

ECONOMICAL PLANS EFFECTS ON CHARCOAL PRICES

José Luiz Pereira Rezende¹, Luiz Moreira Coelho Júnior², Antônio Donizette de Oliveira¹, Márcio Lopes da Silva³

(received: october 18, 2006; accepted: march 22, 2007)

ABSTRACT: Energy is essential for human needs satisfaction. With the evolution of machinery, man becomes more and more dependent on the energy stocked in fossil fuels, comparatively to the primitive economy. Wood charcoal is a thermal-reducer used in Brazilian pig iron and steel industries, and its price is formed in an oligopsonic market. Over time, the charcoal prices have varied in function of endogenous and exogenous factors, needing, therefore, to be deflated so that they can be compared in two or more points in time. This work analyzed the variations of charcoal real prices, in national currency; compared and analyzed the real charcoal price in nominal and in real US Dollar and; analyzed the real prices of charcoal, comparatively to the real oil prices. The analyses were accomplished in the period from January 1975 to December 2002. The time series of charcoal prices, in domestic currency were deflated using IGP-DI, considering august, 1994=100, and charcoal prices were also converted to American dollar and deflated using CPI, considering the period 1982-84=100. It was compared, then, the real and nominal charcoal prices. It concluded that the real charcoal prices in Brazilian domestic currency, or in American dollar, presented a decreasing tendency along time. The inflationary disarray, in the 80's and the first half of the 90's, provoked a big price variation in the period; from the beginning the XXI century, charcoal prices were more influenced by the exchange rate; in the energy crisis period, charcoal prices suffered big changes that, however, did not persist along time.

Key words: Charcoal, Forest economy, Economics plans.

EFEITOS DOS PLANOS ECONÔMICOS SOBRE OS PREÇOS DO CARVÃO VEGETAL

RESUMO: A energia é essencial para a satisfação das necessidades humanas. Com a evolução das máquinas, o homem passou a depender cada vez mais da energia estocada nos combustíveis fósseis, comparativamente à economia primitiva. O carvão vegetal é um termo-redutor usado nas siderúrgicas brasileiras onde seus preços são formados em um mercado oligopsônico-competitivo. O setor siderúrgico é de suma importância para o funcionamento do sistema econômico, sendo um condicionante do crescimento industrial. Ao longo do tempo, os preços do carvão vegetal têm variado em função de fatores endógenos e exógenos. Este trabalho analisou os efeitos dos planos econômicos sobre as variações dos preços real e nominal do carvão vegetal e as variações dos preços do carvão vegetal em relação às variações reais do dólar americano e dos preços reais do petróleo. As análises foram realizadas no período de jan/1975 a dez/2002. A série de preços do carvão vegetal, em moeda nacional, foi deflacionada pelo IGP-DI, base ago/1994=100, e sendo também convertidos em dólar americano, deflacionados pelo CPI, base 1982-84=100. Concluiu-se que os planos econômicos influenciam os preços reais do carvão vegetal. O descontrole inflacionário, nas décadas de 80 até meados dos anos 90 do séc. XX, fez com que os preços variassem muito neste período; a partir do século XXI, os preços do carvão vegetal foram mais influenciados pela taxa de câmbio e, nos períodos de crise energética, os preços do carvão vegetal sofreram grandes oscilações que, contudo, não se sustentaram, tendendo a se estabilizarem com o fim do galopante processo inflacionário.

Palavras-chave: Carvão vegetal, economia florestal, planos econômicos.

1 INTRODUCTION

Energy is essential for satisfying human needs. Along the centuries, man learned how to use the available energy sources in the nature; however, the humanity's evolution is constituted, parallel to the growth of the energy consumption (ROVERE, 1996). With the evolution of the machines, the production of goods and services started to depend more and more of the energy thrust of the fossil fuels, formed in other geological eras, comparatively to

the flow of solar energy that indirectly sustained the primitive economy.

The world energy situation continues to be dominated by fossil fuels. The impact of economical and demographic growth is lessened by a decrease of the energy intensity, caused by the combined effects of the structural economical changes, of technological progress and of the energy price increase.

Nowadays, petroleum is the main source of energy. The elevation of its prices to a certain level made possible

¹Professor do Departamento de Ciências Florestais da Universidade Federal de Lavras/UFLA – Cx. P. 3037 – 37200-000 – Lavras, MG – jlprezen@ufla.br, donizete@ufla.br

²Professor do Instituto Superior de Educação de Afonso Cláudio – Rua Presidente Lima, 178, Centro – 29100-330 – Vila Velha, ES – lmcjunior@hotmail.com

³Professor do Departamento de Engenharia Florestal da UFV – Campus Universitário – 36571-000 – Viçosa, MG – marlosil@ufv.br

the research and the use of alternative energy sources, mainly the cleaner and renewable ones, as the hydroelectric, eolic, solar, biomass (charcoal, alcohol, etc.), hydrogen cells, geothermic, etc.

The national metallurgical activity incorporates, in its productive process, energy from charcoal, used as thermal-reducer. The price of charcoal is formed by the demand of the elaborate steel plants and by the supply of the independent producers, therefore, in an oligopsonic and competitive market (respectively).

The metallurgical sector, by nature, is essential to the operation of the economical system and plays a key role in the industrial growth, receiving from the government authorities' special attention (AZZONI, 1984). However, the charcoal always deserved prominence in the National Plans of Development.

As charcoal prices are not constant and the purchasing prices vary in different moments, it is necessary to adjust its values to make it possible to compare them over time. The economical indicators are used to do these comparisons. The same inflation indexes that serve as indexation of readjustment in the rent contracts can be used to measure price longitudinal variations of the goods and available services in the economy.

The conversion of the currency is a practice that the emergent countries have as base, to solve the chronic problems of their inflationary process. However, the dollarization concerns two processes that should not be confused, being the wealth escape for the foreign currencies and the indexation of the prices and wages fastened by the exchange rate (FRANCO, 1991).

The dollarization process happened at several Latin-American countries, where the domestic currency was substituted by the hegemonic currency, following the agreement in the monetary parity by Bretton Woods's agreement. In the Brazilian economy, due to the indexation system and due to the sophistication of the financial sector, the indexed currency substituted the domestic currency as reserve of value, while the domestic currency continued carrying out its traditional function of medium of exchange.

In spite of many studies adopt the currency conversion as parameter of comparison of economical series; they forget that even in a stable economy as the United States one, there is a loss in the purchase power due to "inflation", making it necessary to deflate the US dollar.

As studies on the effects of the economical plans and of the real variations of US dollar on charcoal nominal

and real prices lack in the economic literature, this research tries to fill out these gaps.

This work analyzed and characterized the effects of the economical plans on charcoal real prices, in the period from 1975 to 2002. The specific objectives were:

- To analyze the variations of charcoal real prices, in national currency;
- To compare and to analyze charcoal real prices with nominal and real US dollar;
- To analyze the effects and causes of the economical plans on charcoal real prices.

2 MATERIAL AND METHODS

The monthly medium prices paid for a cubic meter of charcoal in the State of Minas Gerais, in the period of January of 1975 to December of 2003, were obtained from Statistical Annuals of ABRACAVE (ABRACAVE, 2003), today, Mining Association of Forestation (AMS). The prices of the barrel of petroleum were obtained of the Statistical Annual of the Organization of oil exporting countries (OPEC, 2004), available in the site <http://www.opec.org>. The Brazilian economical indicator used was IGP-DI, available in the site <http://www.ipeadata.gov.br>. The American economical indicator used was CPI, available in the site <http://www.bls.gov/cpi>.

The inflation expresses the average price increase of an economy or of segments of this economy, provoking a loss of the purchasing power of the currency. The inflation indexation value also serves for readjusting charcoal prices over time.

Brazil, in 1975-2002 period, experienced five changes in its monetary unit. Most of the changes were limited to the cutting of zeros, in other words, a new monetary unit started to be worth a thousand of the old monetary units. In "Plano Real" there was a more sophisticated alteration, with the introduction of "Real Unit of Value" (URV), that coexisted with the (CR\$) for a certain period and, finally, both were substituted by the Real (R\$). The rate of conversion of "Cruzado Real" for Real was of 2.750,00 CR\$/Cr\$/R\$, while the rate of conversion of URV for Real of one to one, according to the Table 1.

The charcoal prices contained in the ABRACAVE annual statistical report are quoted in the effective national currency or in current US dollar, therefore, it is necessary to convert them to a unique currency (monetary unit) so that the economical indicator can be applied.

Table 1 – Monetary patterns previous to the “Real”.**Tabela 1** – Padrões monetários anteriores ao Real.

Monetary pattern	Release Date	Conversion Rate
Cruzeiro (Cr\$)	15.05.1970	Cr\$ 1.000,00 = Cz\$1,00
Cruzado (Cz\$)	28.02.1986	Cz\$ 1.000,00 = NCz\$1,00
Cruzado Novo (NCz\$)	16.01.1989	NCz\$ 1,00 = Cr\$1,00
Cruzeiro (Cr\$)	16.03.1990	Cr\$ 1.000,00 = CR\$1,00
Cruzeiro-Real (CR\$)	01.08.1993	CR\$ 2.750,00 = R\$1,00
Real (R\$)	01.07.1994	-

Fonte: BACEN (2003).

Thus, the charcoal monthly nominal prices were converted to US dollar using the pondered American average commercial dollar, official of the Brazilian Central Bank of (PTAX 800) at sale price, and later deflated by the American economical Indicator to find the US real dollar.

The indicator used in this study was the Consumer Price Index (CPI) which is the index of American inflation that measures the medium price change paid by urban consumers for a basket of goods and services in the consumer's market.

The calculation of the baskets of goods and services (CPI) is developed with detailed information of the expenses supplied by the families and of individuals that really bought such products. This index is calculated by The Bureau of Labor Statistics that classifies all the goods of the expense in more than 200 categories, arranged in eight main groups: Food and Beverage; Home; Clothes; Transports; Health; Recreation, Education and Communication; and Other Goods and Services.

The formula used to calculate charcoal real price was:

$$P_r = \frac{P_n}{\text{Indice}} * 100$$

Where:

P_r = Real Price

P_n = Nominal Price or average price,

Indice = Economical indicator

To change the base of comparison of the series of prices of the charcoal, generating one or more series with base same to 100 in the month determined by the user, it was made the following calculation:

$$P_{mt} = \frac{P_{nk} * P_{rt}}{P_{rk}}$$

Where = Real Price of the base modified in the period t,
= Nominal price in the period k (period for the new base = k),

= Real price in the period t,

= Real price in the period k.

The base period used for calculating the index numbers was 1982-84=100 and, for changing the calculation base it was chosen the month of August of 1994=100. For the base period it should be avoided “abnormal years”, i.e., periods with wars, recessions and economical crises that may distort real or deflated values. It seems that the chosen periods present the necessary characteristics.

After accomplishing the indexations, the analysis of the economical plans effects on charcoal prices were carried out in a detailed form.

3 RESULTS AND DISCUSSION

The real charcoal prices, in national currency, are presented in Figure 1. As the series is of 28 years and, in this time period, several monetary reforms (monetary unit change) occurred, in other words, currency changes, as shown in the Table 1, the respective charcoal real prices were converted to the on going Brazilian currency “Real” (R\$). These currency changes were too frequent which render almost useless to indicate their nominal values over time.

To verify the difference between real price and nominal price of charcoal, the American currency was used (dollar). The series as a whole, Figure 2, shows that the real prices of a cubic meter of charcoal are falling over time. Charcoal real prices fall over time due to inflation, in other words, there is a loss to the population purchasing power due to the increase of prices of consumed products.

To better study charcoal price variations over time, the total time span studies was segmented in smaller periods as pointed out bellow.

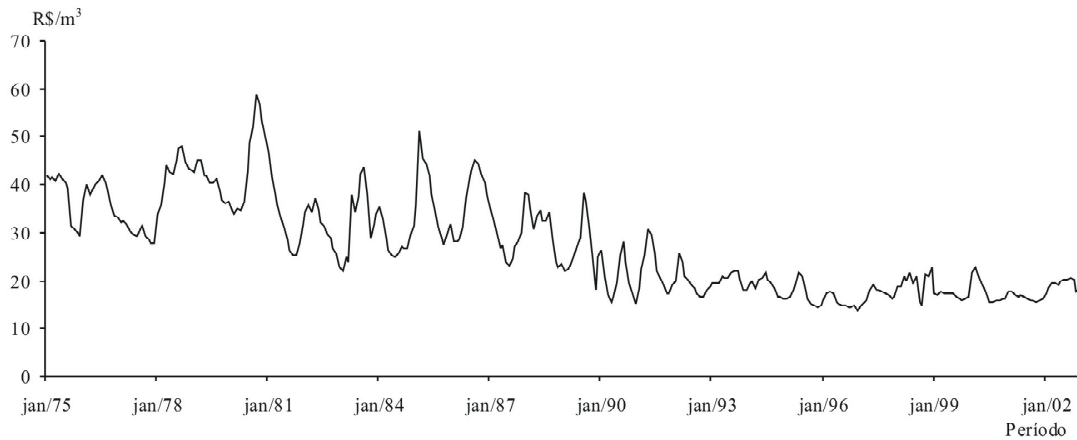


Figure 1 – Charcoal Real prices behavior from 1975 to 2002 (IGP-DI, Base ago/1994=100).

Figura 1 – Comportamento dos preços reais do metro cúbico de carvão vegetal no período 1975 a 2002 (IGP-DI, Base ago/1994=100).

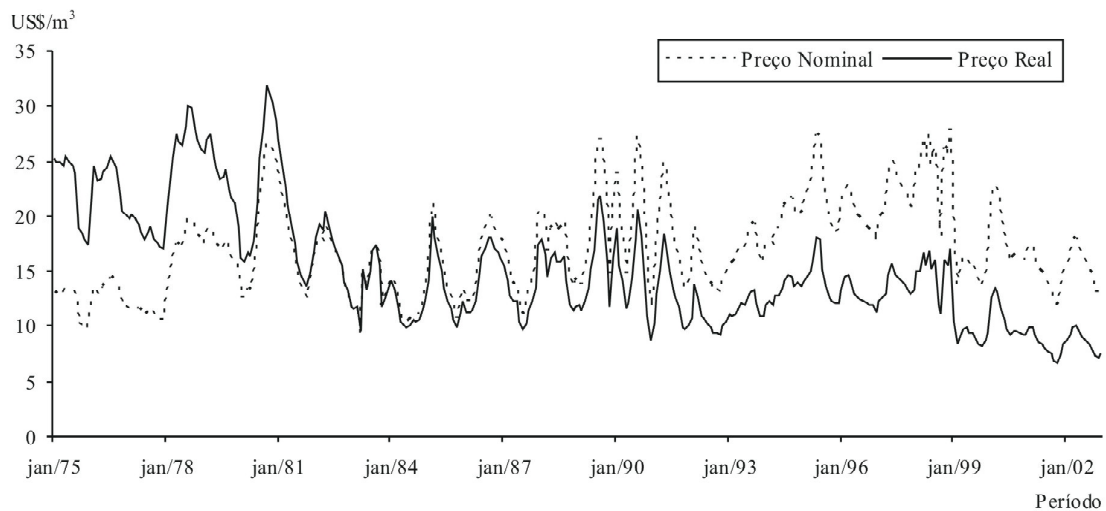


Figure 2 – Behavior charcoal real and nominal prices (US\$/m³) from 1975 to 2002, (CPI base 1982-1984=100).

Figura 2 – Comportamento do preço real e nominal do carvão vegetal (US\$/m³) no período de 1975 a 2002, (CPI base 1982-1984=100).

The II National Plan of Development (II PND) was forwarded by the government at end of 1974 to eliminate the structural shortcomings of the Brazilian economy. It emphasized the investment in key industries, looking for autonomy in inputs. Through the Energy policy,

the Program of Charcoal was launched envisaging its production expansion and modernization through researches; charcoal should be used as raw material in the manufacturing of higher aggregate value industrialized products.

In 1976 10% of the consumption of charcoal was already constituted of planted forests of the gender Eucalyptus. This was made possible by the tax exemption program of 1965. In August, 1976, the real price of the cubic meter of charcoal reached US\$ 25.08. After this period, a significant price fall occurred, reaching the bottom price of US\$ 17.09, in December, 1977. This figure is 68.14% inferior to the charcoal price practiced in August of 1976, as can be seen in Figure 3.

Most of the metallurgy industry that consumes charcoal is concentrated in Minas Gerais State. The state government promulgated the State Law 7.163 of December 19, 1977, that altered the legislation on the Forest Tax. The market answered with a gradate increment in charcoal prices, that decreased to 75.37% in the previous year's price, in August, 1978. At this time the 2nd oil crisis was about to begin.

However, the demand market, in volume, didn't answer immediately to the forest tax effects and charcoal consumption. In 1978, it was 15.15 mil m³, only 0.66% below that one of the previous year. However, a Strong influence of this taxation was felt by the integrated plants, having a reduction 2.5% of the production of cast iron. But, one cannot forget that the government's priority, at that time, was energy generation.

The government managed to control charcoal market price by stimulating forestation and increasing firewood supply; consequently, charcoal price fell to US\$ 15.93 per cubic meter, in February, 1980.

From the late 70's of last century on, the country started facing serious difficulties, mainly, related to foreign

debt financing, committing its productive capacity due to the fast increase in international interest rate. This scenery together with the second oil crisis favored charcoal use in the base industries.

The international economy experienced, in 1979, one more oil shock leading to the decline of the world economical development which prolonged up to 1981.

The growth optimism that prevails until II PND, even with the economy in a declining process, didn't proceed ahead in the following economical plans of the 80's, also known as "Lost Decade". Starting from the III National Plan of Development (III PND) (1979), the inflation process, years of depression and the "heterodox shocks" joined to the loss of the quality of the planning process, consequently, the economy as a whole deteriorated, exhausting the "development euphoria" mood of previous PND's.

The III PND was projected to take place from 1980 to 1985, but was interrupted in the second semester of 1980. This development plan little differed from the previous PND's. Following the "Cepalian Thinking", in the beginning of the 80's decade, the import substitution process was consolidated, due to the fiscal benefits in infrastructure, agriculture and reforestation.

But, the industries that used petroleum related raw material, due to the high prices, were prejudiced, while charcoal dependent industries suffered less influence at first, but due to charcoal demand increase, charcoal prices, in a short period, arose from US\$ 15,93, in February, 1980, to US\$31.85 in September, 1980, increasing about 99,94%. Figure 4 shows that in this period charcoal prices presented a cyclical behavior.

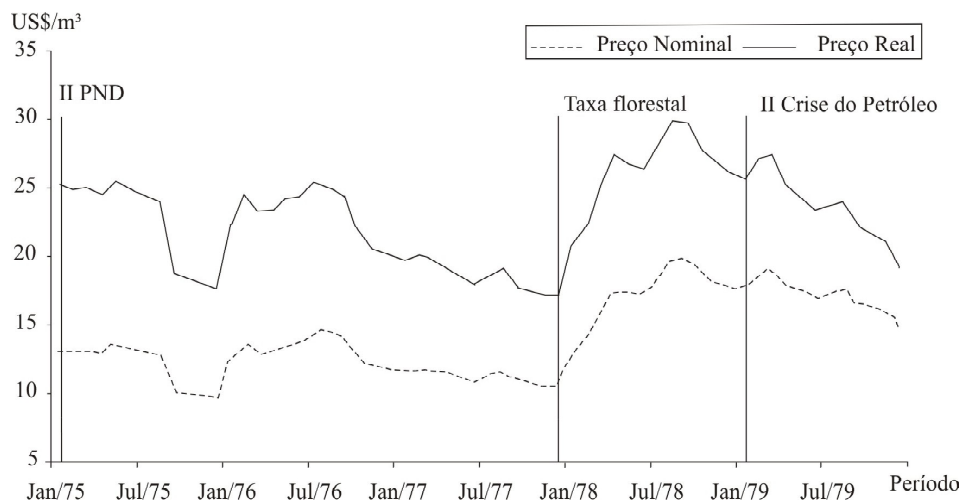


Figure 3 – Behavior charcoal real and nominal prices (US\$/m³) 1975 to 1979, (CPI base 1982-1984=100).

Figura 3 – Comportamento do preço real e nominal do carvão vegetal (US\$/m³) no período de 1975 a 1979, (CPI base 1982-1984=100).

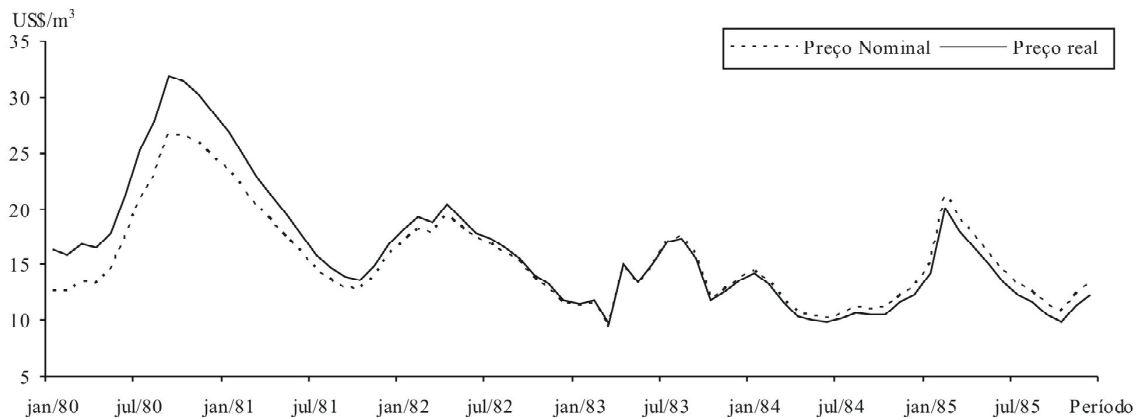


Figure 4 – Behavior of charcoal real and nominal prices (US\$/m³), from 1980 to 1985 (base 1982-84=100).

Figura 4 – Comportamento do preço real e nominal do carvão vegetal (US\$/m³), no período de 1980 a 1985 (base 1982-84=100).

Gremaud et al. (1999) consider that the process of external adjustment envisaging balance of payment surplus, that had began in 1980, was deepened in 1982, even under IMF tutorial, sought the foreign debt payment that the country accumulated during the II PND. The adopted politics was based on the contention of aggregate demand, to establish a relative price structure favorable to the external sector, through the devaluation of the exchange rate.

Consequently, there was a deep decline of GDP and in the Industry, mainly, between 1981 and 1983, according to the Table 2. The prices of the charcoal, for instance, suffered expressive fall (57,30%) from September of 1980 to October of 1981.

After the military regime, in the middle of the decade of 1980, the in coming government elected the inflation combat as its main goal in the conduction of the economical policy. From 1985 to 1994, the inflation combat and the economical stabilization was tried in several ways, in a sequence of economical plans (Plano Cruzado, Plano Bresser, Plano Verão, Plano Collor I, Plano Collor II and Plano Real).

The “Plano Cruzado” of February, 1986, the Brazilian program of stabilization, that promoted a monetary reform established the “Crusado” (CZ \$) as new monetary pattern. The conversion rate was adjusted as Cr \$1.000,00 for CZ \$1,00. The intention of Plano Cruzado was to create a stable currency, that was soused to be able of eliminating the galloping inflation process, producing a neutral effect. Thus, the same pattern of

income distribution of the “Cruzeiro”, the old monetary unit remained.

The success of “Plano Cruzado” obtained in containing inflation and increasing the purchasing power of the population, through the price freeze of goods and services, did not last long. In February, 1986, beginning of Plano Cruzado, the price of the cubic meter of the charcoal was US\$ 11.24 per cubic meter. The plan drove the country to a euphoric mood. It increased the consumption in all the social extracts, consequently, charcoal real prices tended to increase. In August, 1986, charcoal real prices were 61,30% higher than in February of the same year, mainly due to low inflation, demand increase and the higher production of cast iron (Figure 5).

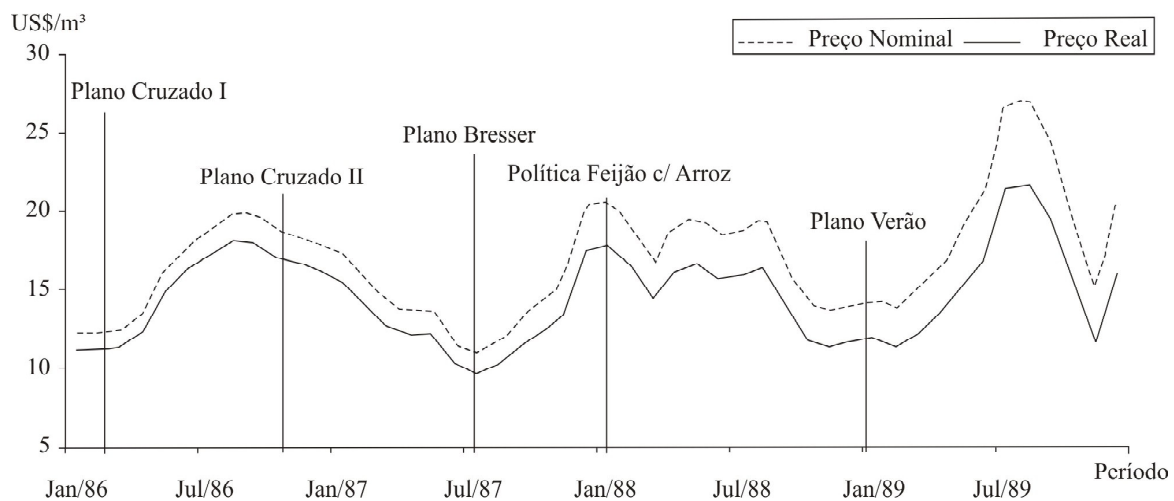
Due to the purchase power increase of wages without the correspondent production increase, the goods disappeared from the super market shelves and the suppliers started to over price goods and services, and, therefore, the inflationary process started again.

The government managed to maintain the price freezing until the elections, extracting larger political dividends of the strategy, but the economy, however, was completely disorganized. As inflation returned soon after the elections of 1986, a new economic plan, “Plano Cruzado II” was established, this time unchaining prices in order to attack the fiscal problem. However, the prices arose, systematically, and again a galloping inflationary process was on the way.

Table 2 – Growth in the period from 1980 to 1985 (Index 1980 = 100).**Tabela 2** – Crescimento no período de 1980 a 1985 (Índice 1980 = 100).

Year	GDP	Industry	Cast iron production	Consumption of charcoal
1980	100	100	100	100
1981	95,75	91,7	88,44	94,35
1982	96,63	91,30	83,47	88,77
1983	93,81	85,91	98,22	104,35
1984	98,90	91,38	131,32	135,68
1985	106,75	99,08	138,20	141,68

Source: ABRACAVE (2003).

**Figure 5** – Behavior charcoal real and nominal prices (US\$/m³), from 1986 to 1989 (base 1982-84=100).**Figura 5** – Comportamento do preço real e nominal do carvão vegetal (US\$/m³), no período de 1986 a 1989 (base 1982-84=100).

On January 20, 1987, a payment suspension of the services of the foreign debt was announced (economic moratorium), provoking widespread price increase. The inflation increase accelerates, and the population lost the trust in the government. Consequently, the real prices of charcoal began to fall due to the spare volume supplied at the market place, going down to US\$ 10.45 per cubic meter, in June, 1987, while GPI-ID achieved an 25,87% increase. In the same period, the government placed, yet, a new economical plan, the “Plano Bresser”, envisaging the well known target of containing inflation.

Starting in June, 1987, the plan aimed at freezing prices, rents and wages for three months. The “Plano Bresser” was, at first, more consistent and flexible than the previous ones

and managed, at first, to stop the public deficit and the inflation process, to eliminate most of the Fiscal Incentives, including the tax exemption program of forestation, and, finally to increase tributes. The negotiations with IMF were resumed, suspending the moratorium; however, the results were not satisfactory. Charcoal prices suffered expressive increase of 84.93% between July, 1987 and January, 1988.

The economical politics of “arroz com feijão” (Beans with Rice), was adopted in January, 1988. The aim this time was to accept some inflation to avoid adopting drastic measures, but to avoid at any cost the hyperinflation. Thus, as shown in Figure 5, this charcoal price stability was maintained during the whole period, when the “Beans with Rice” policy kept inflation under control.

The Plano Verão was announced in January 15, 1989. It was the third economical shock and the second monetary reform of the Government of the time, creating a new monetary unit, the “Cruzado Novo”. It was cut three zeros of the “Cruzado”; another prices freeze was imposed. It put an end to the indexation and it proposed the privatization of several state owned companies and it was announced several cuts in the public expenses, with the contracted employees’ discharge in the last five years. The cuts were not made, the plan failed and the inflation discharged. Only in December, 1989, the prices went up 53.55%. In February, 1989, to the same period of the following year, the inflation arrived to 2.751%.

The Collor government, as the previous one, had as basic concern, the inflation combat. At the time, inflation rate was in an unbearable level, and the economy was totally disorganized. A new stabilization program denominated “Plano Collor”, based on a monetary confiscation was established. The Cruzado returned as the monetary unit in March 16, 1990, and the inflation reached 81.32% in the same month, the highest point in the Brazilian economy history. Charcoal price reached US\$ 11.57 in April, 1990 (Figure 6).

The government confiscated all the Brazilian banking savings above Cr\$50.000,00. Besides eliminating

inflation, the plan aim was to establish measures to modernize the economy and to open the country to the international competition with the gradate reduction of import tax and aliquots. Plano Collor’s effects were immediate on charcoal market, due to the commercial opening, favoring the exports of iron and steel. The increment in the charcoal price reached 79.26%, in August, 1990, as compared to that of April of the same year.

However, the government was not able to control the inflation and the country dived in a recessive process. The inflation process started all over again in the middle of 1990’s. In December, 1990 the monthly rate was about 19.39% and the yearly accumulated inflation reached the unbelievable figure of 1.198%. The charcoal real price fell to US\$ 8.78 per the cubic meter, reaching the historic lowest level ever.

In January 31, 1991 the “Plano Collor” II that doesn’t put an end to the inflation was ordained deepening the recession process, Table 3.

The economical activities, in 1993, began to give signs of recovery. The opening of the market for imported products promoted by the Government forced the Brazilian companies to invest in the improvement of the products quality and in the modernization of the production processes. In 1993, GDP increased 4.1%, after two years of fall, and the charcoal based metallurgy increased 13.07%.

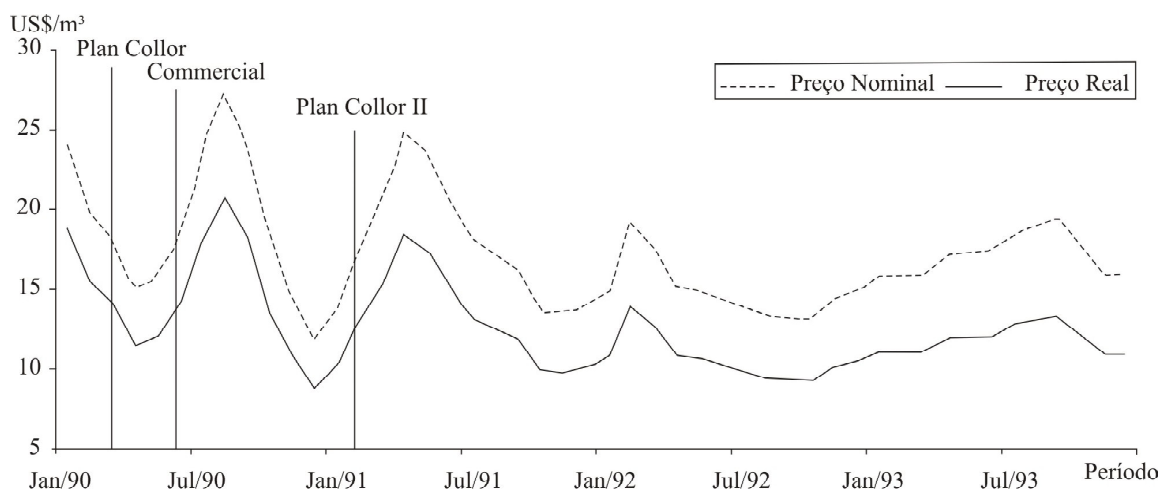


Figure 6 – Behavior of charcoal real and nominal prices (US\$/m³), from 1990 to 1993 (base 1982-84=100).

Figura 6 – Comportamento do preço real e nominal do carvão vegetal (US\$/m³), no período de 1990 a 1993 (base 1982-84=100).

Table 3 – Growth, in the period 1990-1994 (Index 1990 = 100).**Tabela 3** – Crescimento, no período 1990 a 1994 (Índice 1990 = 100).

Year	GDP	Industry	Cast iron production	Charcoal Consumption
1990	100	100	100	100
1991	101,03	101,41	84,69	85,54
1992	100,48	98,79	79,16	78,80
1993	105,43	98,61	89,52	87,47
1994	111,60	97,44	96,56	94,09

Source: ABRACAVE (2003).

However, charcoal real prices in the government's transition period for the vice-president were controlled. A plan of stabilization of the economy was announced, in December, 1993, setting aside the shocks and surprise measures.

The Stability of the Brazilian economy would come, in 1994, with Plano real. The change of base of the index was accomplished in August, 1994 = 100 to update close future deflated prices, due to the abrupt disturbances of the national economy in previous periods.

Figure 7 displays charcoal real and nominal prices of a cubic meter in the whole studied period, with CPI (base August, 1994 = 100). After the economy stabilization, in 1994, the real values came very close to the nominal values, showing that planning could be made with smaller risk, when monetary stability is reached.

In March, 1994, when the price of a cubic meter of charcoal was US\$ 17.71, the Real Unit of Value (URV) was established. URV was a monetary unit that didn't substitute the currency in circulation, the "Cruzado Real", but, it served as reference for prices. In fact all prices were converted to it. In "Cruzado Real", the new Brazilian temporary currency, the inflation continued existing, but, prices were fixed in URV.

In July, 1994, URV gave place to the new currency, the Real. From the creation of URV till the introduction of the Real, the charcoal price increased 13.21%. "Plano Real" stopped inflationary escalate that had begun in the seventies. The main cause for stopping the inflationary process was the suppression of the indexation, i.e., all prices going up according to the inflation rate. The country, finally, started experiencing inflation rates similar to those of stable and developed economies (Figure 8).

The Real won the trust of the population and cut the effect of past inflation on prices (inertial inflation),

but the currency was worth more than it would, in other words, there was an over valorization and the government seemed not to know how to adjust the currency value without putting the conquered stability at risk.

In March, 1995, the Central Bank (BC) implanted the system of bands for the exchange market; the exchange rate could vary, since it remained in the limits established by the Central Bank.

In May, 1995, charcoal price reached US\$ 26.99. The government started, then to move the limits of that band, taking the Real to depreciate slowly. The objective was to reach a point of balanced price, without disrupting the economic process, such as a large-scale monetary devaluation.

That strategy did not work out and financial crisis erupted in Asia, in July, 1997, and the international market cut the credit for countries with very high external deficits. The investors thinking were that those countries, sooner or later, would have to depreciate their currencies to avoid the risk of international insolvency.

Brazil, then, started once again to experience difficulty in financing its foreign debt and in sustaining its currency relative value. To maintain foreign investments in the country, Brazil elevated the interest rates at very high levels, causing fall in charcoal prices.

The pressures grew up in August, 1998, when Russia also had to depreciate its currency and declared moratorium of its international debt. As reaction to that crisis, Brazilian BC elevates the interest rates to 43% a year. This fact is made clear in Figure 9 that shows an abrupt oscillation of charcoal price in 1998.

In January, 1999, however, the pressure was unsustainable and Brazil gave up on struggling against the investors. The government left the price of the dollar to arise freely in January 13.

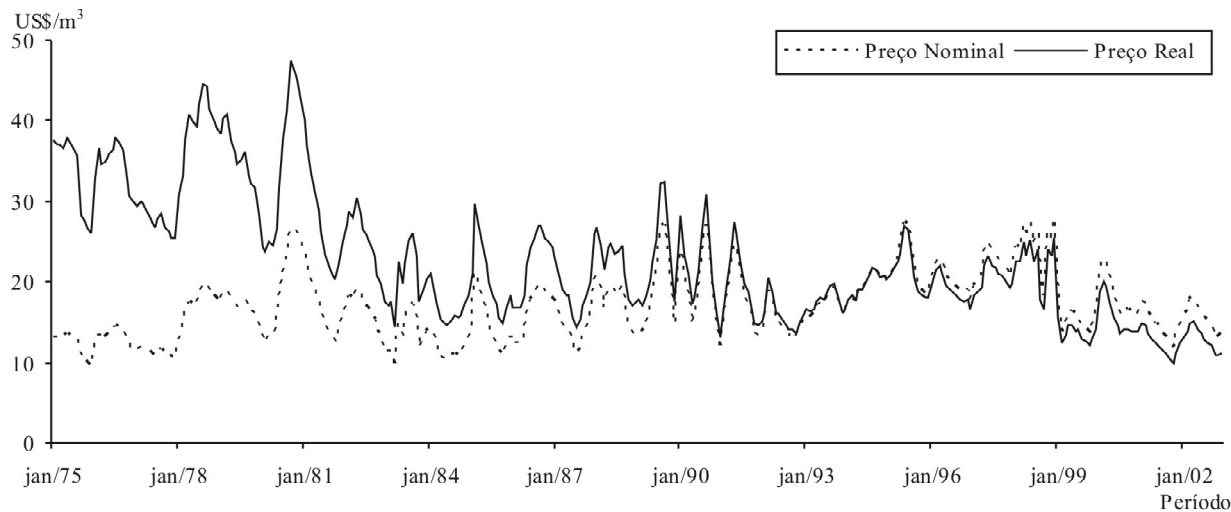


Figure 7 – Behavior of charcoal real and nominal prices from Jan/1975 to Jan /2002 (CPI base Aug/1994=100).

Figura 7 – Comportamento do preço real e nominal do carvão vegetal no período de 1975 a 2002 (CPI base ago/1994=100).

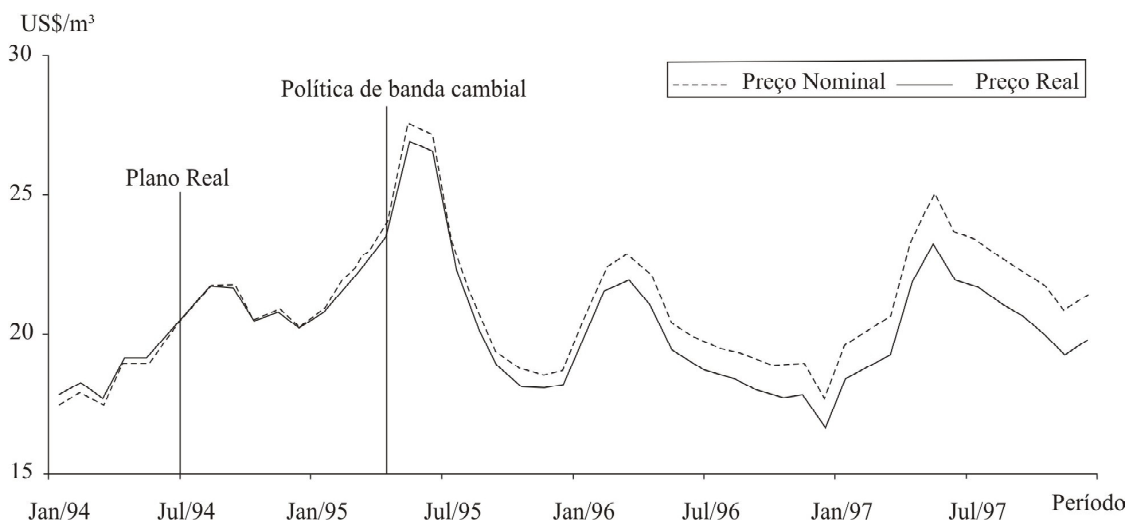


Figure 8 – Behavior of charcoal real and nominal prices from Jan/1994 to Dez/1997 (CPI base Aug/1994=100).

Figura 8 – Comportamento do preço real e nominal do carvão vegetal no período de jan/1994 a dez/1997 (CPI base ago/1994=100).

In December, 1998, before the exchange rate depreciation, charcoal price of a cubic meter was US\$ 22.50. In spite of the initial optimism, the “Real” continued to fall vertiginously, reaching a depreciation of 37% in terms of US Dollar in only one month and charcoal price fell 38,48% in the same period, reaching the lowest quotation, of “Plano Real”, of US\$ 12.50 in February, 1999. At this point in time the exchange rate was set at R\$ 2.165 per US dollar.

The passage from controlled to free exchange rates, for the first time in the country’s history, was surprisingly calm. Thwarting the fears of last years, the country allowed the currency to depreciate without losing inflation control. It seems that Central Bank and Treasury Department once again played a key role in solving these problems and in controlling foreign investors’ humors. From this point in the time on, charcoal prices seem to be varying according to US dollar quotation.

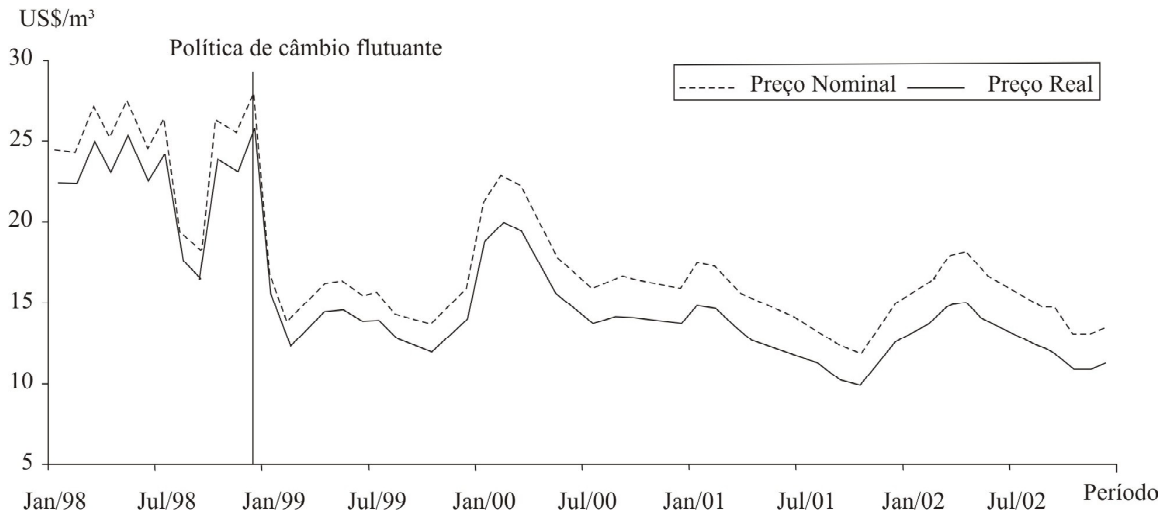


Figure 9 – Behavior of charcoal real and nominal prices from Jan/1998 to Dez/2002 (CPI base Aug/1994=100).

Figura 9 – Comportamento do preço real e nominal do carvão vegetal no período de jan/1998 a dez/2002 (CPI base ago/1994=100).

However, Brazil overcame the crisis of monetary stabilization quicker than the Southeast Asian countries, Mexico and Russia. Naturally, 35% to 40% depreciation of the domestic currency was a problem to the economy that needed an intense work of re-adaptation of the businesses, mainly, including the charcoal market.

This occurred, at least in part, because the economy remained paralyzed during some months, while the dollar didn't find a stable price level, the interest rate kept above 30% p.a. and it was not known which would be the inflation equilibrium level.

A new "ghost" besides the macroeconomic indicators and the world crises appears in the Brazilian forest sector, published by the Brazilian Society of Forestation (SBS). The idea put forward by SBS was that in the turning of the century, there would be a "Forest Apagão", i.e., a generalized lack of forest products such as wood for charcoal making, for secondary transformation industry, for pulp and paper industry, etc..., was on its way. In this period, a world wide energy crisis breaks up and charcoal prices reach, in January, 2000, US\$ 20.12 per cubic meter, due to the shortage of raw material supply. This situation, however did not last long and prices fell to US\$ 13.71 in July of the same year.

Thus, the wood shortage was more harmful to the charcoal sub-sector than to any other forest sub-sector both to independent producers and to integrated plants. The integrated plants are more organized and

possess a better planning because it produces its own forest based raw material. The independent producers of charcoal already contracts of short period with the steel plants.

In January, 2001, the prices went up, reaching US\$ 14.87 level again, due to the favorable exchange to the exports, however, it started falling again until October, 2001 reaching US\$ 9.98, when the exchange rate was R\$ 2,74/US dollar. The exchange rate was controlled up to June, 2002; charcoal prices went up, reaching US\$ 15.03 once again, in April, 2002. The quotation of the dollar broke the psychological barrier of R\$ 3.00/US dollar; consequently, charcoal prices fell to the bottom level of US\$ 10.79, in November, 2002, arising again in December.

4 CONCLUSIONS

According to the analyses done in this work, the following conclusions can set forward:

The real charcoal prices, in national currency, over time presented decreasing tendency.

The oscillations of charcoal real price, in US dollar, feel, basically, for the demand in the industries that use it as raw material;

The government programs in the 60's and in the 70's increased charcoal supply, consequently, influencing its prices;

The charcoal prices were influenced by the economical plans that envisaged economical stability.

The inflationary disarray caused a very big charcoal price variation from 1986 to 1990.

From the XXI century on, charcoal prices were more influenced by exchange rate and by supply.

In the periods of energy crisis (petroleum) charcoal prices suffered great oscillations that, however, did not sustained in the long run.

5 BIBLIOGRAPHICAL REFERENCE

ABRACAVE. **Anuário estatístico**. Belo Horizonte, 2003.

AZZONI, C. R. Aspectos do financiamento do setor siderúrgico no Brasil. In: ENCONTRO NACIONAL DE ECONOMIA, 12., 1984, São Paulo. **Anais...** São Paulo: ANPEC, 1984. CD-ROM.

BACEN. **Padrões monetários anteriores ao real**: prazos para troca. Disponível em: <<http://www.bcb.gov.br/?MECIRTROCA>>. Acesso em: 6 ago. 2003.

FRANCO, G. H. B. Dolarização: mecanismo, mágicas e fundamentos. In: ENCONTRO NACIONAL DE ECONOMIA, 14., 1991, Curitiba. **Anais...** Curitiba: ANPEC, 1991. CD-ROM.

GREMAUD, A. P.; VASCONCELLOS, M. A. S.; TONETO JÚNIOR, R. **Economia brasileira contemporânea**. 3. ed. São Paulo: Atlas, 1999.

OPEC. **Annual statistical bulletin 2002**. Disponível em: <www.opec.org>. Acesso em: 7 fev. 2004.

ROVERE, E. L. L. Energia e meio ambiente. In: MARGULIS, S. (Ed.). **Meio ambiente**: aspectos técnicos e econômicos. 2. ed. Brasília, DF: IPEA, 1996. 246 p.