Geographical Indications and The Trade Related Property Rights Agreement: A Case Study of Basmati Rice Exports

Kranti Mulik
Graduate Student
333B Waters Hall
Department of Agricultural Economics
Kansas State University
Manhattan, Kansas 66506
email: kmulik@agecon.ksu.edu

John M. Crespi
Assistant Professor
342 Waters Hall
Department of Agricultural Economics
Kansas State University
Manhattan, Kansas 66506

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Abstract

The recent controversy over the granting of patenting rights to three new strains of Basmati rice by the US Patent and Trademark Office is used as a case study to analyze the impact of incomplete protection of intellectual property. Results suggest that there is evidence that the introduction of a competing product that may infringe on India's geographical indicator has harmed Indian producers in key export markets.

1. Introduction.

The Trade Related Property Rights (TRIPS) agreement which seeks to harmonize global intellectual property laws has been a major factor in strengthening worldwide property rights systems. However, since its formulation, the TRIPS agreement has been the subject of considerable controversy and a source of concern among developing nations that feel it favors developed countries. Particularly, the protection of traditional knowledge has been a cause of debate over the granting of property rights to firms for minor alterations of traditional practices or varieties. Geographical indications are one aspect of intellectual property that may afford protection to traditional knowledge without conferring absolute power to any one individual. Yet, many developing countries have failed to take advantage of this form of protection, and, argue that the current TRIPS act does not go far enough to protect traditional products. This has led to instances of "biopiracy," at least alleged by developing countries.

Though there has been a lot of speculation on the impact of TRIPS and the strengthening of the Intellectual Property Rights (IPR) system in developing countries, there is still a dearth of empirical studies on the actual impact of ineffectual IPRs. The recent controversy over the granting of patenting rights to three new strains of Basmati rice to RiceTec, Inc. by the US Patent and Trademark Office provides a good case study. India and Pakistan argue that the US Patent office's granting of a patent to RiceTec on a variant of Basmati severely harmed their export markets. Basmati is a long-grained rice that has been grown in the Himalayan foothills of northwest India and Pakistan for centuries and is a major source of export revenue. In this study, export trade in Basmati rice is used as an example to determine the impact of inadequate protection of intellectual

property. Thus the main objective of this paper is to determine how much, if at all, the introduction of RiceTec's Basmati variety harmed India's export markets. While data limitations impacted the empirical analysis, we do feel that enough evidence is provided to caution nations to move more quickly to institute policies such as geographical indications and that there may be a need to make these indications more specific in future trade talks in order to protect traditional varieties.

The paper is organized as follows. Section two discusses the TRIPS regulations pertaining to geographical indications and details the recent controversy surrounding the granting of a patent to RiceTec, Inc. Section three provides a brief description of the Basmati rice industry in India. Section four outlines the theoretical and empirical model specification and the data used in this study. Section five presents the results, with conclusions and implications discussed in section six.

2. Background on Geographical Indications and the Trade Related Property Rights Agreement (TRIPS).

The TRIPS agreement which seeks global harmonization of IP laws came into effect in 1995. All countries which are members of the World Trade Organization (WTO) are required to follow the TRIPS guidelines to adopt common global laws for protection of intellectual property or face the risk of trade sanctions (WTO, 2004). Developing countries often argue that the TRIPS agreement hampers protection of traditional knowledge something which is an integral part of the agricultural economies of many countries. The focus of developing countries has largely been patents, the more popular form of protection, which they feel is not suitable for protection of traditional knowledge,

as patents grant power to one person. Other forms of protection of intellectual property such as trademarks and in particular geographical indications (GI) have been largely ignored. In this section, we first look at some of the features of GI that facilitate protection of traditional knowledge. Afterward, we discuss how protections via GI could have ameliorated the controversy surrounding the Basmati rice patent granted to RiceTec Inc.

According to TRIPS, geographical indications are defined as "indications which identify a good as originating in the territory of a member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin" (Article 22(1)). The main advantage of giving producers rights to the regional names of their products is that it prevents consumers from being misled by products having similar names but are in fact imitations (Moran, 1993).

Article 23 of the TRIPS Agreement provides additional protection, but only to wines and spirits. Article 23.1 states that wine and spirit producers may not mislead consumers as to the geographical origin or the production style of the product. Also, this section prohibits use of the terms "kind," "type," "style," and "imitation" (i.e. "this product is a type of Scotch Whiskey") in order to prevent other producers producing similar products from exploiting the reputation built by producers whose products are protected under this act. The, additional protection offered to wines to spirits and other commodities, is a bone of contention among many countries. Negotiations are currently underway to extend article 23 in order to provide additional protection to other commodities (WTO, The TRIPS Agreement, 2004).

Article 24 states some exceptions under which geographical indications do not

hold. If a name associated with a particular geographic origin has become "generic", that is, it is associated with a number of products then the particular name can be used outside of the geographical origin, even if the name was originally used to denote a product of that region Two examples are cheddar cheese and Dijon mustard. Article 24 of TRIPS also states that "there will be no obligation under this agreement to protect geographical indications which are not or cease to be protected in their country of origin." (WTO, The Trips Agreement,2004) . Thus, nations using GI must protect their products through their own legislation, otherwise the name will be, essentially, up for grabs. This fact is of importance to the present study because India's legislature, in fact, moved very slowly to extend GI protection to its agricultural products such as Basmati.

Basmati Rice Patent (US patent # 5663484):

Basmati which means the "perfumed one" is a high-quality, long-grain, semi-dwarf rice that has been grown in the foothills of the Himalayas for thousands of years. Basmati rice requires deep fertile soil, cool climate and a short photoperiod. Therefore it is difficult to grow Basmati rice for commercial purposes in other areas. Nonetheles, a Texas rice development company, RiceTec, began producing and exporting a Basmati-type rice it called "Texmati" in 1985, long before TRIPS. After TRIPS came about, RiceTec sought to obtain a patent on its rice. On September 2, 1997, RiceTec did obtain a patent titled "Basmati rice lines and grains" on the basis of 20 claims made by the company in its patent application to the United States Patent and Trademark Office (USPTO). The patent was for novel rice lines, methods used to make the different varieties and determine the rice quality. Claims 1-14 of the patent pertained to the

general characteristics of rice grown in North America, South America, Central America and the Caribbean. Claims 15 to 17 were for rice grains without any limit to geographical indication. Claims 18 to 20 pertained to the specific methods used by RiceTec to develop the rice lines. All 20 claims made related to cross-bred rice lines and grain developed by RiceTec. Of the 20 specific claims made by RiceTec, claims 15 to 17 seemed especially harmful to the Indian export market since they pertained to particular characteristics of Basmati grain. In these claims RiceTec included a claim to 90 percent of rice's germplasm as well as traditional varieties like Bas 370, Taraori, and Basmati Karnal cultivated in India.[1]

RiceTec's claims, nonetheless, were in fact typical characteristics of Basmati rice. In fact, the 2-acetyl-1-pyrroline content compound (see footnote 1) is what gives Basmati rice its distinct aromatic scent. Based on the patent granted to RiceTec by the USPTO, RiceTec applied for the registration of the trademark "Texmati" with the U.K Trademark Registry in 1997. In April 2000, officials of the Indian Agricultural and Processed Food Products Export Development Authority (APEDA), a body established for development of agricultural commodities and furthering their exports, filed an application with the USPTSO to reexamine the Basmati patent, specifically claims 15 through 17. It took APEDA over two years to gather the data to challenge the claim due to the intricacies of RiceTec's claims (Nilacharal 2001; US Patent no. 5,663,484). Another complication is

[1] Specifically, Claim 15 sought patent status on the following characteristics: a rice grain which has a starch index which ranges from 27 to 35; a 2-acetyl-1-pyrroline content around 150 ppb to 2000 ppb.; length around 6.2mm to 8.0mm, width ranging from 1.6 mm to 1.9mm and a length/width ratio of around 3.5 to 4.5; a whole grain index ranging from 41 to 63; a 75% to 150% increase in the length of the grain when cooked, and a chalk index less than 20.

that under U.S. patent law, a patent can be challenged only after it is granted. Further, challenging an entire patent is complex because if one loses on even one count of the claims in the patent the entire patent can be upheld (Ramchandran, 2000). Soon after APEDA's challenge, RiceTec gave up the right to claim 4 and claims 15 through 17. Even with this concession, however, the USPTO found that the 16 remainder claims were also questionable. Subsequently, RiceTec was issued notice by USPTO on March 27, 2001 that its patent was in jeopardy. RiceTec then withdrew the remainder claims except claims 8, 9, 11, 12 and 13 which pertained to new cross bred lines developed by RiceTec that are not similar to any of the varieties grown in India, although Rice Tec claims that the new rice varieties produce grains "similar or superior to those of good quality Basmati rice" (Nilacharal 2001; US Patent no. 5,663,484).

Thus RiceTec now has a narrow patent on three specific rice varieties developed through the company's own research. However, because it no longer has a patent on Basmati lines, it is now prohibited from used the term "Basmati" in marketing its rice. Nevertheless, the revised patent does not prohibit RiceTec from marketing its rice as similar to Basmati (Damodaran 2001; US Patent no. 5,663,484).

RiceTec markets "Texmati", "Kasmati" and "Jasmati" ("Texmati" and "Kasmati" are marketed as substitutes to Basmati while "Jasmati" is marketed as the American version of Jasmine rice grown in Thailand, which incidentally has a large export market in the US and other countries). Though India was successful in winning the legal battle against RiceTec in the US, it still faces legal battles in about 25 countries for 40 different cases since TRIPS places the onus on the importing nation, not the exporting nation, of deciding whether another nation's geographical indication of its traditional goods is valid.

According to APEDA of India, these cases are varied and the battle ranges over obtaining exclusive control over the Basmati trademark in each country to breach of the geographical indication of Basmati. Countries where legal battles are currently waged are Brazil, Chile, Greece, Britain, South Africa, Jordan, United Arab Emirates, Spain, Turkey, Kuwait and Taiwan. In order to cover the legal costs to fight the cases, the All India Rice Exporters' Association has established a Basmati Development Fund which has been collecting Rs 50/tonne (approx $1.09) for Basmati rice exported from India. India has also obtained the aid of the Trademark Watch Agency to keep a watch on any new trademark applications for Basmati rice or its misleading variations that are filed overseas (Nilacharal, 2001).

Of 40 cases filed, India has been successful in winning 15 cases against countries like Britain, Australia, France, Spain, Chile and UAE. In Spain, APEDA has been successful in obtaining a registered trademark for Basmati rice as aromatic rice produced in the sub-continent, thus deterring non-Indian or Pakistani food companies from using the Basmati brand name. In Brazil, India has been able to overturn an application for using Basmati as a trademark for sweets and condiments. India has also been successful in two other cases against RiceTec in Greece and UK (Nilacharal, 2001). In France a food company "Establissments Haudecoeur La Courneuve" was given two trademarks by the French government to use the name "Basmati", specifically, "Riz Long Basmati" and "Riz Long Basmati Riz du Monde" (The Economic Times, 1998). The Indian government has opposed the trademarks and is awaiting a decision from the French Trademark Office. In Greece, RiceTec filed an application to register "Texmati", "Jasmati" and "Kasmati" as trademarks while in the UK an application was filed to

register “Texmati” as a trademark. India was able to overturn both applications on the grounds that the names were very similar to Basmati rice and therefore very misleading (Nilacharal, 2001).

India could have avoided the legal battle and strengthened Basmati’s position in the global market if it had registered Basmati as a geographical indication earlier, however, this would have required updating its intellectual property laws, a process which has been slow in country without a long history of trademark and patent law. It eventually did so, but by then it came at a cost. Further, a revamped TRIPS agreement that extended article 23 to cover traditional goods, not just wines and spirits, would also have prevented RiceTec from marketing its Kasmati brand rice as “traditional Basmati style” or the Texmati brand as “American Basmati”.

In part because of stories like this, India, Switzerland, EU, Czech Republic, Morocco and others are advocating for stronger and wider protection for agricultural products under Geographical Indications. However the United States, Australia, and New Zealand, who were initially in favor of intellectual property rights and WTO and geographical indications for wines and spirits, are opposed to the widening of Article 23 of the geographical indications to cover other agricultural products that they see as mostly generic (RAFI, 2000). Whether or not to allow imports of products that are labeled in a manner misleading to the general public is a discretion exercised by the individual importing country. For example the UK Grain and Feed Trade Association which is the largest importer of Basmati rice in Europe, specifically states that only long grain rice from India and Pakistan can be labeled as Basmati rice. Saudi Arabia which is the largest importer of Indian Basmati allows only Basmati rice grown in the Indian sub-

continent to be labeled as Basmati rice. Therefore, the Indian Basmati is offered protection in these countries (BRIDGES Weekly Trade News Digest, 1998). The United States, however, merely considers Basmati to be a generic name like durum wheat. The USA Rice Federation (1998) advocates that "the terms basmati and jasmine refer to types or generic classes of aromatic rice and that these terms cover many varieties and broad range of qualities. Additionally, these terms are not restricted to products or varieties produced in any specific country or groups of countries." So far, India cannot obtain a trademark for Basmati in the US (Prakash,1998).

A point to note here is that RiceTec applied for a patent after TRIPS came into force. Prior to TRIPS member countries were not required to provide adopt common global levels of protection for intellectual property. Therefore, there was little India could to obtain GI for Basmati rice in the United Sates.

Another problem relates to the fact that Basmati is not literally associated with a place. For example "Champagne" is named after the champagne region of France where the wine is produced. Also, Basmati exporters and producers do not label the rice so as to link the geographical origin with the product. Most Basmati rice packages usually print only the country of origin on the label (Prakash, 1998).

As stated in article 24, in order for GIs to be protected in other member countries, ,they must be protected under national law in their country of origin, something which India has been very slow to accomplish. Though the Indian government passed the Geographical Indication of Goods (Registration and Protection) Bill in 1999, currently, only Darjeeling tea is protected under this Act. Further, a national registry of the goods offered protection under this Act still needs to be established and the manner in which

protection and registration will be offered is still to be determined (Ramchandran 2000).

Two key points that we wish to analyze from the patent granted to RiceTec, are whether India suffered any losses in its key export market as results of not providing adequate protection to Basmati rice and also to determine whether the extension of article 23 would benefit India in the many legal cases it currently faces worldwide.

3. Basmati Rice Industry in India –Background:

In the Basmati rice market India is the largest producer and exporter (ITCIBD, 2003). Of the total production of Basmati rice almost two-thirds is exported (Bhattacharjee *et al.,* 2002). The total world demand for Basmati rice is around 1.18 million tons and is valued at $700 million (Padmanabhan, 2003). The majority of the exports are to the Middle-East while a small percentage of Basmati is exported to Europe and North-America. Saudi Arabia is the largest importer of Basmati rice (65% of Indian exports), followed by the United Kingdom (15% of Indian exports), Kuwait (10%), U.A.E (5%) and other countries (5%) (ITCIBD, 2003).

The Indian Basmati export market is characterized by a large number of exporters. There are few organized players in the Basmati export market. Of the 600,000 tons of Basmati exported in 1998 the export share of major exporters was individually around 30,000 tones (Damodaran, 2001; Asia Pacific Biotech, 1999). Many small firms accounted for the majority of the Basmati exports. According to the All India Rice Exporters Association there are 134 registered Basmati exporters. Of these the major exporters are KRBL, Amira foods, DD International, SunStar Overseas, Sutnam Overseas and United Exports (Srinivas, 2003). Of these exporters KRBL is the largest exporter of

Basmati rice to the US commanding a market share of 52-53%. According to APEDA (2003), India currently has a 60% share of the Basmati market in the US. This share is expected to increase to 75% during the year 2003. KRBL is also the largest exporter of Basmati rice in India, although its export share is less than 10 percent (Business Line 2002). The goal for the rest of the paper is to establish how much, if at all, the introduction of RiceTec's products have hurt Indian exports and, by association, how India has hurt itself by not advancing its own geographical indication further.

4. Theoretical Framework.

The Lerner index (relative markup of price over marginal cost) defined as $L = (P-MC)/P$ where P is the output price and MC is the marginal cost per unit of output, is conventionally used to measure the degree of market power exercised by a firm in a particular market. However, in practice it is difficult to calculate the Lerner index since it requires data on price, and the marginal cost of every firm selling a similar product in a particular industry. This problem becomes more complex in an international market setting where an exporting country has many firms which export products to many destinations and face different competitors in each destination. Finding price, quantity and cost data for each firm is extremely difficult (Goldberg and Knetter,1999). Therefore, we use the concept of the residual demand curve proposed by Goldberg and Knetter (1999) to determine the impact of the patent granted to RiceTec on India's exports. A residual demand curve shows the relationship between a particular firm's quantity and price while considering supply functions of all other firms in the same market. Thus, a flat residual demand curve indicates that a firm has little control over

prices in the market while a steeper residual demand curve is indicative of the firm's ability to set prices. Using the relationship between the Lerner index and the inverse residual demand elasticity, $L = \frac{P - MC}{P} = \frac{1}{|\varepsilon_d|}$, we can determine the extent of market power enjoyed by a firm. Our simple test of harm to India from an ineffectual protection of intellectual property will be the extent of any change in the export Lerner index after RiceTec entered the market.

A complete analysis of the impact of RiceTec's products on Basmati demand would need a great deal of data to ascertain the two goods' substitutability. Unfortunately, specific firm/variety level data are scarce. Here, we propose a model that will nonetheless allow inference to be drawn based upon aspects of the market that are observable. Thus, the residual demand elasticity obtained will be used to determine whether the Indian Basmati exports enjoy some sort of market power in the various importing countries due to distinctness of the product. If India exercises some degree of market power in the Basmati export market then it might be hurt by the entry of RiceTec in the market unless it maintains the distinct image of Basmati rice through protection via geographical indications. As indicated by Goldberg and Knetter, the benefit of this approach is that it is not necessary to estimate cross price elasticities of demand, marginal costs or conduct parameters which measure market power.

For illustrative purposes, consider the following model where India (I) and other (R) producers who market a competing rice to Basmati are considered. For simplicity of the explication assume these other producers are in a single country like the US. Let P^I be the price of exports from India, $Q^I = \sum_{i=1}^{N} q_i^I$ where q_i^I is the quantity exported by firm *i*

in India, Z is a vector of demand shifters. Similarly P^R is the price of the other rice and Q^R is the quantity. Thus, the residual demands for Indian and other rice are given by:

$$P^I = P^I (Q^I, Q^R, Z) \quad (1)$$

$$P^R = P^R (Q^I, Q^R, Z) \quad (2)$$

where P^I and P^R are measured in the currencies of the importing nation. Both Indian and other producers ship to another destination country. Firm i from India chooses quantity to maximize profits in the destination country. Thus, firm i from India chooses quantity to maximize the profit function:

$$\pi_i^I = P^I . q_i^I - e^I . C^I,$$

where e^I is India's exchange rate and C^I is the cost in Indian currency. Similarly firm i in the other nation will maximize the profit function:

$$\pi_i^R = P^R . q_i^R - e^R . C^R,$$

where e^R is the US exchange rate and C^R is the cost in R's currency. Assuming $\frac{\partial q_i^k}{\partial q_j^l} \neq 0$ (conjectural variation) $i \neq j$; k, l = I, R, then $\forall\ i = 1,\ldots, N$ and $j = 1,\ldots,M$ the i^{th} first-order conditions for the Indian and other firm are as follows:

$$P^I = e^I . MC_i^I - q_i^I \left[\frac{\partial P^I}{\partial Q^I} \left(1 + \sum_{i \neq j}^{N} \frac{\partial q_j^I}{\partial q_i^I} \right) + \frac{\partial P^I}{\partial Q^R} \left(1 + \sum_{i \neq j}^{M} \frac{\partial q_j^R}{\partial q_i^I} \right) \right]$$

$$= e^I . MC_i^I - q_i^I \left[\theta^I + \varphi^I \right] \quad (3)$$

$$P^I = e^R . MC_j^R - q_j^R \left[\frac{\partial P^R}{\partial Q^R} \left(1 + \sum_{i \neq j}^{M} \frac{\partial q_j^R}{\partial q_i^R} \right) + \frac{\partial P^R}{\partial Q^I} \left(1 + \sum_{i \neq j}^{M} \frac{\partial q_j^I}{\partial q_i^R} \right) \right]$$

$$= e^R . MC_j^R - q_j^R \left[\theta^R + \varphi^R \right] \quad (4)$$

In equations (3) and (4), the first term in the brackets (which we denote by θ^k, k=I, R)

represents the competitive behavior of exporters among themselves while the second term (denoted by φ^k) is the interaction between Indian and other exporting firms.

Multiplying equations (3) and (4) by $\sum_{i=1}^{N} s_i^I$ and $\sum_{j=1}^{M} s_j^R$, the summation of the market shares of the individual export firms in each country where $q_i^I = s_i^I Q^I$ and $q_j^R = s_j^R Q^R$, equations (3) and (4) can be rewritten as follows:

$$P^I = e^I MC^I - Q^I \Psi^I \qquad (3')$$

$$P^R = e^R MC^R - Q^R \Psi^R, \qquad (4')$$

where $\psi^k = \theta^k + \varphi^k$. The parameters θ^k and φ^k vary from zero to one, where zero implies that the firms are perfectly competitive (P = MC) while one implies that the firms act collusively. Thus, $\Psi^k \in [0,2]$, since $\theta^k, \varphi^k \in [0,1]$. For simplicity, we assume firm symmetry and discuss reaction functions in terms of how one nation "reacts" to another. Luckily, for our purposes we do not need to estimate Ψ^k to answer the simple question we have posed in this paper. Following Goldberg and Kentter (1999), if we simultaneously solve equations (2) and (4') we can get the other nation's reaction function with respect to India. Thus

$$Q^{R*} = Q^R (e^R, MC^R, \psi^R, Z, Q^I) \qquad (5)$$

From (5) we can now solve for the residual demand for India as follows:

$$P^I = P^I (Q^I, Q^{R*}, Z) = P^{I,RES}(Q^I, e^R, MC^R, Z, \psi^R) \qquad (6)$$

Thus, $P^{I,RES}$ is no longer a function of Q^R. Also e^I and MC^I are the cost shifters for India and can be used as instruments to determine the demand as these are excluded

from residual demand curve.

Empirical Model

Using the methodology described above our estimating equation for the residual demand curve takes the following general linear form:

$$P_m^I = \lambda_m + \eta_m Q_m^I + \alpha_m Z_m + \beta_m W_m^n + D_0 + D_0 \cdot Q_m^I + \varepsilon_m \qquad (7)$$

where the subscript m denotes a specific destination market. P_m^I is the per-unit export price of Indian Basmati, Q_m^I is the quantity of Indian Basmati exports to market m, Z_m is a vector of demand shifters for destination m, W_m^n is vector of cost shifters for the n competitors India has in a particular destination market (but does not include any cost shifters for India) and ε_m is the error term. The dummy variable D_0 measures the shift in demand after RiceTec's entry in 1985, where 1 represents RiceTec's presence and 0 otherwise. Finally, $D_0 Q_m^I$ is an interaction term measuring the change in slope of the demand curve for Indian Basmati after RiceTec's entry.[2] Separate inverse residual demand equations will be specified for the different destinations to which India exports Basmati rice. The vector of cost shifters is comprised of two elements. One element consists of the cost shifters such as wages expressed in the competitor's currency and the second element consists of the exchange rate between the competitor's currency and the specific destination market. As Goldeberg and Knetter note, exchange rates are especially useful in identifying the residual demand curve since they shift the relative costs of different exporting countries. Since, the quantity exported is an endogenous variable, it needs to be instrumented. The appropriate instruments that can be used are cost shifters for India since they are not included in the estimating equation but are correlated with quantity due to the first order condition. Therefore the exchange rate between India and the specific destination country serves as an ideal instrumental variable.

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[2] We also experimented with an additional dummy and interaction variable to measure changes in the slope of the demand curve after the granting of a patent to RiceTec in 1997, but, as the related coefficients were not statistically significant nor did they alter the results in any significant way, we dropped these variables from our model specification to conserve degrees of freedom.

Data Sources

Because of data limitations and the need to find nations that also had a long history of imports of both Indian and RiceTec rice, we chose to examine Indian exports to four countries: the US, Canada, Kuwait and the UK. Data on the quantity and value of Basmati rice exports from India were obtained from *The Foreign Trade Statistics of India*. These publications publish the annual quantity of Basmati rice exports (in MT) and the value (in Rupees) by destination. The sample period for the study was set from 1970-2003. Prior to 1979, *The Foreign Trade Statistics of India* did no have a separate classification for Basmati rice from which to distinguish it from other rice. Therefore, rice under the classification, "rice other than parboiled", is assumed to be Basmati rice. Unfortunately, the publication is available in only a few libraries in the US and none of the libraries had the complete set of volumes from 1970-2003, and at this writing we are still trying to update our data set. For this paper, extrapolations were necessary. Specifically, export data for the years 1977, 1980, 1986, 1994, 1995, 1996 and1997 were incomplete. For the years 1977, 1980 and 1986 data were extrapolated by taking the average of the preceding and the following year. For the years 1994-1997 data for total Basmati exports (quantity and value) were available but not by destination. Thus from the total Basmati exports, data for the four destination countries U.S, U.K, Canada and Kuwait used in this analysis were generated using the average share exported to the respective countries in the previous five years. The percentage of exports going to these countries was then calculated using the total quantity values. This share percentage was used to calculate the export share of the five countries from the total Basmati exports in

the years 1992-1996.

Data on the annual exchange rates, wholesale price indices, wage rates and producer price indices for India and the destination importing countries were obtained from annual volumes of the *International Financial Statistics* over the period 1970-2003.

5. Results and Discussion

Using the empirical methodology specified above, a residual demand curve was estimated for India. A joint estimation for the four destination markets, United States, Canada, Kuwait and United Kingdom was performed using the Three Stage Least Squares (3SLS) approach to account for the endogenous quantity and the contemporaneous correlation between the error terms of the four equations. The dependent variable in all four equations was the per unit export price to the destination market expressed in the destination market currency. The independent variables used were the cost shifters of the competitors, the wholesale price index (wage index was not available) in Pakistan (WPAK) and the wage index in US (WUS). In addition, the exchange rates between the competitors and the destination market (competitor currency per destination market currency) were also used. PAKUS, PAKUK, PAKCA and PAKKU represent the exchange rate between Pakistan and the destination markets US, UK, Canada and Kuwait Similarly, USUK, USCA, USKU are the exchange rates between the United States and the destination markets UK, Canada and Kuwait. Finally, THUS, THUK, THCA and THKU are the exchange rates between Thailand (which produces a competing aromatic, non-Basmati, rice) and the destination markets. The endogenous variables are QUS, QUK, QCA and QKU, which is the quantity (in tons)

exported by India to the destination markets. D0 is the dummy variable which measures the shift in demand after RiceTec's entry in the market, where 1 represents entry of RiceTec's Texmati (from 1985) and 0 otherwise. D0US, D0UK, D0CA and DOKU are the interactions variables between D0 and the quantity exported for US, UK, Canada and Kuwait respectively, which measure the change in the slope of the residual demand curve after Texmati's entry in the market. The instrumental variables used for the endogenous quantity is the wholesale price index for India and exchange rates between India and the four destination markets.

Results for the four destinations markets are reported in Table 1. The R^2 for all four equations ranged from 65% to 80% . The quantity coefficients were negative for all four equations but significant for only UK and Kuwait. Results of particularly interest are for the UK and Kuwait markets, traditionally large importers of Indian Basmati. In the UK equation, the quantity coefficient was negative and significant at the 1% level of significance. The wage rate in the US had the expected positive correlation indicating that an increase in the wage rates in the US raises India's rival's costs allowing India to set a higher export price for Basmati. The coefficient on the exchange rate between the US and UK also had the expected positive sign indicating that an increase in the exchange rate between US and UK increases the US's cost of selling to the UK and thus allowing India to charge a higher export price to the UK. The coefficient on the dummy variable, D0, was also significant at the 1% level as was the coefficient on D0UK. In the Kuwait equation also the coefficient on quantity exported was negative and significant at the 10% level. The coefficient on the dummy variable was also significant at the 10% level, indicating that there was a shift in demand after the entry of RiceTec.

The Lerner indices are reported in Table 2. The lack of market power that India has in the US and Canadian markets is reflective of the fact that India's Basmati rice exports to these countries have been relatively minor in terms of world trade, increasing only in the last few years (the coefficients on QUS and QCA incidentally were not significant). Of particular interest are the Lerner indices in the UK and Kuwaiti markets where both Indian and RiceTec exports are substantial. The Lerner index is 27% in the UK market and 14% in Kuwait. After the entry of RiceTec, these indices drop to 19% in the UK market and 5% in the Kuwaiti market. The decline in the Lerner indices after RiceTec's entry is consistent with the story that India was not able to maintain the distinct image of Basmati in the world market.

6. Conclusion and Implications

Different forms of intellectual property rights protection such as trademarks, geographical indications and patents have been around for a long time. But unlike industrialized countries that have a long history of protecting their intellectual property, the legal protection of intellectual property is still relatively new to developing countries. In developing markets, much emphasis has been placed on reducing tariffs and quotas with relatively less attention paid to strengthening their intellectual property right system. With the advent of TRIPS all developing countries are required to strengthen their IPR system. Yet, many developing countries have failed to take much action in this regard as we have seen in the case of India.

We examined the impact of incomplete protection of intellectual property by using the recent controversy regarding Basmati rice as an example. Our analysis indicates

that of the four markets studies, the residual demand elasticites for Basmati rice in the UK and Kuwait fell after the entry of a competitor, RiceTec, who might not have been able to compete had India been proactive in trademarkking its Basmati variety or had TRIPS been more encompassing of traditional commodities as some nations wish. While further analysis is warranted because of our current, incomplete data set, our findings are consistent with the impact of a substitute good in a differentiated products market. In other words, our findings support India's claim that Indian Basmati is losing its distinct image in certain export markets. While the share of RiceTec's products are is still small in the world Basmati market, the future of Indian Basmati rice exports will depend largely on how effectively RiceTec is able to market its rice as well as how successfully India preserves the distinct image of Basmati rice.

Further, the TRIPS agreement pertaining to GI does not offer equal protection to other commodities as it does to wines and spirits. As increasing number of countries are involved in similar controversies surrounding protecting their traditional commodities (e.g Jasmine rice in Thailand or Parmesan cheese in Italy), it is perhaps essential to revisit the TRIPS agreement and extend section 23 of the geographical indications to offer additional protection to agricultural commodities. At the same time, for developing countries to be competitive in the international market, it is as important for them to strengthen their intellectual property system as it is to open their markets. Without proper national legislation governing intellectual property, TRIPS as it is currently written is not of much help. In the case of India, at the very least, it could have avoided the time and money spent in the legal battles around the world had it improved its intellectual property system or had TRIPS been more encompassing.

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Table 1: 3SLS Estimates for Indian Basmati Rice exports to the US, UK, Canada and Kuwait
Dependant Variables: Export Price of Indian Basmati Rice Exports in Destination Currency

Variable	United States	United Kingdom	Canada	Kuwait
Constant	76.77***	4.76	-4.57	118.56
	(22.87)	(3.66)	(10.60)	(80.34)
QUS	-0.0024			
	(0.0008)			
QUK		-0.0004***		
		(0.0006)		
QCA			-0.0025	
			(0.0027)	
QKU				-0.0015*
				(0.0008)
PAKUS	-52.45			
	(56.54)			
PAKUK		56.27		
		(55.16)		
PAKCA			13.13	
			(45.19)	
PAKKU				-294.04
				(735.29)
THUS	570.77			
	(398.53)			
THUK		-328.76		
		(243.80)		
THCA			-94.13	
			(236.98)	
THKU				57.35
				(5096.88)
USUK		24.60**		
		(10.87)		
USCA			45.94***	
			(11.55)	
USKU				48.97
				(341.30)
WUS	-0.200	0.0172**	0.0122	-0.0046
	(0.132)	(0.0532)	(0.1408)	(0.5532)
WPK	-0.2307***	-0.0979***	-0.3245***	0.4748*
	(0.0793)	(0.0322)	(0.7450)	(0.2696)
D0	-3.018	-7.111***	-6.972	-36.290*
	(5.260)	(1.985)	(5.640)	(21.870)
D0US	0.00022			
	(0.0008)			
D0UK		0.00037***		
		(0.0626)		
D0CA			0.00269	
			(0.0027)	
D0KU				0.00146
				(0.00095)
R^2	0.736	0.751	0.796	0.684
DW-stat	1.656	1.806	1.947	1.566

***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

Table 2: Inverse Residual Demand Elasticities.

Country	Before entry of Rice Tec*	After Entry of Rice Tec**
United States	0.12%	2.31%
United Kingdom	27.33%	19.12%
Canada	4.91%	3.67%
Kuwait	13.84%	5.69%

*calculated using average quantities and prices prior to 1984

**calculated using average quantities and prices after 1984