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# A Cautionary Note on the Use of Exchange Rate Indicators *

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## Abstract

The paper reviews the basis for the use of various popular exchange rate indicators by tracing their conceptual development, the links between these indicators, and how they are measured in actual practice. It also considers the difficulties often encountered in attempting to obtain empirical counterparts to the various concepts and the limitations on the use of indicators likely to arise therefrom. The paper illustrates the behavior of various exchange rate indicators using data for Colombia and Kenya.

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# I.  Introduction

In operational work on assessing exchange rate policies, extensive use is made of various types of indicators.  These indicators take on a variety of shapes, forms, and nomenclature.  There are purchasing power parity indicators, real effective exchange rate indices based on trade model considerations, and relative price indicators (generally the price of nontradables relative to that of tradables).

However, in practice it is often not clear what a particular indicator is supposed to be measuring both from a conceptual and empirical viewpoint, a factor which presents difficulties in determining both the usefulness and the limitations of employing the indicators.  Several authors have noted, for example, that the term "real" exchange rate is often used quite loosely which can lead to misunderstandings and lack of clarity. 1/  The purpose of this paper is to review the basis for the use of various indicators by tracing their conceptual development and practical application and to discuss the limitations arising therefrom.  Section II examines relative purchasing power parity as an indicator for assessing exchange rate policy.  Section III looks at the development of exchange rate indicators based on trade models, while Section IV examines the real exchange rate defined as the relative price between tradables and non-tradables.  These sections trace the links between conceptual developments and the empirical counterparts of the three types of exchange rate indicators.  As the chief concern of the paper is on applications to developing countries, Section V looks at some examples of the behavior of various indicators in Colombia and Kenya.  Section VI offers some concluding remarks.

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1/  See, for example, Harberger (1986) and Edwards (1989).

## II.  Relative Purchasing Power Parity

The basis for the indicator with the longest pedigree is that of
relative purchasing power parity (PPP). 1/  A key element underpinning
relative PPP is that commodity arbitrage will, at any given level of the
exchange rate, tend to equalize over time the prices of traded goods across
countries after due allowance is made for transportation and transactions
costs, and tariffs.

While commodity arbitrage and substitution possibilities link exchange
rates and traded goods prices, countries also produce and consume nontraded
goods, with the internal relative price of traded and nontraded goods being
determined in equilibrium by real factors such as preferences and factor
endowments.  The central tenet of relative PPP is that the exchange rate
will be proportional to the ratio of money price levels (including both
traded and nontraded goods) between countries, that is to the relative
purchasing power of national currencies. 2/

The determinants of the national price levels will be the monetary
policies pursued in each country and equilibrium in money markets requires
equality of money demand to money supply in each country.  Money supply
shocks should not have permanent effects on the proportionality factor
that links the price indexes or on the factors (such as relative price
vectors and real income or wealth) entering the long-run money demand
functions.  Thus, relative PPP is seen as a suitable indicator of how the
exchange rate between currencies should evolve, with the change in the

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1/  For an account of the development of PPP, see Dornbush (1987).
2/  Only relative PPP is considered here.  Absolute PPP requires a
proportionality factor equal to one.  For a critique of the usefulness of
absolute PPP, see Samuelson (1964).

exchange rate being determined by relative money supply shocks or monetary growth.

The above outline of relative PPP emphasizes the now generally understood proposition that relative PPP is expected to hold only when purely monetary disturbances take place that alter general price levels. Thus, relative PPP is related closely to the quantity theory of money and the long-run neutrality of money, and is subject to the same qualifications. It should be noted, however, that although the proportionality factor is not likely to be permanently affected by monetary shocks, it may shift over time due to non-monetary factors. 1/ It has been suggested, for example, that differential productivity growth in the course of economic development between the traded and nontraded goods sectors could be a source of systematic deviation from relative PPP. 2/ Similarly, money demand functions may shift secularly due to non-monetary factors such as changes in transactions technology.

With the emphasis on the conduct of national monetary policies, it is clear that relative PPP would normally be considered in terms of some general price index for each country which includes both traded and nontraded goods. 3/ For many developing countries the choice is usually limited to the GDP deflator and the consumer price index, with the latter

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1/ Since the neutrality of money is a long-run proposition, the proportionality factor may respond in the short run to monetary shocks.
2/ This is the well-known "Balassa effect". See Balassa (1964) and Samuelson (1964).
3/ Using price indexes for traded goods would generally not be appropriate since this would amount to testing the arbitrage condition in the aggregate and not the relative PPP postulate. A closely related point is that monetary policy usually targets the behavior of some general price index rather than some subset of prices.

generally preferred on grounds of timely availability and higher frequency of observation. However, the variable weight GDP deflator would be more faithful to relative PPP than the fixed weight CPI. In some cases, a wholesale price index may be available, but in a number of developing countries such indices tend to be dominated by imported goods and thus do not satisfy the coverage criterion. Whatever domestic price index is chosen, it seems appropriate for the PPP indicator to be calculated using similar types of foreign price indexes.

The application of relative PPP is usually based on using actual exchange rate data to compute a comparison of relative price levels. This generally amounts in a multilateral world to applying an aggregation procedure to exchange rate and price indexes and computing the change in a real effective exchange rate. The question of the appropriate weighing scheme admits of no simple answer for the relative PPP indicator, since the transmission mechanism is not fully specified. 1/ While trade flows and arbitrage are important elements of the postulate, relative PPP relies in major part on longer-term adjustment to asset market disturbances, in which case the largest weights could be assigned to those foreign countries whose monetary policies count most towards determining the "world's" secular rate of inflation. An alternative, then, to the more commonly used country specific trade-weighted schemes would be some scheme based on the monetary role of the major countries. An SDR-weighted index could be defended on these grounds, as could an index whose weights were based on the GDPs of

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1/ This contrasts, for example, to trade model-based effective exchange rate indicators where the transmission mechanism is more clearly specified and the analysis often extends to considering internal and external balance as targets influenced by exchange rate behavior.

various industrialized countries. However, in cases where trade and asset market links to one major country or subset of major countries are particularly strong, this fact may argue for a tailor-made index.

If the exchange rate indicator so computed were to show a sustained movement away from some initial value, this could be taken as an indication that the exchange rate has diverged from its equilibrium relative PPP value. It should be noted that this statement of relative PPP does not necessarily imply any direction of causation between prices and exchange rates; under a floating exchange rate regime, both exchange rates and prices may be considered endogenous variables jointly dependent on relative money supplies. To the extent that many developing countries have adopted exchange arrangements where the nominal exchange rate is predetermined or managed by the monetary authorities, this choice of regime endogenizes monetary policy. Thus, for example, under a pegged exchange rate arrangement, expansionary credit policies which are inconsistent with the peg produce higher inflation over time and a sustained deviation in the relative PPP indicator. In such a case, it is the inconsistency which brings about relative price shifts between different goods and sectors in the economy, thus bringing about changes in external balance. And it is these relative price shifts which embody changes in external "competitiveness", providing the impetus and rationale for developing indicators directly bearing that name.

The relative PPP postulate relates nominal exchange rates and relative money supplies, but it does not imply that other factors do not influence nominal exchange rates and prices. Thus, in applying relative PPP as a diagnostic indicator, particularly in the case of "managed" exchange rate

arrangements, it is important to determine that it is non-transitory shocks or divergences in monetary policies that are being considered. 1/ Thus, in diagnostic use it is insufficient to establish that the relative PPP indicator has diverged (or is likely to diverge) from some initial value without an examination of the underlying monetary or domestic credit policies being pursued by a country's monetary authorities and the possibility that observable real shocks may have occurred. In adjustable-peg exchange arrangements, the relative PPP indicators may best be viewed as one tool to check on the broad consistency of monetary policy with the chosen arrangement.

### III. Indicators Based on Trade Model Considerations

A second major strand in the development of indicators used in exchange rate analysis can be traced back to the late 1960s and early 1970s to the interest in modeling multilateral trade, particularly in an international monetary system that was not to be based on occasionally adjustable parities as under the Bretton Woods system. The outgrowth of this interest was the development of effective exchange rate indices which attempted to distill the impact of multilateral exchange rate movements on particular target variables.

An important element in the approach taken towards modeling trade flows was the development of an imperfect substitutes model based on the pioneering work of Armington (1969). In such models traded goods are generally distinguished not only by kind but also by their place of

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1/ A related point is that differing degrees of price "stickiness" across countries may also make the indicator subject to significant noise.

production with a less than infinite rate of substitution between supplies originating from different sources. In trade for different kinds of goods, "products" are differentiated and markets are seen as being imperfectly competitive with non-transitory price differentials between different markets and producers being observed in the short to medium term. Unlike the "perfect substitutes" or homogeneous goods model where prices are likely to be arbitraged relatively quickly and be flexible, these classes of traded goods are characterized as having sticky prices and have been referred to as Hicksian fix- as opposed to flex-price goods.

In early development, attention was primarily focused on the implications of multilateral exchange rate changes for the trade or current account balance, and in most instances exchange rate changes were treated as exogenous developments in trade models. The exchange rate changes altered relative prices <u>between</u> traded goods, thereby affecting competitiveness between countries in their traded goods sectors. The Multilateral Exchange Rate Model (MERM), due primarily to Artus and Rhomberg (1973) and Artus and McGuirk (1981), was perhaps the most explicit attempt to model the trading system in a general equilibrium framework. The model was quite a large one dealing with trade flows in five (six in the 1981 version) commodity groupings among eighteen industrialized countries, the oil-exporting countries, and the rest of the world. For each country or country grouping, the demand for and supply of traded goods and nontraded goods were specified, and specific feedthrough and feedback effects between exchange rate changes and domestic prices and costs were assumed. In order to isolate the effect of exchange rate changes, a specific set of assumptions about demand-management policies in each country was adopted, in general

that of keeping real output constant. Thus, it should be emphasized that the model sharply focused on exchange rate "shocks" or movements and not on other variables that contribute to changes in prices for traded goods. Simulations with the model using plausible parameter values from the empirical literature provided the information necessary to derive weights for effective exchange rate indicators focusing on the trade balance. It should be pointed out that the MERM concentrated on nominal exchange rate changes for a given set of feedback assumptions from exchange rates to domestic prices and costs, so that the implied "real" exchange rate changes were less than the simulated nominal ones.

The question of extending the general equilibrium simulation framework of MERM to encompass more individual countries and greater commodity disaggregation presented obvious difficulties in terms of feasibility and tractability. Subsequent development of trade model-based types of effective exchange rate indicators for developing countries was largely based therefore on substantial (or even drastic) simplifications to the MERM-type framework. Black (1976) and Branson and Katseli (1981), for example, specified simple elasticity models of aggregate trade and used them for deriving weights for trade balance-oriented indicators. Branson and Katseli (1981) also considered potential targets other than the trade balance as the basis for the indicators, a possibility attention had been drawn to much earlier by Rhomberg (1976). Drawing on relative purchasing power parity, it was also recognized that exchange rates could become overvalued if exchange rate changes did not compensate for underlying price and cost developments, and thus Branson and Katseli (1982), for example, incorporated deflators in their simple structural trade model so that the

reduced form solution was in terms of deflator-adjusted or "real" effective exchange rates.

It should also be noted that the price terms in the real exchange rate indicator viewed from the trade model perspective represent deflators that might appear in export supply and import demand equations to define relative prices. They should not be viewed as proxies for traded goods prices and as part of a cross-country comparison of such prices, although (as will be considered further below) there are a set of indicators produced by the Fund whose development was primarily based on this objective. Arguments can be made for the use of several types of deflators, but for most developing countries it is usually necessary (by default) to use an overall value-added deflator or, when greater frequency of observation is required, a consumer price or some such similar index. In general, these type of indicators are designed to yield summary information on the likely impact of multilateral exchange rate and relative inflation performance on a country's traded goods sector and its ability to compete internationally. The indicators are on occasion used to try and make inferences about trade sector profitability or how the relative price between tradables and nontradables has moved, but, as they are not designed to do so, the use of the indicators in such a fashion is unlikely to be helpful. 1/

Even with simplifications, however, the derived weights from the reduced form solutions to the models often turned out to require demand and supply elasticity estimates as well as direction of trade data. As a result simple weighing schemes have generally been adopted based on the direction

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1/ For a critique of such indicators if used in this fashion, see Lipschitz and McDonald (1991).

of trade, modified on occasion to try to take into account the nature of trade in particular commodities and the effective competition in various markets and products. 1/ There is a presumption that attempting to take account in the weighing scheme of some of the implications yielded by general equilibrium models should yield "better" exchange rate indicators. It seems reasonable to posit, for example, that an indicator that takes account of competitors in third markets as well as the trading partners themselves should have a higher informational content than one that does not. But, relatively little work has been done on examining the relationship between variously weighted indicators and target variables, such as the trade balance. 2/ In general, however, it has been established ex-post that changes in effective exchange rate indicators, particularly those adjusted by the same aggregate price or cost changes (i.e., real effective exchange rate indicators), have generally been quite highly correlated across various weighing schemes, although this does not necessarily imply that the various indices change in an equiproportionate way.

For industrialized countries, a series of additional indicators have been developed aimed at providing information on the price competitiveness of trade in manufactured products. As expounded by McGuirk (1987), the indicators, which are regularly published in the Fund's International Financial Statistics, are based on an Armington-type system of demand equations in which exchange rate-induced relative price changes lead to shifts in demand between suppliers, and there was no notion that the

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1/ See, for example, Wickham (1987).
2/ See, however, Marquez (1992).

indicators would provide information on profitability or changes in relative prices in the domestic economy between tradable and nontradable goods. 1/ With a dearth of reliable information on product prices at a disaggregated level, it was posited that such series as export unit values, GDP deflators, or, based on mark-up pricing, unit labor costs might provide useful proxies if used with appropriate caution. Under a set of simplifying assumptions as to substitution possibilities, McGuirk was able to obtain a weighing scheme that was parameter free and which was based on disaggregated trade, consumption, and production data. However, lack of data has prevented these types of indicators being developed for most developing countries.

## IV. The Relative Price of Tradables to Nontradables

A third major strand in the development of exchange rate indicators has been the recognition that a key relative price in the economy is that between tradables and nontradables. This relative price ratio has attracted so much attention in the literature that it is often referred to as "the" real exchange rate. The central postulate is that the ratio represents the domestic cost of consuming and producing tradable goods and is a summary measure of the incentives guiding resource allocation between the two major sectors of an economy. If the price of tradables rises relative to the price of nontradables, resources will be reallocated towards the tradable goods sector with the trade balance improving accordingly, i.e.,

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1/ It is implicitly assumed that supply elasticities are infinite.

competitiveness will improve. 1/ The popularity of the concept can be
traced to the fact that for most small open economies, the prices of
tradable goods can be considered to be exogenously given in foreign currency
terms (with the nominal exchange rate translating these prices into domestic
currency terms), and that for the analysis of certain policy issues, in
particular the repercussions of domestic policy for internal and external
balance, the two sector framework can prove extremely useful.

The exogeneity of the terms of trade means for a number of analytical
purposes that exportables and importables can be treated as a composite good
called tradables in the so-called dependent economy model. This may be the
case, for example, when the focus of attention is on the repercussions of
domestic monetary and fiscal policy shocks for internal and external
balance, given the external environment of the terms of trade. For other
purposes, however, it is necessary to treat exportables and importables
separately and use a three-sector framework (exportables, importables, and
nontradables). 2/ This will the case, for example, when it is desirable
to focus on the impact and adjustment to a shock such as the effects of
import price liberalization or a change in the terms of trade. For while
the terms of trade may be exogenously given to a small open economy, they
are not constant; and, if terms of trade shifts are an important source of
internal and external balance difficulties for developing countries, then it
is important to try to integrate such shifts into diagnostic indicators, or

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1/ Whether the real exchange rate is defined as the ratio of tradeable
goods prices to those of nontradables or vice versa is a matter of habit
and/or preference. If one defines an upward movement as an appreciation, a
deterioration in competitiveness would represent an increase in the ratio of
nontradable goods prices to tradable goods prices.
2/ See, for example, Khan and Montiel (1987).

at a minimum recognize the limitations inherent in the use of particular
indicators. 1/

In any event, a serious practical problem in applying the framework to
the development of indicators is the difficulty in obtaining reliable data
on tradable and nontradable prices in most developing countries. A further
difficulty is that of decomposing any such data into its various underlying
determinants such as foreign prices and exchange rates. For some countries
it may be possible to break down the composition of available price
deflators or other indexes into elements which represent tradable and
nontradable goods. Thus, sectoral value-added deflators from the national
accounts may be useful as may export and import price indexes or component
elements of the consumer price index. Wage indices may also provide
valuable information on how nontradable prices are likely to have evolved.
It should be noted that in these instances it is not necessary to compute a
real effective exchange rate index as the data are directly expressed in
domestic currency terms. However, even if these data are available it may
not be straightforward to make the backward decomposition which assists in
the diagnostics. Thus, it is often useful to break down the domestic price
of tradables into the border price of tradables in terms of foreign
currency, the conversion of this border price into domestic currency terms
via the nominal exchange rate, and the effect of taxes (ad valorem and
specific) or tariff rates. However, if (implicit or explicit) taxes or
tariffs differ across sectors or between different goods, it may be

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1/ Exportable prices may rise and importable prices fall leaving the
composite good index unchanged. Yet, an improvement in the trade balance
would be expected, as supply incentives, for example, would clearly change
between the export and import-substituting sectors.

difficult to aggregate without suffering information loss. But while aggregates have their virtues, in many developing countries with specialized productive structures it is often worthwhile looking at sector- or good-specific relative price indicators to aid in assessment.

It is often the case, however, that investigators seek to avoid the problems inherent in the above approach and pursue a less resource-intensive method of trying to approximate the real exchange rate. In essence the approximation consists of: (a) choosing some foreign currency price index to represent tradable goods prices with the nominal exchange rate transforming the index into domestic currency terms 1/; and (b) choosing a domestic price index to perform the nontradables price role. Candidates that have been considered for step (a) include the usual array of traded goods price indices or unit values, wholesale price indices, value-added deflators, and consumer price indices. And, since various foreign countries may be absorbing or supplying tradable goods, some weighted average of exchange rate-adjusted price indexes is required. Thus, the approximation to the real exchange rate is a form of real effective exchange rate indicator, which depending on the choice of price indices and weights may not differ that much in substance from those discussed earlier even if the conceptual basis is somewhat different. Edwards (1989), for example, used wholesale prices in a country's 10 largest trading partner countries for the tradables price index in foreign currency terms, with weights based on the direction of trade, and he used the local CPI as the domestic price index.

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1/ Note that in general this kind of approximation does not take into account insurance, freight, tariffs, and explicit and implicit taxes which affect tradable goods prices as seen by domestic agents.

Assuming effective arbitrage, the tradable component of the domestic CPI should closely track the tradables price proxy expressed in domestic currency terms; as a result changes in the approximate real exchange rate should reflect differences in the behavior on the nontradable component of the domestic CPI. An important difference, therefore, between relative PPP indicators and trade model-based indicators using overall output deflators or CPIs and the type of index used by Edwards (1989) is the attempt to exclude from the foreign price index the nontradable component. 1/ Thus, what the index is trying to get at is how foreign tradable goods prices are translated into domestic currency terms rather than attempting (as in the trade model-motivated indicators) to consider how multilateral exchange rate changes adjusted for underlying inflation may impinge upon tradable goods prices.

The potential problems with the kind of approximation outlined above is that when foreign WPIs (or like variables) are used they may not track too closely the prices being faced by the developing country in question. If, for example, a developing country has a limited export base with exports of selected primary products being relatively important, it seems unlikely that a weighted average of WPIs or import price indices in major partner countries will be a good proxy for the developing country's exportables prices. On the other hand, it can be argued that, because imports are likely to be more diversified in nature, a weighted average of WPIs or

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1/ A related point is what information about the relative price of nontradables to tradables is likely to be provided by an indicator using CPIs for both the domestic and foreign price variables. Edwards (1989) provides an exposition, but the conditions necessary to make inferences seem rather strong (e.g., no terms of trade shifts, the law of one price holds for traded goods).

export prices in major supplying countries may perform somewhat better in

performing as a proxy for a developing country's importables price index.

If such is the case, it reinforces the need to be cautious in interpreting

the behavior of the indicator in terms of the underlying theoretical

framework and in determining how the indicator should move as an

equilibrating response to certain shocks (e.g., to the terms of trade).
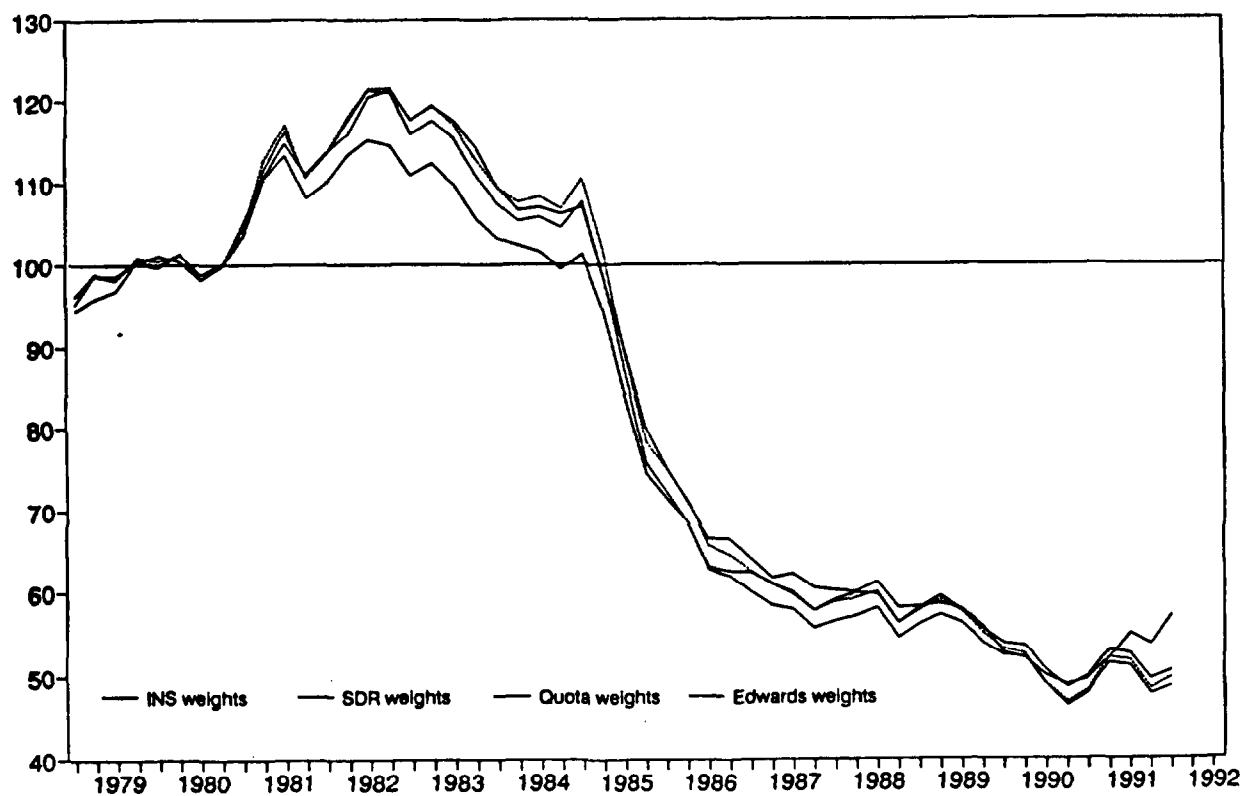

## V. Illustrations

In this section, some examples of various indicators are used to

illustrate similarities and differences in behavior. The first of the

charts shows for the case of Colombia (as an example) the behavior of real

effective exchange rates based on consumer price indices at home and in the

partner or competitor countries. Four different weighing schemes are

employed. The first uses SDR weights (so there are five partner countries)

while the second has weights based on the twelve countries which have the

largest quotas in the Fund. 1/ The third weighing scheme employed is that

of the Fund's Information Notice System (INS) where the weights are based on

a particular country's trade flows and which take into account the commodity

composition of trade and competitive relationships. 2/ The fourth

weighing scheme is that employed in Edwards (1989) which is based on each

country's 10 largest bilateral trading partners. 3/ The four series are

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1/ As in effect after the Eighth Review of Quotas. Both this weighing
scheme and the SDR scheme are based on the considerations raised in Section
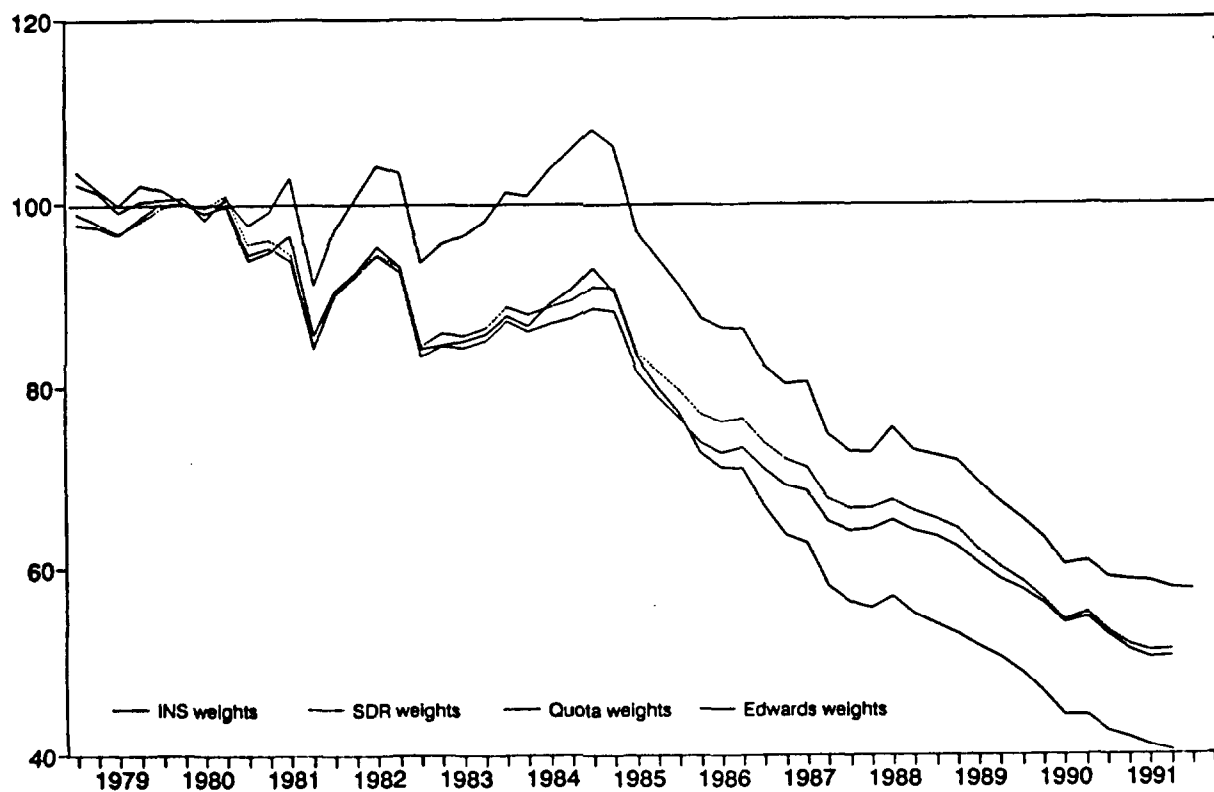II on relative PPP indicators.
2/ For a more detailed explanation, see the introductory notes to
International Financial Statistics.
3/ The trade data on which the weights are based were taken by Edwards
from the Fund's Direction of Trade and are for the year 1975.

## Colombia
### Real Effective Exchange Rates, 1979-91 1/
(1980=100)



INS weights — SDR weights — Quota weights — Edwards weights

## Kenya
### Real Effective Exchange Rates 1979-91 1/
(1980=100)



INS weights — SDR weights — Quota weights — Edwards weights

1/ With real effetive exchange rates based on CPI for home and partner countries.

highly correlated and show similar rates of change over time. For Colombia this is not too surprising since the weighing schemes all give a fairly large and not too dissimilar weight to the United States or to countries whose exchange rate policies are closely linked to bilateral relations with the United States. The second of the charts shows the behavior of real exchange rates for the example of Kenya. The movements in the four series are also highly correlated, but in terms of levels of the indicators behavior differs more than in the Colombian example. In particular, while three of the indicators suggest a significant real depreciation in the early 1980s, the INS indicator does not. The reason for this difference in behavior lies in the greater weight given to competitor countries in the INS index which were not depreciating in real terms against the United States.
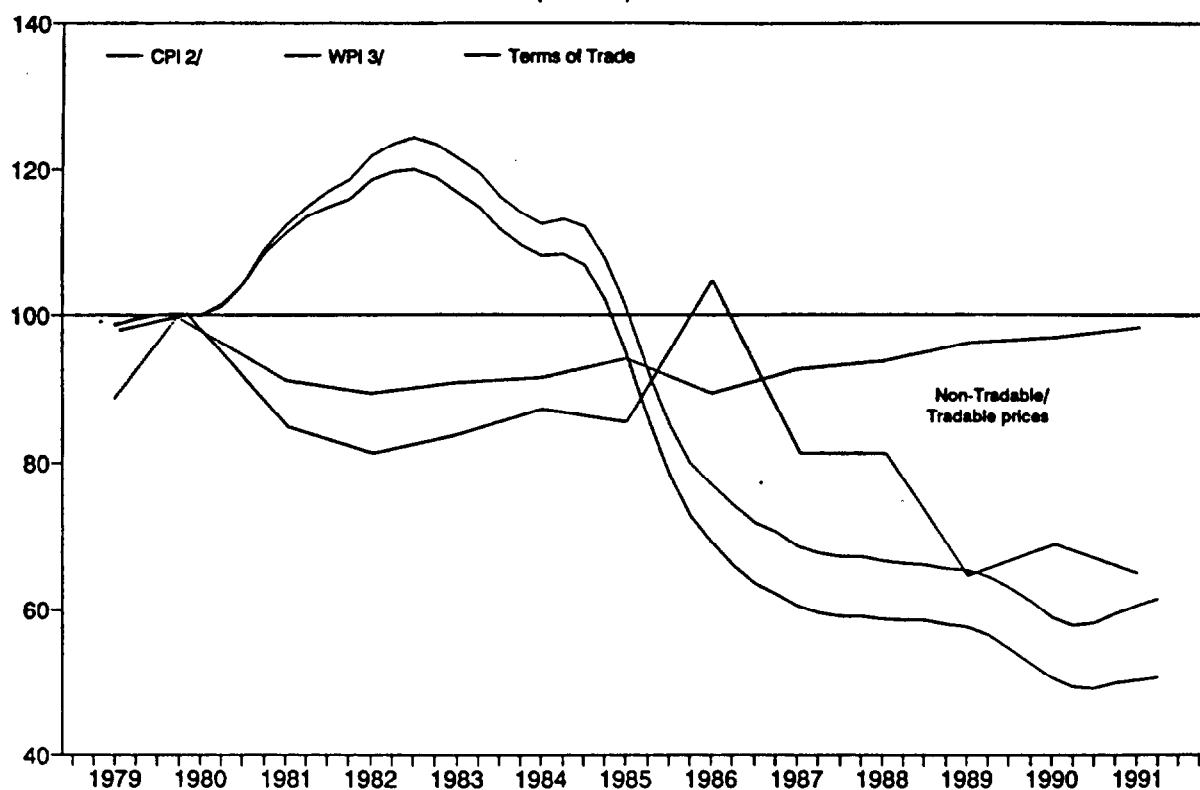
For the second set of charts, an attempt has been made to calculate the price of nontradables to tradables in Colombia and Kenya to see how well the more generally available indicators may serve to proxy such a relative price. The information used to calculate the price of nontradables to tradables are the annual sectoral national accounts data in current and constant prices, where the tradables sector is defined as encompassing agriculture, mining, and manufacturing and all other sectors (including utilities, construction, financial institutions, etc.) being considered as producing nontradables. 1/ Also shown on the charts are two real effective exchange rate indicators (based on Fund quota weights), one using CPIs at home and abroad and the other using the CPI at home but wholesale

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1/ The implicit sectoral value-added deflators were aggregated using moving average weights based on nominal value-added shares, in effect a trans-log approximation.
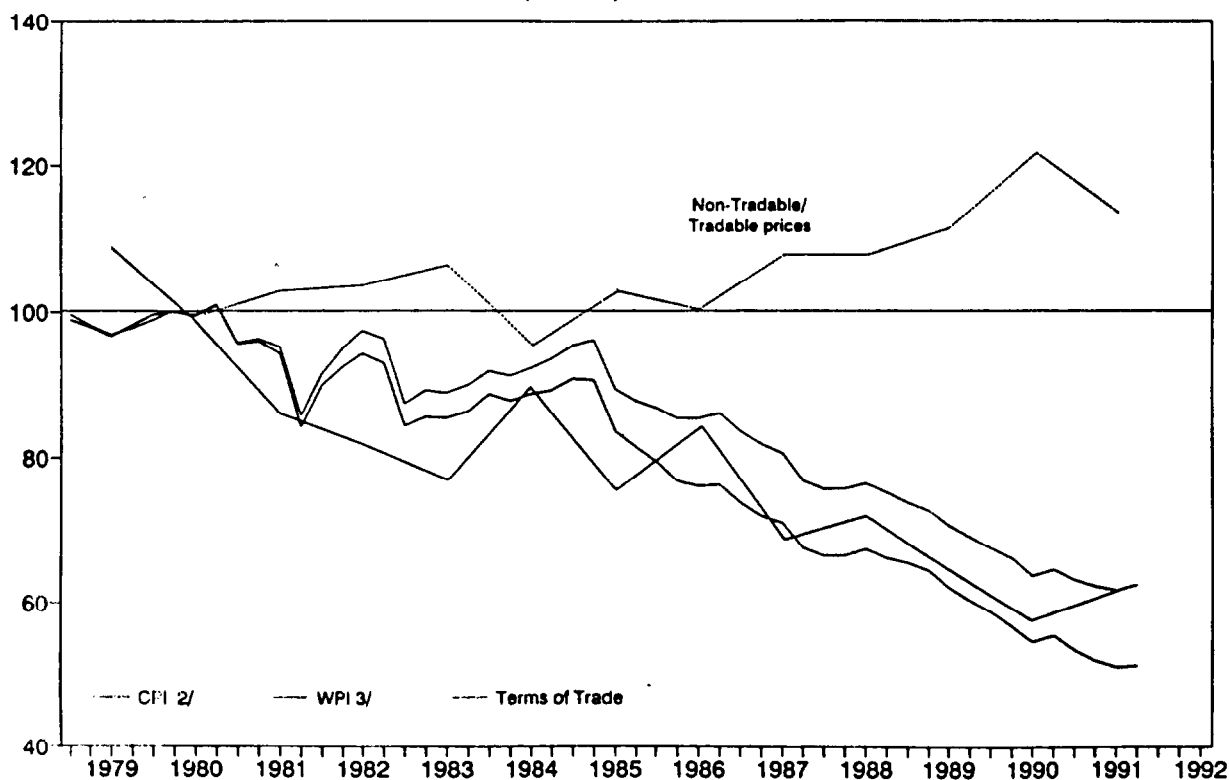
price indices for partner countries. The latter indicator, therefore, incorporates Edwards' proxy for the relative price of nontradables to tradables. A comparison of the behavior of the real effective exchange rate indicators with the national accounts-based relative price indicator points to the danger of _assuming_ that the former are necessarily providing useful information about the behavior of the price of nontradables to tradables. This problem is particularly well illustrated in the Kenyan case where the price of nontradables to tradables has risen significantly while the real effective exchange rate has depreciated. Also shown in the charts are the terms of trade (the relative price of exports to imports), an important indicator of the type of real shock that developing countries have to deal with. In both cases, the terms of trade have deteriorated in recent years and the depreciation in real effective exchange rates may be interpreted as part of the adjustment process in response to such shocks. An interesting additional feature of the Kenyan data is the inverse relationship between the terms of trade and the relative price of nontradables to tradables (from the national accounts data). This relationship probably arises from the fact that agriculture dominates the tradable goods sector and is heavily export oriented. 1/ Such a relationship is not so evident in the Colombian case, probably reflecting the fact that the tradables sector is more diversified across exportables and importables (including manufacturing).

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1/ If the share of exportables in tradables is relatively high and the price of importables moves reasonably closely with the price of nontradables, the real exchange rate will be closely and negatively correlated with the terms of trade.

## Colombia
### Real Effective Exchange Rates, 1979-91 1/

**(1980=100)**



Legend: CPI 2/    WPI 3/    Terms of Trade

Non-Tradable/
Tradable prices

## Kenya
### Real Effective Exchange Rates, 1979-91 1/

**(1980=100)**



Non-Tradable/
Tradable prices

Legend: CPI 2/    WPI 3/    Terms of Trade

1/ Real effective exchange rates calculated with Quota weights.
2/ Using CPI for home and partner countries.
3/ Using CPI for home and WPI for partner countries.

## VI. Some Concluding Remarks

The foregoing discussion has concentrated on the antecedents to real exchange rate indicators as they may be used in the assessment of exchange rate policies in developing countries. Perhaps the most important point that can be made is to stress the theoretical and empirical limitations of such indicators and the need not to ascribe more to movements in such indicators than they can reasonably bear. The indicators, particularly in light of data difficulties, can only form part of the assessment of exchange rate policies.

Despite the theoretical differences between the various approaches, in practice the indicators in general end up being fairly similar in construction. The paucity of data in developing countries means that in many cases unit cost data or tradables-nontradables price data are simply not available on a timely basis. And with the need for high frequency observations, the most readily available data are consumer price indices for the domestic price index and some weighted exchange rate-adjusted foreign price indices for the foreign price index or tradables goods price index. Thus, the end result is a real effective exchange rate index with relatively minor differences in computation.

As guides to international competitiveness, these types of indicators have well known drawbacks. Consumer price indices are subject to the influence of price controls, subsidies, and taxes, and may not reflect underlying developments in factor costs. Competitiveness can change because factor inputs are employed more efficiently or because access has been obtained to improved technology, so that the indicators serve best when their limitations are acknowledged. Thus, an indicator may remain

unchanged, yet increases in wage costs in excess of productivity gains may be affecting the profitability or ability to compete of key sectors. Or, circumstances may change (e.g., a terms of trade shift) such as to require improvements in competitiveness in order to maintain external balance, so that constancy in an indicator is no cause for satisfaction. In sum, the indicators would seem most useful in assessing the consistency of monetary policy in the context of a choice of exchange rate regime and in monitoring in a summary fashion what is happening to exchange rate policy and inflation performance abroad. An additional point to be made is that it seems inappropriate to assume that real effective exchange rate indicators necessarily provide accurate information on how the relative price of nontradables to tradables is behaving. However, research is proceeding on how changes in the external and domestic policy environment affect the behavior of various exchange rate indicators and to incorporate these factors more explicitly into macroeconomic policy design. 1/

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1/ See, for example, Khan and Montiel (1987), Edwards (1989), and Khan and Ostry (1992).

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