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Rent-Sharing in the Multi-Fibre Arrangement

Evidence from U.S.-Hong Kong Trade in Apparel

Kala Krishna
and
Ling Hui Tan

Why would importing countries apparently willingly choose forms of protection that are generally thought to result in large transfers to foreigners? Perhaps because their share of rents — and the consequent harm to developing countries from the MFA — may be greater than has been assumed.

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This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to analyze the effects of the Multi-Fibre Arrangement on developing countries. The study was funded by the Bank's Research Support Budget under research project "License Prices and Rent Sharing in the Multi-Fibre Arrangement" (RPO 676-69). Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Maria Teresa Sanchez, room S7-025, extension 33731 (October 1992, 32 pages).

The Multi-Fibre Arrangement (MFA) restricts the access of developing country exporters to developed country markets. It is usually assumed that the exporting countries receive all of the economic rents that result from these import restrictions — making it unclear whether the developing countries gain or lose as a result of the MFA.

Recent theoretical work on trade policy under imperfect competition casts doubt on whether exporting countries receive all of the quota rents arising from "voluntary export restraints" such as those applied by the MFA. Drawing on this theoretical literature, Erzan, Krishna, and Tan (1991) tested and rejected the hypothesis that MFA quota rents on exports from Hong Kong to the United States accrued in full to the Hong Kong exporters. The results in this paper build on that hypothesis-testing analysis and assess its implications for the returns to Hong Kong producers.

Their results suggest that rent sharing is an extremely important feature of the market for apparel exports from Hong Kong. U.S. importers were estimated to receive rents that were about 62 percent of the landed price of the imports.

Krishna and Tan conclude that the total potential rents arising from the MFA were split unevenly between the United States and Hong Kong — with the U.S. share ranging from 47 percent for skirts to 94 percent for playsuits.

If the results of this study are corroborated for other developing countries, the implications of the MFA for developing countries are considerably worse than has typically been assumed.

ON THE IMPORTANCE AND EXTENT OF RENT SHARING IN THE MULTI-FIBRE ARRANGEMENT: EVIDENCE FROM US-HONG KONG TRADE IN APPAREL*

by

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1. Introduction

The MFA, or Multi-Fibre Arrangement, is among the most important non-tariff trade barriers facing developing countries today. Established in order to "achieve the expansion of trade, the reduction of barriers to such trade and the progressive liberalization of world trade in textile products, while at the same time ensuring the orderly and equitable development of this trade and avoidance of disruptive effects in individual markets and on individual lines of production in both importing and exporting countries,"[1] it in fact sanctions a structure of country- and product-specific quotas on apparel and textiles exported by developing countries to developed countries. Far from furthering the economic and social development of developing countries, the MFA is a major stumbling block on their route to industrialization.[2] Standard paradigms of economic development have countries going through phases of industrialization starting from light manufactures such as textiles and apparel and graduating to more capital and skill intensive industries such as iron and steel. By cutting off access to their major export markets for textiles and apparel, the MFA effectively short circuits the industrialization process for many developing countries at a very early stage.

The MFA has its origins in the voluntary export restraint (VER) on cotton textile products that the United States negotiated with Japan in 1957. This VER succeeded in curbing Japanese cotton goods exports, but its side-effect was a huge increase in United States imports from new entrants to the industry, notably Hong Kong, Portugal, Egypt, and India. In its quest for a more comprehensive solution to control cotton imports, the United States initiated multilateral discussions, held under the auspices of the GATT, which eventually led to the Short Term Cotton Textile Arrangement (STA). The STA was in operation for one year, starting from 1961. It was succeeded by the Long Term Arrangement on Cotton Textiles (LTA) in 1962.[3] The LTA worked well in restricting the supply of cotton textile exports to the United States, but its side effect in turn was an increase in US imports of man-made fiber textiles and apparel. The United States then sought to extend the LTA framework to include wool and man-made fiber textile and apparel products, and thus the MFA was born.

Since its inception in 1973, the MFA has been through four successive negotiations, with each round encompassing a wider range of products and countries. By the end of the second MFA round, the United States had succeeded in bringing more than 80 per cent of its total imports of textile and apparel products under restraint by negotiating bilateral agreements with twenty supplying countries and agreements with consultative mechanisms with eleven other countries. Subsequent negotiations widened country coverage to include many emerging suppliers such as Bangladesh and the Maldives. In the third MFA round, the United States also extended its fiber coverage to include silk blends and other vegetable fibers. The United States currently has some 147 individual textile and apparel categories under restraint, some of which are further divided into subcategories. There are presently nine developed countries and thirty-three developing countries participating in the MFA.[4]

The MFA has been widely studied and much attention has been devoted to its welfare consequences.[5] For example, Morkre (1984) estimates that United States clothing import quotas on Hong Kong in 1980 spawned quota rents of $218 million, or 23 per cent of the total value of clothing imports from Hong Kong; Hamilton (1986) calculates the import tariff equivalent rate of textile and apparel quotas on Hong Kong to be 9 per cent in 1981 and 37 per cent in 1982; and Trela and Whalley (1988, 1990) suggest global gains from the elimination of quotas and tariffs of more than $17 billion (of which $11 billion will accrue to developing countries) and gains to the United States from the removal of quotas of $3 billion.

These estimates are based on the presumption of perfect competition in all relevant markets. In such models, as is well known, tariffs and quotas are equivalent and license prices, when available, equal the implicit specific tariff. The usual practice in these empirical studies is to take the import license price as a measure of the wedge between import price and unit cost in the exporting country.[6] The case of Hong Kong is the most frequently studied, one reason being that Hong Kong quota prices are relatively easy to obtain, since their quota licenses are traded on the open market. In studying other exporting

countries, where quota prices are harder to come by, researchers often use Hong Kong quota prices as proxies.[7]

However, simply assuming the standard competitive model as the basis for empirical analysis of the MFA may be a somewhat cavalier approach. The underlying assumption in the standard competitive model is that both the demand and supply sides of the product market are competitive and, in addition, license holders act competitively and are willing and able to sell at the price that clears the license market. A host of possible alternatives to the competitive paradigm is possible, and many of these have not been analyzed. If imperfections exist, then institutional details such as the quota implementation procedure and license allocation mechanism in the exporting country become more important considerations. If market imperfections result in rent sharing, as we argue here, existing estimates of the effects of liberalization will change dramatically.

The assumption of competitive markets in the study of the MFA is usually defended on the grounds that there are a large number of producers in the textile and apparel market. In the case of some advanced exporters, notably Hong Kong, further justification is provided by the fact that the quotas are efficiently implemented and are, to a large extent, transferable. However, while it seems reasonable to assume that Hong Kong producers are competitive, it is not clear that market power does not exist in the market for quota licenses and on the side of the US purchasers. For example, the 1988 numbers equivalent of the Herfindahl index of concentration in license holding was 3.95 for MFA category 340 (men's and boys cotton woven shirts), and 5.49 for MFA category 434 (men's woollen coats and jackets). The five-firm concentration ratio in license holdings for these two categories was 83 per cent. An editorial in the Hong Kong trade journal, Textile Asia, alleges that: "Quota price fluctuations do not in fact reflect normal supply and demand but the course of manipulation by the quota holders"[8] while Goto (1989, p.218) claims that: "Although governments of exporting countries under the MFA often allocate export licenses in a manner that helps exporters capture the quota rent, many of these exporters face large importing enterprises that can negotiate prices that capture some of the rent for themselves." For the

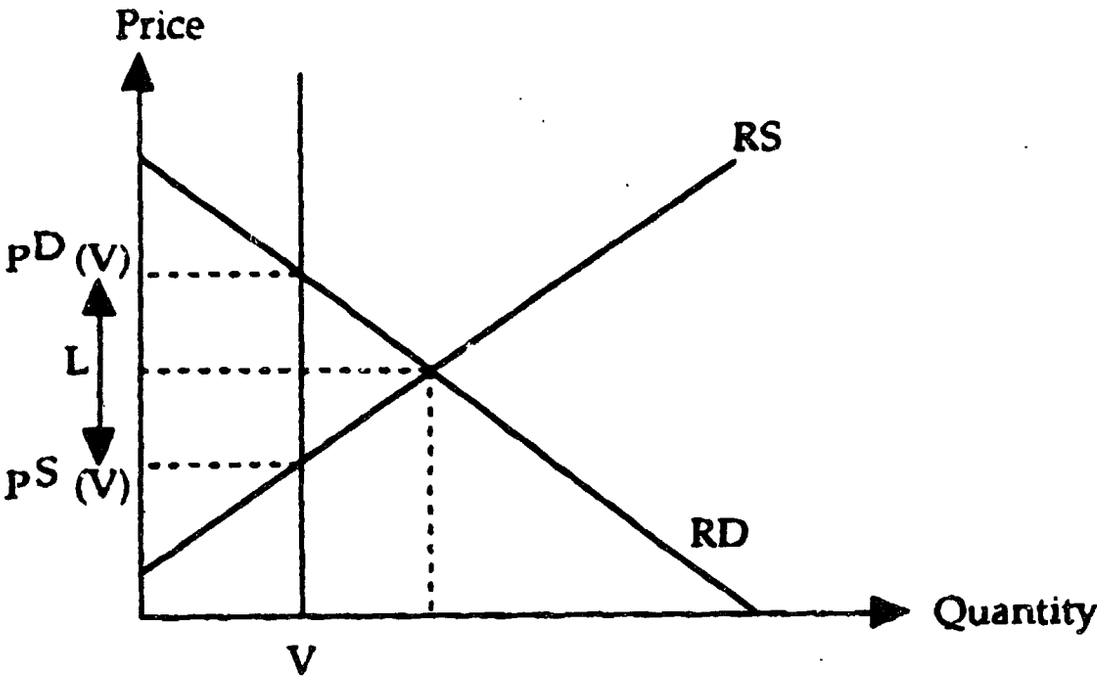
United States, Caves and Rosen (1982, p.16) note that department stores and specialized apparel and accessory stores together account for the lion's share of total sales in women's/girls'/infants clothing, and that "(due) to chain organizations, both these store types exhibit some concentration as buyers at the national level..."[9]

1.1. A Brief Theoretical Review

Figure 1 is a diagrammatic illustration of the competitive model underlying most empirical studies of the MFA. In the figure, the line RD represents residual demand from the United States. This is derived by subtracting US supply and supply from sources other than Hong Kong from total demand in the United States. The line RS depicts residual supply from Hong Kong. This is supply from Hong Kong less demand from all sources other than the United States. In the absence of quotas, the intersection of RD and RS gives the world price and the level of imports from Hong Kong to the United States. If a quota is set allowing only V units to be imported, the US price at which this level of imports is demanded (P^{US}) exceeds the Hong Kong price at which it is supplied (P^{HK}). The difference gives the license price (L), or per unit quota rent.

Clearly, this results from this model are not necessarily applicable if market imperfections exist.[10] Let us refer to the difference between P^{US} and P^{HK} as the "potential rent." Notice that in the competitive model, the license price changes with the quota level so that $P^{US} = P^{HK} + L$ always. In other words, this equality is unaffected by changes in the quota level, and the license price is always equal to the potential rent. Now suppose there is competitive supply but concentration in license holdings as well as market power on the buyer's side. This seems like a fair assumption for the US-Hong Kong apparel trade situation, judging from the data, as well as from existing descriptions in Textile Asia and other sources. In this case, there is bilateral monopoly power, and the issue becomes one of sharing the potential quota rent. As defined earlier, the potential rent from a license is the difference between the supply price (P^{HK})

Figure 1: The Competitive Model



and the demand price in the home market (P^{US}). If this rent is bargained over and shared in some way between the Hong Kong license holders and the US buyers, then the import price will lie somewhere between P^{US} and P^{HK}. As a consequence, (P^{HK} + L) falls short of P^{US}, that is, the license price is no longer equal to the potential rent. In addition, the Hong Kong price inclusive of the license price, can vary with the quota level, as well as the quota utilization ratio and the concentration in license holdings.

1.2 Evidence of Rent Sharing in the MFA

Krishna, Erzan, and Tan (1991) test for rent sharing using data from the United States and Hong Kong. Our approach there was not to point to and model a particular form of market imperfection but instead to test if all the implications of the standard competitive model were borne out in the data. Simply put, if there is perfect competition everywhere, then the license price inclusive Hong Kong price, adjusted for tariffs and transport costs, should be equal to the domestic (US) price of apparel. Other variables such as the quota utilization ratio and the concentration in license holdings should have no effect on this adjusted Hong Kong price.

We tested this hypothesis by regressing the adjusted Hong Kong price on a constant, the United States price, the concentration in license holdings, the quota size, and the quota utilization ratio. We found that we could strongly reject the null hypothesis. Recognizing that our results could be due to compositional differences in US production compared to Hong Kong exports, we developed a way of testing for the existence of such differences. We did not find these compositional differences to be significant on the whole. We also attempted to incorporate some notion of product differentiation by introducing quality differences as fixed effects in the regression. Still, we found that this did not entirely account for the difference in the US and Hong Kong prices.

In this paper, we use an updated version of the Krishna, Erzan and Tan (1991) data on US apparel imports from Hong Kong to provide some estimates of the extent to which quota rents are shared.

2. The Data

The data utilized in this study cover the time period 1981-88 and pertain to three broad areas: domestically-produced apparel, imported apparel from Hong Kong, and license holdings for apparel imports from Hong Kong. We did not attempt to obtain data on all categories of apparel. There are severe difficulties in
assembling a consistent panel of data due to the different and changing classification systems used in reporting information on imports and domestic production. Therefore, we chose groups of apparel such that these consistency problems were minimized. Our objective was to get as many relatively consistently-defined, disaggregated groups that we could find or develop concordances between the different classification systems employed.

We identified ten such groups. They are: (1) dresses; (2) skirts; (3) playsuits; (4) sweaters; (5) trousers; (6) men's coats; (7) women's coats; (8) woven shirts; (9) knit shirts; and (10) underwear. We obtained data for these groups for the following variables between 1981 and 1988. In our notation, the subscript i indexes the apparel group, and t indexes the year.

- P_{it}^{US} : Unit value of US production
- P_{it}^{HK} : C.i.f. Hong Kong price. This includes the license price. We shall refer to this license-price-inclusive Hong Kong price as the adjusted Hong Kong price.
- Q_{it}^{HK} : Imports from Hong Kong.
- H_{it} : Numbers equivalent of the Herfindahl index of concentration in license holding.
- V_{it} : Quota level for imports.
- U_{it} : Utilization ratio of imports, where $U_{it} = Q_{it}^{HK}/V_{it}$.

The quantities are measured in pieces and the prices are in US dollars per piece. The sources of these data and details on how they were created are available from the authors on request.

3. Are Price Differences Wholly due to Quality Differences?

Krishna, Erzan, and Tan (1991) established that there was a gap between the US price of apparel and the license-inclusive Hong Kong price. We further showed that this price differential did not seem to be the inadvertent result of data aggregation.

Another obvious explanation for the price difference between US and Hong Kong produced apparel is that the quality of the two products is not the same. For example, the price of US-made skirts may be higher than the price of skirts imported from Hong Kong not because of rent sharing but because domestically produced skirts are of a higher quality. Unfortunately, we did not have measures of the quality of US apparel and the quality of Hong Kong apparel so we could not include the quality difference as an independent variable. However, we made the simplifying assumption that the US-Hong Kong quality differential was fixed over time, although it could vary across apparel group. Then we incorporated these fixed quality effects by introducing them as apparel group specific dummy variables.

Our estimation procedure is related to the earlier regression in Krishna, Erzan, and Tan (1991). In that regression, we ran the adjusted Hong Kong price on a constant, nine apparel group dummies, the US price, the quota level, the quota utilization ratio, and the numbers equivalent of the Herfindahl index, which measures concentration in the license holdings and proxies for market power in the license market:

$$P_{ic}^{HK} = \alpha_{10} + \alpha_1 D_1 + \ldots + \alpha_9 D_9 + \beta P_{ic}^{US} + \gamma H_{ic} + \delta U_{ic} + \varphi V_{ic}$$

However, the assumption that quality differentials are fixed effects is admittedly a strong one. A common criticism of this approach is that it could generate spurious correlations since within-group variations in the US-Hong Kong price difference will be picked up by any explanatory variable which changes over time. Ideally, we would like to be able to estimate a simultaneous equation system based on Armington's (1969) model, where products are differentiated by their country of origin. Unfortunately data limitations prevent us from doing so. We can, however, take a step towards addressing this criticism by introducing a time trend in our regression equation.

Let T_t represent a (linear) time trend, with the $T_1 = 1$, $T_2 = 2$, ... $T_8 = 8$. Our new regression equation is:

$$P_{it}^{HK} = \alpha_{10} + \alpha_1 D_1 + \ldots + \alpha_9 D_9 + \mu T_t + \beta P_{it}^{US} + \gamma H_{it} + \delta U_{it} + \varphi V_{it}. \qquad (1)$$

The time trend allows some variation in the group intercepts over time, although these year effects are assumed to be the same across apparel groups for every year. This may or may not be a realistic assumption, but short of introducing a dummy for every single observation, there is not much else we can do.[11] We continue to assume that the effect of a quality differential on the price difference is additive, i.e., only the intercept is affected.

The right hand side variables in regression (1) can be considered as exogenous variables. If the United States is a large country, P_{it}^{US} is properly taken as given. As quota license allocations are historically determined, H_{it} can also be taken as given though it does vary over time with the composition of exports. The quota level, V_{it}, is exogeously determined. The utilization rate, U_{it}, should be unity if the quota is binding, and any departure from unity is assumed to reflect exogenous difficulties in attaining full utilization due to frictions in the implementation system.

Our choice of right hand side variables is quite intuitive, although it is not exhaustive.[12] We chose a linear specification because it lends itself most easily to interpretation, as shown in the following paragraphs.[13]

If there is no rent sharing and there are no quality differences, then: $P_{it}^{HK} = P_{it}^{US}$. (Recall that P_{it}^{HK} includes the license price.) In other words, α_1, ..., α_{10} and μ should be zero and ß should be unity. Moreover, none of the other variables should enter significantly into the equation.

If there is no rent sharing but there are time-varying quality differences of an additive form, that is if an American product is "worth" a fixed number of dollars more (or less) than its counterpart imported from Hong Kong, then we should observe, for the ith apparel group at time t: $P_{it}^{HK} = \alpha'_{it} + P_{it}^{US}$, where α'_{it} is the intercept term for apparel group i at time t:

$$\begin{aligned} \alpha'_{it} &= \alpha_{10} + \alpha_i + \mu T_t \quad && \text{for } i = 1,\ldots,9 \\ &= \alpha_{10} + \mu T_t && \text{for } i = 10 \end{aligned}$$

The intercept for each apparel group, α_{it}' would give an estimate of the quality difference in the products by country of origin at time t. The coefficient on P_{it}^{US} should still be unity and τ, δ and ϕ should still be zero. In other words, the null hypothesis is: H_0: ß = 1 and $\tau = \delta = \phi = 0$. If the null hypothesis is proven false, then we take the evidence to be suggestive of the existence of rent sharing.

Rent sharing essentially means that the license price inclusive Hong Kong price is lower than the US price. Now we can think of rent sharing as consisting of two parts: an additive part and a multiplicative part. For example, quota rent may make up a fixed amount plus a fraction of the US price. The fixed amount then represents the fixed (or additive) component of rent sharing and the fraction represents the marginal (or multiplicative) component of rent sharing.

The results of regression (1) are shown in Table 1. The adjusted R^2 is quite high at 0.96, suggesting that our regression has captured most of the relevant factors.[14] The estimate of ß is 0.38, and it is significantly less than unity.[15] Furthermore, the null hypothesis that ß = 1 and $\tau = \delta = \phi = 0$

can be rejected at the 1 per cent level. This seems to suggest that some form of rent sharing exists. We can think of ß as representing the marginal component of rent sharing. A $1 increase in the US price is associated with an $0.38 increase in the adjusted Hong Kong price, so that if our model is correct, $0.62 of the marginal price differential or rent is retained in the United States.[16]

Table 1: Regression Results

Dependent variable = P_{it}^{HK}

Independent Variable	Coefficient*	t Statistic
Constant	2.9112	0.2898
	(10.0446)	
D_1	8.4295	0.8620
	(9.7795)	
D_2	2.1302	0.2240
	(-0.3960)	
D_3	-3.6851	-0.3960
	(9.3067)	
D_4	5.4033	0.7832
	(6.8987)	
D_5	3.5500	1.8767[c]
	(1.8916)	
D_6	3.6596	0.3838
	(9.5343)	
D_7	2.5788	0.2820
	(9.1442)	
D_8	3.0167	1.1659
	(2.5875)	
D_9	5.5284	3.0983[a]
	(1.7844)	
P_{it}^{US}	0.3761	2.3185[b]
	(0.1622)	
H_{it}	-0.0335	-1.4503[d]
	(0.0231)	
U_{it}	0.5765	0.2315
	(2.4903)	
V_{it}	-0.4697 x 10-7	-0.4619
	(0.1017 x 10-6)	
T_t	0.4655	3.9643[a]
	(0.1174)	

R^2 = 0.9653, Adjusted R^2 = 0.9554
Number of observations = 64

*: Standard errors are in brackets beneath the estimates of the parameters. (These standard errors do not differ appreciably from those obtained with the White correction, therefore we discount the possibility of heteroscedasticity in our sample.)
[a]: Significant at the 1 per cent level.
[b]: Significant at the 5 per cent level.
[c]: Significant at the 10 per cent level.
[d]: Significant at the 20 per cent level.

Results of hypothesis-testing:

t-statistic for test of H_0: $\beta=1$ vs $\beta\neq1$:
T = -3.8455 -- reject the null hypothesis at the 1 per cent level.

F-statistic for test of H_0: $\beta=1$, $\tau=\delta=\phi=0$:
F = 4.9560 -- reject the null hypothesis at the 1 per cent level.

4. Estimating the Extent of Rent Sharing

Note from Table 1 that not only is the coefficient on the US price significantly different from unity, but the coefficients on the other variables are not all equal to zero. Therefore we cannot interpret the intercepts for each apparel group as their quality difference.[17] Because the other variables, H_{it}, U_{it}, and V_{it} are not zero, their influence is projected onto the intercept term in (P^{US}, P^{HK}) space. In other words, the relevant intercept for apparel group i at time t in (P^{US}, P^{HK}) space is given by ($\alpha_{it}' + \tau H_{it} + \delta U_{it} + \phi V_{it}$).

Thus, in order to obtain an estimate of the quality difference, we must adjust for this contamination. This can be done by removing the influence of V_{it}, U_{it}, and H_{it} on the intercept for each observation. The "adjusted intercept" for each apparel group is thus given by A_{it}, where:

$$A_{it} = \alpha'_{it} + \gamma H_{it} + \delta U_{it} + \varphi V_{it}.$$

The results of this exercise are reported in Table 2. The fixed component of rent sharing works to make A_{it} negative as it implies a lower adjusted Hong Kong price than the US price, while higher Hong Kong quality works to make A_{it} positive. Since most of the adjusted intercepts are positive, our work suggests that Hong Kong quality exceeds US quality.[18] It is impossible for us to distinguish between quality effects and the fixed component of rent sharing in A_{it}. For this reason, we will only look at the marginal component of rent sharing, which implies that our estimates are under-estimates. As can be seen from Table 1, ß is less than one, as a $1 increase in the US price is associated with a $0.38 increase in the license-price-inclusive Hong Kong price. The amount of marginal rent sharing equals the average US price multiplied by (1-ß).

Figure 2 may help to clarify our explanation. It is drawn for a representative apparel group i at time t in (P^{US}, P^{HK}) space. If there is no rent sharing and there are no quality differences, the fitted line from regression (1) should lie along the 45 degree line, and as none of the other variables matter, this diagram captures all the relevant dimensions.

Table 2: Rent Sharing Estimates

Apparel Group	Year	Adjusted Intercept	Marginal Rent Sharing (in US$)
1. Dresses	1981	...	...
	1982	...	...
	1983	11.33	9.79
	1984	11.80	9.73
	1985	12.27	10.36
	1986	12.73	10.29
	1987	13.20	12.04
	1988	13.66	12.85
2. Skirts	1981	...	...
	1982	...	...
	1983	5.22	7.74
	1984	5.69	7.74
	1985	6.15	7.49
	1986	6.62	7.74
	1987	7.08	8.05
	1988	7.55	8.61
3. Playsuits	1981	...	...
	1982	...	...
	1983	...	...
	1984	...	...
	1985	1.09	2.62
	1986	1.56	2.56
	1987	2.02	3.37
	1988	2.49	3.37
4. Sweaters	1981	6.44	4.49
	1982	6.90	4.62
	1983	7.37	4.80
	1984	7.83	4.99
	1985	8.30	4.62
	1986	8.76	5.18
	1987	9.23	6.43
	1988	9.69	6.30
5. Trousers	1981	...	...
	1982	...	...
	1983	3.35	5.80
	1984	3.82	5.61
	1985	4.29	5.74
	1986	4.75	5.68
	1987	5.22	5.80
	1988	5.68	6.36

Table 2 (Contn'd.): Rent Sharing Estimates

Apparel Group	Year	Adjusted Intercept	Marginal Rent Sharing (in US$)
6. Men's coats	1981	...	...
	1982	...	...
	1983	6.91	10.48
	1984	7.37	10.67
	1985	7.84	11.17
	1986	8.30	11.35
	1987	8.77	13.60
	1988	9.23	14.47
7. Women's Coats	1981	4.50	15.47
	1982	4.97	15.35
	1983	5.43	16.35
	1984	5.90	17.34
	1985	6.37	16.66
	1986	6.83	17.03
	1987	7.30	15.22
	1988	7.76	15.85
8. Woven Shirts	1981	...	...
	1982	2.95	4.49
	1983	3.41	4.99
	1984	3.88	5.05
	1985	4.34	5.05
	1986	4.81	4.99
	1987	5.28	5.30
	1988	5.74	5.68
9. Knit Shirts	1981	2.05	2.31
	1982	2.52	2.31
	1983	2.99	2.50
	1984	3.45	2.43
	1985	3.92	2.50
	1986	4.38	2.37
	1987	4.85	2.31
	1988	5.31	2.37
10.Underwear	1981	...	...
	1982	...	...
	1983	...	...
	1984	-0.81	1.62
	1985	-0.35	1.22
	1986	0.12	0.87
	1987	0.58	0.94
	1988	1.05	0.87

"...": not available.

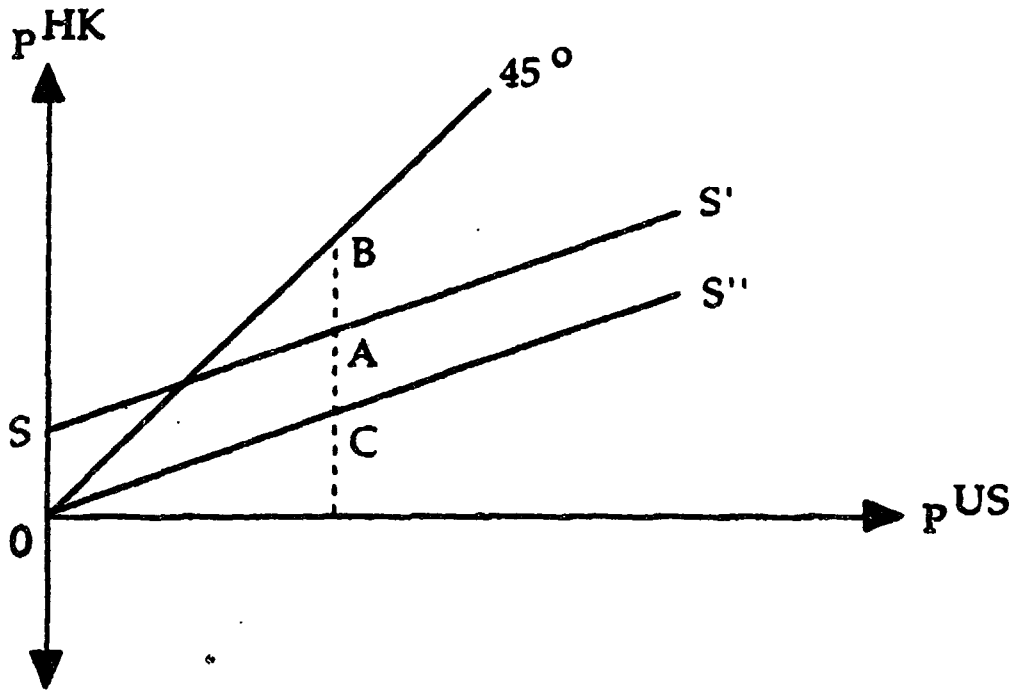
If there is a time-varying quality difference only and this is additive, then the fitted line for time t should be represented by the 45 degree line which is displaced along the intercept by the extent of the quality difference. But its slope should be unity, and no other variable should matter. (The same applies in the case of additive time-varying quality differences and fixed rent sharing.)

If the other variables like the quota size, the quota utilization ratio, and the numbers equivalent do matter, then the fitted line, projected onto (P^{US}, P^{HK}) space, is displaced by the quality effects (and/or fixed rent sharing) and the effects of the other variables with non-zero coefficients at time t. When the effects of these other variables are removed, we obtain the line SS'. This goes through S which is above zero if this apparel group has a higher quality in Hong Kong than in the United States in that year (and no fixed rent sharing). Furthermore, the slope of SS' is less than unity, 0.38 in our case.

If we adjust for quality (and/or fixed rent sharing), i.e., move SS' so that it goes through the origin, we get the line OS". This represents the predicted Hong Kong price at any given US price after removing the effect of quality differences at time t. The remaining difference in the US and Hong Kong prices is due to marginal rent sharing. Thus in Figure 2, OS is the estimate of quality differences and AB is due to marginal rent sharing, which equals (1-ß) times the United States price.

Table 2 also gives the dollar amount of marginal rent sharing. Its contribution relative to the US price is by assumption fixed at (1-ß), or 0.62, across apparel groups.

Figure 2: Marginal Rent Sharing



5. Estimating the US' Share of Potential Rent

To get a more accurate picture of rent sharing, we should focus on the amount of rent obtained by the United States as a proportion of the total potential rent generated by the MFA quotas rather than as a proportion of the US price. Recall our definition of the potential rent which is the difference between the demand price (i.e., the price in the United States) and the supply price (i.e, the Hong Kong price exclusive of the license price.) In the absence of rent sharing, the license price exactly makes up the difference. However, if rent sharing exists, then the license price falls short of the potential rent, with the remainder going to the US importers. In this section, we look at how the potential rent is divided between the Hong Kong exporters (in the form of the license price) and the US importers (in the form of rent.)

As described in Morkre (1979, 1984) and Krishna, Erzan, and Tan (1991), quota licenses in Hong Kong are transferable to a certain extent. However, there is no systematic record of the transactions and we owe a great deal to Carl Hamilton at the University of Stockholm's Institute for International Economic Studies and Peter Ngan of the Federation of Hong Kong Garment Manufacturers, who provided us with monthly license prices for many MFA categories in several years.[19] In order to get an idea of the license price for each apparel group, we had to aggregate our monthly license price data into the ten apparel groups and then average them over time.[20] As can be seen from Table 3, the average license price ranges from $0.12 per piece for underwear to $9.10 per piece for skirts.

Table 3 also gives the potential rent for each apparel group in each year, with the potential rent measured as license price plus marginal component of rent sharing. The rent estimates are obtained from Table 2. As can be seen from Table 3, even if we assign the adjusted intercepts to represent quality differences and consider only the multiplicative component of rent sharing, then the US' share of the total potential rent is very substantial, ranging from 47 per cent for skirts in 1986 to 94 per cent for playsuits in 1988.

Table 3: Rent Sharing Estimates as Proportion of Potential Rent

Apparel Group	Year	License Price (in US$)	Potential Rent* (in US$)	Rent Share**
1. Dresses	1981	...	...	...
	1982	...	...	...
	1983	4.01	13.80	0.710
	1984	3.82	13.55	0.718
	1985	1.42	11.78	0.879
	1986	4.37	14.66	0.702
	1987	3.41	15.45	0.779
	1988	1.92	14.77	0.870
2. Skirts	1981	...	...	...
	1982	...	...	...
	1983	1.47	9.21	0.840
	1984	1.12	8.86	0.874
	1985	2.91	10.40	0.720
	1986	8.54	16.28	0.475
	1987	9.10	17.15	0.469
	1988	3.91	12.52	0.688
3. Playsuits	1981	...	...	...
	1982	...	...	...
	1983	...	...	...
	1984	...	...	...
	1985	...	...	...
	1986	0.23	2.79	0.917
	1987	0.32	3.69	0.913
	1988	0.23	3.60	0.936
4. Sweaters	1981	...	...	...
	1982	1.98	6.60	0.700
	1983	4.35	9.15	0.525
	1984	1.98	6.97	0.716
	1985	1.39	6.01	0.769
	1986	2.63	7.81	0.663
	1987	1.98	8.41	0.764
	1988	1.30	7.60	0.829
5. Trousers	1981	...	...	...
	1982	0.42	...	...
	1983	1.89	7.69	0.754
	1984	1.86	7.47	0.751
	1985	1.27	7.01	0.819
	1986	1.72	7.40	0.767
	1987	3.03	8.83	0.657
	1988	1.94	8.30	0.766

Table 3 (Contn'd): Rent Sharing Estimates as Proportion of Potential Rent

Apparel Group	Year	License Price (in US$)	Potential Rent* (in US$)	Rent Share**
6. Men's Coats	1981	...	...	...
	1982	0.83	...	...
	1983	1.56	12.04	0.870
	1984	2.56	13.23	0.806
	1985	1.58	12.75	0.876
	1986	1.22	12.57	0.903
	1987	2.80	16.40	0.829
	1988	1.79	16.26	0.890
7. Women's Coats	1981	...	...	...
	1982	1.81	17.16	0.895
	1983	3.29	19.64	0.832
	1984	2.51	19.85	0.874
	1985	1.15	17.81	0.935
	1986	1.64	18.67	0.912
	1987	3.01	18.23	0.835
	1988	1.81	17.66	0.897
8. Woven Shirts	1981	...	...	...
	1982	0.36	4.85	0.926
	1983	1.00	5.99	0.833
	1984	1.72	6.77	0.746
	1985	1.70	6.75	0.748
	1986	1.42	6.41	0.779
	1987	1.75	7.05	0.752
	1988	0.88	6.56	0.866
9. Knit Shirts	1981	...	...	...
	1982	0.53	2.84	0.813
	1983	0.71	3.21	0.779
	1984	0.95	3.38	0.719
	1985	0.53	3.03	0.825
	1986	1.57	3.94	0.602
	1987	1.98	4.29	0.538
	1988	0.91	3.28	0.723
10.Underwear	1981	...	...	...
	1982	...	...	...
	1983	...	...	...
	1984	...	...	...
	1985	...	...	...
	1986	...	...	...
	1987	...	...	...
	1988	0.12	0.99	0.879

*: License price plus dollar amount of marginal rent sharing.
**: Marginal rent sharing divided by potential rent.
"...": not available.

We recognize that our estimates are only rough approximations; nonetheless, they do cast doubt on the validity of the assumption that all the quota rent accrues to the Hong Kong exporters in the form of license prices.

6. Conclusion

Our main objective in this chapter was to estimate the degree of rent sharing that occurs in the various apparel groups. Starting from the observation that there is a non-trivial gap between United States price of apparel and the c.i.f. Hong Kong price, inclusive of the license price, our first step was to find out whether this differential could be wholly explained by time-varying quality differences. We found that we could strongly reject this hypothesis, and other variables like the quota size (V_{it}), the quota utilization rate (U_{it}), and the numbers equivalent of the Herfindahl index of concentration in license holding (H_{it}) also played a part in explaining the US-Hong Kong price differential. We concluded that there must be some rent sharing taking place, that is, U.S importers seem to be capturing some of the quota rents.

We can think of rent sharing as being made up of a fixed component which is apparel group specific, and and a marginal component, (1-ß) which is constant for all apparel groups. The fixed component is hard to distinguish from quality differences in the apparel groups, so we focused entirely on the marginal component. Our estimate of the amount of marginal rent sharing as a percentage of the US price was approximately 62 per cent. To get a better picture of how quota rents are distributed between the United States and Hong Kong, we also calculated the amount of rent extracted by the United States as a proportion of the total potential rent. We found that the potential rent was split unevenly between the United States and Hong Kong, with the US' share ranging from 48 per cent for skirts to 94 per cent for playsuits.

We reiterate that our estimates are only very rough calculations. Our limited data set prevents us from undertaking any sophisticated econometric analysis,[21] and we were further disadvantaged by a complete lack of information on some possibly key variables such as the degree of monopsony power on the side

of the US importers. Notwithstanding these data problems, however, our results do call into question the validity of the common assumption that there is perfect competition in the product and license markets under the MFA. It is very likely that the winners under the MFA are not only foreign license holders and domestic apparel producers, but domestic importing firms as well. This further strengthens the domestic lobby for repeated extensions of the MFA, to the detriment of domestic consumers and foreign apparel suppliers. In fact, if rent sharing is a valid concern, then the estimated welfare effects of dismantling the MFA calculated by Trela and Whalley (1988, 1990) may be off the mark, with the gains being lower than estimated for the United States and higher than estimated for the developing countries.

In the future, we hope to extend our work in two directions. First, we plan to extend the scope of our study to include other developing countries in order to provide further insights and to check the generality of our results. We will then study US apparel trade with non-restricted countries as well to see if price differentials also exist that cannot be explained by quality differences -- if so, then our inference of rent sharing under the MFA may be incorrect.

END NOTES

1. GATT (1974, p.6.)

2. See Faini, de Melo and Takacs (1992) for an analysis of the distortions created by the MFA.

3. The LTA was supposed to be in effect for five years starting from 1962, but it was extended twice so that it lasted until 1973.

4. For a comprehensive account of the history and workings of the MFA, see Choi, Chung and Marian (1985), Keesing and Wolf (1980), and Hamilton (1990), especially the chapter by V. Cable.

5. See, for example, Hamilton (1990) which analyzes the effects of the MFA and its proposed reforms from a variety of viewpoints.

6. This is the method used by Morkre (1984), for example, as well as by Trela and Whalley (1988, 1990.)

7. For example, Trela and Whalley (1988, 1990) compute the Hong Kong supply price by subtracting the quota price from the US price. They then compute the production costs of quota restricted products in other exporting countries by multiplying the unit cost in Hong Kong by the ratio of the exporting country's relative wage in the textile and apparel industry compared to Hong Kong. It is worth pointing out that if rent sharing exists, as defined in the text below, this procedure may not be correct.

8. Textile Asia, March 1989.

9. According to their 1972 figures, the eight-firm national concentration was 51.4 per cent for department stores and 10.9 per cent for specialized apparel and accessory stores, with chains of eleven or more units accounting for 88.2 per cent of department store sales and 33.7 per cent of apparel store sales.

10. See Krishna (1992) for a detailed discussion.

11. We tried using seven year dummies instead of a time trend, but the results were very similar. Therefore, we felt that the time trend was adequate for our purposes. Besides, the year dummies used up more degrees of freedom.

12. For example, some measure of monopsony power on the part of the US importers and other cost factors associated with the quota system may be included as independent variables. Unfortunately, as is often the case with empirical work, we were limited by the lack of data.

13. See the appendix for an alternative specification.

14. Of course, it was not possible to control for all possible factors, which is why our regression does not fit perfectly.

15. It is possible that this low ß estimate could be the result of measurement error bias. This could arise if our computed P_{it}^{US} values, after concordance and aggregation, are only noisy proxies for their true values.

16. We experimented with several different functional forms, and found that we could reject the null hypothesis always. The frequently-recommended log linear functional form, for example, yielded similar results in our hypothesis testing to those reported in Table 1. But the regression coefficients in a log-linear equation are elasticities and as such, they cannot be readily interpreted in terms of rent sharing.

17. In fact, the intercepts α_{it}' should be interpreted as the Hong Kong price of group i at time t when its US price is zero and the quota size, the quota utilization rate, and the numbers equivalent are also equal to zero. By removing the "contamination", we are in effect finding the value of the intercept at the existing values of H_{it}, U_{it} and V_{it}.

18. We do not find it implausible that Hong Kong quality could exceed US quality. The textile trade journals point out that Hong Kong is a source of choice for high fashion items because of its manufacturers' ability to respond swiftly to design changes and to maintain quality levels. For example, an article in the July 1988 issue of Textile Asia points out that: "In the US, the trend is towards 'speed sourcing.' The supplier is expected to fulfil an order within a delivery period ranging from 30 to 45 days f.o.b. ... The major advantage of Hong Kong over other manufacturing centers is 'flexibility' ... [i.e.] the ability to meet, and adapt to, different kinds of buyer requirement. Such ability has been the result of accumulation of manufacturing experience and market knowledge, a flexible industrial structure, an efficient material supply network and a well developed infrastructure." (p. 96.) A report on quality in the September 1989 issue of Textile Asia contains interviews with several representatives of the Hong Kong apparel industry (both the buying and selling side) and finds that "such 'plus' factors as flexibility, geographical location and long track record came to the fore as representatives of industry reviewed the quality situation." (p. 219.) The interviewees described how the Hong Kong apparel industry had upgraded its quality in various aspects. For example, there have been considerable improvements in the sewing equipment technology employed, resulting in fewer sewing defects. There has also been a greater call for product testing services from local manufacturers -- as more and more Hong Kong manufacturers move towards the high-value end of the clothing market ("premium goods"), they are increasingly taking steps to guarantee the quality of their garments before shipment. This is especially since "more fashionable items [denote] special quality consideration ..." (p. 207) and "[o]verseas buyers are more strict in the requirements for quality." (p. 211.) In fact, it is the trend among larger manufacturers in Hong Kong to set up their own quality control unit, with an inspection team and in-house laboratory for random checks on production. Neither is Hong Kong inferior in terms of quality of design -- many international designer labels are represented on a franchise basis in Hong Kong, and this has had a positive spillover effect on the local producers who "become more exposed to a high level of quality, and try to match that level with their own products." (p. 206.) In general, the feeling in the industry is that Hong Kong is making better quality (and more expensive) products and that clothing importers are looking to the newer developing country suppliers for cheaper merchandise. Hong Kong wages are significantly higher than in most developing countries and as a result, its apparel industry has moved out of the low end of the market.

19. In addition, Textile Asia frequently tracks quota license prices.

20. Again, we emphasize that our calculations are necessarily very approximate. In particular, if there is perfect competition in the license market, the monthly license price has two components: a scarcity component, and an option value component. (If there is imperfect

competition in the license market, then the license price could also be subject to price fixing.) As quota allocations are valid only for one calendar year, we would expect a license to have no value at the end of the year. Also, a quota holder can either use his license today (by shipping the goods himself or making a temporary transfer to someone else) or defer his license application in the hope of a higher price in the future if demand realizations are high. Therefore, a license has an option value. This option value falls as the year progresses; consequently, we would expect the license price to decline over the year on average. These aspects of the license price path are missed in our averaging procedure.

21. But even this small amount of data was not easy to come by.

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APPENDIX: THE "SERVICES" MODEL

It has been pointed out that US goods may have quality characteristics that make them intrinsically more valuable than Hong Kong goods. For example, suppose Hong Kong apparel is Θ per cent less durable than US apparel. Then the purchaser of Hong Kong apparel is really getting Θ per cent less quantity, and the Hong Kong good would be expected to sell at an Θ per cent discount, which would be reflected in ß, the coefficient on P^{US} in regression (1). This is a valid concern, and we address it in this appendix.

Suppose imports from Hong Kong are of a different quality than domestically-produced clothing. Following Swan (1970), we can think of the quality of a product as the amount of "services" obtained from its consumption. These "services" are a homogeneous good with a uniform price, s_{it}. To the extent that two products embody unequal amounts of "services", they will differ in quality and hence, in price. Let q_{it}^{US} denote the amount of "services" in one unit of US-produced clothing i at time t, and q_{it}^{HK} the amount of "services" in one unit of Hong Kong-produced clothing i at time t.

In the above example, the underlying assumption is that $q_{it}^{HK} = \Theta q_{it}^{US}$. In this case, since $P_{it}^{US} = s_{it}q_{it}^{US}$, and $P_{it}^{HK} = s_{it}q_{it}^{HK} = \Theta s_{it}q_{it}^{US}$, it follows that if P_{it}^{HK} and P_{it}^{US} are measured without error, we should observe: $P_{it}^{HK} = \Theta P_{it}^{US}$. This means that the null hypothesis in the following regression:

$$P_{it}^{HK} = \alpha + \beta P_{it}^{US} + \gamma H_{it} + \delta U_{it} + \phi V_{it}, \qquad \text{(A1)}$$

is H_0: $\alpha = \tau = \delta = \phi = 0$, i.e., nothing else should matter aside from ß, which is the estimate of Θ. Appendix Table 1 shows the results of regression (A1). Clearly, the null hypothesis can be rejected at the 1 per cent level of significance. Note that this approach assumes quality differentials are constant across categories and over time.

We can also approach the issue in a more general manner. Let u_{it} and v_{it} denote random error terms. Then: $P_{it}^{US} = s_{it}q_{it}^{US} + u_{it}$, and $P_{it}^{HK} = s_{it}q_{it}^{HK} + v_{it}$, if

the errors enter additively; and $P_{it}^{US} = s_{it}q_{it}^{US}u_{it}$, and $P_{it}^{HK} = s_{it}q_{it}^{HK}v_{it}$, if the errors enter multiplicatively.

Appendix Table 1: Regression Results

Dependent variable = P_{it}^{HK}

Independent Variable	Coefficient*	t Statistic
Constant	-9.3454	-2.5411[b]
	(3.6778)	
Pit_{it}^{US}	0.5469	9.5922[b]
	(0.0570)	
H_{it}	0.0594	2.6222[a]
	(0.0227)	
U_{it}	13.1758	3.6543[a]
	(3.6056)	
V_{it}	-0.3511 x 10-7	-3.5643[a]
	(0.9852 x 10-8)	

R^2 = 0.8369, Adjusted R^2 = 0.8259
Number of observations = 64

*: Standard errors are in brackets beneath the estimates of the parameters.
[a]: Significant at the 1 per cent level.
[b]: Significant at the 5 per cent level.

Results of hypothesis-testing:

t-statistic for test of H_0: $\beta=1$ vs $\beta\neq1$:
T = -7.9474 -- reject the null hypothesis at the 1 per cent level.

F-statistic for test of H_0: $\alpha=\tau=\delta=\phi=0$:
F = 15.8302 -- reject the null hypothesis at the 1 per cent level.

Specification 1: Additive errors

If we assume random errors which enter additively into the formula, then: $P_{it}^{US} = s_{it}q_{it}^{US} + u_{it}$, and $P_{it}^{HK} = s_{it}q_{it}^{HK} + v_{it}$, where u_{it} and v_{it} are the random error terms. Therefore:

$$P_{it}^{HK} - P_{it}^{US} = s_{it}(q_{it}^{HK} - q_{it}^{US}) + (v_{it} - u_{it}),$$

or:

$$P_{it}^{HK} = P_{it}^{US} + s_{it}(q_{it}^{HK} - q_{it}^{US}) + \epsilon_{it}$$

where $\epsilon_{it} = v_{it} - u_{it}$; ϵ_{it} satisfies the usual assumptions for a random error term. Let Z_{it} denote the difference between the quality of Hong Kong clothing and US clothing, i.e.: $Z_{it} = s_{it}(q_{it}^{HK} - q_{it}^{US})$.

Since we have no way of measuring s_{it}, q_{it}^{HK}, or q_{it}^{US}, we cannot hold quality differences constant by including Z_{it} as an independent variable. However, we can capture Z_{it} to some extent through the use of apparel group dummies and a time trend. In other words, we assume that Z_{it} is a linear function of time: $Z_{it} = z_i + \mu T_t$ for i = 1, ..., 10, and t = 1, ..., 8. Of course, this entails the assumption that the quality difference changes by the same amount every year for each apparel group, but in the absence of a direct measure of quality differences, this is the best we can do.[1] This is what we did in the paper.

Specification 2: multiplicative errors

If we assume the error terms enter multiplicatively, then: $P_{it}^{US} = s_{it}q_{it}^{US}u_{it}$ and $P_{it}^{HK} = s_{it}q_{it}^{HK}v_{it}$. Taking logs, we have:

$$\begin{aligned} \log P_{it}^{HK} &= \log(s_{it}q_{it}^{HK}) - \log(s_{it}q_{it}^{US}) + \log P_{it}^{US} + (\log v_{it} - \log u_{it}) \\ &= (\log q_{it}^{HK} - \log q_{it}^{US}) + \log P_{it}^{US} + \epsilon_{it}^{*} \end{aligned}$$

where $\epsilon_{it}^{*} = \log v_{it} - \log u_{it}$.

Let Z^*_{it} denote the log of Hong Kong quality relative to US quality, i.e.: $Z^*_{it} = \log q_{it}^{HK} - \log q_{it}^{US}$. As before, assume Z^*_{it} can be captured by apparel group dummies and a time trend.

We ran the analog of equation (1) using this new specification:

$$\log P_{it}^{HK} = \alpha^*_{10} + \alpha^*_1 D_1 + \ldots + \alpha^*_9 D_9 + \mu^* T_t + \beta \log P_{it}^{US} + \gamma^* H_{it} + \delta^* U_{it} + \varphi^* V_{it} + \epsilon^*_{it} \quad \text{(A2)}$$

If there exist quality (durability) differences but there is no rent sharing, then we should expect β^* to be equal to 1 and $\tau^* = \delta^* = \phi^* = 0$. If there was only marginal rent sharing, it would show up in the intercept as well, and β^* will still equal 1. If there was both fixed as well as marginal rent sharing, then this model would be misspecified, and running regression (A2) could result in $\beta^* \neq 1$.

The results of regression (A2) are shown in Appendix Table 2. The joint null hypothesis can be rejected at the 5 per cent level of significance. Thus, it is not a misspecification of the error term that is causing us to reject the competitive model.

The disadvantage of the log specification, however, is that it cannot be used to draw any direct implications about rent sharing. The coefficient β^* in the above equation now denotes the per cent increase in the Hong Kong price which accompanies a 1 per cent increase in the US price. From Appendix Table 2, this number is 0.5252. However, it is not clear how to interpret this since the coefficient should be unity even in the presence of marginal rent sharing alone.

Appendix Table 2: Regression Results (Log Specification)

Dependent variable = log P_{it}^{HK}

Independent Variable	Coefficient*	t Statistic
Constant	-3.0220	-3.0604[a]
	(0.9875)	
D_1	4.0859	3.7819[a]
	(1.0804)	
D_2	3.6568	3.5596[a]
	(1.0273)	
D_3	2.9533	3.2192[a]
	(0.9174)	
D_4	3.4134	4.4372[a]
	(0.7694)	
D_5	1.8526	3.9089[a]
	(0.4740)	
D_6	3.7864	3.5601[a]
	(1.0636)	
D_7	3.5857	3.3930[a]
	(1.0568)	
D_8	2.0749	4.4005[a]
	(0.4715)	
D_9	1.3437	4.1556[a]
	(0.3233)	
log Pit_{it}^{US}	0.5252	2.1647[b]
	(0.2426)	
H_{it}	-0.4087 x 10-4	-0.0179
	(0.0023)	
U_{it}	0.0449	0.1798
	(0.2499)	
V_{it}	0.2049 x 10-7	2.0768[b]
	(0.9864 x 10-8)	
T_t	0.0399	3.2512[a]
	(0.0123)	

R^2 = 0.9871, Adjusted R^2 = 0.9834
Number of observations = 64

*: Standard errors are in brackets beneath the estimates of the parameters.
[a]: Significant at the 1 per cent level.
[b]: Significant at the 5 per cent level.

Results of hypothesis-testing:

t-statistic for test of H_0: $\beta=1$ vs $\beta\neq1$:
T = -1.9570 -- reject the null hypothesis at the 10 per cent level.

F-statistic for test of H_0: $\beta=1$, $\tau=\delta=\phi=0$:
F = 3.4224 -- reject the null hypothesis at the 5 per cent level.

END NOTES FOR APPENDIX

1. We can use year dummies instead of a time trend. This is a slightly more flexible specification as it will allow the year-to-year changes in quality differences to vary with time. However, the results are not very different from the simpler specification with a time trend.

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