

Trademark Protection or Protectionism?^{*}

Eugenia Baroncelli [†]

Ekaterina Krivonos [‡]

Marcelo Olarreaga [§]

Abstract

This paper explores the extent to which discrimination against foreign applicants in the trademark registration process can be used as a “behind-the-border” barrier to imports. *Prima-facie* evidence shows that in some developing countries the ratio of trademark registration to applications is much higher for national than for foreign applicants, which is consistent with the notion of discrimination against foreign firms. A simple model is developed that suggests that incentives to discriminate are stronger when foreign firms produce products that are close in quality to the product produced by domestic firms. This hypothesis is then tested and empirically confirmed in three of the four countries in our sample, suggesting that discretion and discrimination in the trademark registration process can sometimes be used as a protectionist tool.

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[†]University of Bologna and The World Bank. e-mail: ebaroncelli@worldbank.org

[‡]University of Maryland and Inter-American Development Bank. e-mail: ekrivonos@arec.umd.edu

[§]The World Bank, and CEPR. e-mail: molarreaga@worldbank.org

1 Introduction

Dating from antiquity, craftsmen's marks have been employed to identify the name of the maker and prevent fraud. One of the many forms of intellectual property rights, trademarks are defined in the current economic and law literature as words, symbols or other signifiers used to distinguish a good or service produced by one firm from the services or goods produced by another firm (Landes and Posner 1987). Therefore, a "trademark" is also "an element of a process of communication...which typically originated with the owner or seller of a product and which is received by a prospective buyer of that product" (Papan-dreou 2002). Tied to the dynamics of communication, a function of information is clearly performed by a trademark, along with one of influencing, through the provision of such information, the final choice of the prospective buyer toward the purchase of that specific product.

Allowing economic agents to register trademarks, governments aim then at reducing consumers' search costs and, indirectly, at stimulating firms to increase or maintain the quality and variety of standards of their trademarked products. Trademarks are powerful instruments in reducing the informational asymmetries between producers and consumers.¹ Trademarks help consumers to distinguish those quality features that are not observable at the moment of the purchase of the product, such as the effectiveness of a shampoo or the reliability of a hard disk. Faced with a choice between two apparently identical products, the consumer would only have a 50 percent chance to pick the one that incorporates the desired unobservable features. On the supply side, it would not be profitable for firms to incur higher costs for (unobservable) quality improvements if these could not be signalled to the prospective buyers to justify a higher sale price. In a market with information asymmetries, without a collective enforcement of trademark rights, there would be no incentive for quality improvements, the level of average quality would drop, and, at the extreme, the market for high-quality products would disappear. If the buyer does not know the quality level of the product she is about to purchase, but only the distribution of quality in the whole market, she will only be willing to pay the price of the average-quality product. Expecting to be offered only the price of an average-quality product, the sellers of above-average quality

products will soon drop off that market. If buyers are rational and anticipate this move from the sellers of high-quality products, they may offer to pay an even lower price to the remaining producers, which induces further exit from the group of producers of above-average quality goods. This continues until high-quality goods are driven out of the market and only the lowest quality good remains (Akerlof, 1970). It follows that, by protecting trademark rights, public authorities secure the existence of markets for high-quality goods, through the reduction of information asymmetries between sellers and buyers. Trademark protection both helps reduce search costs for consumers and induces increase of quality standards for firms. By limiting the use of a certain name to a particular firm, trademark registration allows built-up of brand reputation. The brand with accumulated reputation is then easily distinguished from other products. This distinction reduces the incentives for companies with hit-and-run strategies to enter the market. Enforcement of trademarks will reward firms that have a long-term business horizon, and care about establishing reputation.²

A potential problem with trademark protection – as with any regulatory instrument – is that it may be subject to political capture. By allowing certain firms to register their trademarks and not others, or by applying different standards to the enforcement of trademark legislation, an important commercial advantage can be granted to some firms. This paper explores the extent to which trademark registration discriminates against foreign firms – by not granting (or delaying) their trademark registration – becoming an additional weapon in the protectionist arsenal.³ By not granting (or delaying) trademark registration to foreign producers, the trademark office can effectively shift profits from foreign to home producers. The incentives to do so are explored in a situation with one domestic firm and a number of foreign firms operating in the home market. The results suggest that the government of the home country will have stronger incentives to discriminate against products similar in quality to the ones produced by the domestic firm. The idea is that by not granting registration to products of relatively similar quality the government is able to shift profits to domestic firms without excessively hurting consumers.

The empirical part of this paper focuses on four developing countries, where a majority

of trademarks are held by non-resident firms (the reverse is true in high-income countries; see Baroncelli, Fink and Javorcik, 2005). The four countries are China, Hong Kong, India and South Africa.

2 Trademark Protectionism: *Prima-facie* Evidence

To assess the degree of discrimination against foreign applications in the area of trademark registration, we constructed the following indicator of discrimination against foreign firms, $d_{c,i}$, located in country c and industry i trying to register a trademark in the domestic market:

$$d_{i,c} = \frac{r_i^H / a_i^H}{r_{i,c}^F / a_{i,c}^F} \quad (1)$$

where r_i^H is the number of trademarks registrations processed by the national trademarks office in the name of residents (home producers) in sector i ; a_i^H is the number of trademarks applications filed directly with the national trademarks offices in the name of residents (home producers) in sector i ; $r_{i,c}^F$ is the number of trademark registrations in sector i received by national trademarks offices in the name of non-residents from country c plus designations under either the Madrid Agreement or the Madrid Protocol (“which have not been the subject of a refusal of protection or which are no longer open to such refusal”); and $a_{i,c}^F$ is the number of applications filed in sector i directly with the national trademarks office in the name of non-residents from country c plus the number of trademarks designations under the Madrid Agreement or Protocol.⁴

Our indicator is used as a proxy measure of the rate of transformation of domestic applications into valid registrations, compared to the same ratio when the applicant is a foreign individual or a foreign company (either a person that is not resident within the territorial jurisdiction of the reporting country – hereafter referred to as “destination” – or a company that has not been incorporated in the same territorial jurisdiction).⁵ Values greater than one indicate that the rate of transformation is higher for domestic applicants and that discrimination against foreign applicants may be present. A high variation in this ratio across industries (even though values may be smaller than one) can also reflect

discrimination in some sectors against foreign producers.

In China and Hong Kong, for example, the manufacturing average ratio d is around 0.8 and 0.7 respectively⁶. All manufacturing sectors had an average d below 1, suggesting that there is no evidence of discrimination against foreign firms trying to register their trademarks. On the other hand in India and South Africa, the manufacturing average ratio d is 1.3 and 1.5 respectively, suggesting that discrimination against foreign firms may be present, as on average domestic applications are more likely to end up in registration.

There are 24 manufacturing sectors in South Africa that had a discrimination indicator d above 1, and 20 sectors in India out of potentially 34 manufacturing sectors in WIPO's NICE classification.⁷ The discrimination indicator reached values above 2 for 4 manufacturing sectors in South Africa and 6 in India. The four sectors in which South Africa seems *a priori* to discriminate the most against foreign firms in terms of trademark registration are: ropes and strings (with $d = 3.5$), varnishes sector ($d = 2.6$), agriculture products n.e.c. (including processed food, $d = 2.2$), and furniture and mirrors ($d = 2.0$). Other sectors with a value of the discrimination index above 1 include musical instruments, common metals, hand tools and implements, vehicles, building material, textile, clothing and footwear, meat fish and poultry, coffee, tea and cocoa, beers and soft drinks, alcoholic beverages, and tobacco. The six sectors where the discrimination index takes values above 2 in India are: firearms and ammunitions ($d = 4.9$), meat and fish products ($d = 3.3$), lace and embroidery ($d = 2.9$), leather ($d = 2.4$), hand tools and implements ($d = 2.3$), carpets and mats ($d = 2.0$). Other sectors with a value for the discrimination index above 1 in India include: household and kitchen utensils, paints and varnishes, games and playthings, agricultural and horticultural products n.e.c., coffee and tea, precious metals, common metals, textiles, bleaching preparations, and apparatus for lighting.

There is also a significant variation in terms of discrimination across foreign source countries applying for trademark registration in all four destination countries (see Figures 1 to 4). In China, Argentina, Greece and Israel face a discrimination index above 1.5, indicating that the ratio of registration to applications is approximately 50 percent higher for domestic applicants than for applicants from any of these countries. In Hong Kong,

applicants from Portugal and Russian Federation face an average discrimination ratio above 1.5. In India, Austria, Belgium, Canada, China, Finland and the Russian Federation are the countries with discrimination ratio above 1.5. Finally, in South Africa applicants from Argentina, China, Finland, Hungary, India, Korea, Luxembourg, Netherlands, Portugal face a discrimination index above 1.5.

Thus, there seems to be *prima-facie* evidence that there is some degree of discrimination in the registration process against foreign applicants in the four countries under examination. However, two points need to be raised. First, a value of the average discrimination index below 1 does not mean there is no discrimination to be detected at all. For example, if foreign firms were to have a better (less costly) application technology, discrimination against foreign firms would be consistent with a value of d below 1. The cross-industry and cross-country variation in the registration discrimination index, d , could provide important information that could help us identify the presence or absence of discrimination against foreign trademark applicants regardless of the average discrimination index. This is the approach followed in the next section, where we provide an analytical framework which allows us to identify incentives to discriminate against different country/sectors. Moreover, the absence of discrimination in the registration process tell us very little about overall discrimination in trademark regulation. The crucial source of discrimination could be present at the level of enforcement of the trademark rights rather than at the stage of registration. For instance, the fact that China seems to exhibit no discrimination in the registration process is perfectly consistent with discrimination at the stage of enforcement of trademark rights. Unfortunately, we have no data on enforcement and therefore a complete exercise is not possible.

Second, one may wonder how countries can discriminate against foreign applicants if different conventions and international agreements prevent them from doing so.⁸ A possible answer is the excess discretion granted to trademark offices or the lack of clear rules for the adjudication of trademarks. For example, the Chinese Trademark Law of 1983 (amended in 1993) and the Implementing regulations set very few deadlines for either the Trademark Office or the Trade Review and Adjudication Board to give feedback to private entities.

For example, after being notified of a refusal by the Trademark Office on grounds of non conformity, such as identity or similarity with another (national) registered or preliminary approved trademark, the (foreign) applicant has 15 days to apply to the Trademark Review and Adjudication Board for a review. No deadlines are set either in the law (Art. 21) or in the Implementation regulations (Rules 16 and 17) concerning when the Trademark Office or the Board need to notify the applicant.

India had no provisions for well-known marks until the new Trademark Act was passed in 1999. This implies that owners of well-known foreign marks had no guarantee of having their rights enforced under the Trade and Merchandise Act of 1958.⁹ Note that the data presented above and used in the empirical section are for the period 1994-1998 (see the Appendix B) and therefore correspond to regulations under the old trademark law. Another problem of the old law that has now been remedied is the absence of an Appellate Board. However, the extent of discretion granted to the Trademark Registrar continues to be noticeable in a few areas. For example, regarding the examination of applications, Section 4 of Article 18 of the Indian 1999 Trademark Act states that the Registrar is entitled to refuse an application or to subject its validity to compliance of amendments, modifications, conditions or limitation “if any, as he may think fit”. The new law also contains some regulations that discriminate against foreigners when it comes to opposition to an advertised application. Article 21 grants discretion to the Registrar to ask for a security deposit to be provided in case the opponent to the application is a foreign individual or a foreign firm that neither resides nor carries its business within the territory of India. The law does not provide for any specific sum or range of payment, so the discretion retained by the Registrar seems unlimited, as is the scope of deterrence against a foreigner willing to secure her trademark rights in India.

3 Trademark protectionism: an analytical setup

This section develops an analytical model to explain discrimination in trademark registration against foreign firms. Some simplifying assumptions regarding firm behavior are made in order to focus entirely on the government’s decision to use trademark protection as a

tool for shifting profits from foreign to domestic firms, without explicitly modeling strategic interaction among firms. In Appendix A we relax some of these assumptions, by modeling firms' interaction explicitly, showing how this alters the results regarding discrimination in the registration process.

We analyze a model of a vertically differentiated product with internationally segmented markets. The good is produced by a domestic firm which competes with a number of foreign producers in the domestic market (one from each country). There is a unique level of quality q corresponding to each firm, such that $q_{low} < q_1 \dots \leq q_d \leq \dots \leq q_{high}$, where q_{low} is the lowest available quality, q_{high} is the highest quality and q_d is the quality of the domestically produced good.

Quality is not observable *ex-ante* by consumers which differ in their marginal valuation of quality, denoted by a continuous and uniformly distributed variable $\theta \in [0, 1]$. Each consumer buys 1 unit of the good at the most, choosing the quality level that provides the highest net utility which is defined as:

$$U(\theta, q) = \theta q - p(q) \tag{2}$$

where $p(q)$ is the price of the good. Price is increasing and convex in q . Consumers maximize their net utility given expected quality and their marginal valuation of quality. Consumers with higher θ choose higher quality goods.¹⁰ Consumers with $\theta \in [0, \frac{p(q_{low})}{q_{low}}]$ do not purchase at all since it would give them negative net utility and the remaining consumers chose the quality level of the good according to their θ .

In the absence of registered trademarks, consumers cannot observe the actual quality level of the good. If the only registered trademark is the domestic one, all foreign brands except the generic one with quality level q_{low} disappear from the market consistent with the standard Lemons problem, as discussed in the introduction. The authorization to register only the domestic good effectively cuts the market into three segments: consumers that value high quality will buy the domestic brand and the remaining consumers will either buy the generic (no trademark) foreign product or will not purchase the good at all. This can be seen by focusing on a simplified consumer problem with one registered trademark

(domestic). Consumer's problem becomes:

$$\text{Max}\{\theta q_d - p(q_d), \theta q_{low} - p(q_{low}), 0\} \quad (3)$$

Consumers will prefer to buy the domestic brand if and only if:

$$\theta \geq \frac{p(q_d) - p(q_{low})}{q_d - q_{low}} \quad (4)$$

Denote the critical level of willingness to pay for the domestic quality $\theta^* = \frac{p(q_d) - p(q_{low})}{q_d - q_{low}}$. In the absence of registered foreign trademarks the market share of the domestic firm is $1 - \theta^*$.

Allowing foreign firms to register trademarks reduces the informational asymmetry between producers and consumers, giving the latter more options to choose from. The market becomes segmented corresponding to the number of brands registered on the domestic market. Figure 5 illustrates the consumer's optimal choice depending on her θ . Each curve represents the net utility level associated with a certain quality level. If all foreign firms are allowed to register their trademark products of quality levels q_1 and q_{high} , only consumers with $\theta_1 \leq \theta \leq \theta_2$ consume the domestic brand. If, on the other hand, goods of quality q_1 and q_{high} are not registered trademarks, so that only the domestic brand and the generic good are available, any consumer with $\theta \geq \theta^*$ will purchase the domestic brand, significantly increasing the market share of the domestic firm and its profits.

Discriminating against foreign firms can be optimal from a welfare perspective in the same way as in a world with imperfect competition, positive tariffs may be optimal because they shift profits away from foreign firms to domestic firms. Thus, the profit-shifting argument is present in this setup and can justify the use of discrimination towards foreign firms, which leads to an increase in domestic firms' market share and profits. However, as it can be seen in Figure 5, consumers lose from discrimination, since there are fewer choices available. The loss of consumer surplus from discrimination against country 1 is illustrated by the shaded area in Figure 5.

We assume that quality distribution is exogenous and that quality differentials are

constant throughout the entire quality range, such that $q_2 - q_1 = q_3 - q_2 = \dots q_n - q_{n-1} = \Delta > 0$, which significantly simplifies the derivation of welfare changes induced by trademarks discrimination. Assuming endogenous quality makes the problem analytically intractable once we allow for more than two quality levels (and we need at least four to illustrate discrimination *vis-à-vis* countries with different quality levels).¹¹

Producers face the same variable costs which are quadratic in quality, $c(q) = q^2$. In order to further abstract from strategic interactions among firms, we assume that each producer earns the same per unit profit π .¹² Thus, prices received by producers are predetermined by the quality level and equal $p(q) = c(q) + \pi$. Total profits equal $\Pi_i = \pi D_i$, where D_i is the demand for the good produced by firm i .

The government agency (the Trademarks Office) has perfect information about the quality levels of the goods originating in each country and controls trademark registration. This is not a completely unreasonable assumption - trademarks authorities are more likely to be better informed than consumers about quality levels of the goods, given that the applications for trademark registration that they receive convey certain information about the products and the firms. It is not unusual that the same officials who deal with intellectual property rights (including trademarks) also handle matters of industrial property protection (such as firm registration). Thus, the authorities' insight about the products of particular manufacturers would normally be superior to that of the consumers'. Moreover, if the country is a party to the Madrid System, trademarks officials have access to additional information available through the WIPO Registry in Geneva.

The government maximizes social welfare, which is the sum of domestic profits and consumer surplus:¹³

$$W = \Pi + CS \tag{5}$$

The government maximizes W by choosing which firms are permitted to register trademarks. Note that by changing the variety of the registered foreign goods available to the domestic consumers through trademark protection, the government affects the market shares of all firms.

Consider a situation where the domestic good is of the lowest quality, as depicted in Figure 6. First note that if all trademarks are registered initially, there is no point in cancelling trademark registration of a foreign firm that produces a much higher quality good than domestic firms. In terms of Figure 6, removing trademark registration for q_3 or q_2 when q_1 is present has no impact on the market share of the domestic firm, which continues to sell to consumers with $\frac{pd}{qd} \leq \theta \leq \theta_1$. At the same time, disappearance of these brands unambiguously reduces consumer welfare, since those who previously bought these goods are now left with fewer options to choose from. Total welfare is therefore reduced as a result of the disappearance of these brands. Discriminating against country 1, on the other hand, increases the market share and the total profits of the domestic firm. Although consumers lose in this case as well, total welfare may increase as a result of discrimination. In the following we examine the conditions for positive welfare change brought by discrimination against the closest competitor.

Starting from a situation when all countries are allowed to register their trademarks on the domestic market, it is welfare-improving to discriminate against q_1 if and only if the extra profits created exceed the welfare losses to consumers. The change in consumer surplus when q_1 disappears from the market equals

$$\delta CS_1 = - \left[\int_{\theta_1}^{\theta_3} U(\theta, q_1) d\theta - \left(\int_{\theta_1}^{\theta_2} U(\theta, q_d) d\theta + \int_{\theta_2}^{\theta_3} U(\theta, q_2) d\theta \right) \right] \quad (6)$$

Since $\int U(\theta, q) d\theta = \frac{1}{2}\theta^2 q - \theta p(q)$ and the limits (as depicted in Figure 6) are $\theta_1 = \frac{p(q_1) - p(q_d)}{\Delta}$, $\theta_2 = \frac{p(q_2) - p(q_d)}{2\Delta}$ and $\theta_3 = \frac{p(q_2) - p(q_1)}{\Delta}$ the expression simplifies to

$$\delta CS_1 = -\Delta^3 \quad (7)$$

Thus, consumers unambiguously lose from discrimination against country 1. Note that $\theta_1 < \theta_2 < \theta_3$ is insured by strict convexity of $p(q)$, which implies $\frac{1}{2}p(q_d) + \frac{1}{2}p(q_2) > p(q_1)$.

The change in the domestic firm's profits is

$$\delta\Pi_1 = \pi(\theta_2 - \theta_1) = \pi\Delta \quad (8)$$

Hence,

$$\delta W_1 = \Delta(\pi - \Delta^2)$$

The government decides to discriminate against country 1 only if $\Delta W_1 > 0$, which requires $\pi > \Delta^2$. Assuming that π is high enough to induce discrimination, the government does not allow q_1 to be registered and the good disappears from the market. The next step for the government is to decide whether discriminative action against country 2 should take place. In this case the change in consumer surplus is

$$\delta CS_2 = - \left[\int_{\theta_2}^{\theta_5} U(\theta, q_2) d\theta - \left(\int_{\theta_2}^{\theta_4} U(\theta, q_d) d\theta + \int_{\theta_4}^{\theta_5} U(\theta, q_3) d\theta \right) \right] \quad (9)$$

where $\theta_4 = \frac{p(q_3) - p(q_d)}{3\Delta}$ and $\theta_5 = \frac{p(q_3) - p(q_2)}{\Delta}$. Integrating and substituting θ_2, θ_4 and θ_5 in (9) simplifies the expression to

$$\delta CS_2 = -3\Delta^3 \quad (10)$$

The domestic firm gains additional market share $\theta_4 - \theta_2$ and the additional profits are the same as in the previous stage:

$$\delta\Pi_2 = \pi(\theta_4 - \theta_2) = \pi\Delta$$

The change in the total welfare from discrimination against q_2 is then

$$\delta W_2 = \delta\Pi_2 + \delta CS_2 = \pi\Delta - 3\Delta^3 = \Delta(\pi - 3\Delta^2) \quad (11)$$

The marginal increment in profits is constant as one discriminates against foreign firms located further away in quality space, while the marginal loss in consumer surplus increases with the quality distance between domestic and foreign firms. Thus, the change in social

welfare decreases as governments discriminate against foreign firms that manufacture goods of very different quality than those domestically produced:

$$\delta W_1 - \delta W_2 = 2\Delta^2 \tag{12}$$

Since we assumed $\Delta > 0$, the expression is strictly positive, implying that the change in welfare becomes smaller as the government moves from discriminating against country 1 to discriminating against country 2 as well. Note that it now requires $\pi > 3\Delta^2$ to discriminate. While any $\pi \in [\Delta^2, 3\Delta^2]$ would induce discrimination against country 1 ($\delta W_1 \geq 0$), further discrimination would leave the country worse off ($\delta W_2 \leq 0$). With $\pi > 3\Delta^2$ the government will chose to discriminate in both cases, but the welfare increase is smaller in the second stage. Note that welfare changes do not depend on the value of q_d , but only on the quality gap. The relative magnitudes of the welfare changes associated with discrimination against countries 1 and 2 for different values of π and for quality gap $\Delta = 0.1$ are illustrated in Figure 7.

Following the same approach, it can be shown that further discrimination (against a hypothetical country 3) will produce a still smaller welfare change. It follows that, if initially it is welfare-improving to discriminate, the incentives to do so diminish as we move further away in quality space. The change in welfare continues to drop as more brands disappear from the market, and it eventually becomes negative, when the loss in consumer welfare outweighs the profits to domestic producers. At this point the trademarks office stops discriminating and allows the higher quality goods to compete with the domestic brand.

It is straightforward to derive similar results for the case when the domestic good is the highest in quality. In this situation the government also first chooses whether to discriminate against the country which is closest in quality to the domestic brand and then whether to discriminate against the next country. The conclusion is the same as before: it may be welfare-improving to discriminate against the closest competitor, but further discrimination would produce smaller welfare gains, which eventually would turn into losses.

Thus, in this simple model a country discriminates against brands that are similar in

quality to the domestic one and allows trademark registration of those that are of a significantly different quality. In other words, if trademark registration is used as a protectionist tool, then discrimination is more likely in the case of foreign firms that produce goods similar in quality to the domestic ones. This will be the basic hypothesis explored in the empirical section of the paper.

4 Trademark Protectionism: Empirical Methodology

To test for the presence of protectionist rationale behind discrimination in trademark registration we explore the correlation between the registration discrimination index developed in section 2 and a proxy for quality differences between domestic and foreign firms. More specifically, for each of the four countries under examination (China, Hong Kong, India and South Africa) we run the following regression:

$$d_{i,c} = \beta_1 \Delta q_{i,c} + \beta_2 m_c + \alpha_i + \epsilon_{i,c} \quad (13)$$

where $d_{i,c}$ is the trademark registration discrimination index in industry i for products originating in country c , $\Delta q_{i,c}$ is the absolute value of the difference in quality in products of industry i produced in country c versus products of the same industry produced in the home country (China, Hong Kong, India or South Africa); α_i is an industry dummy included to capture any industry specific effect (e.g., higher trade protection in a particular industry or better organized lobbies); m_c is the share of imports from country c in total imports of the destination country, and $\epsilon_{i,c}$ is an i.i.d error term. A negative β_1 indicates that as the difference in quality between domestic and foreign products increases, there is less discrimination against foreign firms. This will be consistent with the notion of trademark protectionism explored in the previous section. Import share m_c is included to test whether discrimination is more likely to occur in cases where the exporting country already has a large share of the domestic consumption of foreign goods. This could happen, if we assume that a large import share means that goods imported from that particular country are similar in quality to the domestic goods (based on the Linder hypothesis). A

positive β_2 would then strengthen the argument that discrimination is stronger in the cases of close resemblance between foreign and domestic products.

The quality level of products in a particular industry i is captured by the share of sector i 's exports to the QUAD (Canada, European Union, Japan and the United States) in total industry exports. The difference in quality between products produced in the home country and its trading partners is therefore calculated as $\Delta q_{i,c} = |s_{i,H} - s_{i,c}|$, where $s_{i,c}$ is the share of industry i 's exports to the QUAD in country c 's total exports of i . In the case of QUAD members' exporters, we also include their sales at home in the calculation of $s_{i,c}$. Subscript H stands for the home country (i.e., destination country): China, Hong Kong, India and South Africa. We propose taking the difference rather than the ratio when measuring $\Delta q_{i,c}$ in order to avoid losing observations when exports to the QUAD of country c are equal to zero. Note however that estimates using the ratio are qualitatively identical to the ones reported in Tables 1 and 2.

The basic assumption for using this ratio as an indicator of product similarity is that products consumed in the QUAD are of relatively high quality, as QUAD consumers (i.e., consumers in rich countries) have higher θ s than consumers in the rest of the world. This hypothesis was first put forward by Linder (1961). Fink, Javorcik and Spatareanu (2003) and Hallak (2003) have recently provided some empirical evidence in favor of this assumption using very different approaches. Thus, if two countries have similar export shares to rich countries, then it is likely that the products they manufacture are of similar quality.

Alternatively, the differences in quality levels could be captured by prices (or per unit import values) of the domestic and the imported goods. An important *caveat* is that we would need to compare very specific products. Our trademark protection data, however, are aggregated at the industry levels – we can not calculate discrimination index for each particular good. For example, for each exporting country we have discrimination index for textiles and apparel sector, but comparing the quality of a "representative" good in this sector does not seem feasible, since we can only obtain per unit prices of specific goods, such as men's shirts or T-shirts.

5 Empirical Results

Table 1 shows the results of the estimation of equation (13) using a pool of the four destination countries, with and without industry dummies (α_i), with and without home destination country dummies and with and without aggregate import shares from each source country. All six regressions reported in Table 1 show a negative and significant relation between differences in product quality and discrimination against foreign firms in the trademark registration process. The three last regressions also show that aggregate import shares enter negatively, but insignificantly into the equation explaining discrimination in the trademark registration process. Note that whenever we introduce import-shares we use an instrumental variable estimator to control for the potential endogeneity of bilateral imports to trademark discrimination. We instrument using geography variables (distance, common border and common language) as in Frankel and Romer (1999). Results without the use of instrumental variables are very similar, and qualitatively identical.

Table 2 provides estimates of equation (13) by country for each of our 4 destination countries (China, Hong Kong, India and South Africa), but excluding the aggregate import share variable m_c . Three of the four countries in the sample show again a negative and significant correlation between quality differences and discrimination against foreign firms. The exception is China, where there was initially very little *prima facie* evidence of discrimination against foreign firms. Note that in Hong Kong, whereas *prima facie* evidence was also weak, the econometric evidence suggesting that the trademark registration process can be used as a protectionist device is also very weak. It is negative and statistically significant before we introduce industry dummies, but it turns insignificant after introducing industry dummies. Thus most of the discrimination could be explained for example by industry lobbying (or other variables) rather than quality differences across source countries in a particular industry.

Table 3 adds the (instrumented) import share variable, m_c to the results provided in Table 2.¹⁴ Again our indicator of quality difference, $\Delta q_{i,c}$ is negative and statistically significant in India and South Africa. In Hong Kong and China it is not statistically significant. Note that this does not necessarily imply that there is no discrimination in Hong

Kong and China. As shown in the Appendix, if the weight given to domestic producers in the government's objective function is sufficiently large, then governments will want to discriminate against all qualities, not only those that are similar to the ones that are domestically produced. So one potential explanation of the results in Table 3 (and 2 for that purpose) is that in China and Hong Kong the weight given to domestic producers is sufficiently high, so that it makes sense to discriminate *vis à vis* all qualities and therefore our variable $\Delta q_{i,c}$ cannot capture this. An alternative explanation is that there is no discrimination in the registration process.

However, this second explanation can be challenged by the coefficient of m_c , which is positive and significant in these two countries (China and Hong Kong). This implies that the larger are imports from a particular country, the more likely is that country to be discriminated against, which would also support our theoretical prediction if one assumes that the Linder hypothesis holds (i.e., countries that produce and consume similar products trade significantly with each other). It is insignificant in South Africa, indicating that most of the discrimination is explained by quality differences at the industry/country level. In India, there is evidence of discrimination both at the product level, as captured by $\Delta q_{i,c}$, but also at the more aggregate level, as captured by m_c .

We also performed two robustness checks. First we introduced tariffs as an additional explanatory variable. The coefficient on tariffs is generally negative (except in the case of China), but statistically insignificant. A negative coefficient would suggest substitutability between tariffs and discrimination in the trademark registration process in terms of their protectionist objectives. All other coefficients were qualitatively the same as in Table 3 (and Table 1 for the pooled regression). We also estimated the pooled and country specific regressions using random effects and results were again very similar.¹⁵

6 Concluding Remarks

As traditional trade barriers, such as tariffs and quotas, have been eliminated in the developing world, much of the attention in the policy debate has shifted to the so-called

“behind-the-border” barriers to trade. Although it is difficult to give a comprehensive definition of this concept, one could define it as a set of policies or an institutional setup that explicitly or implicitly discriminates against foreign firms. The barrier explored in this paper is the potential capacity of trademark offices to discriminate against foreign firms in the registration of their trademarks. By not allowing foreign firms to register their trademarks, these institutions can reduce the capacity of the foreign firms to penetrate the home market.

Prima facie evidence for four developing countries suggests that there could be discrimination in the registration process against foreign firms in some of these countries. A simple model is then developed to show that discrimination is more likely to occur when products offered by foreign firms are of similar quality to the ones produced by domestic firms. This implication of the model is then tested for the four countries under examination (China, Hong Kong, India and South Africa). Results are consistent with the alleged trademark protectionism in at least two of the four countries: India and South Africa. It should be kept in mind, however, that the absence of protectionism in the registration process is consistent with the presence of protectionism at the level of enforcement. One potential direction for future research is to explore the extent to which enforcement of trademark legislation can also be used as a protectionist tool, in particular in countries where there is little evidence of discrimination in the registration process.

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Appendix A - The Theory

In this Appendix we investigate how the results presented in Section 3 change when prices of the vertically differentiated goods are endogenously determined. In this setting firms' per unit profits vary with quality levels. The main result in section 3 holds (i.e., governments have incentives to discriminate against foreign applicants with products of quality similar to the domestic firm), but with some qualifications. First, note that once prices and markups are endogenous, it only makes sense to discriminate if the government puts a sufficiently high weight on producer surplus relative to consumer surplus in its objective function (for political economy reasons, for example). Then governments will only discriminate against similar quality products if the weight put on domestic producers is not too high. If the weight is too high, then the government will have incentives to discriminate against all products. Thus, our result in section 3 holds for a range of weights granted to profits in the government's objective function.

We analyze a model with four firms: one domestic and three foreign. The quality levels are still exogenously determined, domestic quality being the lowest, and we maintain the assumption of constant quality differentials, such that $q_1 = q_d + \Delta$, $q_2 = q_d + 2\Delta$ and $q_3 = q_d + 3\Delta$. Variable costs are still quadratic in quality, $c(q) = q^2$. Profits of firm i are then given by

$$\Pi_i = (p_i - q_i)D_i \tag{14}$$

where D_i is the demand for q_i . Given the utility function (2), the range of marginal

valuation of quality $\theta \in [0, 1]$, and absent discrimination by the home country, the market shares of the firms are:

$$D_d = \frac{p_1 q_d - p_d(q_d + \Delta)}{\Delta q_d} \quad (15)$$

$$D_1 = \frac{(p_2 - 2p_1 + p_d)}{\Delta} \quad (16)$$

$$D_2 = \frac{(p_3 - 2p_2 + p_1)}{\Delta} \quad (17)$$

$$D_3 = \frac{(\Delta - p_3 + p_2)}{\Delta} \quad (18)$$

Each firm maximizes its profits with respect to own price, taking the prices of the other firms as given. The Nash equilibrium is then:

$$p_d^* = \frac{q_d(\Delta + 39\Delta^2 + 45q_d^2 + 76\Delta q_d)}{45q_d + 52\Delta} \quad (19)$$

$$p_1^* = \frac{(q_d + \Delta)(2\Delta + 78\Delta^2 + 45q_d^2 + 100\Delta q_d)}{45q_d + 52\Delta} \quad (20)$$

$$p_2^* = \frac{(8\Delta^2 + 208\Delta^3 + 45q_d^3 + 7\Delta q_d + 375\Delta^2 q_d + 220\Delta q_d^2)}{45q_d + 52\Delta} \quad (21)$$

$$p_3^* = \frac{(30\Delta^2 + 338\Delta^3 + 45q_d^3 + 26\Delta q_d + 546\Delta^2 q_d + 271\Delta q_d^2)}{45q_d + 52\Delta} \quad (22)$$

Social welfare is again defined as the sum of domestic profits and consumer surplus, where profits are defined by (14) and consumer surplus is obtained by summing over all consumers:

$$CS = \sum_i \int_{D_i(\theta)} U(\theta, q_i) d\theta \quad (23)$$

Discriminating against country 1 leaves three firms in the market instead of four. The equilibrium prices change, leading to changes in market shares, total profits, consumer surplus and social welfare. Profits of the domestic firm increase and consumer surplus decreases as a result of discrimination.

$$\Pi_1 - \Pi_0 = \frac{1}{2} \Delta \frac{A}{(9q_d + 20\Delta)^2 (45q_d + 52\Delta)^2} \quad (24)$$

$$CS_1 - CS_0 = -\frac{1}{8} \Delta \frac{B}{(9q_d + 20\Delta)^2 (45q_d + 52\Delta)^2} \quad (25)$$

where both A and B are strictly positive.¹⁶ The change in total welfare is

$$W_1 - W_0 = \frac{1}{8} \Delta \frac{4A - B}{(9q_d + 20\Delta)^2 (45q_d + 52\Delta)^2} \quad (26)$$

The expression is strictly negative in the range of parameters that ensures that each firm sells in the no discrimination scenario.¹⁷ Therefore, it is never welfare improving to discriminate even against the closest competitor. This conclusion is different from the one obtained in Section 3 where all prices were predetermined. Note that the welfare change is negative in this particular case where social welfare is a simple sum of producer and consumer welfare. If, on the other hand, profits of the domestic firm weigh more in the social welfare function than consumer surplus, for example due to industry lobbying,

discrimination can occur. In this case the social welfare is defined as:

$$\widetilde{W} = k\Pi + CS \quad (27)$$

where $k \geq 1$. This modification implies that the change in social welfare can be positive (for sufficiently high values of k), which induces trademarks discrimination.

If the government discriminates against country 2 after the good produced by country 1 has disappeared from the market, the domestic firm only competes against country 3. This move further increases the profits of the home firm, while reducing the welfare of the consumers. At $k = 1$ the country on the whole is strictly worse off, but for higher values of k discrimination against country 2 could lead to welfare improvements.

Since the final expressions for $\widetilde{W}_1 - \widetilde{W}_0$ and $\widetilde{W}_2 - \widetilde{W}_1$ are rather long and not easily interpreted, the comparison of their magnitudes is made with the help of simulations. The welfare changes associated with discrimination against country 1 ($\widetilde{W}_1 - \widetilde{W}_0$) and against both countries 1 and 2 ($\widetilde{W}_2 - \widetilde{W}_1$) for a hypothetical case is depicted in Figure 8.

Whether or not the trademarks office decides to discriminate depends on the values of k , q_d and Δ . While at $k = 1$ discrimination always induces loss of social welfare, at higher values of k discrimination may lead to welfare gains. Whether the change in welfare is greater in the first stage (discrimination against country 1 only) or in the second stage (discrimination against both countries 1 and 2) for different values of k depends on the quality of the domestic good and the quality gap. Figure 8 illustrates the case where $q_d = 0.1$ and $\Delta = 0.1$. At $k < 3.7$ no discrimination would occur. If $k \in [3.7, 4.9]$ the welfare change is positive in the first stage, leading to discrimination against country

1, but not in the second stage, meaning that no discrimination action would be taken against country 2. However, for values of k greater than 4.9 the government will choose to discriminate against both countries.

Thus, relaxing the assumption of equal per unit profits for all firms produces a situation where the decision to discriminate depends on the quality differential and on the weight that the government attributes to the welfare of domestic producers.

Appendix B - The Data

The data set used for this study includes trademarks, trade, production and tariff data for four countries (China, Hong Kong, India and South Africa), each of which is considered as the country of registration of brand names, and will hereafter be referred to as “destination”). The data are at the industry level, covering the period from 1994 to 1998. An average for this period is taken for every observation. The reason for this is that the trademark registration process can often take more than one year and we therefore wanted to avoid any biases due to the long delays that registration may often entail. In some of the countries in our sample, the registration process can take easily two to three years. Data on trademarks registrations and applications are disaggregated by country requesting a registration (hereafter referred to as “source”).

The sources of the trademarks data are the CD-ROM version of the 1998 WIPO database on trademarks, and the 2002 World Bank Trademarks Database (Baroncelli, Fink and Smarzynska 2005), also based on WIPO data. The sector disaggregation used here is a combination of the Nice Classification, the system used in both the WIPO and World Bank

sources, and the International Standard Industrial Classification (ISIC) at the three-digit level, in which most of the output and trade data are reported. The final industry classification has 21 sectors. The country source disaggregation is the one provided by WIPO and discussed in Baroncelli, Fink and Smarzynska (2005). There are potentially 40 source countries in WIPO's database; not all 40 countries have positive registration in our 4 destination countries (see Figures 1 to 4 for coverage in terms of source countries in each of our destination countries). The trade, tariff and production data necessary to construct the export shares in the calculation of $\Delta q_{i,c}$ come from the World Bank Trade and Production Database (Nicita and Olarreaga 2001). The data have been integrated with updated data from the United Nations Statistics Comtrade database as well as with the United Nations Industrial Development Organization (UNIDO).

Notes

¹Trademarks are only one among the many tools through which firms can signal their products' quality; others being price and warranties.

²While a thorough analysis of the reasons for and against trademark protection is clearly beyond the scope of this paper, it is worth indicating that the costs of drafting laws, maintaining a trademark register and a registry, along with the administrative and judicial apparatuses necessary to deal with securing and sanctioning trademark rights may not always be offset by the increase in both consumers' and producers' surpluses associated with trademark enforcement.

³Discrimination in the enforcement of trademarks can also potentially be used as a discriminating tool. Note that, by explicitly doing so, the discriminating government would violate its national treatment obligations in Article 2 of the Paris Convention (administered by WIPO) and therefore the WTO's TRIPS agreement. But agreements being incomplete contracts, there may be room for circumventing obligations.

⁴The data on registrations are from Baroncelli, Fink and Javorcik (2005). The data on applications are from WIPO's CD-ROM on trademarks. The Madrid Agreement of 1891 and the Madrid Protocol signed in 1989 and entered into force in 1995 substantially reduce the transaction costs involved in registering trademarks by allowing firms that reside in member states to file a single international application for registration in multiple countries. For more on data sources and construction of variables, see the Appendix B.

⁵One can imagine that foreign firms that are domestically established may also be subject to discrimination, or to less discrimination than an exporter without commercial presence in the host country. This unfortunately cannot be analyzed with the data that is available to us. Applications by domestic residents are likely to include applications of both national and foreign-owned firms based in the host country.

⁶Note that in Hong Kong all services industries have a ratio d above 1, probably indicating discrimination

in sectors where the Hong Kong economy is specialized.

⁷Although we do not have output data available for the NICE classification which includes 34 manufacturing sectors, we do have output data available at the ISIC 3 digit level of the UNIDO classification that includes 29 manufacturing sectors. In all ISIC 3 digit industries, all four countries have positive output.

⁸Note that there is currently a trade dispute in the WTO regarding (potential) discrimination against foreign applicants of trademarks (and geographical indications) regulations for agricultural products and foodstuff in the European Union. The case was brought up by the United States and Australia and other countries have requested to be third parties.

⁹Discretion in the interpretation of the law also explains why two restaurants in South Africa were allowed to use the name “McDonald’s” after McDonald’s corporation missed a deadline to renew its registration in the early 1990s. It took multiple lawsuits and a reversal by the Supreme Court of South Africa of an earlier decision by a lower court to McDonald’s to get the rights to its world famous name (case no. 547/95).

¹⁰Convexity of $p(q)$ insures that the quality chosen is increasing in θ , since the solution to the consumer’s optimization problem is $\theta = p'(q^*)$. It follows that $\frac{\partial q^*}{\partial \theta} = \frac{1}{\frac{\partial \theta}{\partial q^*}} = \frac{1}{p''(q^*)} \geq 0$

¹¹However, it seems that the main analytical result of this paper (“governments will have incentives to discriminate *vis à vis* foreign firms that produce similar products to the ones produced by domestic firms”) will not be affected in a systematic way if we were to endogenize firm quality.

¹²This assumption is relaxed in Appendix A, and the basic result holds with some qualifications.

¹³Note that in this setup with constant marginal costs and no fixed costs, producer surplus and firm’s profits are equal.

¹⁴These estimates may be inefficient if there is collinearity between m_c and $\Delta q_{i,c}$. However the correlation coefficient between these two variables is very low (it varies between 0.01 and 0.1 depending on

the destination country) and the variance inflation factor for these regressions oscillates between 1 and 4 suggesting that multicollinearity is not a problem. This is not necessarily surprising as $\Delta q_{i,c}$ varies by sector and country, whereas m_c varies only by country.

¹⁵Results of these two estimations are available upon request.

¹⁶The final expressions for A and B in terms of q_d and Δ are too long to be reported here, but can be obtained from the authors.

¹⁷The final expression is not presented here due to its complexity. Simulations reveal that for values of q_d and Δ that secure positive demands for all goods in the initial stage the expression is strictly negative. The binding constraint in the situation with no discrimination is $D_3 > 0$, which requires $q_d < \frac{26}{51}$ and $\Delta <$

Table 1. Trademark Protectionism: Pooled results

	(1) ^a	(2) ^a	(3) ^a	(4) ^a	(5) ^a	(6) ^a
Difference in quality ($\Delta q_{i,c}$)	-0.16*** (0.05)	-0.19*** (0.03)	-0.15*** (0.05)	-0.16*** (0.05)	-0.19*** (0.05)	-0.15*** (-0.04)
Import share (m_c)				-0.01 (0.07)	-0.02 (0.08)	-0.05 (0.07)
Constant	-0.06** (0.03)	-0.02 (0.06)	-0.08* (0.05)	-0.05* (0.03)	-0.02 (0.05)	-0.12* (0.07)
Industry dummy	No	Yes	Yes	No	Yes	Yes
Destination country dummy	No	No	Yes	No	No	Yes
R ² -adjusted	0.01	0.02	0.05	0.01	0.02	0.05
# observations	1560	1560	1560	1560	1560	1560

^aThe endogenous variable is given by the registration discrimination index against foreign firms, $d_{i,c}$. All regressions are estimated using ordinary least squares, except for those where m_c enters as an explanatory variable, in which cases we have used instrumental variables to correct for the potential endogeneity bias. Figures in parenthesis are White-robust standard errors. *** stands for significance at the 1 percent level; ** for significance at the 5 percent level, and * for significance at the 10 percent level.

Table 2. Trademark Protectionism by Country

	China ^a	China ^a	Hong Kong ^a	Hong Kong ^a	India ^a	India ^a	South Africa ^a	South Africa ^a
Difference in quality ($\Delta q_{i,c}$)	0.21*	0.04	-0.17**	-0.12	-0.21***	-0.20**	-0.29***	-0.44**
	(0.11)	(0.17)	(0.08)	(0.10)	(0.08)	(0.09)	(0.10)	(0.13)
Constant	-0.29***	-0.26***	-0.13***	-0.29***	0.02	0.09	0.15***	0.25***
	(0.05)	(0.18)	(0.04)	(0.15)	(0.03)	(0.07)	(0.05)	(0.08)
Industry dummy	No	Yes	No	Yes	No	Yes	No	Yes
R ² -adjusted	0.01	0.05	0.01	0.10	0.02	0.12	0.01	0.08
# observations	421	421	407	407	361	361	371	371

^aThe endogenous variable is given by the registration discrimination index against foreign firms in each of the four countries, $d_{i,c}$. All regressions are estimated using ordinary least squares. Figures in parenthesis are White-robust standard errors. *** stands for significance at the 1 percent level; ** for significance at the 5 percent level, and * for significance at the 10 percent level.

Table 3. Trademark Protectionism by Country: does import volume matter?

	China ^a	Hong Kong ^a	India ^a	South Africa ^a
Difference in quality ($\Delta q_{i,c}$)	0.02 (0.17)	-0.03 (0.12)	-0.31*** (0.11)	-0.44*** (0.07)
Import share (m_c)	0.41*** (0.13)	0.14*** (0.04)	0.74*** (0.29)	0.54 (0.41)
Constant	-0.24 (0.16)	-0.39** (0.17)	0.08 (0.08)	0.38*** (0.13)
Industry dummy	Yes	Yes	Yes	Yes
R ² -adjusted	0.06	0.10	0.12	0.08
# observations	421	407	361	371

^aThe endogenous variable is given by the registration discrimination index against foreign firms in each of the four countries, $d_{i,c}$. All regressions are estimated instrumental variables to correct for the potential endogeneity bias of m_c . Figures in parenthesis are White-robust standard errors. *** stands for significance at the 1 percent level; ** for significance at the 5 percent level, and * for significance at the 10 percent level.