

North–South terms-of-trade trends from 1960 to 2006

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The composition of exports of developing countries is increasingly dominated by manufactured goods. This has not changed the fact that their major trading partners continue to be the developed countries. In order to properly assess the distribution of gains from trade, there is a pressing need to analyze the movements in the terms of trade of developing countries with respect to the developed ones. A statistical analysis of the North–South terms of trade reveals that the terms of trade have turned against the South since the 1960s. However, the terms-of-trade deterioration is neither continuous nor evenly distributed over different country groupings. The existence of a structural break in the mid-to-late 1970s together with the greatest adverse terms-of-trade movements against the highly indebted and least developed countries attest the discontinuity and unevenness of this process.

Keywords: distribution of gains from trade; North–South terms of trade; Prebisch–Singer hypothesis; error correction models; long-run trend estimation

JEL Classifications: F14, F02

1. Introduction

The gains that an individual country can reap from international trade depend on the changes in its volume and product composition of trade, and the movements in its relative prices of tradable goods. As a measure of these movements, the trends in the barter terms of trade (the evolution of a country's export prices relative to import prices) play a crucial role in determining the distribution of gains from trade between trading partners.¹ An upward trend, for example, indicates a rising price of exports relative to imports, which can result in a higher net export revenue as long as the volume effects of this relative price change is low. Thus, improving terms of trade would increase net export earnings as long as the price elasticities of exports and imports are low. By contrast, a deterioration in the terms of trade of a country might result in relatively low gains from trade if its adverse effect is not offset by an increase in its net export volume. Still worse, the gains from trade might turn into real income losses if the negative impact from terms-of-trade deterioration outweighs the positive impact from the increase in the volume of exports. Therefore, the gains from trade do not accrue automatically and are far from being equally distributed, depending on the movements in the terms of trade and changes in export/import volumes.

Singer (1975) called for shifting the debate on the terms of trade from a focus on types of *commodities* to types of *countries* as empirically more relevant and theoretically more important. Analyses of trends in primary commodity prices relative to

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manufactures have a tendency to lose their empirical relevance in a world where the export composition of developing countries is increasingly dominated by manufactures. Nevertheless, few studies have actually focused on the empirics of terms of trade between developing and developed countries. From a theoretical standpoint, it is not possible to capture 'unequal exchange relations'² between the periphery and the center merely by using the relative prices of primary commodities, nor is it possible to evaluate the extent to which gains from technological improvements in the periphery are exported abroad.³

This paper empirically examines the evolution of the terms of trade of developing countries *vis-à-vis* developed countries. Beginning with a review of the literature on terms-of-trade debates, we highlight the distinctions between 'commodity terms of trade' and 'country terms of trade' and the importance of the choice of different time periods and different statistical estimation techniques to the results. The rest of the paper presents an analysis of the autoregressive dynamics of the North–South terms-of-trade series, including a test of time trends. A disaggregated analysis of terms-of-trade trends for a large number of developing country groupings provides evidence of substantial terms-of-trade deterioration over the time period 1960–2003/6. The concluding section presents a brief summary of the study's findings.

2. Literature review on the terms-of-trade controversy

By the end of World War II, the prevailing economic wisdom expected the developing country barter terms of trade to increase due to the rapid technological progress in industry relative to primary sectors, which would lower the relative prices of manufactures exported by the industrialized countries. This view was challenged by Prebisch and Singer in the early 1950s (Prebisch 1950; Singer 1950). They argued that the developing country terms of trade had a tendency to deteriorate, and they suggested a number of complementary reasons for this tendency. These reasons can be grouped into two types: those that are specific to *commodities* traded and those that are specific to trading *countries*.

The first commodity-specific factor leading to declining terms of trade for developing countries was the lower income elasticity of demand for primary products compared to that for commodities having higher technological content (commonly known as Engels Law). The second was the lower price elasticity of demand for primary products. These two factors combined implied that, as incomes grew, the demand for primary products would increase less rapidly than demand for manufactured goods, lowering the relative price of primary goods without increasing the quantity exported due to the lower price-elasticity. As a result, the total export earnings of developing countries would decrease. Third, most of the commodities exported by developing countries were substituted by synthetic products, which reduced their demand. Fourth, the output of developing countries was composed of products whose markets had low barriers to entry. These low barriers brought about a greater squeeze on profit margins relative to commodities which were harder to produce and more technology-intensive (Prebisch 1950, 1959, 1964; Singer 1950, 1975).

In addition to these commodity-specific determinants of terms of trade, Prebisch and Singer offered a number of country-specific factors. The first one concerned labor market differences between developing versus industrialized countries. They argued that the latter had tight labor markets and powerful trade unions. This ensured a cost-plus marking-up system of prices in the high-income countries. In contrast, the large

reserves of surplus labor in developing countries kept real wages low and close to subsistence. Consequently, their output prices had a tendency to rise much less in comparison to those of high-income countries. Secondly, the industrialized countries protected their domestic primary sectors against foreign competition, limiting the size of export markets. Finally, growth in developing countries required imports of manufactured goods, most importantly capital goods, in order to develop the industrial sector and infrastructure. When a large number of developing countries simultaneously increased their primary exports to finance imports of these goods, their terms of trade deteriorated further. This 'fallacy of composition' effect was (and is still) exacerbated by the practices of international lending agencies that encourage countries to increase exports, without much coordination between different programs (Singer 1998).

Prebisch and Singer would have preferred to examine the movements in the terms of trade originating from these country-specific factors underlying asymmetries between developing and advanced countries. Due to limitations of data, however, this was not possible at that time. Hence, they decided to measure the trends in unit values of manufactures *vis-à-vis* primary products as a proxy for the terms of trade between advanced and developing countries. It is important, however, to keep the distinction between 'commodity terms of trade' and 'country terms of trade' in mind.⁴ While the relative prices of primary commodities with respect to manufactures remains relevant for developing countries whose export earnings are based on a small number of primary commodities, developing countries as a group are not simply exporters of primary goods and importers of manufactured goods. The share of manufactured goods in developing countries' exports has risen from about 20% in 1980 to more than 70% in 2003 (UNCTAD 2005). But most of the trade of developing countries continues to be with developed countries. The data show that about 70% of the trade of low- and middle-income countries is with high-income countries (World Bank 2002).

As a result of these trends, the commodity terms of trade have increasingly diverged from the country terms of trade as the commodity composition of developing country exports has shifted towards manufactured goods. Moreover, the country terms of trade remain an important indicator of the relative price of traded goods between developing countries *vis-à-vis* developed ones since the major trading partners of most developing countries are the developed economies.

Since the original Prebisch–Singer thesis was formulated, the focus on commodity terms of trade has been the subject of extensive debate. One empirical question was the importance of the choice of sample period to the results. For example, Spraos (1980) confirmed the historical trend deterioration in Prebisch's series from 1876 to 1938 (albeit at a slower rate), but he found no significant trend deterioration if the period was extended to 1970. This finding implied that the time span chosen could be a major determinant of whether the declining trend in terms of trade would be observed.

A second empirical concern was the importance of the choice of statistical estimating techniques to the results. The emergence of new econometric tools, such as unit-root-testing and cointegration analysis, enabled authors such as Cuddington and Urzua (1989) to dispute earlier findings of a worsening in commodity terms of trade.⁵ They challenged the findings of Grilli and Yang (1988) on the grounds that the estimated series was non-stationary, which rendered the estimation of the trend invalid. The traditional log-linear trend equation, they argued, is only valid if the data-generating process is trend-stationary (or TS). Otherwise, they argued that the non-stationary series must be made stationary by using a difference-stationary (or DS) model. Employing a DS model, they estimated a trend rate that was not statistically different

from zero (Cuddington and Urzua 1989, 441). These results were disputed by Singer, Sapsford, and Sarkar (1992), who argued that Cuddington and Urzua's procedure of unit-root-testing was not appropriate because of their inclusion of many insignificant lagged periods of the dependent variable. The exclusion of these unnecessary variables, they showed, resulted in the rejection of the null-hypothesis of a unit root and an estimation of a declining trend.⁶

The country terms of trade was also subject to empirical testing, although by fewer studies. First, Kindleberger (1955: 290) estimated that the terms of trade of Western Europe improved by 50% *vis-à-vis* the less-developed areas outside of Europe. Second, Wilson et al. (1969) found that the least developed countries' terms of trade declined 10% from 1950 to 1965. Third, Sarkar (1986) estimated the trend deterioration in two price ratios: first, 0.51% per annum in the export prices of developing countries relative to those of developed countries; and second, 0.93% per annum in the prices of exports from developing to developed countries relative to the prices of imports from developed countries into developing countries.

Studies have also estimated the relationship between commodity and country terms of trade. Bleaney and Greenway (1993), for example, found that over the period 1955–89 a 1% deterioration in the primary products' terms of trade translated into a 0.3% deterioration in the terms of trade for developing countries as a whole. This effect is expected to be much greater for African and Latin American countries, which are more commodity-dependent than Asian countries in general.

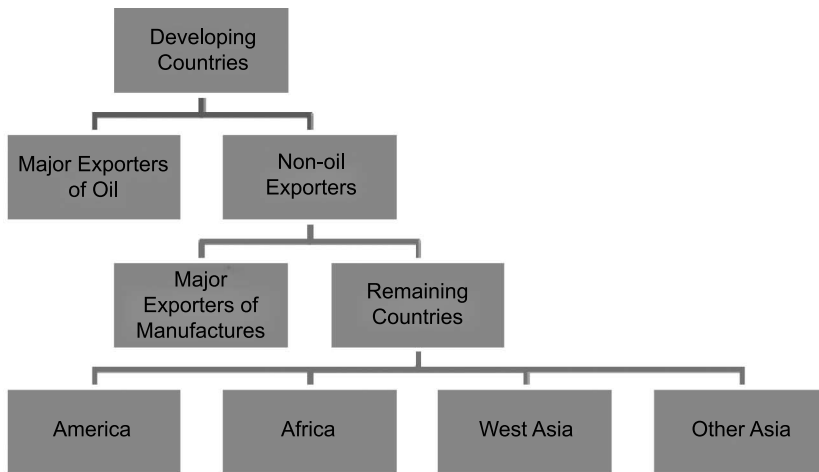
The empirical literature was also concerned with the commodity terms of trade of *manufactures* exported by developing countries relative to those exported by developed countries. Focusing on the period 1970–87, Sarkar and Singer (1991) found an annual decline of 1%, or a cumulative decline of 20%. These estimates were disputed by Athukorala (1993), who found no trend when he excluded the non-processed non-ferrous commodities (primary-commodity-based) from the category of manufactures. Replying to these criticisms, Sarkar and Singer (1993) regressed the trend rate of terms of trade against the share of non-ferrous metals in total manufactured exports, and found that cross-country variations in the latter did not explain the former.

Recent studies such as Kaplinsky (2006) and Ocampo and Vos (2008) present evidence in support of Sarkar and Singer's results. The fall in developing countries' terms of trade in manufactures is often attributed to 'more intense global competition for the specific types of manufactures typically produced by developing countries at early stages of their industrialization (i.e. low-skill, labor-intensive manufactures)' (UNCTAD 2005, 88). In particular, the fast export growth of these kinds of manufactures by China has made the competition in these markets more intense, pushing down relative prices (Kaplinsky 2006).

A final empirical question about the terms-of-trade analysis is whether to use cost insurance freight (cif) or free on board (fob) prices, since the inclusion or exclusion of transportation costs might substantially affect the movements in individual country terms of trade. As Hadass and Williamson (2002) have demonstrated, falling costs of transportation might reverse the decline in primary products' terms of trade.

3. Empirical analysis

This section examines the direction of movement in the terms of trade of the global South *vis-à-vis* the global North from 1960 to 2006 by employing an autoregressive model to estimate the long-run trend and test its significance. The global North and South refer



Memo Items:

- i) Least Developed Countries (LDCs)

Figure 1. Classification of developing countries based on export specialization and geographic location.

to the developed and developing economies respectively. The analysis is based on nine terms-of-trade indices, each corresponding to a separate category of developing countries, which are classified by the UNCTAD *Handbook of Statistics* according to their major export commodities and their geographic locations (see Figure 1).

First, the major oil-exporting countries are separated from the developing countries as a whole because their terms of trade depend completely on the changes in oil prices. Second, the rest of the developing countries – i.e., non-oil-exporting countries – are further divided into two categories: the major exporters of manufactures and remaining countries. Third, the remaining developing countries – i.e., non-oil- and non-major-manufacture-exporting countries – are grouped according to their geographic location: America; Africa; West Asia; and Other Asia. Fourth, there are two additional categories of countries in the UNCTAD classification under the name of ‘memo items’: the least developed countries (LDCs) and the highly indebted countries (HICs). The taxonomy of this classification is presented below.

The time period 1960–2006 was chosen solely on account of data availability for the country classification above.⁷ Moreover, each terms-of-trade index is a net-barter terms-of-trade index, calculated as the ratio of the unit value of exports to the unit value of imports. While the data for unit value of exports are reported on an fob basis, those for imports are reported on a cif basis (UNCTAD *Handbook of statistics* 2008).

Figure 2 overlays the aggregate terms of trade index for developing countries as a whole onto the terms-of-trade indices of oil exporters and non-oil exporters. The spikes in the aggregate index reflect the increases in the relative price of oil during the oil shocks of 1973 and 1978. Both oil shocks can be clearly seen from the upward movements in the series. Moreover, the following downward adjustment corresponds to the debt crisis after 1982 and the currency devaluations for the majority of indebted developing countries. Once the oil exporters are excluded from the sample of developing countries, a marked long-term downturn is noticeable in Figure 2.

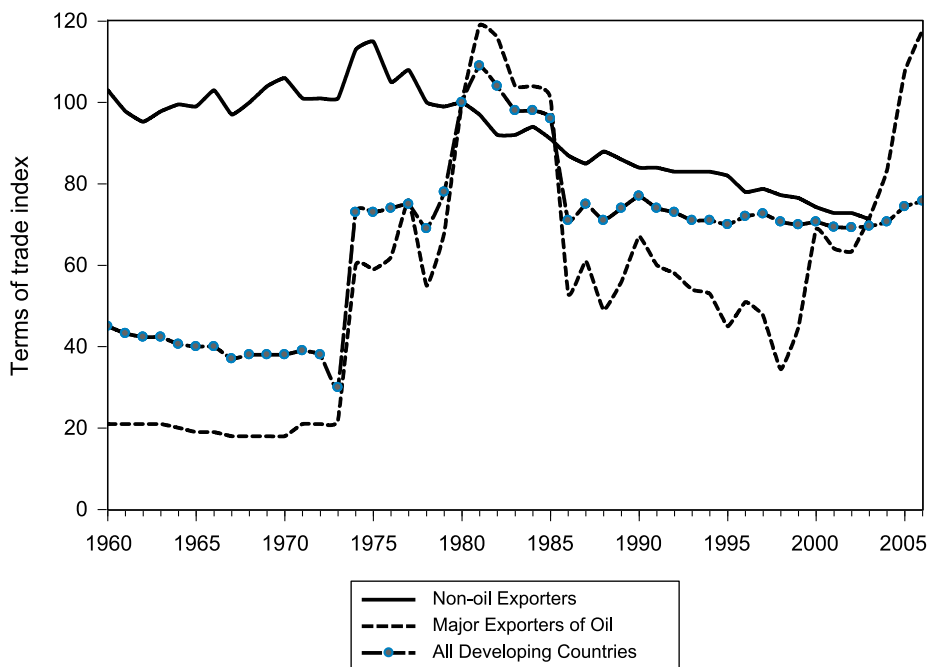


Figure 2. Terms of trade indices for all developing countries, oil exporters, and non-oil exporters, 1960–2003/6.

Source: UNCTAD Handbook of Statistics.

Figure 3 shows that the terms of trade of the major exporters of manufactures were significantly higher prior to the 1980s than that of remaining non-oil exporters. However, the index of the former group starts to decline more steeply than that of the latter and converges with it over time. This evidence reinforces the empirical findings of Sarkar and Singer (1991) that the commodity terms of trade of *manufactures* exported by developing countries relative to those exported by developed countries displayed a downward trend.

The visual inspection of the terms-of-trade series for various groups of countries from Figure 4 also suggests a prolonged declining trend over the period 1960–2003. In order to determine whether the terms of trade follows a negative trend over the long run, the methodology developed by Bleaney and Greenway (1993) and Razzaque, Osafa-Kwaako, and Grynberg (2007b) is implemented.⁸ Suppose that the behavior of net-barter terms of trade (NBTT) can be represented by an autoregressive model⁹ that includes a time trend:

$$\ln NBTT_t = a + bt + c \ln NBTT_{t-1} + u_t \quad (1)$$

where t is time and u is a white-noise disturbance term. By subtracting $\ln NBTT_{t-1}$ from each side, equation (1) becomes:

$$\Delta \ln NBTT_t = a + bt + \psi \ln NBTT_{t-1} + u_t \quad (2)$$

where $\psi = c - 1$. Equation (2) turns into an ideal error-correction model if ψ is negative, statistically significant and greater than -1 , (i.e., $-1 < \psi < 0$; Razzaque, Osafa-Kwaako,

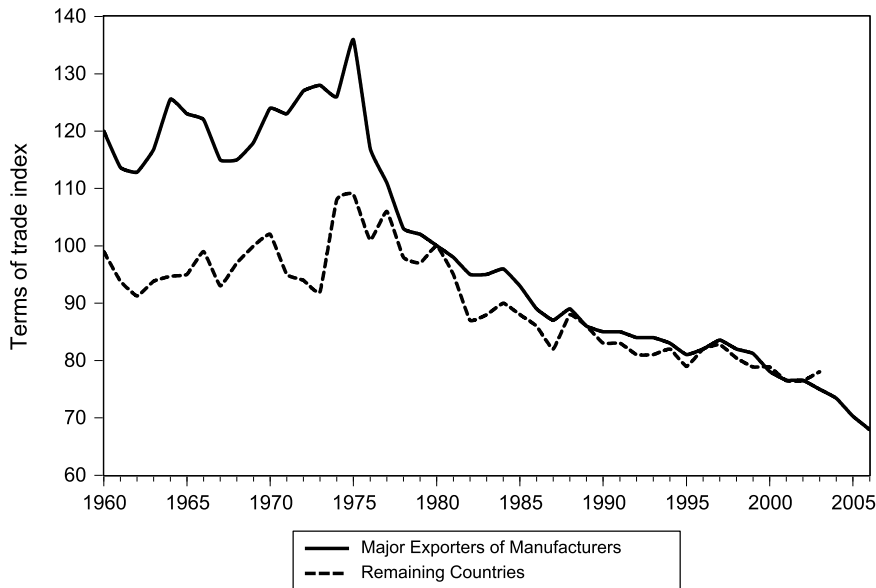


Figure 3. Terms of trade indices for major exporters of manufactures and remaining countries, 1960–2003.

Source: UNCTAD Handbook of Statistics.

and Grynberg 2007b, 37). If this is the case, the change in $\ln NBTT_t$ is negatively related to its current level, which will pull back the short-run deviations to the steady state long-run trend path. In contrast, if $\psi = 0$, $\ln NBTT_t$ would be a random walk with an increasing variance over time. The estimation results of equation (2) can be interpreted in the following fashion: if $b \neq 0$ and $\psi < 0$, $\ln NBTT_t$ has a non-zero deterministic trend, i.e., it has a long-run tendency to revert to a non-zero trend following any short-term disturbances; if $b \neq 0$ and $\psi = 0$, $\ln NBTT_t$ is a random walk with drift; in this case, a negative (positive) value estimated for b implies that it is more probable that $\ln NBTT_t$ will be smaller (greater) in the future compared to its current value. The combinations of the following conditions therefore provide empirical support for the declining trend hypothesis: (1) $b < 0$ and $\psi = 0$; (2) $b < 0$ and $\psi < 0$. An augmented version of equation (2) will be used as the estimation equation:

$$\Delta \ln NBTT_t = a + bt + \psi \ln NBTT_{t-1} + d \Delta \ln NBTT_{t-1} + v_t \quad (3)$$

This version follows the usual practice with Dickey–Fuller regressions by including the first-order lagged dependent variable (i.e., $\Delta \ln NBTT_{t-1}$) in equation (3) irrespective of its statistical significance. In addition, dummy variables are used to control for the sudden jumps in commodity prices. Most terms-of-trade indices have a clear peak around the mid-1970s. In order to control for these sharp terms-of-trade movements, the trend equations to be estimated have to include point dummy variables. The inclusion of these point dummy variables lets us pull the atypical data points towards the expected result for a normal year, defined by the trend equation.

Results reported in Table 1 show that the estimated coefficients of the trend variable are negative and statistically significant at the 5% level for all categories of



Figure 4. Terms of trade indices for the remaining countries disaggregated by region and economic groupings of LDCs and HICs, 1960–2003.

Source: UNCTAD Handbook of Statistics.

developing countries, i.e., $b < 0$. The lagged level dependent variable ($\ln NBTT_{t-1}$) is negative and less than zero for all the regressions. For all groups of countries except the LDCs and the remaining West Asian countries¹⁰, the t-ratio on $\ln NBTT_{t-1}$ is higher than the Dickey–Fuller critical value. Thus, we reject the null hypothesis of a unit root at least at the 10% level, which means that ψ is significantly different from zero. The combination of a negative trend coefficient with a negative lagged dependent variable, with both being significant, leads us to the case where $b < 0$ and $\psi < 0$. This implies that the terms of trade series has a long-run tendency to revert to a negative trend following any short-term disturbances. In order to determine the degree of the decline in terms of trade, it is necessary to calculate the long-term growth rate.

The last column of Table 1 displays the long-term growth rate in NBTT in percent per annum for each group of countries.¹¹ The rate is negative for all groups, ranging between -0.65 (for the remaining countries) and -2.19 (for the highly indebted countries, HICs). For all non-oil-exporting developing countries, the terms of trade has fallen at an annual rate of almost 1.5% from 1960 to 2003, which cumulatively

Table 1. Estimation results for different categories of developing countries (based on UNCTAD terms-of-trade indices, 1960–2003/6).

$\Delta \ln NBTT_t$	Constant	T	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-m}$	$\Delta \ln NBTT_{t-12}$	Dummies	Adj R^2	AIC	Serial corr.	White's Q	Trend (%)
Non-oil-exporting countries	6.160 (2.94)	-.0026 (-2.94)	-2271 (-2.50)	—	—	—	$D751: -.080$ (-1.95)	0.15	-161.08	1.722 (0.1894)	34.733 (0.015)	-1.15
	23.428 (4.93)	-.0099 (-4.86)	-.66866 (-4.50)	$\Delta \ln NBTT_{t-12}$ -.065(0.37)	—	—	$D751: -.073$ (-2.01)	0.46	-135.79	1.171 (0.2792)	16.265 (0.298)	-1.48
Major exporters of manufactures	10.67 (4.33)	-.0046 (-4.27)	-.3238 (-4.22)	—	—	—	$D751 -.132$ (-3.99)	0.36	-168.89	3.471 (0.0625)	20.042 (0.392)	-1.42
Remaining countries	5.349 (2.76)	-.002 (-2.51)	-.2916 (-2.87)	—	—	—	$D741 -.158$ (-4.43)	0.41	-157.79	8.283 (0.004)	29.78 (0.055)	-0.69
	6.285 (3.41)	-.0023 (-3.11)	-.3553 (-3.65)	—	—	—	$D74751 -.132$ (-4.98)	0.46	-161.49	0.462 (0.497)	26.47 (0.118)	-0.65
Remaining America	7.215 (2.60)	-.0029 (-2.40)	-.31778 (-2.82)	—	—	—	$D751 -.131$ (-2.49)	0.21	-112.60	0.017 (0.897)	24.347 (0.082)	-0.91
	8.297 (3.05)	-.0032 (-2.78)	-.3981 (-3.45)	—	—	—	$D75771 -.118$ (-3.03)	0.27	-115.39	0.268 (0.605)	15.93 (0.46)	-0.80
Remaining Africa	8.199 (2.81)	-.0031 (-2.53)	-.4047 (-3.32)	—	—	—	$D771 -.158$ (-3.08)	0.28	-112.85	1.769 (0.184)	18.19 (0.31)	-0.77
Remaining West Asia	7.711 (2.37)	-.0031 (-2.20)	-.3054 (-2.71)	—	—	—	$D731 -.178$ (-3.77)	0.36	-120.22	4.383 (0.036)	10.27 (0.85)	-1.02
	9.636 (2.04)	-.0039 (-1.88)	-.3892 (-2.53)	$\Delta \ln NBTT_{t-2, t-3, t-4, t-5}$	—	—	$D731 -.18$ (-3.40)	0.31	-98.86	1.334 (0.2481)	5.29 (0.98)	-0.99
Remaining Other Asia	14.17 (3.30)	-.0055 (-3.20)	-.7425 (-3.35)	—	—	—	$D731 .0774$ (1.38)	0.27	-106.64	11.22 (0.001)	11.20 (0.79)	-0.74
	13.108 (3.06)	-.0049 (-2.94)	-.70314 (-3.16)	—	—	—	—	0.25	-106.49	1.473 (0.225)	10.276 (0.852)	-0.71

Table 1. (Continued).

$\Delta \ln NBTT_t$	Constant	T	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-m}$	$\Delta \ln NBTT_{t-l}$	Dummies	Adj R^2	AIC	Serial corr.	White's Q	Trend (%)
LDCs	7.94 (2.50)	-.0035 (-2.42)	-.197 (-2.46)	—	-.096 (-0.65)	$D771$ -.182 (-3.53)	0.24	-130.65	1.685 (0.19)	13.12 (0.83)	-1.78
HICs	33.91 (4.34)	-.0155 (-4.30)	-.70664 (-4.44)	—	.34322 (2.15)	—	0.45	-77.80	0.75 (0.39)	9.3219 (0.502)	-2.19

Note: Figures within the parentheses under coefficients are t -ratios. Those under the test statistics of serial correlation and White's Q -statistic are p -values. The Dickey-Fuller critical values for the coefficient of $\ln NBTT_{t-1}$ at the 10, 5 and 1 percent levels are, respectively, -3.18, -3.50 and -4.15 for all series except HIC_t , which has 24 observations, and therefore the corresponding critical values for its $\ln NBTT_{t-1}$ are -3.24, -3.95 and -4.38. Variables with the letter 'D' indicate a point dummy variable. For example, $D751$ indicates a dummy variable with 0 for 1973 and 1 for all other years, and $D7577$ indicates a dummy variable with 0 for 1975 and 1977, and 1 for all other years.
The estimates of trends do not significantly change when the dummies are excluded from the estimation. The only changes that occur affect the stationarity of the series, i.e. some estimates might point to a non-stationarity in the time-series.

amounts to 47% from 1960 to 2006. The sharpest declines in NBTT are observed for the least developed countries (LDCs) and the highly indebted countries, declining respectively at the rates of -1.78 and -2.19% annually. The least deterioration is observed for the remaining countries as a whole: -0.65% . There is a notable contrast between the trend rates of major exporters of manufactures' NBTT and the remaining countries' NBTT. While the former index declined at the rate of 1.42 , the latter declined much less, 0.65% per annum. This evidence matches with our visual inspection of Figure 3, in which we noted the steeper decline of the NBTT of major exporters of manufactures.

The regression residuals are tested for serial correlation and normality. First, the Breusch–Godfrey serial correlation LM test results are reported under the column 'serial corr.' in Table 1. Residuals were found to be serially correlated for first regressions for West Asian and Other Asian countries' NBTT. This can be seen from the p-values below 5%, which implies rejection of the null hypothesis of no serial correlation. In the case of the West Asian NBTT, adding four additional lagged regressors, i.e., $\ln NBTT_{t-m}$, eliminated the problem of serial correlation, while in the case of Other Asian NBTT, leaving out the insignificant point dummy variable made the series serially uncorrelated. These second regressions are preferred specifications for making inferences. Second, the tests of normality are conducted using White's Q-statistic. Since these statistics are greater than 5% for all preferred specifications, i.e., the second regressions when there is a second one, we fail to reject the null hypothesis that the residuals from each regression are normally distributed. This also implies that the inferences drawn from these model specifications are valid.

In addition, we performed two kinds of structural break tests: exogenous and endogenous break tests (tests of unknown break dates). The results suggest the presence of structural breaks in the North–South terms-of-trade indices during the mid-to-late 1970s. In the case of the non-oil exporting developing countries, for example, the terms of trade increased by 0.77% per annum prior to 1975 and declined by 1.42% per annum after 1975. With a limited number of time series observations, however, structural break tests may not be conclusive and more research into this is needed. Nevertheless, from Figures 2–4, it can be observed that the terms-of-trade indices display breaks during mid-to-late 1970s.¹²

4. Concluding remarks

The controversy over the international terms of trade has predominantly focused on the commodity terms of trade – between primary commodities versus manufactures, or manufactures versus manufactures with different countries of origin. However, neither of these measures accommodates the changes in the commodity composition of developing country exports. While the first measure – the primary/manufactures terms of trade – is hardly relevant when the export bundle of developing countries is increasingly dominated by manufactured goods, the intra-manufacturing terms of trade completely ignores the primary commodities exported by the developing countries. These drawbacks arising from using different versions of commodity terms of trade can be avoided if the country terms of trade – that is, the terms of developing countries' trade *vis-à-vis* developed countries – are taken as the unit for measurement. This is especially the case if the aim is to adequately measure the extent to which gains from trade are unevenly distributed between the global North and South.

Our review of the literature also shows that empirical inferences concerning the trend in the terms of trade have been strongly shaped by the particular time-series techniques used. In order to avoid pitfalls in unit-root testing, this paper employs a more general specification of the trend equation, which allows us to proceed without *a priori* testing of the variables for unit roots. The results of the econometric analysis concerning nine North–South terms of trade indices reveals that the terms of trade have turned against the South since the 1960s. However, the terms-of-trade deterioration is neither continuous nor evenly distributed over different country groupings. Further analysis of the data provides evidence of structural break around the mid-to-late 1970s in the South–North terms of trade, which deteriorated at a rate of almost 1.5 % per year during the post-break period. Cumulatively, this amounts to a decline of 47% from 1960 to 2006 – the most striking finding to date in support of the dynamic unequal exchange thesis.

The terms-of-trade deterioration was not evenly distributed across countries. First, the highest rates of decline in terms of trade are observed for the least developed and highly indebted countries: –1.78 % and –2.19 % per annum respectively.¹³ Moreover, the terms of trade for major exporters of manufactures deteriorated much more severely than for the rest of the non-oil exporting developing countries. This supports the view that manufactured exports are not immune to falling relative prices (Singer and Sarkar 1991; Kaplinsky 2006). Within the country group of non-major exporters of oil and manufactures (or the remaining countries), the terms of trade for developing countries in America exhibits greater deterioration compared to terms of trade for the developing countries in Other Asia. In all, then, these findings point to a highly differentiated and uneven process of development that is partly structured by international trade relations.

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Notes

1. The term ‘terms of trade’ always refers to the ‘barter terms of trade’ unless otherwise stated.
2. This concept is used in the way it was developed by Sarkar and Singer (1991). It is concerned with the relative distribution of gains from trade between the center and the periphery.
3. For evidence, see Lall (1998).
4. See Singer (1975) for the theoretical importance of ‘country terms of trade’ versus ‘commodity terms of trade’.
5. For a detailed review of these empirical debates, see Razzaque, Osafa-Kwaako, and Grynberg (2007a). Diakosavvas and Scandizzo (1991) also provide a review of the earlier literature.
6. For a more recent study of developing countries commodity terms-of-trade trends, see Ram (2004).
7. Note that this time period is valid for three terms-of-trade indices of developing countries: developing countries as a whole; the major exporters of oil; and major exporters of manufactures. For the rest of the indices (with the exception of HICs), the time period covers 1960 to 2003. For the category of highly indebted countries (HICs), the time range is from 1978 to 2003.
8. The reason for choosing this methodology is to avoid the loss of power from unit root tests, and to be able to determine the long-run trend of the series for cases where the null hypothesis of a unit root is rejected.

9. The trend equation is an extension of the linear trend equation, e.g., $\ln Y_t = a + bT + u_t$, whereby the growth rate for the dependent variable Y per time period T is given by the coefficient b .
10. For these groups' terms of trade, we fail to reject the null hypothesis of unit root, i.e., $\psi = 0$. However, as we noted before, the case where $b < 0$ and $\psi = 0$ also provides empirical evidence for the deterioration in net barter terms-of-trade.
11. In equation (2), $\Delta \ln NBTT_t = a + bt + \psi \ln NBTT_{t-1} + u_t$, b is the time trend. However, the trend affects prior values of $NBTT$, which because of the lagged term affect subsequent values of $NBTT$. Thus, the trend has two effects: a direct effect on $NBTT$ (coefficient b) and an indirect effect through the lagged values of $NBTT$. To calculate the long-term trend, we assume that equation (2) is equilibrium in the long run, meaning that $\ln NBTT_t = \ln NBTT_{t-1}$. Then, the change in $\ln NBTT_t$ would be zero: $0 = a + bt + \psi \ln NBTT^{t-1} + u_t$. Replacing $\ln NBTT_{t-1}$ by $\ln NBTT_t$, we obtain $0 = a + bt + \psi \ln NBTT_t + u_t$, which can be rearranged as $-\psi \ln NBTT_t = a + bt + u_t$, or $\ln NBTT_t = (a/-\psi) + (b/-\psi)t + u_t$. The coefficient on the trend variable is the long-run trend rate: $(b/-\psi)$.
12. The detailed results of the structural break tests are available on request.
13. Note here that the criteria for inclusion in the memo item groupings exert a downward bias in the terms-of-trade movement since a decline in terms of trade is one contributor to being a poor or highly indebted country.

References

- Athukorala, P. 1993. Manufactured exports from developing countries and their terms of trade: A re-examination of Sarkar-Singer results. *World Development* 21, no. 10: 1607–13.
- Bleaney, M.F., and D. Greenway. 1993. Long-run trends in the relative price of primary commodities and in the terms of trade of less developed countries. *Oxford Economic Papers* 45: 349–63.
- Cuddington, J.T., and C.M. Urzua. 1989. Trends and cycles in the net barter terms of trade: A new approach. *Economic Journal* 99: 426–32.
- Diakosavvas, D., and P.L. Scandizzo. 1991. Trends in the terms of trade of primary commodities, 1900–1982: The controversy and its origins. *Economic Development and Cultural Change* 39, no. 2: 231–64.
- Grilli, E.R., and M.C. Yang. 1988. Primary commodity prices, manufactured goods prices, and the terms of trade of developing countries: What the long run shows. *World Bank Economic Review* 2, no. 1: 1–47.
- Hadass, Y., and J. Williamson. 2002. Terms of trade shocks and economic performance 1870–1940: Prebisch and Singer revisited. NBER working paper, no. W8188, March 2001.
- Kaplinsky, R. 2006. Revisiting the revisited terms of trade: Will China make a difference? *World Development* 34, no. 6: 981–95.
- Kindleberger, C.P. 1955. Comment. *American Economic Review* 45(supp.): 6–10.
- Lall, S. 1998. Exports of manufactures by developing countries: Emerging patterns of trade and location. *Oxford Review of Economic Policy* 11, no. 2: 54–73.
- Ocampo, J.A., and R. Vos. 2008. *Uneven economic development*. London and New York: Zed Books.
- Prebisch, R. 1950. *The economic development of Latin America and its principal problems*. New York: United Nations.
- Prebisch, R. 1959. Commercial policy in the underdeveloped countries. *American Economic Review* 49, no. 2: 251–73.
- Prebisch, R. 1964. *Towards a new trade policy for development*. New York: United Nations.
- Ram, R. 2004. Trends in developing countries' commodity terms-of-trade since 1970. *Review of Radical Political Economics* 36, no. 2: 241–53.
- Razzaque, M., P. Osafa-Kwaako, and R. Grynberg. 2007a. Secular decline in relative commodity prices: A brief review of the literature. In *Commodity prices and development*, ed. R. Grynberg and S. Newton, 17–34. New York: Oxford University Press.

- Razzaque, M., P. Osafa-Kwaako, and R. Grynberg. 2007b. Long-run trend in the relative price: empirical estimation for individual commodities. In *Commodity prices and development*, ed. R. Grynberg and S. Newton, 35–67. New York: Oxford University Press.
- Sarkar, P. 1986. The Singer–Prebisch hypothesis: A statistical evaluation. *Cambridge Journal of Economics* 10: 355–71.
- Sarkar, P., and H.W. Singer. 1991. Manufactured exports of developing countries and their terms of trade since 1965. *World Development* 19, no. 4: 333–40.
- Sarkar, P., and H.W. Singer. 1993. Manufacture–manufacture terms of trade deterioration: A response. *World Development* 21, no. 10: 617–20.
- Singer, H.W. 1950. The distribution of gains between investing and borrowing countries. *American Economic Review* 40: 473–85.
- Singer, H.W. 1975. The distribution of gains revisited. In *The strategy of international development*, ed. H.W. Singer, 376–82. London: Macmillan.
- Singer, H.W. 1998/ Terms of trade fifty years later: Convergence or divergence. *Zagreb International Review of Economics and Business* 1, no. 1: 13–25.
- Singer, H.W., D. Sapsford, and P. Sarkar. 1992. The Prebisch–Singer terms of trade controversy revisited. *Journal of International Development* 4, no. 3: 315–32.
- Spraos, J. 1980. The statistical debate on the net barter terms of trade between primary commodities and manufactures. *Economic Journal* 90: 107–28.
- UNCTAD. *Handbook of statistics*, published by UNCTAD annually.
- UNCTAD. 2005. *Trade and development report, 2005: New features of global interdependence*. New York and Geneva: United Nations.
- Wilson, T. et al. 1969. The income terms of trade for developed and developing countries. *Economic Journal* 79, December: 213–32.
- World Bank. 2002. *World development indicators: 2002*. Washington, DC: World Bank.