

**THE TERMS OF TRADE DEBATE AND  
THE IMPLICATIONS FOR PRIMARY PRODUCT PRODUCERS**

by

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**Abstract**

The terms of trade debate initiated by Raul Prebisch and Hans Singer over half a century ago continues to this day, and is unlikely to be resolved soon. Regardless of the ultimate outcome, however, to suggest that countries should diversify away from the production of mineral commodities and other primary products, as Prebisch, Singer, and others have done, may be counterproductive, encouraging countries to abandon their most promising path to faster economic development.

This is because the long-run trends in the real prices of most goods reflect shifts in their market supply curves and in turn production costs. If the prices of primary products are falling but a country's production costs are falling more, the producer surplus or wealth the country realizes is rising, increasing the benefits it receives from its primary product production and trade. Alternatively, if prices are rising but a country's costs are rising more, the benefits from primary product production and trade are presumably falling despite the higher primary product prices.

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The Classical economists—Thomas Malthus, David Ricardo, and others—believed that the terms of trade of primary products would rise over time as the limited availability of land and other natural resources pushed their marginal production costs and prices up. In the early 1950s, Prebisch (1949) and Singer (1950) challenged this position, first by claiming that the terms of trade of primary products had fallen over time, and second by advancing several reasons for the downward trend and for expecting it to continue.

In particular, they pointed out that the competitiveness of primary product markets means that the benefits of new, cost-reducing technology are passed on to consumers fully and quickly in the form of lower prices. With manufactured products, in contrast, the managers, owners, and employees of the producing firms are able to maintain a good part of the benefits of technological change thanks to their market power. So, less of these benefits are passed on to consumers in the form of lower prices.

In addition, they noted, the demand for primary products is less responsive (or elastic) with respect to income than is the demand for manufactured products. As a result, as income grows over time, the demand for manufactured products and in turn their prices rise more rapidly than is the case for primary products.

The Prebisch and Singer articles ignited a debate that spanned the second half of the 20<sup>th</sup> century and continues to this day. As Hadass and Williamson (2002) note, the debate encompasses three questions: First, have the terms of trade of primary products in fact declined over the long run? Second, what are the important determinants behind the observed changes in terms of trade? And third, what are the implications for public policy, especially for developing countries that depend on primary commodity exports?

With respect to the implications for public policy, it is fair to say that the work of Prebisch and Singer provided much of the intellectual support for the interventionist policies pursued by many developing countries during the 1950s, 1960s, and 1970s. These policies promoted protectionism and import substitution, with generally disappointing results. More recently, proponents of the resource curse thesis—which contends that reliance on the production of mineral and other primary products impedes economic growth in developing countries—have suggested that the declining terms of trade of primary products provide part of the explanation for this perverse result.<sup>2</sup>

While a comprehensive survey of the terms of trade literature over the past half-century is beyond the scope of this short study, the sections that follow examine each of the three questions noted above. The objective is to suggest that, although the debate continues, whether the long-run trend in the terms of trade of primary products is falling, stationary, or rising by itself has little or no policy significance for countries exporting primary products. More specifically, even if the terms of trade are falling, for many countries reliance on the production and export of primary products is still likely to be

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<sup>2</sup> The literature, it should be noted, also contains other explanations for the alleged curse of resources, as well as many studies questioning the existence of a negative association between resource dependence and economic development. For a review of this literature, see Stevens (2003).

their most promising development strategy, one that can foster a faster pace of economic growth than any of the available alternatives.

### **Trends in the Terms of Trade**

The Prebisch-Singer hypothesis generated a plethora of empirical studies testing whether or not the terms of trade of primary products have fallen. Only a few of the more important studies are noted here, as this is sufficient to demonstrate the diversity of views. More comprehensive surveys can be found in Spraos (1980), Diakosavvas and Scandizzo (1991), and Hadass and Williamson (2001).

Spraos (1980), after reviewing the early literature, focuses on the difficulties and complexities encountered by these works. From his own analysis, he contends the evidence is inconclusive. However, Sapsford (1985), using the same data but a different specification of the relationship between the terms of trade and time, discovers a significant downward trend, and so provides more support for the Prebisch-Singer hypothesis.

Bleaney and Greenaway (1993), using a new and improved data series for primary product prices from the World Bank (Grilli and Yang 1988), find a significant downward trend in the terms of trade when data before 1925 (when primary product prices were quite high) are considered. But, when the period analyzed starts after 1925, this is not the case. They also note that the prices for food, metals, and other groups of primary products behaved differently, suggesting that support for the Prebisch-Singer hypothesis based on primary commodity prices in general may suffer from aggregation problems and thus be misleading. Cuddington (1992) provides further support for this concern. He also examines prices trends for 24 individual commodities, and finds that the long run trends for all but three are zero or positive. However, using different estimation techniques on the same data, León and Soto (1997) find 17 of the 24 commodities have negative long-run price trends, a finding that provides much more support for the Prebisch-Singer hypothesis.

While most of the empirical studies assessing the trend in terms of trade employ univariate time series analysis, Bloch and Sapsford (1991, 1996, 1997, and 2000) in a series of studies develop and estimate a multiple equation model that distinguishes between the primary commodity and manufacturing sectors. Their results, which can identify the influence of various contributing factors, provide support for a secular decline in the terms of trade of primary products.

One potentially important issue raised by Svedberg and Tilton (2003), which the available literature has yet to address, concerns the influence of quality improvements over time on the prices for primary products and manufactured goods. For some time, macroeconomists have known that the U.S. Consumer Price Index (CPI) and other deflators used to convert nominal prices into real prices tend to overestimate inflation. An important reason for this is their failure to adjust properly for price increases that reflect improvements in the quality of products. A cell phone purchased today, for example, may

be 10 percent cheaper as well as smaller and in other ways better than a similar model purchased a year ago. So, holding quality constant, the true decline in price is greater than 10 percent. The failure to take account of such quality improvements across all goods and services introduces an upward bias in the CPI and other deflators.<sup>3</sup>

While the quality of the copper, coffee, and other primary products sold on international markets has improved over time, there are good reasons to suspect that such improvements have been modest compared to the quality improvements enjoyed by manufactured goods. This raises the possibility that some of the trend in the terms of trade of primary products simply reflects the fact that the quality of the goods exchanged for primary products is rising faster than the quality of primary products. When Svedberg and Tilton (2003) calculate the real price of copper using adjusted deflators designed to remove this bias, they find that the long-run trend over the past century is upward, not downward as is the case with the uncorrected deflators.

In summary, some but only some of the available data show that the terms of trade of primary products have fallen over the past century. It is also unclear whether breaks and changes in the long-run trend have occurred, and if so, whether a downward trend has prevailed in the recent past and continues to prevail today. Another important issue is the extent to which trends in the terms of trade of individual primary products or subgroups of primary products are captured by the trend for primary products as a whole. Most countries exporting primary products depend largely on only one or a few such products. Finally, the literature on the terms of trade for primary products has yet to assess the extent to which the observed trend simply reflects greater improvements in quality for manufactured goods.

### **The Determinants of Prices**

Supply and demand determine the prices for both primary products and manufactured goods. In competitive markets, the long-run supply curve, which is what is of interest to us here, reflects the industry's long-run marginal cost curve. We also know that the long-run marginal cost curve rises with output, but at a declining rate for many primary products. The reason for this is the much greater availability of marginal resources. For example, the most fertile land for growing coffee is scarce compared to somewhat less attractive, though still suitable, land. Similarly, much less copper is found in deposits with an ore grade averaging 1.0 percent than in deposits with only 0.5 percent copper. As a result, the slope of the long-run supply curve becomes increasingly flat or horizontal as price rises.

For manufacture goods, the quality of resources being exploited is not an issue, and so, unless the availability of inputs is in some other way constrained, increases in output are possible with little or no effect on per unit costs. For example, automobile manufacturers, if given sufficient time to increase their own capacity and to induce their suppliers to do so as well, presumably could double their output without a significant

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<sup>3</sup> There are other reasons as well for believing common deflators are biased upward. For more on the sources and estimated magnitude of these biases, see Boskin et al. (1998) and Schultze (2003).

increase in the cost per vehicle. As with primary products, constant marginal costs imply a relatively flat supply curve.

A horizontal long-run supply curve has important implications. In particular, after market demand reaches a certain level, demand no longer has a significant influence on the long-run equilibrium price. In Figure 1, for example, whether demand is  $DD_1$  or  $DD_2$ , the long-run market price is more or less  $P^*$ . This suggests that concerns over the long-run responsiveness of demand to changes in income for primary products are misplaced. If world GDP grows over the long run at 2.0 percent a year causing the demand for wheat and copper to rise by 0.5 percent and the demand for automobiles and personal computers to rise by 6.0 a year, the impact of this differential on the prices for primary products and manufactured goods is negligible if their long-run supply curves are relatively horizontal.<sup>4</sup>

A horizontal supply curve also means that changes in long-run prices are largely or entirely driven by shifts in the supply curve, which in turn for competitive industries reflect shifts in the marginal cost curve. Such shifts can occur because the costs of labor and other inputs change and because new technology reduces production costs. If one controls for general inflation by examining trends in real costs and prices, the cost-reducing effects of new technology for most goods have over the long run offset any tendency for input prices to rise. As a result, the real prices of many primary products and manufactured goods have fallen over the long run.<sup>5</sup>

There are, of course, exceptions, especially in the service sector. Where goods and services are heavily labor intensive and new technology is unable to reduce significantly the man-hours needed per unit of output, the rise in real wages over time tends to push prices higher. Education, medical care, legal services, and haircuts are examples. But even in such cases, it is changing costs that are largely or entirely driving the long-run trends in prices in competitive markets.

However, as noted earlier, Prebisch and Singer argue that the markets for manufactured goods are not competitive. Clearly, where firms possess market power, they can restrict supply and thereby keep price above the competitive equilibrium. Similarly, over the long run, they can keep prices from falling as technology reduces costs, and thus retain the benefits flowing from new technology, benefits that in competitive industries are passed on to consumers. Moreover, where producing firms and their suppliers possess market power—the first in the product market, the second in input

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<sup>4</sup> It is important to note that the supply curves for primary products and manufactured goods in the short run (a period of time less than that required to build new capacity) do not tend toward the horizontal as output rises but rather at some point turn vertical as output approaches existing capacity. As a result, shifts in demand can have a major impact on prices in the short run, and indeed the prices of many mineral commodities, as is well known, fluctuate greatly over the business cycle. For more on the cyclical volatility of commodity prices, see Tilton (1992).

<sup>5</sup> For many primary products, the cost-reducing effects of new technology has produced a downward trend in real prices over the long run despite the increasing need to exploit resources whose poorer quality entails higher costs. For more on the effects of depletion and technology on the long-run trends of real prices for mineral commodities, see Tilton (2002).

markets—it is possible for the some of the benefits of new technology to flow to workers and other input providers, raising production costs and reducing the decline in price that new technology otherwise would have generated.

Indeed, as the following quote highlights, Singer (1950, pp. 477-8) explicitly rejects the idea that the trend in the terms of trade for primary products could simply reflect a decline in their production costs relative to those for manufactured goods, proposing instead that market power produces an asymmetry in the distributions of the benefits of technological progress favoring the producers of manufactured goods:

The possibility that these changing price relations simply reflect relative changes in the real costs of manufactured exports of the industrialized countries to those of food and primary materials of the underdeveloped countries can be dismissed. All the evidence is that productivity has increased if anything less fast in the production of food and raw materials, even in the industrialized countries but most certainly in the underdeveloped countries, than has productivity in the manufacturing industries of the industrialized countries. . . .

Dismissing, then, changes in productivity as a governing factor in changing terms of trade, the following explanation presents itself: the fruits of technical progress may be distributed either to producers (in the form of rising incomes) or to consumers (in the form of lower prices). In the case of manufactured commodities produced in more developed countries, the former method, i.e., distribution to producers through higher incomes, was much more important relatively to the second method, while the second method prevailed more in the case of food and raw material production in the underdeveloped countries.

So, in assessing the Prebisch-Singer thesis, a critical question is to what extent the firms producing goods traded in world markets actually possess market power? Or, more specifically, is there a systematic tendency for the markets for primary products, but not those of other traded goods, to be competitive?

Both Prebisch and Singer were greatly influenced by the world economic situation in the late 1940s, the period when they were conducting the research and developing the insights reflected in their two articles. At that time, the industrialized world was largely confined to North America, Europe, and Japan, and both Europe and Japan were struggling to recover from the devastation of World War II. So the United States was by far the dominant industrial power, and many of its concentrated industries, such as the automobile and industrial equipment industries, may well have possessed market power.

The economic recovery of first Europe and then Japan, coupled with the more recent industrialization of Korea, Taiwan, Singapore, and now China and India, have completely altered the world economic scene. Today, globalization is widely recognized

by both its proponents and opponents as a major force reshaping the world. Aside from a few primary products, such as diamonds and oil, it is hard to identify goods whose producers possess market power, and who for long can prevent the benefits of new technology from flowing to consumers in the form of lower prices. When we look at goods with rapidly declining prices, we typically find products where innovation and new technology is driving production costs down. They include manufactured goods, such as computers and other electronic equipment, as well as copper and other primary products. Goods with constant or rising prices tend to have rising costs, largely because they are labor intensive and for this or other reasons more impervious to the downward pressure on costs imposed by new technology.

Moreover, even in those few remaining pockets of the economy where firms possess some market power, prices are still likely to follow closely trends in production costs, where producers set prices on the basis of costs plus some designated markup. This is a pricing technique widely believed to be common practice among firms with market power.

### **Implications for Countries Exporting Primary Products**

Although the debate over the long-run trend in the terms of trade of primary products remains unresolved, it is still worth considering the implications of a declining trend for countries that produce and export these products. This is especially so since the implications are not as self-evident or clear as Prebisch, Singer, and many others have assumed.

It is true that falling terms of trade mean that countries exporting primary products must over time offer an ever bigger basket of export products (that is, more and more copper, coffee, or wheat) for a given basket of (non-primary) imported goods. As a result, it is frequently presumed that the benefits these countries derive from trade are declining, and that they would be better off diversifying away from primary product production. Development economists, however, have long recognized that the simple barter terms of trade, given by the weighted prices of exports over imports, can be misleading in this regard.<sup>6</sup>

The reason for this is that ultimately the welfare of a country depends on the wealth, or what economists call rents, that it generates and retains from the production of goods and services. The production of goods and services produces wealth in two ways. First, it creates consumer surplus, which is the difference between what consumers would be willing to pay for a good and what they actually have to pay. It is measured by the area under the demand curve and above the market price.<sup>7</sup> For example, Figure 2 shows a

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<sup>6</sup> For a discussion of the various ways that development economists have modified the simple barter terms of trade in an attempt to overcome its shortcomings, see Meier (1968)

<sup>7</sup> The demand curve can be considered a collection of descending points, the first or highest of which represents the reservation price (that is the highest price a consumer is willing to pay for a product) of the consumer willing to pay the most for the product. The adjacent points reflect the decline in the reservation price as we move from the consumer willing to pay the highest price to the consumer willing to pay the second, third, fourth, and so on highest price. Since the reservation price reflects the value of the good to

world demand curve ( $DD_w$ ) and world supply curve ( $SS_w$ ) for a good, such as copper. The equilibrium price is  $P_e$  and output  $Q_e$ . The area  $ABP_e$  represents the total (global) consumer surplus generated by the production of copper.

Second, the production of goods and services also creates producer surplus, which for any given product is the difference between the price at which producers would be willing to supply the good and the actual market price. It is measured by the area below the market price that is above the supply curve. In competitive markets, where the supply curve reflects the industry marginal cost curve, producer surplus is the difference between the total production costs and the total revenues of the producing firms. In Figure 2, total (global) producer surplus is given by the  $P_eBC$ .

Now, if a developing country produces a primary product, such as copper, its supply curve might look like  $SS_c$  in Figure 2. In this case, its producer surplus, which would constitute a part of the total producer surplus, would be given by the triangle  $P_eDE$ . If this country's domestic consumption of copper were small, the wealth it receives from the copper industry would be determined largely by its producer surplus.

Everything else being equal, any tendency for the market price of copper to decline over time reduces the producer surplus and hence the wealth that such a country realizes from mining and exporting copper. On the other hand, for those countries exporting products whose price is rising, just the opposite is the case. Since the real prices of numerous primary products have been declining over the long run, many maintain the benefits that countries exporting primary products realize in the form of producer surplus are also falling. As a result, like Prebisch and Singer, they believe that these countries would be better off if they diversified into the production of goods with rising prices.

Of course, such a strategy if adopted by all, or even by many, countries would be self-defeating. As countries reduced their output of primary products and moved their labor and other resources into the production of manufactured goods and services, the prices of the former would rise and those of the latter fall, reversing any decline in the terms of trade of primary products.

More importantly, however, this policy recommendation depends critical on the assumption that everything else remains the same as the terms of trade of primary products fall. However, as we have seen, long-run price trends for most products are driven largely or entirely by shifts in their supply curves, which in turn reflect changes in production costs arising from new technology and other factors. Without changes in production costs there would be no changes in prices. So, to assume that the production costs of primary products remain unchanged while their prices fall is simply untenable.

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the consumer (that is, its contribution to the consumer's welfare), the difference between a consumer's reservation price and the market price represents the net contribution that the availability of the good makes to the consumer's welfare. Summing these welfare gains across all consumers gives the total consumer surplus generated by the production of a good, or in other terms, the wealth it creates for all consumers.

For an individual country, the net effect of declining prices and costs may be positive, neutral, or negative depending on whether the downward shift in its costs and supply curve are sufficient to offset the reduction in its total revenues arising from the decline in price. In short, if its costs are falling faster than the market price, the wealth it realizes in the form of producer surplus is increasing. In this situation, shifting out of primary product production will slow wealth creation and the pace of economic development.

On the other hand, if prices are falling faster than its costs, then the wealth a country realizes in the form of producer surplus is declining. The reason for this, however, is not the decline in price and the resulting deterioration in the country's terms of trade, but rather the country's failure to keep up with its competitors in terms of reducing its production costs. This may reflect a loss of comparative advantage in the production of primary products. If so, it is for this reason, and not the declining terms of trade, that it should be moving out of the production of primary products.

Finally, it should be noted that rising export prices are not necessarily good for producing countries, since rising prices normally reflect upward shifts in the supply curve, the result of higher costs. Countries producing such goods may not find their producer surplus increasing over time. Whether this is, or is not, the case depends on how rapidly their costs are increasing relative to those of their competitors, and in turn relative to the rise in the market price.

## **Conclusions**

Terms of trade debate initiated by Prebisch and Singer over half a century ago continues to this day, and is unlikely to be resolved soon. For a country exporting primary products, however, whether the terms of trade for primary products are falling, stationary, or rising by itself has little importance. Long-run trends in the real prices of most goods and services largely reflect shifts in their market supply curves and in turn production costs. As a result, prices and costs tend to move together.

If the price of a primary product is falling but a country's production costs are falling more, then the wealth the country realizes in the form of producer surplus is rising, increasing the benefits it receives from its production and trade. Alternatively, if price is rising but a country's costs are rising more, the benefits from production and trade are presumably falling despite the rising price.

As a result, even if the terms of trade of primary products are falling, to suggest that countries should diversify away from their production, as Prebisch, Singer, and other over the years have done, makes little sense. Indeed, it may be counterproductive, encouraging countries to abandon what may be their most promising path to faster economic development.

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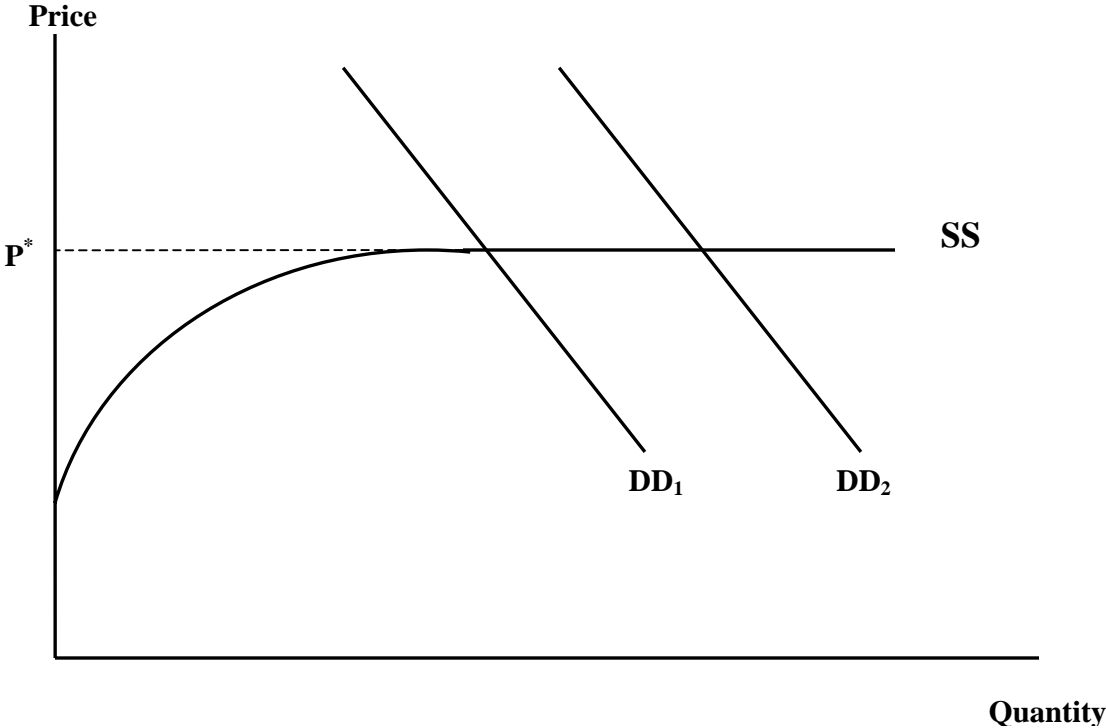
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**Figure 1. Market Price with a Horizontal Supply Curve**



**Figure 2. Consumer Surplus and Producer Surplus Created by the Production of a Primary Product**

