New Kinds of Comparisons of the Prices of Tradables and Nontradables

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ABSTRACT

The received international economics view of the consequence of international trade is that it tends to equalize relative prices of tradable goods in different countries. This tendency is not strong enough to justify a literal belief in the law of one price, but it is an input into a variety of important economic propositions (e.g., the Balassa-Samuelson differential productivity hypothesis). This paper aims at an empirical verification of the price-equalizing effect of trade by comparing relative tradable and nontradable goods prices across countries using International Comparison Programme (ICP) benchmark price data.

The differences between relative tradable and nontradable prices are examined in two different ways. The first of these involves a measure of the similarity of price structures in a pair of countries, and the second works with a decomposition developed by Nuxoll of the variance of the whole price structure into tradable and nontradable components. Analysis of the price-similarity and variance component estimates provides evidence that in fact the trade effects are clearly perceptible, if perhaps not as great as might have been expected.

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New Kinds of Comparisons of the Prices of Tradables and Nontradables

One important part of the received international economics view of the consequence of trade among countries is that it tends to equalize relative prices of tradable goods in different countries. This tendency may not be sufficiently strong to justify a literal belief in the law of one price, but it certainly is an input into a variety of important economic propositions. For example, the Balassa-Samuelson [1964] relies in part on this price-equalizing effect for some goods but not others. An empirical verification of the effect with existing final-expenditure data is not easy, but investigations based on the prices collected in the various International Comparison Programme (ICP) benchmark studies[1] throw light on the phenomenon.[2]

We begin in Section I with a review of our previous work on the relationship between the prices of tradables and nontradables. In Sections II and III we develop two different ways not previously exploited of analyzing the differences between tradable and nontradable prices. The first of these involves a measure of the similarity of price structures in a pair of countries, and the second works with a decomposition developed by Nuxoll of the variance of the whole price structure into tradable and nontradable components. Section IV summarizes the results of this empirical exercise and points to directions for future work.

I Background for the Present Investigation

In Heston, Nuxoll, and Summers [1994], an attempt was made to distinguish between the average relative prices of tradable and nontradable goods. In the ICP the prices of individual goods are expressed relative to a numeraire country's currency unit. (The average of the prices of a group of goods is referred to here as a price parity to maintain consistency with the practice of using the term purchasing power parity (PPP) for the average price of all the goods of aggregate GDP, expressed per unit of the currency of the numeraire country. To make a country's tradable and nontradable price parities reflect relative prices, each of the price parities was divided by the country's overall PPP.)

First, we clarify what is meant by tradable and nontradable goods. The ICP works from the expenditure side. In the 1985 benchmark study, GDP was broken down into 139 basic headings of final-goods spending on Consumption (108), Investment (29), and Government (2), covering everything from various kinds of food, clothing, and shelter to machinery and construction to items of government services. It compares prices of identical or very similar goods and services across countries. For some goods, of course, such comparisons are very difficult and subject to considerable error.

Determining which of the basic headings should be regarded as tradable and which nontradable is necessarily fairly subjective.[3] In the absence of hard, specific information on what goods might potentially enter into international trade versus those that inevitably are absorbed domestically, the categories placed in the nontradable classification covered all services and construction. (Following Peter Hill [1977, 1987], a service is taken to be a nonstorable good and therefore unlikely to be traded; and because elements of construction are necessarily attached physically to some part of the domestic economy, they would not be traded.) All other categories were placed in the tradable classification. Annex A provides a description of the 1985 benchmark study categories classified as tradables (94) and nontradables (42).[4] It should be emphasized that tradables in this definition are items that could be traded, though of course they are not necessarily in fact traded. (This is why the terms "tradable" and "nontradable" are preferred to "traded" and "non-traded")[5]

Our previous work focused first on averages of prices parities--remember, expressed relative to PPP--of tradables and nontradables.[6] The relationship was explored between each of the price parities, and also the ratio of the two, and GDP per capita. (For example, the ratio of the two price parities was regressed against GDP per capita. As expected, the ratio varied inversely with income, and in a statistically significant way. More than that, the finding was replicated over the fifteen year period between 1970 and 1985, and for a number of different country combinations.[7]) The work with average tradable and nontradable prices as related to GDP per capita was extended to the basic heading level also. The regressions involving these disaggregated data confirmed what was found with the average price-parity data.[8]

II Price-Similarity Indexes

A. The Definition of a Price-Similarity Index

In this note new ways of exploiting the ICP benchmark data are examined. A sharper alternative to average price parities is used in comparing countries. Consider the problem of judging how closely *n* relative prices match in two countries. A natural measure of the similarity of the price structures of the countries comes out of a consideration of the geometry associated with the n-dimensional price vectors of the two countries. Think of the plots of the two price vectors in n-dimensional space. Each price vector defines a point, and the similarity of the price vectors can be measured by the size of the (two-dimensional) angle formed by the n-dimensional rays defined by the points. In fact, the cosine of the angle (call it PS, for price-similarity) rather than the angle itself, is a particularly convenient and transparent index of the degree of similarity of the price vectors. Partly, this is because PS is scaled so that it equals zero when the relative prices are as far apart as they can be (i.e., when the rays are orthogonal in the n-dimensional space) and it equals 1 when the relative prices are exactly the same (when the rays coincide). In addition, PS_{ij}, is defined by a familiar formula:

$$[1] \quad PS_{ij} = \frac{\sum_k W_{kij} P_{ki} P_{kj}}{[\sum_k W_{kij} P_{ki}^{\ 2} \sum_k W_{kij} P_{kj}^{\ 2}]^{1/2}} \quad , \quad k=1,\dots,n$$

PS_{ij}, is a weighted raw correlation coefficient between the sets of relative prices of countries i and j. The w_{kij} weight factors take account of the relative importance of the individual goods in the total GDP of each of the two countries.[9] (Specifically, w_{kij}, is the geometric mean of the real shares of GDP of the k'th good in the i'th and j'th countries. $W_{kij} = (\ddot{E}_k q_{ki} \bullet \ddot{E}_k q_{kj})^{1/2}$ where $\ddot{E}_k$ is the international price of the k'th good.)

B. Price-Similarity Indexes for All Goods

Table 1 displays the PS_{ij}'s for the complete set of prices of 136 goods, both tradables and nontradables, in the 64 countries of the 1985 benchmark study. The countries are arrayed in ascending order of real GDP per capita as determined in the benchmark study. Since the full set of PS's forms a 64-by-64 symmetric matrix with 1's down the principal diagonal, only the upper triangle of the matrix is presented. One would expect that pairs of countries at the same stage of economic development (that is, pairs with similar GDPs per capita) would have high PS's and that pairs at different stages would have low PS's. This is borne out by even a casual comparison of the similarity indexes close to the principal diagonal of the matrix, where country pairs have similar incomes, with the entries far off of the principal diagonal, where country pairs have quite different incomes.[10] (Over 70 per cent of the 63 PS's along the first diagonal in from the principal diagonal are greater than 0.8; no PS in the 64-entry upper-right-hand corner is as great as 0.8.) This is a quite interesting finding, if not surprising, because it invites consideration of the possibility that such a pattern also exists over time as well in cross-sections.

C. Price Similarity Indexes of Tradables and Nontradables

Now we divide each country's 136-dimensional vector into two subvectors, the first containing the price-parities of only the 94 tradables and the other containing only the price-parities of the remaining 42 nontradables. Tables 2 and 3 display the price-similarity matrices, PS^T and PS^{NT}, for the two kinds of goods. How would one expect the entries of the two matrices to compare? If indeed trade does have its reputed price-equalizing effect, then the entries in the tradables matrix should be greater than corresponding nontradables entries. Going beyond that, the Belassa-Samuelson differential productivity hypothesis implies that the tradables-nontradables difference should be greater if the income difference between the countries is greater. But these expectations need not be taken as inevitable fact. In anticipation of the possibility that the data might not confirm the expectations, one should be ready to consider what factors can explain why international trade would not in fact lead to tradables price-similarity indexes dominating uniformly the nontradable indexes. An obvious possibility is that in the present study the goods have not been properly classified with respect to the tradable-nontradable dichotomy. Or that trade takes place in intermediate products primarily, so the final-goods dichotomy does not really display the effects of trade. Perhaps the tradables price-similarity indexes are not so great because market interventions of individual countries in the form of quotas and subsidies might have created barriers to the price equalizing effects of international trade on tradables. (Of course, this reduction is likely to be minimal for pairs of countries that have engaged in similar interventions.) Or perhaps pairs of countries at the same income level may have high price-similarity values for nontradables because the price structure for nontradables is heavily influenced by similar labor costs or other considerations associated with similar factor endowments. Enough speculation. What do the data show?

D. Are the Tradables Price-Similarities Greater Than the Nontradables Price-Similarities?

Tables 2 and 3 will be compared in a number of ways. First, we simply look at the averages of the entries in the two matrices. The mean PS for tradables is 0.793; for nontradables it is 0.761. The difference between the two, 0.032, is of the expected sign but it is small in size. However, the standard error of the difference between the means, 0.0034, is so small--after all, 2,016 observations is a large sample---that the associated Student-t statistic of 9.5 clearly calls for at least tentatively accepting the hypothesis that tradable price similarities are greater than nontradable price similarities.

Now consider a different way of analyzing the tables. We calculate for each country the average of its price-similarity measures with respect to all the other 63 countries, first for tradables and then for non-tradables. (Call the first average $A_I^T = [\sum PS_{ki}^{T}]/63$ and the second $A_i^{NT} = [\sum PS_{ki}^{NT}]/63$.) In 43 of the 64 countries, about two-thirds of the total, the price-similarity average for tradables, A_i^T, is greater than the corresponding average, A_I^{NT}. (That is, for 43 values of i, A_I^T exceeded A_I^{NT}.) Because the A_I's are not independent, the appropriate statistical test here is not obvious. To get a rough idea of what is going on though, a simple binomial test assuming independence can be performed. (In this case the binomial statistic probably should be compared with critical values greater than the ones ordinarily used from a normal curve table.) Since 43 "successes" have been observed out of

64 trials, the binomial test statistic, 2.75, certainly calls for rejecting the hypothesis that the price-similarities of tradables and nontradables are of the same size (but not at the porbability level implied by the usual binomial test.

E. Explaining the Differences Between Individual Values of PS_{ij}^{T} and PS_{ij}^{NT}

We go on to illuminate the likely patterns in the differences between PS_{ij}^{T} and PS_{ij}^{NT}. As argues above, there is a strong presumption that the differences are related to the incomes of the countries. Two approaches involving country incomes, on non-parametric and the other parametric, will be pursued. The term non-parametric refers here to an examination of the relationship between { PS_{ij}^{T}, PS_{ij}^{NT}} differences and {y_i, y_j} country incomes that assumes nothing about the functional form of the relationship. (In all that follows, incomes are GDP per capitas in 1985 international prices.) In the parametric case, a specific functional form is assumed.

1. Non-parametric examinations of the $ä_{ij}$ matrix of arithmetic differences between PS_{ij}^{T} and PS_{ij}^{NT}

a. Means of regions

Consider the half-matrix $ä_{ij,}$ defined by [2], displayed in Table 4.

[2] $ä_{ij} = PS_{ij}^{T} - PS_{ij}^{NT}$ $i < j$ and $i = 1,\dots,64$

Since the countries have been arranged in ascending order of income, $ä_{ij}$ can be partitioned into six regions as depicted in

Figure 1. The vector of 64 countries has been divided into three subvectors: (i) Low: the 21 poorest countries, beginning with Ethiopia and ending with Cameroons; (ii) Middle: the 22 middle-income countries, beginning with Egypt and ending with Spain; and (iii) High: the 21 countries with the highest incomes, beginning with Ireland and ending with the United States. ä$_{ij}$'s 6 regions then refer to pairs of poor countries (LL), pairs of middle-income countries (MM), pairs of rich countries (HH), and the three other possible combinations, (LM, LH, MH). Figure 1 displays three numbers for each region: $\bar{d}$, the average ä$_{ij}$, for the region; $S_{\bar{d}}$, an estimate of the standard error of $\overline{d_{ij}}$; and N, the number of country pairs within the region.

There is no mistaking the pattern in the figure. The difference between PS_{ij}^{T} and PS_{ij}^{NT} is minimal for middle-income pairs, high-income pairs, and middle-high-income pairs. Trade seems to make little difference for these country pairs. (In fact, the observed {PS_{ij}^{T}, PS_{ij}^{NT}} differences are <u>negative</u>, though small.) However, when a low-income country is a member of the pair, the story changes: the difference then is positive and substantial if the second member has a middle income, and even greater if the second member has a high income. The Student-t statistic, [d - O]/s_d], for each region suggests that (apart from noise, of course) the $\bar{d}$'s of the LH and LM regions are certainly positive; those of the MM are surely zero; but the remaining regions (LL, MH, and HH) are problematic. To put it another way, the confidence intervals derived from the $\bar{d}$'s and $s_{\bar{d}}$'s suggest that the economic significance of the observed mean differences is (i) pronounced if not great for LH and LM; marginal for LL (but LLs being next to economically and statistically significant regions rubs off on LL); unquestionably negligible for MM; and not more than marginal at best for MH and HH in view of their negative $\bar{d}$'s.

This preliminary look at the PS's through a fairly crude income prism is the equivalent of a non-parametric version of regression where all independent variables are dummies. A more conventional regression treatment will be presented below.

b. <u>Spatial autocorrelation</u>

If price similarity is associated with similarity in incomes, then a measure of correlation should capture this effect. Two such measures in common use are those of Geary [1954] and Moran [1948]. (See Aten [1994].) Essentially, the Geary and Moran statistics look at the autocorrelation of the income variable when the pairwise relation among the observations is ordered by another variable, the price similarity index. Geary takes the square of the differences between incomes, $(y_i-y_j)^2$ and uses the PS_{ij}s as the pairwise weights. If two countries have similar incomes---that is, the $(y_i-y_j)^2$'s are small---and their prices are also similar---that is, the PS_{ij}s are high---then this represents positive autocorrelation. This will show up in the Geary calibration in the form of a low value. If the incomes appear to be randomly distributed with respect to the price similarities, then Geary's value will equal 1. Moran uses the relative distances from the mean income, $\bar{y}$, namely $(y_i - \bar{y})(y_j - \bar{y})$. In the Moran case, the interpretation of the correlation coefficient is familiar: a Moran value near 1 indicates a strong positive relationship in which similar incomes go with similar prices and dissimilar incomes go with dissimilar prices; and a Moran value near -1 indicates a strong negative relationship. The Moran measure is particularly sensitive to extreme income values while the Geary measure is more sensitive to absolute differences in incomes. In general, if Geary and Moran are telling the same story, higher Moran values will be associated with lower Geary values, and vice-versa. When applied to the tradable and nontradable matrices, the Geary and Moran measures come out to be as follows:

	Geary	Moran
Tradables	.935	.079
Nontradables	.893	.115

Both measures indicate, as expected, that the connection between price similarity and income similarity is higher for nontradables than tradables.

2. A parametric examination of the d_{ij}, matrix of arithmetic differences between PS_{ij}^{T} and PS_{ij}^{NT}: regression analysis

In this section a parametric approach involving the somewhat rigid functional form restrictions of regression analysis will be carried out. To see the role of the incomes of the i'th and j'th countries in determining the magnitude of the d_{ij} elements, a regression was run to quantify the relationships specified in [3a] and [3b].

[3a] $d_{ij} = a(y_i / y_j) + by_j + my_i + e + u_{ij}$, $y_i > y_j$

[3b] $d_{ij} = a(y_i / y_j) + by_j + e + u_{ij}$, $y_i > y_j$

[3a] is simply a linear representation of the view that d is related to the difference between the incomes, defined multiplicatively by y_i/y_j,; the level of the countries' incomes, defined by y_j, the lower of the two incomes; and the interaction term between the difference and level effects, y_i. [3b] differs from [3a] by eliminating the interaction term. (Notice that a shoe was just dropped!) The estimated value of a

provides a basis for testing the conjecture that d_{ij} is likely to be greater for pairs of countries at different levels of income. (That is, that $a > 0$.) The y_j variable in [3a] and [3b] is there to control for the possibility that the effect on d of a given income difference might not be the same if both countries are relatively rich rather than both being relatively poor. The interaction term on the right side of [3a] is provided to take account of the possibility of a particular kind of non-linearity. The estimated versions of [3a] and [3b] are given in [3a'] and [3b']. The standard errors of the coefficients appear in parentheses below the coefficients.

[3a'] $d_{ij} = 0.004116(y_i / y_j) - 0.9590\times10^{-5} y_j + 0.0464\times10^{-5} y_i + 0.02717$
(0.738) $(0.2157\text{x}10^{-5})$ $(0.1398\text{x}10^{-5})$ (0.00676)

$R^2 = 0.0678$

[3b'] $d_{ij} = 0.004273(y_i / y_j) - 0.9096\times10^{-5} y_j + 0.02806$ $R^2 = 0.0678$
(0.000565) $(0.1560\text{x}10^{-5})$ (0.00620)

The estimates of a in [3a'] and [3b'], +0.004116 and +0.004273, have the expected sign, and their standard errors as reported on the assumption that the disturbance terms, m_{ij}, are independent is such as to make the Student-t values for $\hat{a}$ comfortably significant for the null hypothesis under consideration. The negative value of $\hat{b}$ indicates that d will be less for any specified percentage difference in income if the two countries are affluent rather than poor. The statistically insignificant value of the estimate of $\hat{m}$ in [3a'] justifies the dropping of the interaction term from the regression. (The second shoe just dropped!)

An acute reader will observe the absence of any reference in the text so far to a vital statistic reported in every regression output. The coefficient of determination, $\bar{R}^2$, tells what proportion of d's variation is explained by income difference and income level. Its values are very low, only 0.068, so clearly much has been left out of the explanation [3b] provides about d. Obvious candidates for inclusion in [3b] are the proximity of the two countries or trade flows between the two countries and with other countries. (A thorough analysis designed to get deeper into the essence of the trade flows would require an examination of transport costs, measures of trade barriers, customs unions, etc.). No attempt has been made to explore these avenues here, however. (A plea for further exploration is repeated in the "Concluding Remarks" of Section IV.)

III **An Alternative Similarity Measure**

An alternative to PS_{ij}, as a measure of price similarity, based on relative price variability will now be considered. Such a measure is widely used in the inflation literature as well as in studies of price structure. (See, for example, Allen and Diewert [1982]). If p_{ki} and p_{kj}, are the prices of the k'th good in the i'th and j'th countries, let P_{ij} be the average over all k of the price ratios P_{ki}/P_{kj}. The present approach to measuring price similarity is based on the variance of the difference between ln (p_{ki}/p_{kj}) and ln P_{ij}, using as weights in the computation the average expenditure for each good of all of the countries. The lower the value of each element, which is dimensionless in terms of currency units, the more similar is the price to the average of either tradables or nontradables. The measure has been estimated for all possible pairs of countries.

A feature of this index is that the variance of all price differences can be decomposed into that within the group of tradables and nontradables and between the two groups. Here we concentrate on only one feature of this analysis, the within-group means and variances. We expect the variance within tradables to be less than the variance within nontradables. These variances and associated means are reported in Table 5 for four ICP benchmark studies

First, the mean and variance of tradables is always less than that of nontradables. This then is consistent with the finding reported above. The mean and variance became larger in the successive benchmark studies. This is probably due to the introduction of more benchmark countries with a wider range of economic structures. In addition, the later entries into the

ICP studies probably had weaker statistical resources that led to price collections of lower quality and this introduced wider variance. (The number of African participants increased from 3 to 15 between 1975 and 1980, and then there was an increase of 3 more in 1985. Many of these countries have very diverse economic structures and very weak statistical systems.)

The results in Table 5 do not lend themselves to a simple analysis of variance test because a weighting system has been used for each heading entering into the index. In this regard, it should be clear that the weighting system imbedded in Table 5 is different from that used in calculating d. (The implications of pair-wise versus common weights requires exploration.) However, a simple sign test of the equality of medians for each country pair revealed that the tradables similarity index was significantly below that of nontradables; where tradable measures below those of nontradable are positive, the proportions were: 1970: 81.7 per cent; 1975: 91.8 per cent; 1980: 84.4 per cent; and 1985: 65.2 per cent. The lower value for 1985 is still significant, but it suggests that our analysis of the 1985 benchmark study based on the d matrix is working with the most difficult case.

IV Concluding Remarks

The expectation that tradable prices are more uniform across countries than nontradable ones was verified in the various empirical approaches described above. Working with price-similarity indexes or variance components, it was easy to see in broad-stroke terms that for the most part, the tradable indexes were greater than the nontradable ones. "For the most part" means there remains something to be accounted for, however, to reduce the inevitable "noise" in such relationships. It was found that country incomes provide a real if slight explanation for when the tradable-nontradable price-similarities are close together and when they are far apart. The empirical finding went beyond simply verifying that greater income differences give rise to greater tradable-nontradable index differences. It turns out that income level as well as income difference helps to explain index differences. The Belassa-Samuelson effect turns on income differences, but more empirical work is required to understand the level effect. The extent and character of a country's international trade certainly affects the price structure of its tradables versus that of its nontradables, and this is a prime area to focus on. Further investigation is needed to beef up the meager R^2's found in the income regressions.[11]

ENDNOTES

1. The ICP benchmark studies have been reported in Kravis, Kenessey, Heston, and Summers [1975] and Kravis, Heston, and Summers [1978] for 1970; Kravis, Heston, and Summers [1982] for 1975; United Nations and Eurostat [1986] for 1980; United Nations and Commission of the European Community [1994] for 1985; and Organization for Economic Co-operation and Development [1993] for 1990.

2. Particularly, see the work done on tradable vs. non-tradable prices in Kravis, Heston, and Summers [l982], pp. 191-195; Kravis and Lipsey [1988]; and Heston, Nuxoll, and Summers [1994].

3. We pass over the question of whether it would be better to use price parities derived from the production side of the national accounts. The answer turns on the nature of international trade. If most of it involved intermediate rather than final products, then the answer probably would be yes. In fact, the needed price parities for the production side are available for only a very small number of countries, so the question is moot.

4. Three of the 139 headings of the benchmark study (change in stocks, net expenditures of residents abroad, and the net foreign balance) can be negative. The calculation of the price parities for these categories is rather arbitrary so they have been excluded from these price-similarity indexes. The remaining 136 headings are divided between 94 tradable and 42 nontradable categories.

5. The adequacy of the classification procedure and its robustness with respect to minor differences in definitions was explored in Heston, Nuxoll, and Summers [1994] by considering some classification variations. The conclusions reached were not sensitive to the minor variations examined.

   In assessing any empirical conclusions that follow, the reader should bear in mind the critical characteristic of the tradables-vs-nontradables classification system: the goods of the ICP refer to final expenditures. Therefore, services here are those consumed as final products. Example: Legal services purchased by General Motors do not enter into the nontradable category; because they are intermediate products in the production of automobiles, they end up absorbed in the automobiles categories and as such they are counted as tradables. Commercial legal services will be embodied in tradables rather than nontradables if they are performed in industries producing tradables. (Note, however, the commonly quoted fact that Wall Street law firms contribute as much to the plus side of the United States balance of payments as, say, Boeing Aircraft.) Of course, legal services purchased by households are definitely counted as nontradables.

6. The overall tradable price parity was calculated as the value of all tradable expenditures denominated in national prices divided by the value denominated in international prices. The price-parity of nontradables was calculated in the same way.

7. Other variables besides income would have contributed to an explanation of the tradables-to-nontradables price parity relationship, of course. Nothing was done in Heston, Nuxoll, and Summers [1994] to look further into this.

8. The aggregate of nontradables includes sectors with widely different technologies. Furthermore, Summers' [1985] services demand study of a number of subgroupings of nontradable services found their income elasticities were not at all uniform. This provided the motivation to disaggregate in Heston, Nuxoll, and Summers [1994]. Were the relationships found for the price-parity averages also observable in the disaggregates? Specifically, were the slopes of the standardized {price-parity vs. income} regressions for the individual detailed categories of tradables predominately less than the regression slopes of the nontradable categories? The answers were yes and yes, but an unusual non-parametric test was required to show it.

9. One would not regard a difference in the relative prices of caviar in two countries to count for as much as an equal difference for milk. See Kravis, Heston, and Summers [1982] for a detailed description of how the weighting problem was handled differently in that previous work.

10. This 1985 finding was also found earlier. The price similarity matrix for the 34 countries of the 1975 benchmark study (see Kravis, Heston, and Summers [1982] (Table 9-1, pp. 352-3) also shows this.

11. As an illustration of the non-obvious things one might look into, consider the fact that a significant influence on the measured prices of nontradables is the use of input prices (namely, government salaries and compensation) to estimate output for the public sector. Government salary scales are likely to deviate more from market scales in low income countries. This means that the method of measuring

nontradable prices may make the perceived similarity for pairs of low income countries lower than for high income countries. An international trade consideration concerns trade barriers. Low and middle income countries tend to have more trade barriers than high income countries. This would cause tradable price similarities to be lower for pairs of low income countries than for high. It is not at all certain what the overall implications are of these and similar considerations.

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