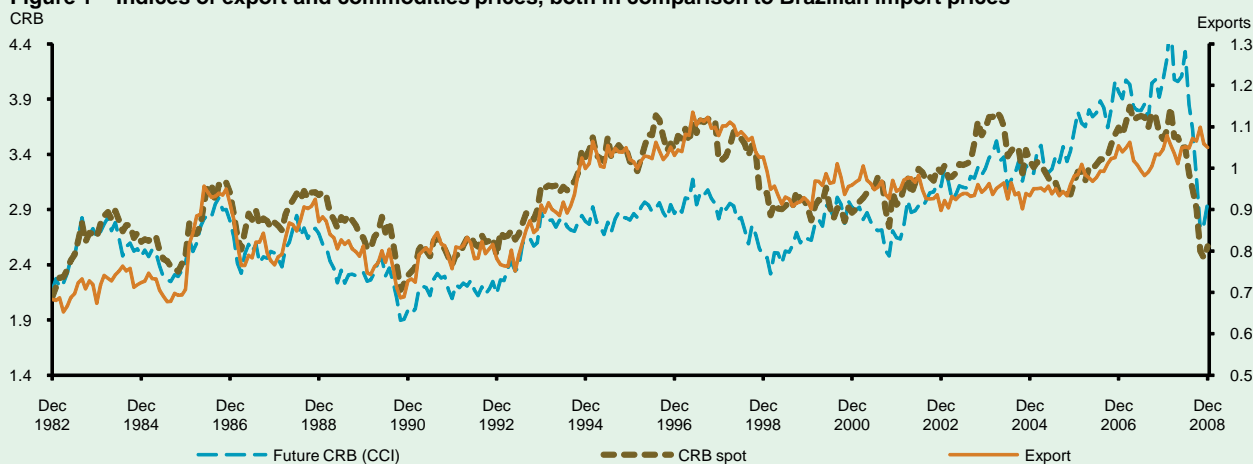


Correlation between the Terms of Trade and the International Prices of Commodities

In foreign trade, terms of trade are defined as the ratio between the prices of exports and imports of a given country. The improvement in the terms of trade means more favorable conditions for imports, stimulating the domestic production of goods to be exported. To this real effect it should be added the positive monetary effect that increases the balance of trade, even if the quantum of traded goods remains unchanged. In addition, changes in the terms of trade generate potentially important income-effects in producing regions or countries. In the case of Brazil, evidence shows a decisive impact of international prices of commodities on the terms of trade. This box analyses the terms of trade in view of its importance for the balance of trade and the allocation of resources in the economy. In addition, the box also examines the likely effects of the sharp reduction in the international prices of commodities occurred in the final quarter of 2008.

Figure 1 – Indices of export and commodities prices, both in comparison to Brazilian import prices

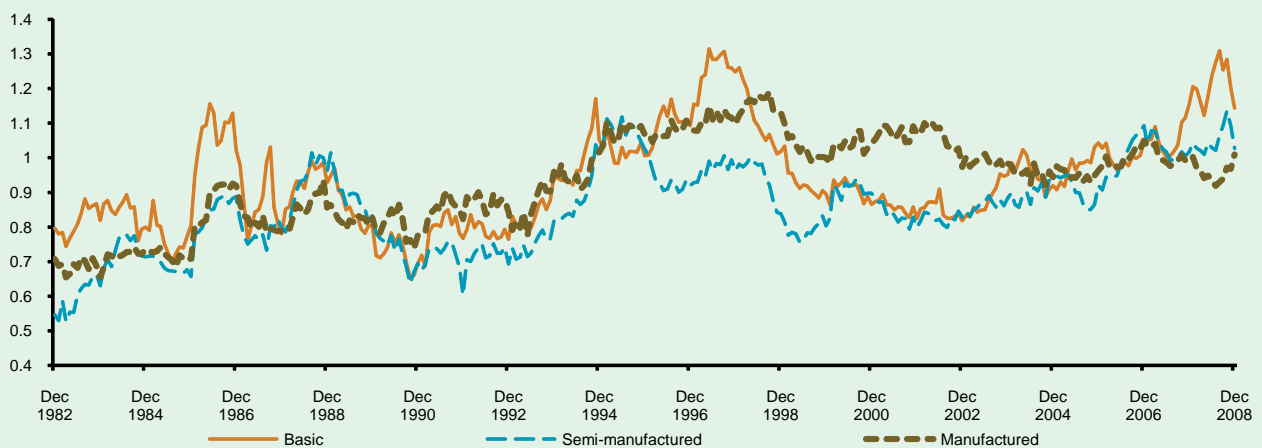


The dynamic ratio between the Brazilian export prices and the international prices of commodities, both expressed in terms of prices for imported goods,

is shown on Figure 1, with monthly data from January 1982 to December 2008. The prices of commodities are based on the Commodity Research Bureau's (CRB) indices, while the prices of Brazilian exports and imports are based on the Foreign Trade Studies Center Foundation (Funcex) indices. By analogy to the terms of trade, the ratio of these indicators and prices of imports is a measure of the incentives for an economy to specialize in commodities.

By analyzing Figure 1, it may be observed that the selected price indices present a series of cyclical movements, especially when longer periods are taken into account. By taking the most recent cyclical movement, which refers to the commodities boom initiated in 2002, more significant impacts on the terms of trade seem to have occurred only after 2006. Notwithstanding this could question whether the empirical correlation between the variables is relevant, the breakdown of export prices by aggregated factor, as illustrated on Figure 2, reveals a significant improvement in the terms of trade for basic and semimanufactured goods. And, at least up to 2006, this trend is smoothed by the manufactured goods only. This points to a greater concentration, over the latest years, of the real and nominal effects of the terms of trade of basic and semimanufactured goods.

Figure 2 – Export price indices by aggregating factor, all in comparison to Brazilian import prices



As shown in Figures 1 and 2, evidence points to the improvement in all indicators of the terms of trade and relative commodity prices in the period under analysis. In fact, despite occasional downward movements, the upward trend prevails on average. Formally, in all series there is a component responsible for the consistent

Table 1 – Average growth rate of price indices

Annual rate, 1982-2008

Indice	%
Brazilian exports	
Total	1.54
Basic	1.60
Semi-manufactured	1.63
Manufactured	1.25
Commodities	
CRB spot	1.60
CRB future	1.99

1/ Price indices related to Brazilian import prices.

improvement in the Brazilian terms of trade in the last quarter of the century. Table 1 quantifies the constant tendency through the average rate of annual growth of the variables. The relative decrease in the price of imports reflects structural changes – initiated in response to the external debt crisis of the 1980's, complemented by the opening of the economy in the 1990's and deepened by the search for petroleum self-sufficiency –, which tend to align the economy with its comparative advantages.

Therefore, this is the most relevant trend for the variables in the long-term. Thus, the forecast should be careful with regard to the level of the most recent figures, impacted by the shorter cycle. This is especially relevant for the analysis of the recent period, in which a sharp contraction of the international prices of commodities was observed at the end of 2008. Since these indicators generally reflect the markets in which commodities are negotiated as financial assets, it is reasonable to assume that the strong shock may result from high volatility and overshooting. Therefore, the price level relevant for carrying out extrapolations of the trend may not be as low as that observed at the end of last year. By comparison, the Brazilian terms of trade are more dependent on the price rigidity in the commodity market, which minimizes the transmission of shocks from the asset market and indicates a long-term trend that starts from a not so unfavorable level.

The analysis of the correlation between the terms of trade and the international commodity prices took into consideration the medium and long-term cyclical

Figure 3 – Export price indices in comparison to import prices; medium and long-term cyclical components

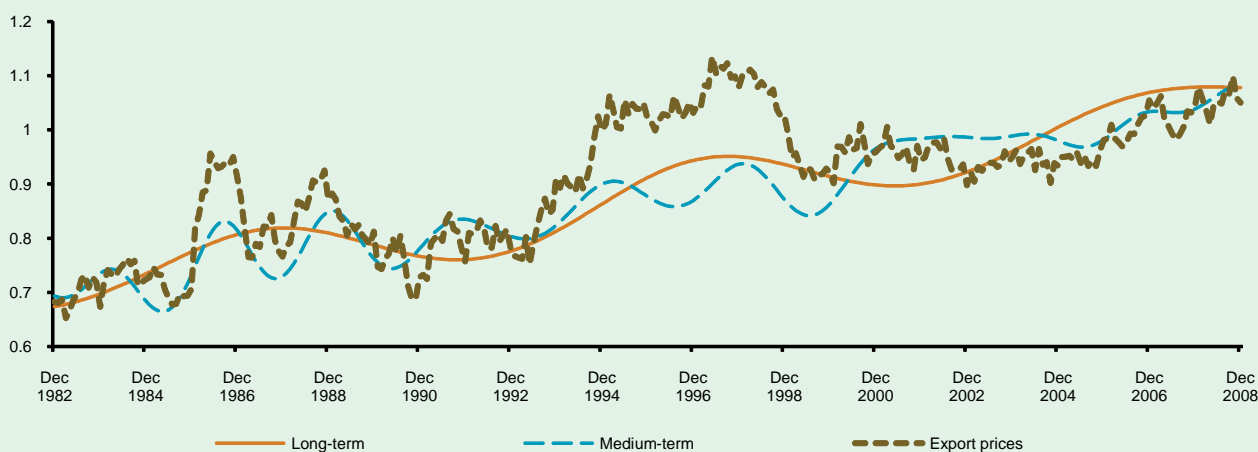


Figure 4 – Commodities Current prices (CRB spot) in comparison to import prices: medium and long-term cyclical components

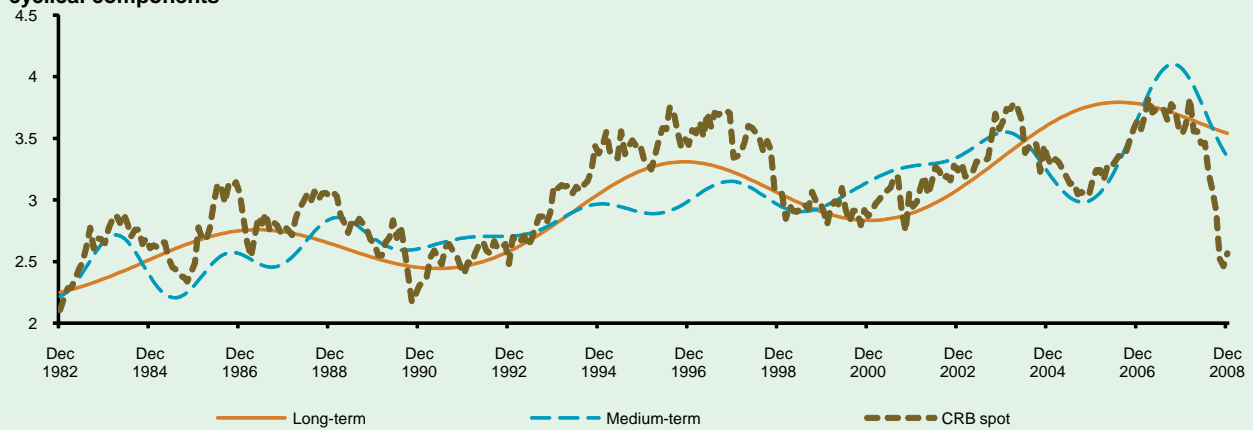
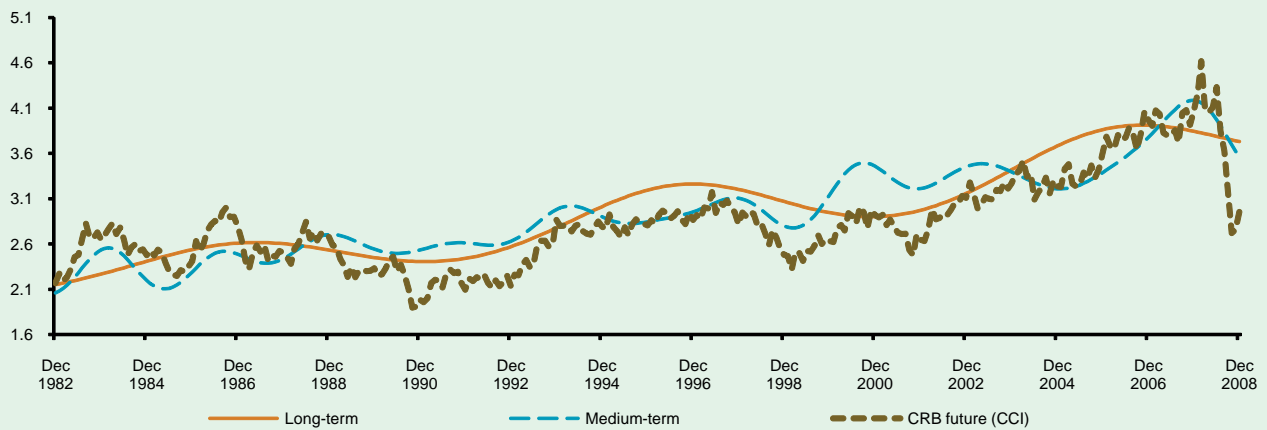


Figure 5 – Commodities future prices (CCI) in comparison to import prices: medium and long-term cyclical components



components, revolving around the growth trend¹. The breakdown of the series in cyclical movements of different periodicities is appropriate to the context, since it permits to associate the index movements to commodity booms or business cycles in the world economy. The breakdown of terms of trade and commodity prices according to their cyclical components is shown on Figures 3, 4 and 5. Medium-term cycles may be understood as those with periods from 2 to 8 years for its conclusion, and long-term cycles, those with periods from 8 to 12 years.

In all figures, the long-term cycles sustained commodity booms starting around 1982, 1992, and 2002. With regard to the most recent cycle, evidence

1/ A formal definition of correlation between cyclical components may be found in Croux, Forni & Reichlin, 2001, A Measure of Comovement for Economic Variables: Theory and Empirics, The Review of Economics and Statistics, 83-2. The medium and long-term components were extracted by a band pass filter approximately optimum in finite samples. Formal definition may be found in Christian & Fitzgerald, 2003. The Band Pass Filter. International Economic Review, 44-2.

Table 2 – Correlation between commodities price indices and export price indices^{1/} for medium and long-term cycles^{2/}

Commodities prices	cycle	Brazil's export prices			
		Total	Basic	Semi-manufactured	Manufactured
CRB spot	medium	0.54	0.47	0.57	0.36
	long	0.88	0.93	0.89	0.77
CRB future – CCI	medium	0.51	0.45	0.58	0.27
	long	0.86	0.92	0.87	0.73
CRB future – CCI (-3)	medium	0.57	0.48	0.67	0.34
	long	0.92	0.97	0.92	0.81
CRB future – CCI (-9)	medium	0.25	0.11	0.41	0.17
	long	0.97	0.98	0.97	0.92

1/ Price indices referring to Brazil's export prices.

2/ The expected duration of medium cycles is from 2 to 8 years and of long cycles is from 8 to 12 years.

shows that the peak was reached in 2006, despite the break in the two following years due to the medium-term business cycle. In a broader sense, the business cycles are responsible for the fluctuations of the series around the curve drawn by the long-term cycles, and their quantitative influence is more accentuated at the beginning and at the end of the sample. The breakdown does not attribute to the medium and long-term components the sudden drop in the commodity indices, which are better adjusted to a shorter-term development. Therefore, this reinforces the argument that the reduction in international prices, at the levels currently observed, should not be permanent.

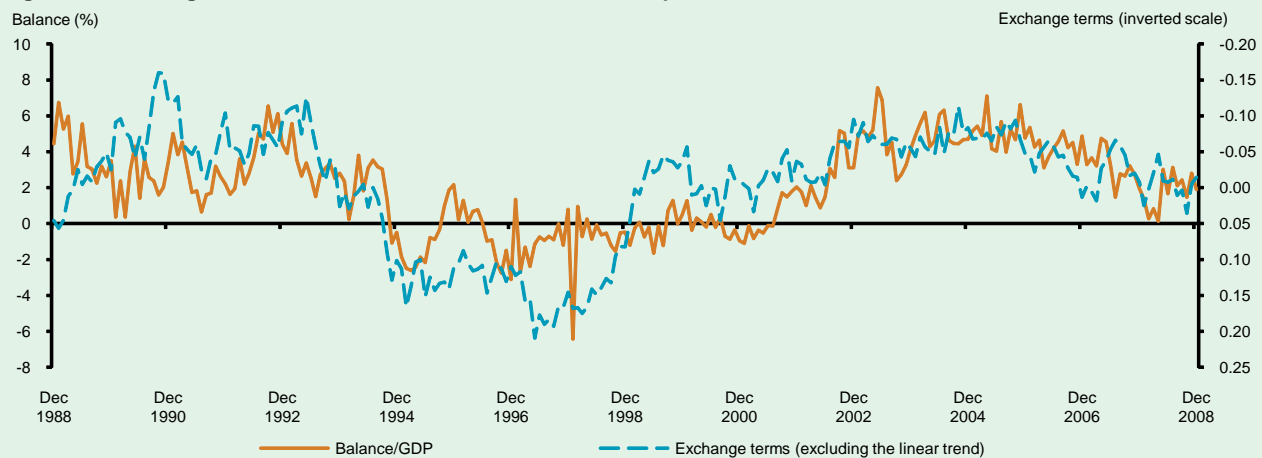
The dynamic correlation of the series, that is, the correlation between the respective cyclical components, is shown on Table 2. The first lines of the table report to the contemporary correlation, in which case the current and future commodity indices do not show significant differences. In both cases, it may be observed a greater correlation for the long-term cycles. The terms of trade for manufactured goods show the lowest correlation with the relative price of commodities in all the periodicities, while the semimanufactured goods exhibit the greatest correlation registered for the medium-term cycles. With regard to the basics, they are more relevant in the long-term, periodicity in which they show greater correlation with commodity indices.

In order to examine the potential of the commodity indices as leading indicators of terms of trade, correlations were calculated for up to twelve months in advance. The current prices index, CRB spot, does not show any correlation improvement with any antecedent. In the comparison, the future prices index, future CRB (CCI), shows a significant improvement, thus showing a good antecedent indicator. In fact, the greater correlation of future CRB with the export prices occurs, in the medium cycle, in the 3-month period; and, in the long cycle, in the nine-month period. It may be observed that the improvement over contemporary correlation is more important for long cycles. Extrapolating the information of the future CBR for the terms of trade, one may expect the beginning of recovery, in relation to recent floors, of the long-term cycle by the end of 2010 and, of the medium term, in 2009.

In addition to the information contained in the historic series of relative prices, the foundations of the commodity markets also indicate a downward cycle, with later recovery at levels lower than those observed in 2008. In fact, a World Bank study² identifies as the origin of the last commodity boom a strong positive demand shock, especially in emerging countries, reinforced by favorable international liquidity conditions. Moreover, the study points to the lack of investments on petroleum prospecting and metal extractive industries as a limiting factor to the capacity of supply to respond to the demand shock. The hike in the prices of agricultural inputs, strongly affected by petroleum, coupled with the increased demand for foodstuffs and alternative energy sources, also contributed to the increase in the prices of agricultural commodities, especially in the last two years. Currently, the scenario is completely diverse. On the one hand, demand pressures have been completely reversed by the international liquidity crisis and, on the other, maturing of productive investments and technological initiatives consequent upon higher prices, expanded the supply response capacity. In this framework, expectation point to a scenario of slow recovery in the prices of commodities.

Both medium and long-term trends have relevant consequences on the trade balance. The immediate impact is the negative incentive to produce goods to be exported, which tends to reduce prices and,

Figure 6 – Exchange terms and the account trade balance in comparison to GDP



2/ World Bank Global Economic Prospects 2009: Commodities at the Crossroads. <http://go.worldbank.org/TYAM73LY40>.

Figure 7 – Exchange terms and effective real exchange rate



consequently, the aggregated income. However, the negative income shock and the release of productive inputs by the exporting sector tend to appreciate the imported goods in relation to nontradable goods, negatively stimulating imports. The total effect on the balance of trade depends on the relative dimension of the opposite channels of exports and imports. As illustrated on Figure 6, the negative correlation of terms of trade and balance of trade suggests the predominance of the imports channel. In fact, Figure 7 shows the negative correlation between the terms of trade and the price of importable goods, measured by the effective real exchange rate, a condition necessary to affect imports³. Therefore, in the absence of other impacts on the real exchange rate and imports, the forecasted reduction in the terms of trade tends to improve the balance of trade when it is measured in relation to the aggregated product. Thus, it is possible that the reduction in comparison to that observed in the previous year is not so significant as the median of the market forecasts for the latest months.

3/ Notes about the variables shown in the graphs: (i) the terms of trade exclude the growth trend; (ii) the trade balance was calculated by dividing the annual product by 12; (iii) the real exchange rate is an approximate indicator for the relative price of imported goods.