kreps, 1990.

In their modelling approach, Grossman and Hart use a two-period model where the parties' contract in the first period consists only of a distribution of property rights. After this distribution has been contracted upon, the parties make non-verifiable, relation-specific investments and in the second period the surplus is negotiated upon. Inspired by the property rights school, I also focus on the structure of authority as an alternative to complete contracts. However, my focus is on the distribution of property rights concerning differentiation in *general – not relation-specific investments* as in the above mentioned Grossman and Hart model. Relation-specific investments in differentiation are analysed as a special case of a more general model where I try to draw clear distinctions between the concept of investments in differentiation on the one hand and the concept of relation-specific investments used in both transaction cost analysis and by the property right school on the other hand. Furthermore, as opposed to the Grossman and Hart model, my benchmark is a *competitive context* even when the parties have undertaken their investments. The reason for this different approach is a very simple one. The international market for apparel consists of fringe producers and distributors, and relation-specific investment, if relevant at all, has to be analysed as a special case of a more general model. Furthermore, in this analysis property rights are defined in terms of the parties' possibilities to *exclude* other agents from either dealing or producing – not residual claims as in the literature referred to above. As such, I follow a property rights approach to exclusive dealing.[9]

The second set of concepts which is important in this paper derive from theories of *vertical restraints*. Exclusive dealing is already mentioned, but in addition the possibilities that the parties have to establish franchise arrangements are discussed.[10] The main point is that the actual and potential types of vertical restraints between the distributor and the seller influence the competition between the distributor and the seller, which in turn influences the investments undertaken by the two parties. As opposed to general theories of exclusive dealing, I do not focus on strategic commitments in a monopoly or duopoly context.[11] Further, as opposed to Chandler (1977) who assumes there is a general tendency of vertical integration, I argue that in the clothing case there is an international "hybrid" division of labour in the sense that production is undertaken by separate firms. This type of international division of labour gives the distributor more flexibility

[9] There exists a whole branch of literature analysing exclusive dealership (see e.g. Bernheim and Whinston, 1992; Mathewson and Winter 1987).

[10] The actual type of vertical restraints which may occur in a market reflects the distribution of property rights. Only in the case of supplier control can a seller impose exclusive dealership or franchise arrangement on the distributor.

[11] An overview of the literature on vertical restraints is given by Tirole (1988) and by Katz (1989).

than an integrated firm, while both the distributor and the producer get stronger incentives to invest in DI. This view is also in line with industrial theories of flexibility in the modern manufacturing process. Following the analysis by Milgrom and Roberts (1990b:526):[12]

> the increased flexibility of assets reduces the marginal value of governance activities.

In section 2, I discuss four different general phenomena of product differentiation. Each phenomenon may imply a control problem in the sense that the investing party may be exploited by the other party since the investments are unverifiable. Four different control regimes are introduced in section 3 that 'secure' that the agent who undertakes DI can reap the profits of such investments. These different control regimes or governance structures represent different market outcomes. In section 4, I develop a general theoretical model based on the Nash bargaining solution. This model subsumes all the phenomena depicted in section 2 and is used as the main point of reference for the normative analysis in sub-sections 4.1-4.3. In section 5 a positive analysis is undertaken. Based on a survey among random exporters of clothing from Bangladesh, the focus is on whether or not a particular phenomenon occurs in the market for clothing.[13] As a comparison, secondary literature and data are used to illustrate the automobile case. Based on the theoretical results in section 4 and the positive analysis in section 5, I draw some policy lessons concerning possible branding strategies in the clothing market in section 6.

2. Four phenomena of product differentation

In the following section, I present the basic framework of the analysis and four different phenomena are illustrated. I use a short-term model where the parties involved in a transaction have symmetric information; the buyer knows the seller's cost function and the seller knows the buyer's value function. It is assumed that a brand name is related to a distributor and that the distributor undertakes the investments in marketing. However, an individual producer may control the distributor's use of the brand name and may undertake the marketing through integration with the distributing agency. Generally, the producer of garments is not facing the consumer market directly. He is selling to distributors; importers, retailers, chain stores and so forth.

[12] In their analysis, Milgrom and Roberts focus on clusters of characteristics found in the modern firm due to complementarities between activities.

[13] See also appendix 1.

Initially, there is an international market for each differentiated product (every type of clothing). Each product has a world market price or a competitive price. Different types of clothing may be compared by scaling units (quantity) such that the price of one unit of every type of clothing is identical to the world market price P for such a *generic* product of apparel. I focus on a deal between one particular buyer (distributor) and one seller in such a competitive market. The two parties' investments are eventually undertaken with the aim of increasing the profit through product differentiation, e.g., increase the net value for a particular distributor or a producer. As opposed to the model by Grossman and Hart (1986), these investments are not necessarily relation-specific, and in this competitive context, the actions undertaken by these two agents have no effect on the world market prices. The average value for a particular distributor is given by $V(I_b,I_s)$, while the supplier's average cost is given by $C(I_b,I_s)$. The arguments in the cost- and value functions reflect the buyer's (I_b) and the seller's (I_s) investments in differentiation respectively.

The market is competitive in the sense that the international value function of the distributors (consumers in the last resort) is equal to the international cost function of the producers. The fringe producers and distributors earn zero profits, and the competitive solution is given by:

(2.1) $C(0,0) = V(0,0) = P.$

Initially, the arguments in the above cost- and value functions are zero as in (2.1). However, by investing in differentiation in the sense that V or C changes relative to the competitive price, the parties may increase their profit. Furthermore, I assume:

(2.2)
V is non-decreasing in I_b and I_s
C is non-increasing in I_b and I_s

Hence, it follows that $V(I_b,I_s) \geq P$ and $C(I_b,I_s) \leq P$ if I_b or I_s is positive. If $V < P$, the producers would always sell directly to the world market. On the other hand, if $C > P$, the producers would rather buy the products on the world market than produce themselves.

Following from the above normalising procedure, the cost function has a specific meaning. The cost function is the minimum production cost of producing one unit of a generic product of garments. Two different products (e.g., trousers and shirts) or products of different qualities are scaled on the basis of such a generic product.

Let the following simple example illustrate: The generic product (A) has a quality, cost and price equal to one. However, there is an additional differentiated product (B) where quality, cost and price all are equal to two. Since B is scaled as half a unit of A, the scaled unit cost of producing B, measured in terms of A is 1. For both types of products, it is a competitive market since price per cost-unit is equal in both markets. If the seller invests in differentiation through quality upgrading or innovation in technology such that the *price of the product increases more than its cost*, it implies a cost reduction or a reduction in the input which is necessary to produce one generic unit of output (e.g., an investment in differentiation of product B in the example above which increases the price of the product B to 3, while its cost only increases to 2.5 and, hence, the price per cost-unit is increasing). Such a modelling approach, makes it easier to handle both the increase in value due to a quality change and the subsequent change in costs since they are treated *simultaneously* in the term $C(I_b,I_s)$. I refer to phenomena 1 and 2 for an interpretation of the value function, while the cost function is interpreted in more details in the sub-sections discussing phenomena 3 and 4. Since both parties may invest and the investments either influence the buyer's value or the seller's value (cost), four general phenomena arise and these are discussed in the sub-sections below. Each phenomenon is characterised by a specific property of the C or V functions. The phenomena discussed below may arise separately or in combination with other phenomena.

2.1 Phenomenon 1: "Distributor generated brand differentiation"

The first phenomenon considered is characterised by the feature that for some cases the value function varies with I_b:

(2.3) $V(I_b'',I_s) > V(I_b',I_s) \geq P$ for some I_b'', I_b' (with $I_b'' > I_b'$) and I_s

It is possible to make an investment which increases the valuation of the product relative to the competitive price independently of which firm is producing it. One example of such an investment is marketing a particular (distributor) brand. By such marketing, the distributor's label may have a generous effect on the value of the product regardless of the production unit. When the goods in question are search goods, marketing a particular brand may imply that the consumers are more aware of the particular brand, and thereby it is easier found. On the other hand, when the good is an experience good, expenditures on advertising a particular brand name may signal that the brand is of high quality.

The marketing campaigns by brands in the market for clothing, e.g., Benetton, Levi's or H&M are usually *brand specific* as opposed to *product specific*. In the

case of Levi's, their marketing is appealing to a specific life style or image, a life style which presumably is not acquired by using other brands. In the Benetton case, the formulation "United Colors of Benetton" is framing the specificity of the brand (e.g., its design based on heavy use of colours), while by depicting dying children or illustrating Reagan as an aids victim, the brand gets publicity and acts as if it has social responsibility.

The above expression is general in the sense that for some investments by the buyer value increases at each level of the seller's investment, and I have not specified the effects on costs. If only phenomenon 1 occurs, e.g., the distributor makes an investment in marketing which only influences the value of his brand without changing the cost function of the producer, I define the case as *pure distributor generated brand differentiation.* It is well known that two products, e.g., two trousers from Bangladesh, originating from the same producer, characterised by the same quality and design, may be sold at a different price when labelled as a brand of Hennes and Mauritz (H&M) than when sold as an unlabelled product (Sappington and Wernerfelt, 1985; Connor and Peterson, 1992). The main point is that when the distributor's value function is increasing, the distributor achieves a higher value or profit by his investment regardless of which firm produces its goods.

In cases where phenomenon 1 does not exist, V is independent of I_b.[14]

2.2 *Phenomenon 2: "Producer generated brand differentiation"*

The second phenomenon considered is characterised by the feature that for some cases the value function varies with I_s:

(2.4) $V(I_b,I_s'') > V(I_b,I_s') \geq P$ for some I_s'', I_s' (with $I_s'' > I_s'$) and I_b

It is possible for the seller to make an investment which favours one particular distributor. When the investment has been undertaken, the increased value, relative to the competitive price, is independent of which firm is producing the good. The phenomenon reflects situations where the valuation of the distributor's brand name increases due to the seller's unverifiable investments, and this increased valuation may be utilised by the buyer even if the seller is substituted. When phenomenon 2 occurs, the investment is relation specific and *external* to the firm which invests

[14] When marketing is not influencing the consumer's perceptions of a particular brand, there are no reasons to increase the distributor's investments in marketing since the marginal value of such investments are less than its cost.

– the particular distributor is earning profit due to the investment by the supplier. Let the following two examples illustrate the phenomenon. Our particular distributor has exclusive rights to distribute a particular car e.g., Toyota. Since cars are experience goods, the distributor presumably needs assistance by the producer to build up a *reputation* as a high quality brand. From the general literature analysing investments in reputation as a mean to overcome moral hazard problems (Klein and Leffler, 1981; Shapiro, 1982, 1983; Allen 1984), one know that the producer requires a quality premium (price is above marginal cost) to make such investments. The phenomenon described in this sub-section may represent a positive shift in the lowest price the producer requires to produce high quality products. Since these investments are assumed unverifiable and the product is an experience good, the distributor may achieve a rent by substituting a high-cost firm having a reputation as a high quality producer by low cost producers. Skimming the cream by labelling the substituted product a Toyota reflects a hit and run strategy undertaken by the distributor. If Toyota makes high quality cars, they prefer that the label of Toyota is used exclusively on cars made or controlled by Toyota.

The same sort of mechanism occurs when a subcontractor in an industry (e.g., automobiles) develops a *technology* which initially only has a value for one particular distributor or a particular brand, but after being developed, can be obtained from a pool of potential subcontractors. A recent example is the "hold up" faced by Honda when British Aerospace sold their 80 per cent share in Rover to BMW in March 1994. Since 1979, Honda has provided most of the technology and taught Rover how to make cars. Using the terminology of my model, labelling the codeveloped cars Rover makes Rover a distributor and Honda a subcontractor or a supplier. The fact that Honda only owned 20 per cent of Rover was not enough to prevent that Rover, or BMW in the last resort, in a way could skim the cream at the cost of Honda. As argued by Levin et al. (1987), R&D spending and innovation depend on the ability to appropriate returns.[15] A partial explanation of why brand names/products in the market for cars are controlled by the producers is that if it was not the case, a manufacturer like Toyota would have few incentives to invest in research and development, design and quality improvement.

In cases where phenomenon 2 does not exist, V is independent of I_s.[16]

[15] By controlling for appropriation, the concentration ratio in the automobile industry is much less important in explaining R&D spending than displayed in previous studies undertaken by the same authors. In fact concentration is possibly an endogenous variable.

[16] Since investments have a cost, there are no reasons for the producer to increase his investment so as to increase the value for a particular distributor.

2.3 *Phenomenon 3: "Distributor generated product differentiation"*

The third phenomenon considered is characterised by the feature that for some cases, the cost function varies with I_b:

(2.5) $P \geq C(I_b', I_s) > C(I_b'', I_s)$ for some I_b'', I_b' (with $I_b'' > I_b'$) and I_s

It is possible for the distributor to make an investment which reduces the cost relative to the competitive price. When the investment has been undertaken, the producer's net value (price – cost) increases and the producer earns a profit by such an investment independently of whom distributes the product. When phenomenon 3 exists, the investments are relation specific and, hence, there are *external* effects. Two examples of this phenomenon are given below.

First, industrial customers making more and more demands on the quality of the products are elsewhere emphasised as contributors to economic growth in general[17] and in the garment sector in Bangladesh in particular (Rhee, 1990). In these analyses dynamic learning effects are introduced as the central impetus for growth, while in my interpretation the specific knowledge of the buyer is favouring a particular producer. Some examples may clarify: Levi's has a guideline ('Levi's Law') as to what is required at each step in the production process, a guideline which is enhancing the quality of the products produced by its subcontractors. Other famous buyers as well, such as the Dutch firm C&A, are assisting their manufacturers in setting up efficient production lines while undertaking quality control. These activities by well-qualified buyers create pressures upon manufacturers to increase efficiency, accuracy and quality and to deliver on time. To the extent that the above investments by the buyers are unverifiable and are favouring a particular producer in the sense that only producers or subcontractors may utilise these investments, the producer acquires a competitive advantage which may be used by selling to other brands.

Second, when the distributor or the core brand in its marketing campaign is appealing to *general* characteristics of the product; e.g., Levi's is marketing black jeans, or General Motors (GM) is marketing a special car like Chevy 1955 having general features, the subcontractors or the producers may utilise such campaigns by selling their products having the same characteristics to other distributors. A producer of black jeans may earn a profit even when using a different label than

[17] See Porter (1990). In the context of export development for the LDCs, this point has also been stressed by Egan and Mody (1992), Lall (1991), and Keesing and Lall (1992).

Levi's and a producer of a car with similar characteristics to a Chevy 1955 could label its car a Ford.

When phenomenon 3 doesn't occur, the cost function is independent of I_b.

2.4 Phenomenon 4: "Producer generated product differentiation"

The fourth phenomenon considered is characterised by the feature that for some cases, the cost function varies with I_s:

(2.6) $P \geq C(I_b,I_s') > C(I_b,I_s'')$ for some I_s'',I_s' (with $I_s'' > I_s'$) and I_b

It is possible for the producer to undertake investments in technical innovation or quality improvements which increase the net value of the product (reduce the relative cost). Selling in the world market, the producer acquires a higher price per cost unit. The net increased value for *a particular production unit*, measured in terms of a generic product is $P - C(I_b,I_s)$. This net value is independent of whom distributes the product and is analysed as a reduction in the cost function. However, in a competitive market, a prerequisite for such an increased net value is that the investments are not easily imitated by the competitors. Hence, one would expect this phenomenon in situations where the quality improvement is due to high investments in fixed costs (Shaked and Sutton, 1983; 1982). When only the producer invests in differentiation, and the investment does not favour any particular distributor, I define the case as *pure producer generated differentiation in production.*

When phenomenon 4 doesn't occur, the cost function does not vary with I_s.

3. Control regimes.

The phenomena described above may imply underinvestments by the two parties unless one is able to create control regimes or a distribution of property rights preventing hold ups. These control regimes are explained by the needs to give the two parties incentives to invest in differentiation.

3.1 Control regimes and distribution of property rights

Four different control regimes are introduced and compared. *Supplier control* refers to a situation where the seller has the exclusive right (or authority) to be the sole seller to this dealer. He can prohibit the dealer from buying from other

sources (exclusive dealing) including the seller himself. Hence, the seller may threaten the buyer with closure, in which case the buyer achieves zero profit. The buyer's threat is to refuse purchasing the product, in which case the supplier achieves P - C. The producer may always get P by selling the product in the world market. *Buyer control* refers to a situation where the distributor has the exclusive right to distribute the product. The distributor is able to prohibit the producer from delivering to other distributors (exclusive production) including himself. The buyer's threat is closure, in which case the supplier achieves zero profit, while the supplier's threat is no deliveries. But, the distributor can always obtain the value V by buying the product at the price P, and his threat point is given by V - P. The *pure trade solution* refers to a situation where the parties can buy and sell to whomever they want. The seller is able to sell to whomever he chooses at the world market price P and his costs are given by C. The buyer is able to buy from all the potential sellers at the world market price P and sell at the price V. After investments have been made, I have summarised both the buyer's and the seller's threat points (d_s and d_b) under the three regimes discussed above.

Table 1
The agents' threat points. Three different governance structures

Control regime	Seller's threat point (d_s)	Buyer's threat points (d_b)
Pure trading	$P - C(I_b,I_s)$	$V(I_b,I_s) - P$
Supplier control	$P - C(I_b,I_s)$	0
Buyer control	0	$V(I_b,I_s) - P$

The analysis is based on comparisons between the three kinds of institutional settings mentioned above with the *vertical solution*. If the costs of vertical integration is zero, the first-best solution is the same as the joint profit maximum (the vertical solution) for the two agents — not the sector or the country as a whole.[18] However, the vertical solution is not always attainable due to governance costs. The first-best solution is used as a benchmark for studying the type of distribution of property rights which give the best incentives to invest in differentiation. The term *second-best solution* is used to characterise that institution of the three mentioned above which is closest to the first best solution.

[18] The analysis is only a partial equilibrium analysis. What is good for the producer in Bangladesh and the distributor in Western-Europe is not necessarily good for Bangladesh as a country or for the consumers in Western-Europe.

4. The Nash bargaining solution

The investment is observed ex post, but is not verifiable and so it is impossible by contract to condition the price on the investments by the two parties. Rather, the initial contract specifies a distribution of property rights along the lines discussed in section 3. The existence of incomplete contracts creates a bargaining pressure on the parties who participate in the deal. In such a bargaining game, let us assume the Nash bargaining solution. If negotiation succeeds, the transfer price is set ex post, after the parties have invested. The two parties take account of the ex-post bargaining in their pre-bargaining investments, analogous to the pre-capital or labour investments analysed in the context of collective bargaining in the labour market (Grout, 1984; Hoel, 1988; Moene, 1983; 1988). The competitive context and the distribution of property rights are vital in describing the two parties' threat-points and their resulting bargaining power in this bargaining process. In sub-section 4.1, I derive the Nash prices, and in sub-section 4.2 I proceed with deriving the equilibrium investments. In sub-section 4.3, the normative results are presented.

4.1 The Nash prices

The hypothesis is that it is optimal to increase the bargaining power of the party investing in DI. I assume that the orders (quantity) are fixed and identical to one. The Nash bargaining solution is given by:

$$\arg\max_{P_N} (V(I_b,I_s) - P_N - d_b)^{\alpha}(P_N - C(I_b,I_s) - d_s)^{1-\alpha}$$

The supplier's negotiation power is given by $1-\alpha$, and the buyer's negotiation power is α; where $0 \leq \alpha \leq 1$.[19] d_b and d_s refers to what the parties can achieve if the negotiation fails (see table 1). The Nash solution may be rearranged and given thus:

$$P_N(I_b,I_s) = C(I_b,I_s) + d_s + (1-\alpha)(V(I_b,I_s) - C(I_b,I_s) - d_s - d_b).$$

From the above expression, one is able to draw a general result which makes it easier to interpret the different cases discussed below. The buyer has to pay a

[19] In marketing literature channel power between manufacturer and distributor are studied in numerous articles (see Stern and El-Ansary, 1988 for an overview). My model differs from these approaches in that bargaining power and threat-points are separated. In cooperative game theory, bargaining power is related to the parties' impatience and the sequence of moves in a non-cooperative subgame which is generating the cooperative game analysed above.

transfer price consisting of three elements; first, the seller's cost; second, the profit that the seller always can achieve (even if the negotiation fails); and, third, a fraction of net rents. In the following analysis the parties' investments under different governance structures are examined on the basis of symmetric cases ($\alpha = 1/2$).[20] When the parties split the gains equally, $V - P_N - d_b = P_N - C - d_s$.

Hence, the Nash price can be rewritten as:

(4.1) $P_N = (V - d_b + C + d_s)/2$

According to (4.1) the transfer price, and hence, the price of the investment *faced by the investing actor*, depends on the current type of control regime. By substituting the threat points given in table 1 into (4.1), one obtains the Nash prices:

Table 2
Nash prices under different governance structures

Control regime	Nash prices
Pure trading	$P_t = P$
Supplier control	$P_s = (V(I_b,I_s) + P)/2$
Buyer control	$P_b = (C(I_b,I_s) + P)/2$

Remarks. In the pure trading regime (without property rights) the Nash bargaining solution reduces to the world market price $P = C(0,0)$, irrespectively of the parties' bargaining power. *Hence, the distributor achieves all the rent created in distribution (V - P) while the producer achieves all the rent created in production (P - C).* Under supplier control, the negotiation space is the difference between the buyer's value and the given price — not the cost as in a bilateral relationship, and our solution concept assumes that this gain is shared between the two parties. *Under supplier control the seller achieves all the rents created in production, while he only has to share that part of the rents which arise in distribution.* Under buyer control, the negotiation space is the difference between the seller's costs and the given price — not the buyer's value as in a bilateral relationship, and our solution concept assumes that this gain is shared between the two parties. *Under buyer control the buyer achieves all the rent created in distribution while he only has to share that part of the rent created in production.*

[20] An eventual introduction of dissimilarities in the negotiation power of the two parties adds limited new information to the model.

4.2 The equilibrium investments

In the following analysis I assume that there exist equilibrium values of I_b and I_s. These values depend on the governance structure of the market and are given by conditions A-D below. Each condition consists of two parts. The first part reflects the supplier's maximising problem, given the equilibrium value of the distributor's investment. The second part reflects the distributor's maximising problem, given the equilibrium value.

Condition A. If (I_b^*,I_s^*) is a vertical solution, then:

i) $I_s^* \in \arg\max \; V(I_b^*,I_s) - C(I_b^*,I_s) - I_s$

ii) $I_b^* \in \arg\max \; V(I_b,I_s^*) - C(I_b,I_s^*) - I_b$

Condition B. If (I_b^t,I_s^t) is a pure trade solution, then:

i) $I_s^t \in \arg\max \; P - C(I_b^t,I_s) - I_s$

ii) $I_b^t \in \arg\max \; V(I_b,I_s^t) - P - I_b$

Condition C. If (I_b^s,I_s^s) is a supplier control solution, then:

i) $I_s^s \in \arg\max \; (V(I_b^s,I_s) - P)/2 + P - C(I_b^s,I_s) - I_s$

ii) $I_b^s \in \arg\max \; (V(I_b,I_s^s) - P)/2 + P - I_b$

Condition D. If (I_b^b,I_s^b) is a buyer control solution, then:

i) $I_s^b \in \arg\max \; (P - C(I_b^b,I_s))/2 - I_s$

ii) $I_b^b \in \arg\max \; V(I_b,I_s^b) - P + (P - C(I_b,I_s^b))/2 - I_b$

4.3 Results

The model generates four general results given by proposition 1-4 below and two specific results given by corollaries 1-2. Note that total welfare (W) is a sum of profits in distribution ($V - P - I_b$) and in production ($P - C - I_s$), or $W = V - C - I_b - I_s$.

Proposition 1. ***If neither phenomenon 2 nor 3 exists (no external effects), then the pure trade solution is a first-best solution.***

Remarks. The seller's investment has no influence on the buyer's value, and the investment made by the buyer has no influence on the cost function of the seller. Hence, there are no external effects between the two parties. When no external effects occurs, proposition 1 states the general result that the investments by the two parties' in a pure trading relationship are optimal. In such cases the question of ownership is, in a sense, of secondary importance. A pure trade relation where the buyer invests in marketing and the seller invests in quality creates optimal investments by the two parties.

Proof. From profit maximising it follows: First, from condition A, it follows that:

i) $V(I_b^*,I_s^*) - C(I_b^*,I_s^*) - I_s^* \geq V(I_b^*,I_s^t) - C(I_b^*,I_s^t) - I_s^t$

ii) $V(I_b^*,I_s^*) - C(I_b^*,I_s^*) - I_b^* \geq V(I_b^t,I_s^*) - C(I_b^t,I_s^*) - I_b^t$

From condition B, it follows that:

iii) $P - C(I_b^t,I_s^t) - I_s^t \geq P - C(I_b^t,I_s^*) - I_s^*$

iv) $V(I_b^t,I_s^t) - P - I_b^t \geq V(I_b^*,I_s^t) - P - I_b^*$

When V is independent of I_s, and C is independent of I_b, it follows from i) and iii) that:

v) $- C(I_b^*,I_s^*) - I_s^* = - C(I_b^t,I_s^t) - I_s^t$

From ii) and iv) it follows that:

vi) $V(I_b^*,I_s^*) - I_b^* = V(I_b^t,I_s^t) - I_b^t$

Since welfare (W) is given by V - C - I_b - I_s, by adding v) and vi), it follows that welfare is identical under the two regimes.

$W(I_b^*,I_s^*) = W(I_b^t, I_s^t)$ Q.E.D.

Proposition 2. If neither phenomenon 1 nor 3 exists, then supplier control is a second-best solution.

Remarks. If neither phenomenon 1 nor 3 exists, then *the buyer makes no investments* in any regime since the cost- and value functions are independent of I_b. The seller pays all the costs, but receives only a fraction of the generated surplus. Comparing the Nash prices given in table 2, this fraction is highest under supplier control. This fraction increases with the seller's negotiation power (1 - α). If $\alpha = 0$, supplier control is in fact a first-best solution. In fact, as shown in table 2, buyer control gives the buyer a part of the rent created in production (P - C) and all the rent created in distribution, while the seller pays all the costs.

Proof. The proof consists of two parts: First, I will prove that supplier control is at least as good as the pure trade solution. Then, I proceed with proving that the pure trade solution is at least as good as buyer control. The structure of the proof is similar to the proof of proposition 1.

i) From condition C it follows that:

* $(V(0,I_s^s) - P)/2 + P - C(0,I_s^s) - I_s^s \geq (V(0,I_s^t) - P)/2 + P - C(0,I_s^t) - I_s^t$

From condition B, it follows that: $P - C(0,I_s^t) - I_s^t \geq P - C(0,I_s^s) - I_s^s$

and by multiplying each side of the inequality by -1/2 and reversing the inequality, one gets:

** $- (P - C(0,I_s^s) - I_s^s)/2 \geq -(P - C(0,I_s^t) - I_s^t)/2$

By adding * and ** one gets:

$W(0,I_s^s)/2 \geq W(0,I_s^t)/2$

Thus supplier control is at least as good as pure trading

ii) From condition B it follows that:

* $P - C(0,I_s^t) - I_s^t \geq P - C(0,I_s^b) - I_s^b$

From condition D it follows that:

** $(P - C(0,I_s^b))/2 - I_s^b \geq (P - C(0,I_s^t))/2 - I_s^t$

By multiplying ** by -2, and adding * and ** it follows that:

$I_s^t \geq I_s^b$

When neither phenomenon 1 and 3 exists, one knows that:

*** $V(0,I_s^t) - P \geq V(0,I_s^b) - P$

By adding * and ***, it follows that the pure trade solution is at least as good as buyer control:

$W(0,I_s^t) \geq W(0,I_s^b)$ Q.E.D.

Corollary 1. If neither phenomenon 1, 2 nor 3 exists, then supplier control is a first best solution .

Remarks. When the investments made by the buyer are zero and the investments made by the seller do not influence the value of the buyer, supplier control gives the same results as the neutral solution which according to proposition 1, is a first best solution. The phenomenon reflect pure producer generated differentiation in production. In this case buyer control creates suboptimal investment made by the seller and is strictly worse than the neutral solution.

Proof. The proof is self evident and follows directly from proposition 1 and 2.

Proposition 3. If neither phenomenon 2 nor 4 exists, then buyer control is a second-best solution.

Remarks. The *investments made by the seller are zero* (the cost- and value functions are independent of I_s). The buyer pays all the costs but receives only a fraction of the generated surplus. This fraction is however largest under buyer control. If $\alpha = 1$, buyer control is in fact a first-best solution.

Proof. The structure of the proof is similar to the proof of proposition 2.

i) From condition D it follows that:

* $V(I_b^b,0) - P + (P - C(I_b^b,0))/2 - I_b^b \geq V(I_b^t,0) - P + (P - C(I_b^t,0)/2 - I_b^t$

From condition B, it follows that: $V(I_b^t,0) - P - I_b^t \geq V(I_b^b,0) - P - I_b^b$; and by multiplying each side of the inequality by -1/2 one gets:

** $-(V(I_b^b,0) - P - I_b^b)/2 \geq -(V(I_b^t,0) - P - I_b^t)/2$

Thus by adding * and ** one gets:

$W(I_b^b,0)/2 \geq W(I_b^t,0)/2$

ii) From condition B it follows that:

* $V(I_b^t, 0) - P - I_b^t \geq V(I_b^s,0) - P - I_b^s$

From condition C it follows that:

** $(V(I_b^s,0) - P)/2 + P - I_b^s \geq (V(I_b^t,0) - P)/2 + P - I_b^t$

By multiplying ** by -2, it follows that:

*** $-(V(I_b^t,0) - P) - 2P + 2I_b^t \geq -(V(I_b^s,0) - P) - 2P + 2I_b^s$

By adding * and *** it follows that:

$I_b^t \geq I_b^b$

Thus, since phenomena 2 and 4 does not exist, one knows that:

*** $P - C(I_b^t,0) \geq P - C(I_b^b,0)$

By adding * and ***, it follows that: $W(I_b^t,0) \geq W(I_b^s,0)$ Q.E.D.

Corollary 2. ***If neither phenomenon 2,3 nor 4 exists, then buyer control is a first-best solution.***

Remarks. In the case of no external effects and when the investments made by the seller are zero, buyer control generates the same first-best solution as the pure trading regime. In the case of supplier control, the distributor does not possess the sole right to distribution and is unable to reap the full benefits of his investments, with the result that there is underinvestment in differentiation while under the other two regimes, the transfer price is P. Hence, under buyer control and in the neutral regime, the distributor reaps all the rents (V - P) due to differentiation in distribution.

Proof. The proof is self evident and follows directly from proposition 1 and 3.

Proposition 4. ***If both phenomena 2 and 3 exist, or at least three phenomena exist, then one are unable to draw general results, but integration is desirable.***

Remarks. In these models both parties may invest and external effects occur. Weighting problems arise, such that one of the parties "underinvests" while the other party "overinvests", and the best types of property rights depend on the derivatives of the investments and the parties possibilities for imposing vertical restraints. In these cases one has to specify specific value and cost functions.[21]

The general conclusions which can be drawn from the analysis in section 4, are the following: Buyer control has better incentive effects if only phenomenon 1 or 3 exists. Supplier control is better if only phenomenon 2 or 4 exists. Furthermore, if there are no external effects, costs, but no returns accrue in controlling the other agent. In these cases the pure trade solution is a first-best outcome, and it is best that the production and distribution decisions are completely separated by individual firms.

5. An application

The model developed in section 4 analysed the relationship between a particular phenomenon of product differentiation and the expected control regime in a market (e.g., clothing and automobiles). Whether or not a particular phenomenon and a particular control regime exist has to be based on an empirical study of the market

[21] It can be shown that if neither phenomenon 3 nor 4 exist, then the pure trade solution is identical to buyer control. From table 2 it follows that $P_t = P_b$, and the agents face the same maximising problems under the two regimes. Similarly, if neither phenomenon 1 nor 2 exist, then the pure trade solution is identical to supplier control.

in question.[22] My emphasis is on the market for clothing and the main objective of this section is to demonstrate the usefulness of the developed model rather than undertaking a formal test. A formal test would required additional, and yet unavailable, data of marketing costs and product specific investments. First, I briefly discuss existing control regimes. If a particular control regime exists in a market, it may *indicate* that a particular phenomenon is important in that market. Then, I proceed with analysing indicators of phenomena 1-4.

As far as the present governance structure is concerned, the producers of clothing in Bangladesh generally do not face any restrictions on their sales. They are able to sell to whomever wants their products.[23] On the other hand, producers do not possess the rights to impose restrictions neither on the distributors' authority to distribute their products to whomever they want, nor on their buying decisions. As far as the present contracts are concerned, in the clothing sector the contract period with a particular distributor is 4-6 months and related to a specific season. In fact, only 11 per cent of the factories had any formal contract with their main buyer in addition to the terms regulated in the Letter of Credits (LC). *Hence, the pure trade solution appears to be the present governance structure of the clothing market.* If this is the case, the model predicts that phenomena 2 and 3 are unimportant in this market.

In the market for automobiles, however, the extent of *vertical control* is probably more common than in the clothing case. Downstream, distributors are usually organised as independent franchise companies (Marx, 1985). In Norway, car dealers, in general, sell only one brand (exclusive dealing),[24] while in the US the dealer also sells cars made by other manufacturers. Upstream, manufacturers like General Motors produces high asset specific parts, components and subassemblies in house, while general parts are supplied by thousands of firms. To the extent that subcontractors produce parts characterised by a high degree of asset specificity (phenomenon 2 is important), hold-up problems may arise. In the terminology of my model, the core brand (e.g., brands under the umbrella of GM) acts as a distributor towards their subcontractors (producers). During the 1980s the American automobile firms seem to have longer commitment towards their suppliers, recognising that the suppliers are not interchangeable (Helper, 1991). Through long term relationships with their suppliers or vertical integration, the

[22] See sub-section 1.2 and appendix 1 and 2.

[23] In some cases the supplier only used one importer to distribute their products in particular markets (country). However, this type of "restriction" was not based on a formal contract between the supplier and the distributor, and it was not required by the buyer. From the supplier's point of view, it was rather based on economics of scale.

[24] However, a brand like Ford may produce several brands.

incentives of product development by the subcontractor (e.g., the well known acquirement of Fisher Body by GM) may increase.[25] The Japanese subcontracting system of parts has traditionally been a closed system (exclusive production) based on long term relationships with a smaller numbers of suppliers (Aoki, 1988; Asanuma, 1989; Milgrom and Roberts, 1992 and Economist, Oct. 16:67, 1993).[26] *The extent of vertical control in the market for automobiles indicates that phenomena 2 and 3 are important in this market.*

Von Kirchback (1988:37) argues that:

> For third world based manufacturers with sufficient experience in production but without the necessary skills in international marketing, the emergence of buying offices from major retailers based in developed market economies, and international subcontracting has greatly facilitated export expansion. Freeing third world based producers from product design and international marketing, these two channels have played a key role in the growth of manufactured export from developing countries by providing access to markets which could have hardly been penetrated otherwise.

He assumes, in the terminology of my model, that it costs to control the activity of the distributor (phenomenon 1 and 3 may exist), while the producers do not achieve any returns from such controlling activities (phenomenon 2 does not exist). But, as argued in section 4, if phenomenon 2 does not exist, supplier control is not a likely outcome. My empirical focus is therefore on whether phenomenon 2 exists in the market for clothing.

5.1 Producer generated brand differentiation has minor importance in the market for clothing

First, I will undertake a general discussion regarding phenomenon 2. Then, I proceed with undertaking an analysis based on three indicators for whether phenomenon 2 occurs in the market for clothing.

If this phenomenon occurs, the buyer is able to utilise the investments made by the producer (e.g., investments in reputation or a specific technology) independent of whoever delivers the product. In such cases it is important for the producer to

[25] Subcontracting may also reduce risks to the subcontracting group (see Kawasaki and McMillan, 1987; Asanuma and Kikutani, 1992).

[26] In the 1990s one can see another development in the Japanese automobile industry, characterised by less restrictions on the subcontractors' ability to sell their products to more than one brand. More emphasis is made on design making and a flexible system of subcontracting. See The Economist, 1993. Oct 16th.

control the activity of the distributor (supplier control). According to the reputation interpretation of the phenomenon, the key variable is whether the product in question is an *experience good*, in the sense that the consumers have to use the product before they are able to draw conclusions about its true quality. Automobiles are obviously experience goods, but as argued elsewhere, clothing are experience goods as well. As shown in Wiig (1992), the consumers' information on the quality attributes such as for example the sewing, is marginal.

Even though both types of products may be categorised as experience goods, two main differences exist: First, even though the consumers are not aware of the quality, the distributors may have such information. One would expect it to be easier to verify the investments in reputation undertaken by a garment producer than by a producer of automobiles. The production technology of clothing is simple and the distributor may easier single out the investments by the producer in reputation as a high quality brand than in the automobile case. Second, it is well known that producers having a short time horizon are generally less concerned about investment in reputation. It is a striking feature of the automobile industry that the producers are long lived even though some newcomers have entered the market while other established brands have exited. By way of contrast, the established producers in the clothing market in the industrialised countries have been substituted by new entrants from South East Asia. In the case of Bangladesh the garment industry was established in the mid 1980s, and according to my data, the producers' short term problems restrict their possibilities in choosing a long term business strategy. In conclusion, *it is reasonable to expect that the reputation mechanism is more important in the market for automobiles than in the market for clothing*.

Let H_0 represent the hypothesis that phenomenon 2 does not exist in the market for clothing. The alternative hypothesis is that it does. Three indicators are used to falsify H_0. First, if H_0 is false, due to the reputation mechanism discussed above, one would expect a long term relationship between the supplier and the distributor. Second, if H_0 is false, due to the technology interpretation of phenomenon 2, one would expect that the supplier's technology is favouring the production of a particular product for a particular buyer. Third, if H_0 is false, one would expect that the suppliers do control the distributors' activities. As already shown, this is generally not the case. Successively, I will discuss the other two indicators.

Long term relationship. Contracts are needed to plan production, and the short contract period of 4-6 months, indicates that the prospect for investment in reputation in the clothing sector is low, at least in the case of the producers in

Bangladesh. On the other hand, a long term contract may be substituted by *long term informal assignments or direct contacts between the supplier and the distributor.*[27] As far as a long term relationship is concerned, one would expect that if a particular transaction between a seller and a buyer is more valuable for this particular buyer than other transactions, the market share of this transaction would be significant and regular. Hence, I analysed the duration of the relationship between a seller and the most- and second most important buyer. On average the duration of the relationship with the most important buyer is four years in my sample.[28] When it comes to the second most important buyer, the above picture of a long term commitment between the buyer and seller does not change.[29] However, this long term relationship is only formalised by continuing short term contracts or LCs. These long term relationships indicate that the actors derive some advantages from such a relationship. Or to put it the other way round, at least one of the parties is hurt if the relationship is terminated. In sub-sections 4.1 and 4.2, appendix 1, it is shown that the technical most advanced firms generally have long term relationships with their buyers, and the institutional structure of such relationships are characterized by direct contacts (no middlemen). In conclusion, *based on the extent of long term relationships, one is unable to reject the alternative hypothesis that phenomenon 2 exists.*

Substitution in terms of products and buyers. Concerning the interpretation of phenomenon 2 based on technical innovation favouring a particular brand, one can hardly find examples neither in the clothing market in general nor for particular producers of garments in Bangladesh. On a scale from 1 to 5 where 1 signifies that the respondent disagrees strongly and 5 signifies strong agreement, they were asked whether they agreed or disagreed with the following statements:

[27] See appendix 1, section 4.1 and 4.2 for details.

[28] When we take into account that there are factories which only produce on a subcontract basis and that most of the factories are established after 1984, this figure is high. In my survey from 1989, the corresponding figure was two years (Wiig 1990). During the last four years, only 35 per cent of the factories have changed their most important buyer (in terms of value) while 65 per cent still keep their most important buyer.

[29] For 68 per cent of the factories, the second most important buyer is the same as 4 years ago.

Table 3
Degree of asset specificity. (N = 32)

	Average score	Standard deviation
"Our machinery may easily be used in the production of different products (in a given product category) whoever is the buyer"	4.66	0.83
"Our machinery is geared to particular buyers"	1.09	0.53
"Our quality control system is geared to a specific buyer or product"	1.41	0.53

According to table 3, based on measures of *attitudes,* the technology is *general* and gives great *substitution* possibilities among different products in a given category and in the distribution among different buyers. According to the respondents, the same machinery may be used for several types of shirts, skirts and trousers of light fabrics for men, women and children even though some special machinery is required for trousers. When it comes to the garments based on heavy fabrics (jeans, denim products and jackets) or non-knitted products, the plain sewing machines are not appropriate any more. Hence, the machinery for a given product class may be utilised for several types of products, while there are few substitution possibilities between different product categories ex post, or when the investments have been undertaken.[30]

I followed up the questions presented in table 3 by an additional question related to the specificity of the investment associated *with a particular contract.* 78 per cent of the respondents answered that it is only seldom or in rare cases that such contracts entail capital investments specific to the production of the goods covered by such contracts. The corresponding figures are 3 per cent, for often and 19 per cent, for occasionally. For the two last categories, I asked whether they would be willing to risk undertaking a significant investment in new technology or quality control system knowing that this investment could only be used specifically for the production of those goods covered by the contract. Naturally, all answered yes on the condition that they secure a long term contract. On the other hand, if this perception was correct, I would expect a significant relationship between the *duration* of the contracts with their main buyer and the actual value of

[30] Both a MANOVA and an ANOVA analysis show that the scores given above are independent of the technical knowledge of the firm.

investments. However, this was not the case. In conclusion, *by these measures of asset specificity one is unable to reject* H_0.

Except for one indicator, the extent of a long term relationship, both the present governance structure and, as shown by table 3, the generality of the technology signifies that H_0 is true. But how can one explain the extent of long term relationships? I do not find it reasonable that the sort of reputation mechanism discussed in sub-section 2.2 explains it. If that was the case, one would have expected that the producer required a contract either specifying a compensation for his investments or a contract based on exclusive dealing. Hence, some additional explanation has to be offered for why a particular distributor in the market for clothing is not substituting a particular producer for another. One possible explanation are transaction costs. As hiring and firing has a cost, there is a cost associated with producers switching their distributors and vice versa. Aoki (1988) introduced the term relational quasi rent generated by the informational efficiency of relational contracting. Such rents may arise due to the switching costs on both the supplier and the buyer sides of a transaction. If the distributor does not have complete information on product quality, he can acquire knowledge, in terms of quality, delivery and so forth, through long term relationship, and as such, increase the value of the relationship. However, this effect has no value for the distributor if the relationship is terminated, and a switching cost arises. I provisionally conclude *that phenomenon 2 does not exist in the clothing case, while it may exist in the automobile case (see examples in sub-section 2.2, while considering the fact that there are vertical control regimes in this market).* However, there may be a relational quasi rent in both the clothing case and the automobile case.

5.2 Distributor generated product differentiation has minor importance in the standard segment of the clothing market

When it comes to phenomenon 3, the relevant question is whether a particular producer acquires a special position due to the distributors' investments and orders. In section 2.3 I gave some examples from the clothing sector. An additional example of the above phenomenon is related to the fact that the buyer usually does the design. The investments in a new design may have an effect on the producer's costs by inducing quality changes ('design for manufacturability').[31] To the extent that these examples reflect phenomenon 3, the sorting

[31] The term "design for manufacturability" have been used by several authors, e.g. Clark et al. (1987); Hayes et al. 1988). Even in the clothing sector, small changes in design and patternmaking may induce more efficient use of graders and thereby reduce consumption of fabric.

criteria are whether a particular producer is supported by the distributor's investments. As I have no empirical data illustrating whether a supplier ever had windfall profits related to a product of a particular distributor, I have used two proxies.[32] First, when the distributor is dealing with *a number of different producers*, which, as in the clothing case, are able to deliver a specific product, one can hardly expect that one particular producer will be favoured by the buyer's behaviour. Second, when the cost of changing design is low, one can hardly expect that a particular producer will be favoured. As argued by Clark et al. (1987:731):

> If product designs could be changed instantaneously at low cost, the competitive impact of a new product would be sharply reduced...In an industry such as automobiles, the life of a given design is measured in years.

In the automobile industry, changing a model takes a very long time, and models are long-lived and the production costs vary between different models. Subcontractors are heavily influenced by the product development undertaken by, say, Toyota. To make sure that the subcontractors do not exploit the product development undertaken by the core brand by selling to other brands, one would expect long term contracts (or contracts based on exclusive production) versus subcontractors in the automobile industry. As discussed above, such relationships exist in the Japanese market. In the standard segment of garments (e.g., shirts, shorts, skirts and trousers), design making is a technical exercise whereby existing patterns are modified rather than wholly new models being created, and the costs of changing the design are very low. In Western Europe it is usually done by computers. As long as the model (block) is the same, the set-up costs or "switching costs" in production due to changes in design are low as well.[33] The manufacturing costs (cutting and making) in making a shirt for H&M are almost the same as the costs in making a shirt with a different design for Miss Erica. Hence, if the value of these shirts are the same, no particular producers get an advantage due to the investments by the distributor. By way of contrast, in the fashion markets creating a new model collection is more common and new models usually imply increased net value of the product. The investments may favour a particular producer if this firm is the only firm which can deliver the product.

Based on the discussion above, and that buyer control does not seem to exist in the market for standard garments, I provisionally conclude that phenomenon 3 is not important in this market segment. However, it may exist in high quality

[32] As in section 5.1, the extent of long term relationships may not falsify that phenomenon 3 exists in the market for clothing.

[33] Even when the model changes, the sewing process is continuous. For the most efficient firms in Bangladesh, the lead time is nearly zero.

segments of the market. In the market for automobiles it may exist towards subcontractors of parts.

5.3 Producer generated product differentiation is a general phenomenon, but is less important in the market for clothing

I have already argued that phenomena 2 and 3 do not exist in the clothing market; at least not in the case of garments produced in Bangladesh. Whether phenomenon 4 exists is not that important since both the pure trade solution and supplier control are properly able to handle the incentive effects due to the seller's investment in product differentiation. On the other hand, buyer control has weak incentive effects. Since buyer control does not exist, it may indicate that phenomenon 4 exists.

Phenomenon 4 is particularly important in analysing those markets where the characteristics of the product and the production process furnish the competitive edge vis-a-vis competitors producing similar type of products (like automobiles). Technical innovation or quality improvement could arise due to research in product development, cost reduction and design making which influence the manufacturability of the product ('design for manufacturability'). As far as design for manufacturability is concerned, it is especially important in the product development of cars where the assembly process consists of putting together many thousands of individual parts. As far as expenditures on R&D is concerned, it is significantly higher in the automobile industry than in the clothing sector (see section 1). To the extent that these innovations favour a particular distributor, phenomena 2 and 4 exist simultaneously (see sub-section 5.1).

To what extent is the same phenomenon existing in the clothing sector? Is it the case that the manufacturers in the clothing industry undertake technical innovations increasing the relative value of their products independent of whom distributes the product. By discussing the actual type of investments, I intend to show that these investments are in cost-reduction. Furthermore, the cost- reduction may easily be imitated by their competitors and has no value for a particular distributor.

In order for someone to be willing to make such an investment, its marginal value has to be higher than its marginal cost. With regard to costs Hoffman (1985) and Mather (1993), have found that new technologies in the garment sector have mainly been introduced at the *pre-assembly phase* through computer-aided design

(CAD) and computer-aided manufacture (CAM; marking, grading and cutting).[34] However, even in the sewing process some changes have occurred through the introduction of computerised sewing machines, special machines like the embroidery machine, and the use of attachment (inexpensive equipment which reduces sewing time through a reduction in manpower operations). Furthermore, there is a greater use of robots and of the head rail system, and production and quality control systems. Apart from these specific changes, Mather (1993) is right in that few technical innovations have been made as far as assembly is concerned. Assembly may still be characterised as a type of Fordism; e.g., one sewing operator performs one particular task at each station of an integrated assembly line.

However, there are some major differences between the investments undertaken by the producers in Europe and in Bangladesh. While there are two or three workers per machine in Bangladesh, in Europe one worker usually handles more than a single machine at a time. Robots and computerised sewing machines have still not been introduced by Bangladeshi exporters because labour is cheap. Furthermore, in Bangladesh the production targets are based on *past experience* rather than on a production control system based on studies of the time required for each operation. Around five exporters have already invested in advanced machinery like CAD/CAM systems, mainly for marking and grading. A computer-aided marker system costs only around US$50,000. Such a system reduces the labour required for a given amount of output; it also increases accuracy and thereby enhances quality. Furthermore, it saves between 1 and 5 per cent of fabric costs. In Bangladesh, such fabric costs account for three quarters of the price (FOB) compared to 50 per cent in Europe.[35] As regards the introduction of CAD, it is most important in those markets where the design changes rapidly and the production unit produces several differentiated products (models). However, most of the producers in Bangladesh still export less than three basic items (like shirts, skirts and trousers) and the machinery are geared towards the production of non knitted shirts. 70 per cent of the respondents produced non-knitted shirts as their main export item. In a situation where capacity is geared towards a mass market,

[34] CAD speeds the design process, but the impact on productivity is minor. However, by slightly modifying the design, CAD makes it easy to save fabrics. CAM on the other hand has an immediate effect on production through increased flexibility and fabric savings. A marker and grader cost in the range USD50,000 - 500,000 and is a must if the producer wants to reach the fashion segment (Mather, 1993). The cost is around USD1 million for a totally integrated computer aided system and out of the reach for small independent exporters in countries like Bangladesh.

[35] With specific knowledge concerning the use of such technology and maintenance facilities, less developed countries in fact have an advantage over Western Europe in investing in CAM.

flexible (pre)assembly techniques (CAD) are presumably not as important as in the case of the fashion market.

The next question, addressed in appendix 1, section 6, is whether the firms that invest in technology are the firms that earn the highest profits. Generally, these firms acquire higher technical knowledge, have more direct contact with the buyer, have less financial problems and receive the highest price on their products. *In conclusion, I find it reasonable that phenomenon 4 exist in the market for clothing, but it is possibly less important than in the automobile industry. As far as the investments by the producers in Bangladesh are concerned, investments in technology have lead to increased profits in the short run through cost reductions. But, according to the model presented in this paper, they hardly suffice to control the distributors' use of a particular brand name. This is because these investments do not favour any particular distributor (phenomenon 2 is unimportant). In addition, these investments may easily be undertaken by their competitors as well and, thereby, reduce the given market price.*[36]

5.4 Distributor generated brand differentiation is a general phenomenon, but is particularly important in the clothing sector

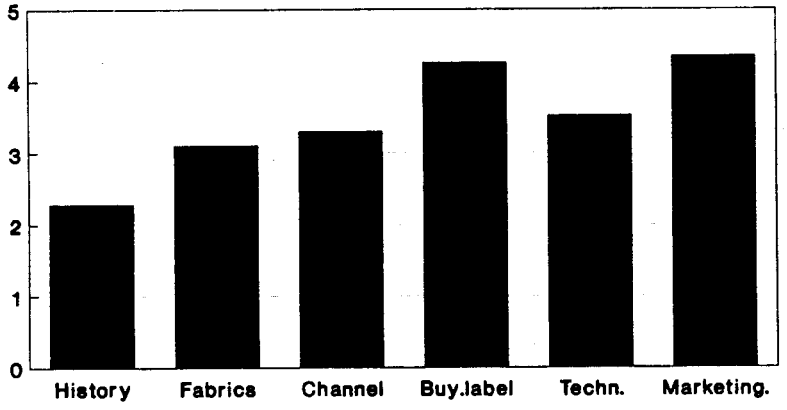
From the garment producer's point of view, whether phenomenon 1 exists is vital for their branding strategy. If only phenomenon 1 exists, the producer could achieve a part of the profit through supplier control. But supplier control has weak incentive effects. Only a part of the returns accrues to the party making investment decisions in marketing. On the other hand, the producer could generate pure profit by integration with a distributing agency marketing their products. Such a strategy requires investments out of reach for a producer located in Bangladesh. Even South Korean chaboels have difficulties in establishing their own distribution network (e.g., Daewoe) marketing the product under the umbrella of the seller's brand name. No one would possibly finance such investments because of the control problems that arise. If a producer or several producers in Bangladesh tried to buy a distribution channel (supplier control integration) marketing their products, the residual claimant to the returns is the integrated unit, while the decision maker of marketing is, and has to be, the marketing department. The marketing department, or distributors, possesses more knowledge concerning the demand for particular products in particular markets and the effects of different marketing campaigns than what would be expected of a producer located in

[36] However, prices are exogenous in this paper.

Bangladesh. When accounting is too inadequate to verify the marketing costs (and the value of such investments), the marketing department is not likely to invest. The main points are that the distributor must have incentives to do what he is able to do, and the suppliers are unable to control such activities. Thus, the model gives one partial explanation of why brand names in the clothing industry are not controlled by the producers. In fact, as already discussed in chapter 1, distributors like Levi's, Hennes and Mauritz and Marks and Spencer usually own the product differentiation line.

If phenomenon 1 occurs in the market for clothing, one would have expected that the producers' perceived costs in marketing restrict in their branding process since they are unable to control the distributors' activity. On a scale of importance from 1 to 5, where 1 signifies not important at all and 5 signifies highly important, the respondents were asked to indicate the importance of 6 different explanations of why they had not created their own brand names.

Table 4
Reasons for not branding



N = 30; "Please indicate the importance of each of the following factors on a scale from 1 to 5".

The following conclusions may be drawn from table 4: The most important reasons for not branding their products, as indicated by the exporters, are that branding would require huge investments in marketing, and secondly, that the buyer primarily wants to market his own label. The exporters perceive marketing and the organisation of the distribution channels as more important than learning effects (e.g., accumulated knowledge; which is measured by learning from previous experience or history) and country specific restraints (e.g., measured by

lack of fabrics).[37] These factors are also more important than investments in technology. The statements by the exporters are in line with the theoretical results of section 4. Following the property rights perspective, the marketing agent has to possess the residual control which permits him to reap the profits from such investments. When the buyer uses his own label, that is exactly what he achieves. The buyer is then able to market his own label and hence achieve the residual profit stream from this investment. Otherwise, underinvestment in marketing may arise. When the label is associated to a specific style, as is the case for Levi's, one would expect that the label and the design are complementary "activities" such that the owner of the label also wants to control the design.[38]

6. General conclusion and branding strategies

By placing orders with manufacturers in Bangladesh that are based on buyer's label and design, the buyers control the differentiation of clothing made in the country. In this paper I have developed a theoretical model which explains this phenomenon. Rather than arguing that adapting to the instructions of the buyers as regards design and quality results from satisficing behaviour or country-specific circumstances such as dependency on imported fabrics or a widespread lack of confidence in locally-made designs, I have argued that different governance structures may better be explained by the characteristics of the marketed product. From this perspective, ownership is seen as an endogenous variable, and the form of such ownership depends on the kind of investments which differentiate products. In turn, such investments depend on the characteristics of the product in question. I have explained the distribution of property rights based on a modelling of the investments in differentiation made by the producer and the distributor, respectively. It is assumed that a brand name is related to a distributor and that the distributor undertakes the investments in marketing. However, the supplier may control the buyer's use of the brand name either by vertical integration or by exclusive production rights.

I distinguish between brand differentiation (the distributor's value is higher than the market price) and product differentiation (the producer's costs is less than the market price) and have focused on four general phenomena of differentiation. The distributor may invest in marketing and design (phenomena 1 and 3 may exist respectively), while the supplier may invest in quality improvement and reputation

[37] In the market for clothing, some argue that the availability of fabrics is a prerequisite for design making, or to put it another way, fabrics and design making are complements. If that is so, the lack of fabrics is an important restraint in branding the products.

[38] See appendix 1, subsection 3.1-3.3.

(phenomena 4 and 2 may exist respectively). The analysis delineates the conditions under which to expect that the distributor rather than the producer will make DI and predicts the types of cost-minimising governance structures which follow. Four different control regimes are compared, and the Nash bargaining solution is used as the main point of departure. The theory predicts a different distribution of property rights for those products that are differentiated through marketing than for those products which are differentiated by way of costly investments in product characteristics. The main policy lessons of this analysis would be the following: The model specifies prerequisites for developing a brand name and hence for earning pure profits through product differentiation. Supplier control is more likely when the investments undertaken by the producer influence the production process, the type of product and product quality or the buyer's value (e.g., through reputation effects). On the other hand, buyer control is more likely when the investments by the distributor influence the value of the product (e.g., through marketing or design making) or seller's cost (e.g., through product and process development). The producer's key to success is the ability to undertake investments which differentiates him from his competitors (phenomena 2 and 4 may exist) and the producer is not substituted or imitated by others.

A comprehensive test of the theory would require micro data from both the industries discussed here — clothing and automobiles — as well as data on marketing costs for their various products. Such data are not yet available, but based on a survey among exporters of garments from Bangladesh (see appendix 1 and 2) and secondary data on the automobile industry, I have tried to indicate both the most relevant phenomena occurring in the two markets and the real control problems that arise.

These data show that the theory developed above to some extent fits the empirical reality: While phenomena 2 and 3 appear to exist in the market for automobiles, they possibly do not in the market for clothing. Hence, the extent of vertical control is prominent in the market for automobiles, while it hardly exists in the market for clothing. The distributors control differentiation in the market for clothing, while the producers do so in the market for automobiles. However, since neither phenomenon 2 nor 3 seem to exist in the market for clothing, a pure trade solution is a sufficient control regime to secure that the party which invests is able to reap the residual profit of such investments. Furthermore, a pure trade solution wherein the distributor invests in marketing while the producer invests in quality is an efficient solution.

Since phenomenon 1 (marketing a particular brand) is important in the market for clothing, one would expect that the producers could achieve increased profits if

they were able to control the activities undertaken by the distributors. However, as argued in sub-section 5.4, the producer is unable to undertake such controlling activities. Both vertical integration and supplier control are costly when the investments in marketing are unverifiable.

One feasible strategy to increase profit is to invest in modern technology (phenomenon 4 may exist), and those firms which have done so are generally achieving a higher price for their products (see sub-section 5.3). I have argued that in the garment case such investments may lead to increased profit through product differentiation. However, these investments hardly suffice to establish the basis for a new brand. First, the investments may easily be undertaken by their competitors as well; second, phenomenon 1 is important in this market and it is a cost by controlling the use of the distributor's brand name; third, phenomenon 2 does not exist.

The second strategy is to produce a product which few others are producing. Muslin silk which is produced exclusively in Bangladesh, could serve as an example. Muslin silk should be considered as a potential branding product in Bangladesh just as Thailand has created a brand name of Thai silk and Indonesia and the Philippines have created a brand name of their famous batik. Furthermore, research is undertaken in Bangladesh to mix jute and cotton and hereby create a new type of fabric. If there is a demand for such new fabric, the prerequisites for branding are fulfilled as long as the competitors are unable to duplicate the production of this type of fabric. However, the activities of the producers should be coordinated. Another strategy to make oneself less substitutable is to create a new style – for example through mixing European taste with local features. But, to the extent that phenomenon 1 is important in such a market, the activities by the distributor is favouring the particular group of producers (phenomenon 3 exists as well) since they are the only ones to produce it. However, a problem may arise by such a strategy. The distributor may possibly integrate backwards (or impose a vertical control regime based on buyer control) to reduce the possibilities for hold ups.

The third strategy is to make investments so that a particular buyer earns more by continuing the relationship than he would by terminating it and finding a new supplier (see the special case of relational quasi rent discussed in section 5.1). By establishing long-term arrangements with particular buyers in accordance with the Nash bargaining solution assumed in this paper, profits are increased as long as the buyer also makes money out of such a relationship. In fact, subcontractors of Levi's say they earn thirty per cent more on the products delivered to Levi's than

on corresponding products delivered to other suppliers.[39] Delivery on time, fulfilment of quality specifications and a good communication network between the supplier and the distributor seem to be necessary conditions for making oneself valuable to a particular buyer. The Benetton case illustrates the value of a network system. The production units are linked to the stores through a database system disclosing sales data on different categories. Through a flexible production system, daily sales data combined with high inventories of undyed clothing, colours and destination of output are decided and implemented immediately (Milgrom and Roberts, 1990b). Hereby, the production units invest in flexible technology which increases the distributor's sales and thereby strengthens the bargaining position of the seller. However, even though such investments increase the supplier's capabilities and thereby his attractiveness, I doubt that these investments are sufficient to create any brand names. But they are necessary to increase temporary profit (Keesing and Lall, 1992).

My general conclusion concerning branding strategies in the clothing market is as follows: For the producers to successfully create a new consumer label would be impossible without also creating a distribution channel for marketing the product. However, as argued above, producers in Bangladesh are unable to control the activities of such distributors. What is attainable in the short run is to make investments to reduce costs and to invest so as to increase one's value to particular buyers. Whether such investments increase long-term profits is another matter.

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[39] In a situation with oversupply in the product market, the higher price could also be understood as a disciplining device.

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Appendix 1: Results from a garment sector survey[1]

1. Introduction

In chapter 4, I argued that the actor who makes non-verifiable investments in differentiation (DI) can reap the residual profits of such investments, provided that he has exclusive distribution or production rights to the result of differentiation. The model developed was based on a particular buyer and a seller in a competitive market negotiating the transfer price after they have undertaken their investments. I identified investments in technology and in marketing of the final products as the key variables in the branding process, and applied this particular model to one market, the market for apparel. As I was particularly concerned with branding strategies undertaken by the producers in developing countries in general and Bangladesh in particular, I undertook a survey among randomly chosen suppliers in Bangladesh. The general results of this survey are presented in this appendix. The results used in order to demonstrate the usefulness of the developed model, are presented in the application part of chapter 4.[2]

The main objective of this appendix is to give a broader overview of the garment sector in Bangladesh than what was possible in chapter 4. Questions such as the size of the firms, their total investments in technology, their technical knowledge and capabilities, how transactions occur, how disputes are solved, which categories of firms are earning profits etc. were only mentioned briefly in chapter 4. In particular, the following questions will be addressed here:

The first question to be addressed is whether the explanations given in chapter 4 correspond with the exporters' own view on why they neither design nor brand their products? Does alternative explanations exist? In particular, I discuss alternative explanations of why the producers do not design their products. This question is addressed in section 3.

[1] I am indebted to Geir B. Asheim, Terje Lensberg and Karl Rolf Pedersen for valuable comments on an earlier draft. Thanks are also due to colleagues at CMI, in particular, Ole David Koht Norbye and Ussif Rashid Sumaila. Any remaining errors are mine alone. Field work in Bangladesh was financed by the Norwegian Agency for Development Cooperation (NORAD).

[2] There may be some overlaps between the arguments of chapter 4 and this appendix since the papers originally were written separately.

Second, are my assumptions concerning the institutional organisation of the market in accordance with reality? In chapter 4, I assumed perfect competition. Rather than focusing on this assumption, I analyse whether there is a *bilateral* relationship between a supplier and a buyer where one actor may be in a position to damage the other? If this is the case, and the parties' investments are non-verifiable, bargaining pressures arise ex post even though a formal contract exists ex ante. A bargaining approach would then appear to be an adequate framework for analysis. I analyse the duration of contracts and relationships, the type of relationship; whether a contract is negotiated through agents and buying houses or directly, and how disputes are solved. These questions are discussed in section 4.

Third, in terms of size, technical knowledge and the duration of relationships with their buyers, what type of firms makes investments? What is the level of such investments? How specific are these investments? These questions are discussed in section 5.

Fourth, are any particular type of firms performing better than the others? Since profit data are unavailable, I have studied some reasonable proxies for profit. These are: whether a firm has financial problems, the wages of the firm and the prices received. This question is discussed in section 6.

The questions addressed above are discussed on the premises that firms in their investment decisions aim to maximise net present value of their investments. However, net present value may vary between firms depending on the type of investment (general or specific technology), the products which are sold (trousers versus shirts), the present main market and the technology of the firm. As shown below, the technical knowledge of the firm is used as an important classification variable. The characteristics and methodology of the survey are presented in section 2.

2. The survey

The analysis in this section serves two purposes: First, it makes it possible to compare my sample with the total population of units. Second, it identifies the present stage of technology as the key classification variable in explaining the size of the firms (size is treated as an endogenous variable), and in addition, as shown in the subsequent sections, the units' performance in terms of relations with their buyers, investment decisions and profits.

I draw a stratified sample of 35 financial units exporting garments. Three strata were selected. One strata consists of 20 randomly drawn units from a corre-

sponding sample investigated in 1989 (Wiig, 1990). That sample was a random sample, and through such panel data I was able to study structural changes at the level of the firm. The second strata consists of units established since 1989. As the number of firms have doubled during the period 1989-1993, and due to the fact that old and new firms may follow different business strategies, five units established later than 1989 were randomly drawn from a list given by BGMEA.[3] In addition, I draw a third sample of 10 units which, according to BGMEA, were successful economic units. These units have expanded capacity as well as product variety and have undertaken several investments since 1989. In this category, one financial unit usually consisted of anything between three and twelve separate factories. Hence, the survey covers nearly 100 factories in Bangladesh. The questionnaire which I used in the interview is presented in appendix 2.

First, I give some brief characteristics of the sample based on *univariate statistics.* Three key variables are described. These variables also serve as classification variables in the following analyses, as one would expect that the units have differently performance depending on the structure and conduct of the market. The variables are, first, size in terms of capacity, employment, turnover and utilisation rates; second, market characteristics in terms of market destination, type of products produced and the number of actors in the different segments and third, present stage of technology. I proceed with using simple linear regression analysis and standard bivariate statistics to analyse the *relationships between these three variables.* However, the sample size is small and the variance in data is high. Hence, one has to be cautious in drawing strong conclusions based on the survey data. Furthermore, a full model of the relationships between the different variables is not presented. The methodology focuses on correlation between a set of variables, and does not necessarily posit a causal relationship.

Medium to large scale firms. In table 1, I present three indicators for the size of the firm: capacity per month, turnover (FOB value of exports) and present employment volume. When the utilisation rate is low, present employment is not a good indicator of capacity. Therefore, I also present the figures for utilisation rates. Due to the great dispersion in data, as noticed in table 1, I give the figures for standard deviation, minimum and maximum in addition to the mean.

[3] Bangladesh Garment Manufacturers & Exporters Association.

Table 1
Capacity and turnover

	Mean	Standard Deviation	Minimum	Maximum	N
Capacity knitted. Doz. per month	13,500	14,581	2,500	50,000	9
Capacity woven. Doz per month	12,968	12,421	1,500	50,000	32
Nr. of employees	1,236	1,776	90	8,500	27
Export in mill. US$. 1993	9.7	12.1	0	50	28
Utilisation rate (%)	88.7	16.0	40	100	30

The biggest economic unit had 8,500 employees, with a capacity to cover the whole Norwegian market for shirts, while the smallest unit had less than 100 employees. For the firms in operation, the value of annual exports (FOB) varies between US$50 million and US$1 million. Some units, especially the biggest ones, refused to give precise statements of their turnover. Hence, some units have possibly higher turnover than those figures reported above.

According to table 3, 56 per cent of the units had more than 500 employees, while only 15 per cent had less than 250 employees. The rest of the units, 29 per cent, had between 250 and 500 employees. Hence, the units interviewed were large- to medium scale factories. Compared to other studies, the averages presented above are higher, possibly higher than the averages in the real population (Chaudhuri and Paul-Majumder, 1991). As an example, the utilisation rate in the garment sector in Bangladesh is only 60 per cent (BGMEA), while in my sample it is nearly 90 per cent. The main reason for such a discrepancy is that my sample is biased. Big units with long experience in international trading are overrepresented. The low utilisation rate presented by BGMEA is possibly a result of the entry of new sweatshop factories (Piore, 1988), factories without quotas based on past performance or experience in trading at the world market. After a while such firms are driven out of operation. For units which are in operation, the utilisation rate is high, and only one of the 34 factories which I visited in 1989 closed down during the period until February 1994.

Segregation in terms of products and main market. In table 2, I give some indicators of the degree of specialisation in different market segments.

Table 2
Most exported item, main market and number of customers.

	Mean (%)	Standard deviation	Minimum	Maximum	N
Share of production to most important market	80	19	45	100	23
Market share of most exported item	81	17	50	100	32
Present customers of most exported item	7	10	1	40	20

From table 2, one can conclude that the units are specialising in particular markets (Europe or US). The share of production to the most important market is around 80 per cent. Units are also specialising in particular types of products (e.g. shirts or trousers). On average, their most exported item is sold to more than seven different buyers. These figures agree with the overall export structure of garments from Bangladesh and show that the producers to some extent have succeeded in penetrating new markets (like the European market).[4] Europe was the main market destination for 65 per cent of the units, while 35 per cent of the units exported mainly to the US. For 70 per cent shirts were their most exported item.

Technology level in terms of supplier's capabilities. According to technical specialists, one is able to categorise the units' technical capabilities according to their existing collaboration agreement with their buyers. Five different stages or sets of agreements are considered. These categories are important classification variables in buyer's selection of a particular firm and setting conditions for a contract.

After establishing a garment factory, the first stage is usually to export on a CM (cutting and making) or CMT (CM + trimming) basis, while the buyer or his agent provides sourcing of fabrics, quality and production inspection assistance. In Piore's terminology (Piore, 1988), this stage may correspond to the *sweatshop* factory. The second stage is sourcing their own *fabrics* and selling on a FOB basis, the third step is undertaking one's *own production engineering system* and the fourth stage is *making the pattern and the grading*. These stages follow successively from what has been achieved in the past stages. When all these stages have been completed successfully, one is able to receive only a *basic model* from

[4] I refer to observation i) in chapter 1.

the buyer (stage 5). At the very last stage one is able to sell one's own models.[5] 17 per cent of the units belong to group five, the advanced group, while 32 per cent belong to the two lowest groups. Less than 50 per cent of the units in the sample do the grading, a prerequisite for making their own design (see table 3). Due to the fact that big and successful firms are overrepresented in my sample, these figures are obviously biased. They give an overstated description of the overall technology level. But, on the other hand, some units are at the stage where making their own models are the subsequent step to take. Compared to the situation in 1989, more units are now in the position of sourcing their own fabrics, organising their own production engineering system and making the grading by themselves.

As asserted above, the classification scheme represents an approach to technical innovation based on a certain sequence of phases. Each phase has to be completed successfully before a unit advances to the next stage, but the time frame could be brief at every step. One possible explanation is the following: To sell your own model collection, you need a good reputation (see chapter 4; sub-section 2.2). This reputation may be built up by temporarily selling high quality goods at a loss. However, in taking financial constraints (see section 6) and learning by doing effects (see sub-section 4.2 and table 3) into account, rather than making a huge investment to pass directly to stage 5, the discounted net present value of profit is higher by achieving profits at each step. The profits could then be reinvested to pass on to the next stage.

Whether this phase description is in accordance with reality is nonessential for my argument. The main point is, that one is able to categorize the firms according to their present technology. The present technology reflects previous investment decisions presumably based on maximising behaviour. In fact, the units classified at stages 4-5 generally correspond to the units which have undertaken huge investments in technology, while the units at the lowest stages have invested less (see section 6).

Size - primarily a result of technical knowledge. Let me finalise this sub-section by analysing the relationship between the size of the firm, its present technology level and its most important market. Size is considered as the "endogenous" variable. In table 3, I use bivariate statistics, while in table 4, a regression model is presented.

[5] In fact, two units create their own designs. However, their exports of these products were only minor. These units are therefore grouped in category 5.

Table 3
Employment by technology level. (In %)

Employment	% of total	Stage 1	Stage 2 or 3	Stage 4 or 5
1-250	14.7	27.3	14.3	6.3
251-500	29.4	54.5	42.9	6.3
501 or more	55.9	18.2	42.9	87.5
	100	100	100	100
Nr. of cases	34	11	7	16

As indicated by table 3, *the employment level increases according to the firms' technical knowledge.*[6] The reasons why some units possess higher knowledge than others are not explained by this survey. In section 4.2, however, a bilateral relationship with their main buyer is introduced as one possible explanation.

The results of the regression analysis are presented in table 4. The analysed model is specified as follows:

$$E(EMPLNR) = k + \beta_1 MMARK + \beta_2 MBKNOW$$

The variables and their values are defined as follows:

Employment (EMPLNR)	No. of employees
Main Market (MMARK)	1 - Quota US 0 - Else (e.g., Europe)
Technical knowledge (MBKNOW)	0 - Stage 1, 2 or 3 1 - Stage 4 or 5 (do the grading)

By recoding main market and technical knowledge, two dichotomous variables are created. According to the primary data, these variables are independent and I use them as explanatory variables for the present number of employees.

[6] If learning effects occur, the opposite is the case; size could determine technical knowledge.

Table 4
Size, market and knowledge

	β	T	Sig T
MMARK	715	1.07	.29
MBKNOW	1642	2.69	.01
(Constant)	233	.53	.60

where: R Square = .28; F = 4.9; Signif F = .02

Technical knowledge is statistically significant in explaining the size of the firm (in terms of the employment level), while market is insignificant. If size is an indicator of smooth profits, the results in table 4 are interesting. The more advanced units are doing best. One need not to be surprised by such a result, as it underscores the fact that *investment in technology and knowledge may increase profits* (see section 5 and 6).

In sum, one may conclude that the sample is representative in terms of market orientation, but concerning capacity and technology, the sample represents the most advanced sub-sector of the garment sector in Bangladesh. As the purpose with the sample was to illustrate a theory- not to predict averages in the population, I find the sample adequate for such a purpose.

3. Why not design and create brands?

As argued in chapter 4, one would expect that a successful branding strategy depends on investments in marketing and technology, the establishment of adequate distribution channels and specific knowledge. In a situation where the brand image is related to a specific design, the ability to design could be an additional constraint in branding. The reasons for not making their own designs are therefore related to the arguments for not branding their products. However, one main difference between such explanations is the timing. In the market for clothing, making the design seems to be the first step in the process of branding. Design making is a necessary, but not a sufficient condition in the process of branding. These questions are treated separately. First, in sub-section 3.1, I analyse the reasons *given by the exporters* for why branding does not occur. Second, in sub-section 3.2 I discuss in more depth why they do not design their own products. In these sections I explore why the producers are not challenging the buyers, while in sub-section 3.3 I try to see it from the buyers' point of view.

3.1 Reasons for not branding

If phenomenon 1 (distributor generated brand differentiation) occurs in the market for clothing, one would expected that the producers' perceived costs in marketing restrict their branding process. Producers are unable to control the distributors' investments in marketing. As shown in chapter 4, section 5.4 (table 4), the most important reasons for not branding their products, as indicated by the exporters, are that branding would require huge investments in marketing, and secondly, that the buyer primarily wants to market his own label. The exporters perceive marketing and the organisation of the distribution channels as more important than learning effects (e.g. accumulated knowledge; which is measured by learning from previous experience or history) and country specific restraints (e.g. measured by lack of fabrics). These factors are also more important than investments in technology. These statements by the exporters are in line with the theoretical results of chapter 4; section 4. Following the property rights perspective, the marketing agent has to possess the residual control which permits him to reap the profits from such investments. When the buyer uses his own label, that is exactly what he achieves. The buyer is then able to market his own label and achieve the residual profit stream from this investment. Otherwise, underinvestment in marketing may arise. When the label is associated to a specific style, as is the case for Levi's, one would expect that the label and the design are complementary "activities" so that the owner of the label also wants to control the design.

However, how general are these results, and what lessons can be drawn? To study such issues, I would analyse how perceptions vary among the different categories of units described in section 2. The general results drawn in table 4, chapter 4, are stronger if this variation is low. As mentioned in section 2, size and knowledge are closely interrelated. Technical knowledge and market orientation are therefore used as explanatory variables, while the scores given on investments in marketing, buyer's use of own label, and investment in technology are dependent variables. By a MANOVA analysis, it was found that technical knowledge was statistically significant while market orientation was not. In table 5, I present the results of the analysis, using technical knowledge as the only explanatory variable.

Table 5
Perceptions of branding by technical knowledge. MANOVA

	F	Sig. F.	Mean stage 1-3	Mean stage 4-5
Investments in marketing	0.46	0.50	4.2	4.5
Buyer's use of label	9.6	0.00	4.8	3.6
Investment in technology	0.78	0.38	3.7	3.3

where Pillai's trace = 0.047

Regarding the main effect of technical knowledge, which is specified as in table 4, we can see from the significance level of Pillai's trace that the reasons for not branding varies between firms at different stages. The univariate F tests reveal that the differences in effects are concentrated in buyer's use of label. Those units at the lowest stage perceive buyer's requirement of using his own label to be a greater obstacle than the other units. Hence, the high score on this explanation is mainly *a group effect*; the present stage of technical knowledge, as opposed to a general perception by all the units. Concerning investments in marketing and technology, I do not find any significant differences between units at different stages. From the exporter's point of view, one may conclude from table 5 (and chapter 4) that brands are developed through appropriate choice of distribution channels and by marketing the products rather than by investments in technology. This is line with the assumption made in chapter 4; brands are related to the distribution channel.

3.2 Reasons for not making their own design

Rather than to challenge the buyer by creating one's own brand, the producer may do his own design. Both types of actions require investments. When the perceived net present value of such investments are low, it is most profitable to continue producing garments under the auspices of the buyer. Concerning design making, the respondents were asked to indicate the two most important reasons for not designing their own products. The structural response alternatives were based on common explanations of why the country's producers do not *design* their own products. In addition to the variables discussed in the above section, three general and common explanations would be *risk aversion, satisficing behaviour and lack of knowledge*. First, I discuss shortly these explanations and then I proceed with analysing how they are perceived by the exporters.

There is a *risk* involved in designing a new product. In case one is unable to sell a collection, stock lots and sunk development costs arise. Foreign buyers, spreading their purchases between several manufacturers, possibly have greater opportunities for *carrying* such risks than have manufacturers in Bangladesh. The producers do not face a consumer market directly, they rather sell through buyers, middlemen or distributors, located in the importing countries. Whenever such buyers specify design, the manufacturer is fully insured, but has no incentive to undertake design. This explanation is credible, but is based on the assumptions of uncertainty and risk aversion. The results found in chapter 4 do not require such additional assumptions.

To some extent, design making reflects fashion trends. In the 1960s these trends were created by the leading agencies (brands) in the fashion market. In the 1990s, however, the situation is different. There are plenty of discount stores, and people are to some extent more concerned about the quality and design of the particular product in question rather than its brand name (see chapter 3). Trends are created "on the streets", by fashion houses and by marketing agencies which either have invested in such trends by themselves or are acting on behalf of agents which have done so. Furthermore, these trends change rapidly. Even though knitted products or nylon training suits were "hot" items last year, they are possibly less popular in 1994. A producer located in Bangladesh, far from the end user, has a comparative disadvantage in terms of *knowledge* of these expected trends. International brands and distributors, on the other hand, possess the financial strength to employ personnel forecasting, as well as influencing, such trends.

However, from table 6 it follows that the producers not claim risk and information of fashion trends as the main obstacles in the process of designing their own products.[7]

Concerning *satisficing* behaviour, it is argued that manufacturers in Bangladesh are reluctant to change their business profile, management and strategy in a situation where their profits are satisfactory. Hence, they continue obeying a buyer's order rather than developing their own products.[8] Some of the units visited pointed out that they preferred high sales volume and low prices with accordingly minimum profits on each item, compared to a situation with higher profits per unit and lower sales volume. If the fixed price competitive assumption is satisfied, this market strategy can hardly be explained by assuming optimal behaviour and, hence, may illustrate satisficing behaviour. On the other hand, it may also reflect the fact that the producers are facing a downward sloping demand curve and as long as the price elasticity is greater than one, it could yet be a rational strategy. Even though the image of a more or less passive and suboptimal managing director (who is usually the owner as well) given above may be accepted as a partial explanation of why some firms do not maximise their profit, I do not find this explanation robust enough to explain the general tendency for manufacturers to be 'in the pocket' of their buyers. Furthermore, my own field experience contradicts this view. I found producers to be acting very rationally within their constraints. In fact, in a highly competitive market for garments, the extreme success in terms of

[7] Risks and information concerning fashion trends are treated simultaneously and specified as "Design reflects fashion trends, which you are unable to know in advance". Only 15.2 % of the respondents consider this as their main problem in making their own design.

[8] This argument was asserted by government officials in the Export Promotion Bureau, and consultants of ITC (International Trade Centre) and ILO (International Labour Organisation).

growth of exports from Bangladesh during the last decade can hardly be explained by satisficing behaviour and reluctancy. In 1992 Bangladesh's garments exports had risen to the very high level of US$1.4 billion. Bangladesh was by 1990 the largest supplier of shirts to the European Community (EU). It is the eighth largest supplier of garments to the United States and the tenth largest supplier to the EC. From table 6, it follows that satisfactory profits, specified as "the factory is running well", is the less important factor in explaining why the exporters do not design their own products.

Additional explanations are sometimes offered for why exporters do not undertake design. *Lack of technical knowledge* is often pointed to, as is lack of designers. However, as shown in column 2 of table 6, 54.5 per cent of the units do not make the grading themselves (stage 1-3), while only 21.2 per cent of the units mentioned lack of technical knowledge as the most important reason for not designing their products. The discrepancy between the present lack of knowledge and the fact that this is not perceived to be the main obstacle in design making, may be explained by a fourth point - the buyer will not buy unless he makes the design himself.

Table 6
Most important reason for not making their own design by technical knowledge. (In %)

Reason	Row total	Stage 1-3	Stage 4-5
Buyer requires own design	27.3	38.9	13.3
Lack of technical knowledge	21.2	22.2	20.0
Can't predict fashion trends	15.2	11.1	20.0
Factory is running well	3.0	-	6.7
Mass export	12.1	11.1	13.3
Others (e.g., marketing)	21.2	16.7	26.7
Column %	100 (N = 33)	100 (54.5 %)	100 (45.5%)

94 per cent of the units in the sample did not design their own products. According to table 6, the single most important reason given to explain this fact, is that the buyer did *not want to buy unless he made the design* - even when the producers had the knowledge of design making. Lack of technical *knowledge* in the making of design and lack of information concerning fashion trends were also important reasons given by the respondents. 64 per cent of the respondents responded positively to these three explanations. The alternative explanations of no need; either due to satisfactory profit or that making design is not an important

input in a mass consumer market, seem to be of less importance. However, 21.2 per cent of the respondents pointed to other reasons, including the reason that going for design requires too huge investments in marketing.

As in section 3.1, one has to analyse how *general* these results are. I have analysed how these perceptions vary among different categories of units. In the presentation, technical knowledge is used as the only independent variable (see the two right columns of table 6). *Those units which either perceive that the buyer insists on own design making or that they lack technical knowledge as the main reasons for not designing their own products, are in general small units. Furthermore, they are also likely to be the units at the lowest technical stages* (1,2 or 3; see section 2). The bigger and more advanced units give other reasons - especially that design making requires too huge investments in marketing. However, by using a chi-square test, I am unable to reject the hypothesis that the main reasons pointed out by the respondents for not designing their products are independent of their technical knowledge. Hence, one can hardly say that the answers follow from the characteristics of the sample. On the contrary it seems like *the responses are based on a general pattern of perceptions. According to the respondents, the buyer would not buy unless he makes his own design is the most important reason why the exporters are not designing their own products.*

From tables 5 and 6, *three general questions* have to be addressed. First, why do the buyers demand the use of their own label? Second, why do the buyers require making their own design? Third, to the extent that technical knowledge or information concerning fashion trends may be bought on the international market, why do these alternative types of market *transactions* not take place? More than 36 per cent of the units treat these explanations as their main bottlenecks in design making. In sub-section 3.3, the two first questions are addressed, while the third is addressed in section 4.1.

3.3 Why require the use of buyer's label and design?

With reference to chapter 4 on the property rights perspective, I discuss briefly the first two questions addressed above. As pointed to by the exporters, brands in the clothing market are related to huge investments in marketing. There are two different types of marketing and two consequences concerning the use of labels and who should make the design. First, we have marketing of a particular brand (chapter 4; section 2.1), e.g. international brand names like Levi's, the labels of importers or store names. If the buyer uses his own label, the same agent has control of marketing as possessing the residual rights to the profit stream from this investments. Otherwise, underinvestment in marketing may arise. When the label

is related to a specific style, as is the case for Levi's, one would expect that the label and the design are complementary "activities" so that the owner of the label wants to control the design. In addition, the buyer knows what the consumer wants and by designing their own styles, the monitoring problems may be reduced. Second, we have general marketing (chapter 4; sub-section 2.3), for example of a particular denim shirt. If design is the main intrinsic input differentiating such a product from others, one would expect that the buyer wants to control the design. In both cases, the statements given by the exporters are in correspondence with the position taken in chapter 4 - *differentiation in the clothing market is related to design making and marketing of the product rather than to product specific investments.*

4. Is there a bilateral relationship?

First, I analyse whether the assumption of a perfect *competitive market* is fulfilled. This depends on the structure and conduct of the market. On the supply side there are 1,650 exporters of garments in Bangladesh and 70-80 per cent of them produce shirts. Furthermore, the entry cost is very low. On the demand side there are several hundred buyers (buying houses, warehouses, importers, wholesalers and manufacturers) which indicate that the market may be a competitive one. As a matter of fact, 73 per cent of the units sold their most exported item to more than two buyers. On average each firm sold their products to seven different buyers. Even if the competitiveness assumption should be wrong, e.g. the buyers have market power, as argued in chapter 4, an oligopsonistic market situation would not weaken my arguments, it would rather reenforce them. Second, I proceed with analysing whether the producers have *a long term relationship* with their buyers. If that is so, there may be externalities along the lines discussed in sections 2.2 and 2.3, chapter 4.

4.1 Duration of contracts and relationship

Long term relationship. Contracts are needed to plan production, and in the clothing sector, the contract period with a particular distributor is 4-6 months and seasonal. A long term contract may be substituted by *long term informal assignments or direct contacts between the supplier and the distributor.* On average the duration of the relationship with the most important buyer is four years in my sample. When it comes to the second most important buyer, the above picture of a long term commitment between the buyer and seller is unchanged. These long term relationships indicate that the actors derive some advantages from the relationship or that least one of the parties will be hurt if the relationship is terminated. A producer may damage a buyer in two ways. First, the delivery may

be delayed and second, the quality of the products may not be acceptable. The prospect of a long term relationship, and the fact that the buyer may refuse to buy if delay and quality problems arise, may reduce this moral hazard problem. Stocklots may in turn create great financial problems for the exporters. Since the units are medium to large firms, long term relationships with their most important buyers serve as a capacity buffer and thereby stabilise their exports. In chapter 4, I called such advantages of a particular relationship as externalities arising from the parties' non verifiable- investments. I also introduced the term relational quasi rent arising from the switching costs of changing trading partners.

As shown below, technical advanced firms generally have a long term relationship with their most important buyers. The duration of such relationships are neither influenced by firms' market orientation nor by buyers' market shares. In table 7, I present the result of a simple linear regression analysis where technical knowledge (MBKNOW) is used as the only explanatory variable (see table 4 for a specification). The model is specified as follows:

$$E(MBYEAR) = k + \beta MBKNOW$$

Table 7
Duration of relationship with most important buyer (MBYEAR)
by technical knowledge (MBKNOW)

	β	T	Sig T
MBKNOW	1.67	1.95	.06
(Constant)	3.12	5.22	.00

where R Square = 0.12

According to table 7, *the duration of relationship with their most important buyer is primarily a question of the technical knowledge of the firm.* The expected duration of such relationship increases nearly two years when the unit is able to make the pattern and grading themselves (stage 4-5). This relationship is significant at a 6 per cent level.

4.2 Type of relationship

In those segments of the garment sector where the design changes rapidly and success depends on the speed of response, Lall (1991) argues that close *information links* have to be set up between the buyer and the manufacturer. Direct contact represents one such link. Both *direct contact* (no middlemen) with the producer and the establishment of a long term relationship, may reduce the buyer's

problems of monitoring the production. Direct contact may also facilitate the exchange of information between the buyer and the seller. The seller may benefit from such relationships as well. The fact that industrial customers making more and more demands on the quality of the products are emphasised in parts of the literature as contributing to economic growth in general and to growth in the garment sector in Bangladesh in particular (see chapter 4, section 2.3). Furthermore, as shown in table 6, more than 36 per cent of the respondents focus on lack of information (either fashion trends or technical knowledge) as a main problem in making their own design. Rather than buying such information, these market transactions may be substituted by a bilateral relationship between the buyer and the seller.

Following Lall's hypothesis (1991), the institutional structure of such links *varies between different markets*. Compared to Western Europe, the US market is characterised by low prices and quality and design are therefore not as important.[9] Consequently, as shown in Wiig (1990), Bangladesh exporters had closer relations with European buyers than with American buyers. Almost 70 per cent of garments exports from Bangladesh to the US market was dispatched by independent *intermediators* (agents) almost identical to a pure market transaction.[10] The only difference is that the buyer specified the design even in this market segment. In 1994, however, it appears that 48 per cent of the factories dealt directly with their *most important buyer*, while 52 per cent negotiated through agents and buying offices (see table 9). These last figures are independent of the particular market in question. According to table 8, the same conclusion follows by looking at the *percentage of usage of agents* as intermediates.

Table 8
Usage of agents as intermediates in exports to the US and Europe. %

Frequently use of agents (%)	US (N =24)	Europe (N =29)
0-5	33.3	31.0
6-30	12.5	13.8
31-60	4.2	10.3
> 60	50.0	44.8

[9] Due to the quota premium, an exporter in Bangladesh receives higher prices on a standardized product of garments exported to the US as compared to Europe. In Europe, however, there is also a quality segment of fashion products with higher value added.

[10] Following Balderston (1959) and Etgar et al. (1982), I see such agents arising because of large scale economies in searching for the producer with the lowest price.

While around 30 per cent of the units never used agents, around 50 per cent used agents in more than 60 per cent of the negotiated contracts. These frequencies do not vary significantly with the main market destination. Hence, inferring from the sample of 1994, it seems that the above hypothesis by Lall is rejected. *Rather than market orientation, according to table 9, the unit's stage of technical knowledge seems to determine the institutional type of the transaction.*

Table 9
Transaction with main buyer by technical knowledge. %

Transaction	Stage 1	Stage 2 or 3	Stage 4 or 5	Row %
Agent	100	50	18.8	51.5
Direct contact	-	50	81.2	48.5
	100	100	100	100
Column %	33.3	18.2	48.5	100 (N =33)

The technical knowledge and the size of the firm seem to determine the extent of direct contact with their main buyers. At least there is a strong correlation between these variables. One possible reason for the extent of close relationships to be higher for the advanced group, is that in this case *both parties benefit from such a bilateral relationship*, while for the sweatshop factories at stage 1, only the seller does. From the buyer's point of view, the more advanced units are not as easily substitutable as they are fewer. In addition, they represent the firms with the highest level of suppliers' capabilities. Sweatshop factories usually produce standard garments. In that market segment problems of monitoring are less than for units producing more advanced products. As indicated in table 7, firms with low technical knowledge are possibly inefficient and are dropped when the buyer becomes aware of this matter. From the seller's point of view, especially the advanced ones, rather than buying information or designers, direct contact with their buyers may be used in order to entail information concerning final consumer demand. Direct contact may therefore serve as an impetus for growth. However, validity problems arise in discussing the relative importance of these factors on the basis of table 9.

4.3 The extent of bargaining and disputes

After a contract is signed, disputes usually arise concerning modification of design, delivery time, quality and quantity of different sizes and styles. Changes in such

variables in turn create a pressure on the price initially agreed upon. Such disputes may be solved by three different mechanisms: bargaining, contract or exit. In addition, the disputes could be solved by residual control caused by ownership of the firm. However, the vertical integration between the customer and the producer is negligible. The extent of ownership connection with their main buyer is only seven percent.

One would expect that the extent of these different mechanisms reflect the present market situation. In a spot market, one would expect intensive use of contract or exit mechanisms, while in a bilateral relationship bargaining or ownership connections are the appropriate means of solving disputes. In response to a direct question on how the suppliers resolved such disputes, depending on the variety of disputes (e.g. price, quality and delivery time), between 70-80 per cent solved disputes through bargaining. Only 10 per cent of the disputes were solved through the terms regulated in the LC (Letter of Credit). 10 - 20 per cent of the disputes were regulated through termination of the relationship or through other mechanisms.

In sum, the results in this section are as follows: *First, there is a segment of the market characterised by a long term relationship between a particular buyer and a seller (a bilateral relationship). In this segment, the buyer and the seller usually engage in direct contacts. A significant characteristic of a particular seller in such a market is that the firm possesses high technical knowledge. Second, disputes are usually solved through bargaining between the parties.*

5. Long term relationship and investments

In the last section I found that the relationship between the buyer and the seller in many cases could be of a long term informal nature. In this section I want to explore the question of whether the long term relationship could be explained by the volume and character of the *seller's* investments. First, I analyse the relationship between the *general* investments and the background variables discussed in section 2. Specific investments are discussed in chapter 4.

General investments - a question of technical knowledge. The actual investments undertaken during the last three years vary between US$7 million and nil. The average investment is US$900,000. The advanced units (stage 4-5) invested nearly 40 times more than the others. Their average was US$2 million, while units at stage 1-3 had a mean of US$75,000. If we exclude the units that invested more than US$2 million, (4 units at stage 4-5; where the investments also included investments in premises), the average in the advanced group is reduced to

US$285,000. Still the investment in this group is 4 times the level of the investments by units at stage 1-3. *Hence, it is mainly the advanced units that make large investments.* The investments are undertaken in premises (especially those units which have invested more than US$2 millions), expanding capacity, special machinery like the embroidery machine, modern machinery for dying, ironing and fusing and programmable sewing machines. Concerning programmable machinery, only 23 per cent of the units invested in such machinery, while 17 per cent invested or are in the process of making investments in CAD/CAM, mainly computerbased graders.[11]

In table 10, I present the results from a linear regression analysis where MMARK and MBKNOW are used as explanatory variables for investments. The variables are specified as in table 4, and the model is specified as follows:

$$E(\text{Amount of investment}) = k + \beta_1 MMARK + \beta_2 MBKNOW$$

Table 10
Investments by main market and technical knowledge

	β	T	Sig T
MBKNOW	2,027,721	2.8	.01
MMARK	-1,057,338	-1.45	.16
(Constant)	451,978	0.83	.41

where: R Square 0.30; F = 4.64 and signif F = .02

According to table 10, only technical knowledge is significant in explaining the amount which is invested. In addition to market orientation, the duration of contracts with their main buyer was found to be insignificant. However, technical knowledge is statistically insignificant when using investments per employees as dependent variable.

The specificity of the investments. In circumstances where the buyer or the seller undertakes specific investments, a long term relationship is a strategy to reduce potential 'hold up' problems. I was unable to get access to disaggregated data on

[11] 6 units in my sample had undertaken such investments. I presume very few additional units in the garment sector in Bangladesh have undertaken such investments since this type of information is easily transmitted through the biggest and most important actors in the sector. Hence, I presume only around 1 per cent of the factories in Bangladesh have invested in such technology.

the supplier's particular investments in specific technology. Through indirect methods, however, the survey indicates the degree of such eventual asset specificity as far as the exporters' current technology is concerned. This question was addressed in chapter 4, section 5.1. I concluded in chapter 4 that producers' investments could not be grouped as investments in 'producer generated brand differentiation.' Rather, it seems that the investments are in cost reduction for a specific product category (e.g. shirts or skirts, denim jeans, trousers and so forth). According to chapter 4 such investments are important to increase profits in the short run, but are not sufficient to create their own brands. On the other hand, these investments may increase quality and thereby the probability of maintaining a long term relationship with a buyer.

6. Investment, profit and wages

In this section, I address the following question: Do the units which invest also correspond to the units which earn profits? Since profit data are unavailable, I have studied some reasonable proxies for profit. These are: *whether a firm has financial problems, the wages of the firm and the prices received.* These indicators are studied in the sub-sections below.

6.1 Financial problems - a question of technical knowledge

One would expect that those units which are doing well do not have any significant financial problems. Rather than *financing their investments* by bank loans, they are able to finance it by means of new equity capital or reinvestment of their own profits. According to table 11, *72 per cent of the units did not have any financial problems*, while according to table 12, 90 per cent of those which were financially in good shape financed their investments by means of new equity capital or reinvestment of own profit. These figures indicate that the investments are profitable.

In table 11, I have analysed whether the extent of financial problems depend on the technical knowledge of the firm.

Table 11
Problems in financing investments by technical knowledge. %

Financial problems	Row total	Stage 1-3	Stage 4-5
Yes	27.6	37.5	15.4
No	72.4	62.5	84.6
	100	100	100
Col. total	100 (N =29)	55.2	44.8

Out of the two groups, firms at stage 1-3 have relatively more financial problems. This seems to indicate that the firms at stage 4-5 are earning more or belonging to a group which have easy access to credits or possibly both. In table 12, the reasons why the units have no financial problems are presented.

Table 12
Reasons why firms have no financial problems by technical knowledge. %

Reasons	Row total	Stage 1-3	Stage 4-5
Financed mainly by new equity cap.	35	50	20
Financed mainly by reinvestment of own profit	55	40	70
Financed mainly by our customers	10	10	10
Financed mainly by bank loans	0	0	0
Col. total	100 (N=20)	100 (N_1 =10)	100 (N_2=10)

According to table 12, firms at stage 4-5 are mainly financing their investments by reinvestment of profits. This result supports the above hypothesis that the advanced units are earning most. But, according to section 5, it does not appear to be the case that this profitability is related to the specificity of the technology. Rather, it seems to be the result of a cost minimising strategy or, as argued in section 4, a particular relationship with their buyers.

6.2 The unexplained wage differentials

Since Bangladesh largely exports labour intensive products, according to the factor price theorem, one would generally expect rising real wages in the garment sector. There are no available official statistics to study such changes in wages. However, in my sample of 1989 and 1994, I have collected wage figures for skilled sewing workers. The figures for helpers and apprentices are not that interesting as the labour supply of these groups is nearly unlimited or perfectly elastic.

Table 13
Average monthly wages in Taka (TK) for fully skilled sewing workers excluding overtime.
1989. 1994

	Average	St. Dev.	Min	Max	N
1989	1274	220	850	1900	32
1994	1815	692	1000	5000	29

The nominal average wage increased 42 per cent during the 1989-94. The inflation rate for the same period was above 20 per cent. Hence, real wages have increased.[12]

However, the distribution of growth may vary between firms depending on their investments in technology, or it may be that some part of the labour force obtains a greater share of the profits. The primary data show that the *increase in wages are statistically independent of the technical knowledge of the firm, its amount of investments and its main market and size.* Furthermore, such demand driven explanations of wage growth and its distribution cannot explain the dispersion in the wage level between firms. Hence, wages do not seem to be an appropriate indicator of profitability. The dispersion in wages may rather reflect the relative scarcity of labour facing the individual unit.

When it comes to the wages for cutting masters and pattern makers, two important and *scarce groups*, the picture is different. Those units which have invested in modern technology give significantly higher wages to such employees. As only one unit in my sample has a trade union, the degree of unionisation can hardly be used as a classification variable for profit. In the following sub-section, I will discuss CM (cutting and making) as a proxy for profit.

6.3 CM - mainly a question of main market

CM per doz., or the transfer price of cutting and making, reflects what the units achieve by sewing the products. Since the labour input varies between different product categories, I have limited the analysis to shirts. Three explanatory variables, main market (MMARK), technical knowledge (MBKNOW) and whether a transaction is negotiated by an agent or directly (MBTRANS), are used in the

[12] Some part of the growth is related to the different samples drawn. However, as I have wage figures for 16 units visited both in 1989 and 1994, I am able to control for this sample effect. In so doing, the wage increase is reduced to 35 per cent for these 16 units.

regression. The single most important variable is MMARK. 88 per cent of the variation in CM is explained by this variable, and *the price of cutting and making is significantly higher by selling to the US market than to Europe,* mainly due to a quota premium. By a stepwise linear regression procedure, as in table 14, using MBTRANS in addition to MMARK, MBTRANS is found to be significant. *Units selling directly generally receive a higher price.* The same is the case for the technical advanced units at stages 4-5. This technology effect is, however, only significant when we do not control for MBTRANS. In itself, MBTRANS explains more than MBKNOW. But as indicated in sub-section 4.1, technical knowledge and the structure of the relationships with the main buyer are interrelated variables.

Table 14
CM by main market and technical knowledge. A stepwise regression

	β	T	Sig T
MMARK	11.5	9.9	.000
MBTRANS	-1.5	-2.4	.039
Constant	7.5	.44	.000
MBKNOW[13]	.13	1.3	.229

where: R Square .93; F = 63.2; Signif F = .00.

In sum, measured by the extent of financial problems, the most advanced units are running best. Measured by the CM, those firms having direct contact with their main buyers are performing best. However, the single most important explanation of CM is whether the units are selling to the US or Europe.

7. Main results

A stratified sample of 35 financial units exporting garments was drawn in order to illustrate the theory developed in chapter 4. In addition, the objective of the sample was to give a broader overview of the garment sector in Bangladesh. The sample is classified by size, present stage of technology and market destination. As shown in section 2, the sample is representative in terms of market orientation, but concerning capacity and technology, the sample represents the most advanced sub-sector of the garment sector in Bangladesh. The methodology used focuses on correlation between a set of variables, and does not necessarily posit a causal relationship. The main results obtained are:

[13] MBKNOW did not pass the PIN test.

- The exporters' perceptions of the constraints in branding their products correspond to the assumptions in chapter 4 - brands are related to a distribution channel and marketing of the final product. Concerning design, the buyer will not buy unless he makes his own design. According to the respondents, this is the most important reason why the exporters do not design their own products (see section 3).

- There exists a market segment characterised by bilateral relations. In this segment, the market is characterised by a long term relationship between a particular buyer and a seller. In addition, the buyer and the seller usually engage in direct contacts. A significant characteristic of a particular seller in such a market is that the firm possesses high technical knowledge. I argue that the extent of close relationships are higher for the advanced group, because both parties, in this case, may benefit from such a bilateral relationship, while for the sweatshop factories at stage 1, only the seller does. From the buyer's point of view, the more advanced units are not as easily substitutable and represent the firms with the highest level of suppliers' capabilities. From the seller's point of view, especially the advanced ones, rather than buying information or designers, direct contact with the buyers may be used in order to entail information concerning final consumer demand. Direct contact may therefore serve as an impetus for growth (see section 4).

- The investments in technology are in quality improvement (cost reduction), but have no value for a particular distributor. It is mainly the advanced units that make large investments and such investments may increase the probability of maintaining a long term relationship with a buyer (see section 5).

- Advanced units (in terms of technical knowledge) are generally performing better than the sweatshop factories at the lowest stages. Advanced units have few financial problems and are sizable (see section 6).

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Appendix 2:
Garment sector survey

A. General questions:

1. Factory Name:..... Profile or pamphlet of your factory: Yes ☐ No ☐

2. The garment industry in Bangladesh faces several problems. Please indicate the two most important problems faced by your company, by using the numbers 1 and 2 respectively.
   - Lack of fabrics ☐
   - Lack of adequate distribution channels ☐
   - Improvement of quality and design making ☐
   - Government facilities and regulations (customs, lc, entry) ☐
   - International competition and regulations (China, Vietnam; MFA, EU or NAFTA) ☐
   - Others (please specify) ☐

3. What is your present capacity and employment size?

a) Knit: doz a month.....
   Woven: doz a month.....
   Utilization rate .....

b) If production of knitted products, are you producing fabric by your own? Yes ☐ No☐

c) Employment: 1-250 ☐ 251-500 ☐ 501 or more ☐

   Present numbers:.....

4. What is currently (1993) your most exported item? (shirts, trousers, skirts etc.) .....
   Most important item's share of total export? .....
   Average order size of most exported item? .....
   How many customers (buyers) bought this item in 1993? 1-2 ☐ 3-6 ☐ More than 6 ☐

   Present customers .....

5. What is currently your main market for this item?
   Quota US ☐ Non Quota US ☐ Europe ☐ Others ☐

   Main market share of total output .....

6. Does this unit have any sister concern or enter into any kind of financial or admistrative group? Yes ☐ No ☐

7. How frequently (per cent of contracts in 1993) have you used agents as intermediates in your export to:

	0-5%	6-30%	30-60%	>60%
US	☐	☐	☐	☐
Europe	☐	☐	☐	☐

8. At present, are you using agents more frequent than 5 years ago?

More ☐ Less ☐ Same ☐

B. Branding and design

9. No garment exporter in Bangladesh has created it's own brand name. Why has your company not created such a brand name? Please indicate the importance of each of the following factors on a scale of importance from 1 to 5, where 1 signifies not important at all and 5 signifies highly important.

	1	2	3	4	5
Short history	☐	☐	☐	☐	☐
Lack of fabrics	☐	☐	☐	☐	☐
Distribution channels are not developed	☐	☐	☐	☐	☐
The buyer primarily wants to marketing his own label	☐	☐	☐	☐	☐
Branding requires too large investment in technology	☐	☐	☐	☐	☐
Branding requires too large investment in marketing	☐	☐	☐	☐	☐
Others, please specify	☐	☐	☐	☐	☐

Comments:.....

10. Does your company creates it's own designs? Yes ☐ No ☐

If no, why? Please indicate the two most important factors by using the numbers 1 and 2 respectively.

Lack of technical knowledge (designers).	☐
Design reflects fashion trends which you are unable to know in advance.	☐
Even if you had the knowledge, the buyer will not buy unless he makes the design	☐
The factory is running well.	☐
We do not need designers since we are exporting standard garments in large quantities.	☐
Others, please specify	☐

C. Investment

11. What kinds of investments have been undertaken during the last three years to differentiate (diversify) your products?

a) New machinery and technology;

Special machines (eg. knitted, ironing, fusing, embroidery, dying)

.....

Programmable machines.	Yes ☐ No ☐
Technology CAD/CAM (grader, cutter, head rail system, robot)	Yes ☐ No ☐

Comments: .....

b) Training programs for workers and quality control; Process ☐ End ☐ Both ☐

c) Production control and target system:
Last experience (Pr machine/hour target) ☐
Time study (standard time methods) ☐

d) Attachments; e.g. folding, bending marking Plenty ☐ Some ☐ None ☐

12. Have you faced significant problems financing the above investments? Yes ☐ No ☐

If no, why?
Funding has mainly been secured by raising new equity capital ☐
Funding has mainly been secured by reinvestment of own profit ☐
Funding has mainly been secured by bank loans ☐
Funding has mainly been secured by our customers ☐
Combination; please specify..... ☐

13. Some technologies are geared towards a specific product and/or buyer while other technologies may be applied more generally in production. As far as your current technology is concerned, please indicate whether you agree or disagree with the following statements on a scale from 1 to 5 where 1 signifies that you disagree strongly and 5 signifies strong agreement.

	1	2	3	4	5
Our machinery may easily be used in the production of different products whoever is the buyer.	☐	☐	☐	☐	☐
Our machinery is geared to particular buyers.	☐	☐	☐	☐	☐
Our quality control system is geared to a specific buyer or product	☐	☐	☐	☐	☐

Comments:.....

14. Would you consider it a common feature of contracts with international buyers of garments that such contracts entail capital investments specific to the production of the good covered by such contracts?

Often ☐ Occasionally ☐ Seldom,rare ☐

If often or occasionally:
Hypothetically, if you secured a long term contract with an important buyer, would you be willing to risk undertaking a significant investment in new technology or quality control system knowing that this investment could only be used spesifically for the production of those goods covered by the contract? Yes ☐ No ☐

15. What is the level of the lead time running a new order.

Continuous ☐
> 1 day ☐

D. Main customer (buyer) and contract

16. Of your total output in 1993, indicate the relative share which is contracted to your main buyer? <10% ☐ 10-30% ☐ >30% ☐

    Type (retailer (1), importer (2), chain store (3), manufacturer; local or international (4) ☐

17. How long have you been supplying this firm (years)? .....

18. Is this particular transaction negotiated by you directly or through an agent?
    Agent ☐ Direct ☐

19. Has the identity of your main buyer changed during the last 4 years?
    Yes ☐ No ☐

20. Has the identity of your second most important buyer changed during the last 4 years?
    Yes ☐ No ☐

21. Do you have any formal contract with your main buyer in addition to the terms regulated in the LC? Yes ☐ No ☐

22. Are there any ownership connections (equity or shared investment) between your firm and your main buyer? Yes ☐ No ☐

23. How do you resolve disputes with your main buyer concerning:

	Contract	Bargaining	Cancellation	Others
Acceptable quality	☐	☐	☐	☐
Modification of design, delivery time, quantity and price	☐	☐	☐	☐

Do serious disputes usually imply that your relationship is permanently terminated?
Often ☐ Occasionally ☐ Seldom,rare ☐

24. What is the usual collaborate agreement with your main buyer?

    1. CMT; based on standard time ☐
    2. CMT + own supply of fabrics (FOB/CIF) ☐
    3. FOB + own production system (Production engineering; receives pattern from buyer) ☐
    4. Production engineering + grading (Pattern) ☐
    5. Buyer supplies only the basic model or collection. ☐

If 2-5, does the buyer or his agent provide your factory:
- with production and quality inspection assistance? Yes ☐ No ☐
- sourcing of fabrics Yes ☐ No ☐

25. What is the average ordinary monthly wages for:
fullskilled sewing workers .....
cutting master .....
patternmaker .....

26. How are the wages adjusted? Individual contracts ☐ Collective wage bargaining ☐
Individual salary ☐ Piece rate ☐

27. Does any labour (trade) union exist in your factory? Yes ☐ No ☐

28. What do you consider as the most reasonable use of your company's profit this year?

Pay dividend to the shareholders ☐
Reinvestment in new machinery ☐

Comments .....

29. Turnover (FOB) 1993 .....

30. Average CM most important product .....

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