ISSN 1519-4612

Universidade Federal Fluminense

TEXTOS PARA DISCUSSÃO

UFF/ECONOMIA

Universidade Federal Fluminense
Faculdade de Economia
Rua Tiradentes, 17 - Ingá - Niterói (RJ)
Tel.: (0xx21) 2629-9699 Fax: (0xx21) 2629-9700
http://www.uff.br/econ

esc@vm.uff.br

The mark up in industrial Brazilian firms in the 1990s: econometric evidence

Carmem Aparecida Feijo*
Luiz Fernando Cerqueira**

TD 266
Dezembro/2010

 * Professor da Faculdade de Economia/UFF. E-mail: lcer@uol.com.br.
** Professor da Faculdade de Economia/UFF. E-mail: cfeijo@terra.com.br.

Abstract

Our aim in this paper is to investigate in econometric terms the determinants of mark up in the Brazilian industrial firms in the 1990s, a period stamped by slow economic dynamism and relevant changes in the macroeconomic environment. The econometric exercise developed in this article, based on panel data for industrial firms, showed how microeconomic and macroeconomic variables explained the determination of the mark up. A negative relation was found between demand variation and mark up variation, suggesting that it evolved in an anticyclic way. This behavior is explained based on the increase in uncertainty that surrounded changes in the macroeconomic scenario in the 1990s. Several econometric models were tested and all presented the expected results according to our interpretation.

Keywords: estimation with panel data, pricing, mark up determination, micro and macroeconomic interactions.

JEL: C33, D21, D40, E31.

Resumo

Nosso objetivo neste trabalho foi testar econometricamente os determinantes do mark up em firmas industriais no Brasil nos anos 1990. A década de 1990 foi marcada por baixo crescimento e relevantes mudanças no cenário macroeconômico. Os exercícios econométricos desenvolvidos foram baseados em dados de painel para firmas e mostraram como variáveis micro e macroeconômicas explicaram a determinação do mark up. Encontramos uma relação negativa entre variação na demanda agregada e no mark up, sugerindo que o mark up evoluiu de forma anti-cíclica. Este comportamento pode ser interpretado como resultado do aumento da incerteza afetando expectativa dos agentes nos anos 1990, dado as mudanças no cenário macroeconômico. Diversos modelos econométricos testados e como regra, todos apontaram para confirmação das premissas levantadas neste artigo.

Palavras-Chave: estimação em dados de painel, precificação, determinação do mark up, interações micro e macroeconômicas.

Introduction

The significant changes in the economic scenario in the Brazilian economy in the 1990s were marked by economic and financial deregulation, price stabilization and privatizations. Although those changes, according to the liberal agenda, should have a positive impact on growth,[1] growth rates were modest along the decade. Despite the slow growth, the 1990s saw the recovery of industrial productivity, which had been stagnated since the 1980s. This result can be largely attributed to the external deregulation and exchange rate appreciation after the stabilization plan in 1994.

Microeconomic literature points out that the increase in production efficiency as a result of more flexible commercial relations should result in, at least, two positive effects on the economy. On the one hand, a greater exposure to foreign competition should positively influence firms to improve their product quality and productivity by using inputs more efficiently. Thus, an increase in economic growth rates should be expected, encouraged by the acceleration in incorporating technological change. As has been mentioned, economic growth rates were relatively low in the 1990s. On the other hand, the reduction in tariff and non-tariff barriers should imply in broadening the market for more firms, increasing competition and contributing to a reduction in mark ups. Reduction in industrial mark ups was not observed either. In 1990 the average mark up of industrial firms moved from 1.22, in 1993, to 1.30 in 1996 and 1.38 in 1999 (see Table 1 in Annex). These results show that the mark ups changed and increased. This is in sharp contrast with the findings of Ferreira & Guillén (2004, p 527), who observed little change in the mark ups in the 1990s. The authors, when presenting the results of their econometric estimates about the effect of economic deregulation on the Brazilian productivity and production framework, concluded that:

> The channel to this increase in productivity is not, apparently, the increase in competition, since there is no statistical evidence of mark up reduction. This is perhaps the most surprising result in the article, the fact that the mark up does not change significantly after commercial deregulation.

Considering the macroeconomic scenario in the 1990s, the objective of this paper is add new evidence about the mark up behavior of industrial Brazilian firms in the 1990s. Our theoretical hypothesis is that the new economic environment did not reduce the degree of uncertainty in the economy, inducing industrial firms to a defensive behavior when setting their prices. In this sense, this text discusses theoretically causal links and investigates empirically variables that can be identified as having influence in price formation in the 1990s, through the determination of the mark up of industrial firms. Price formation is a key variable to explain the production and accumulation behavior of the firm, because it largely determines the generation of firm's profits. Also, pricing strategies of firms are fundamental to the understanding how monetary policy affects the real side of the economy. In spite of the relevance of the subject, empirical studies about mark up determination in Brazil in recent times are scarce and not conclusive. In this context the contribution of this paper, with the econometric evidence, is to add new arguments to explain industrial mark up behavior in the nineties.

[1] See, for a debate on this issue, Hermann, 2002.

This paper works with the assumption that prices, in a large portion of the economy, are fixed through the application of a mark up over production costs. The main reference here is the classical empirical study of Hall and Hitch (1939). Thus, the key variable that firms administrate is the mark up - not the price itself. The decision about the mark up depends on the firm's perception in relation to the behavior of the market for its product and on macroeconomic environment, given a growth strategy chosen to be followed over time. This hypothesis allows for the establishment of an interesting relation between microeconomic and macroeconomic variables in the firm's decision process, as well as an important interaction between short term and long term decisions (Feijo, 2002).

This paper develops in the following way. In the next section we briefly present theoretically how the price formation process takes place in the context of an oligopolistic firm deciding under uncertainty. Then we discuss how changes in the macroeconomic scenario of the Brazilian economy in the 1990s affected the industrial firm's behavior regarding the determination of the mark up. So we present the econometric results of the model for the industrial mark up determination in industrial Brazilian firms in the 1990s, testing several different econometric models. The results found in the econometric exercise confirmed the main conclusions of our economic analysis, and also, we found out that the more simple specifications offered the more robust result. A last section summarizes our conclusions.

I. An overview of mark up determination based on the post Keynesian literature

The post Keynesian literature attributes a particular interest in the mark up determination as it considers that production, price and investment decisions are linked to mark up decision. In this literature, mark up behavior is the result of the interaction of a complex set of economic forces[2]. Under the assumption that decisions are made under uncertainty, firms cannot fully evaluate the consequences of their actions, and therefore determine for sure the price that maximizes their profits. So, the mark up becomes the strategic variable firms manipulate in search of their maximization targets.[3] Post Keynesian authors advocate that price formation process reflects how diversified firms build their growth strategies according to how they perceive the future behavior of demand, costs, and competition.[4]. According to the Kaleckian tradition, the supply price in oligopolized markets reflects the firm cost structure and market power.[5]. Besides that, it is also assumed that it reflects the internal fund requirements to realize the firm's investment plans.

Kenyon (1979) proposes a sequence of arguments to explain the determination of the mark up by an oligopolistic firm. First, the firm decides about the future investment

[2] For example, Eichner (1973, 1976, 1985), Harcourt and Kenyon (1976); Davidson (1978), Kenyon (1979); Shapiro (1981); Feijó (1993), Arestis and Milberg (1993-94), Downward (2000), Shapiro and Sawyer (2003) among others.

[3] Davidson (1978) suggests that prices are formed by means of a mark up rule over costs given a production level considered as being standard.

[4] In this sense we recall Penrose's (1959) observation, that it is subjective judgment, rather than objective fact that is considered in firm's decision making process

[5] According to Kalecki (1971) the firm's mark up is determined by the degree of competition between firms in an industry $(p_i - u_i)/u_i = f_i(p^*/p_i)$, where p^* is the weighted average price in an industry, u is the direct cost, and i represents the firm's subscription.

plans based on the relation between the observed capacity utilization rate and some desired rate – this desired rate being such that the firm will be capable of meeting a sudden increase in demand for its product; after that, the firm chooses the mark up that will allow it to retain the profits required to fulfill its obligations and meet its strategic objectives. The firm then chooses the mark up that will provide the expected profit level. The firm will maintain this price as long as demand conditions indicate that the productive capacity is adequate, and as long as production costs do not deviate from their normal level.

As Shapiro and Sawyer (2003) pointed out, although prices depend on costs, there is no automatic transmission mechanism in costs to prices, that is, prices depend on the mark up (a strategic decision), as well as on costs. When costs change, the prices do not necessarily change; the mark up over the costs may change instead of the prices[6]. In the same way, when demand changes, firms with oligopoly power will decide to change prices according to their strategy of capital accumulation in the long run. Again, there will be no automatic mechanism linking price changes due to changes in demand.

Prices, in this sense, cannot be treated as functions of the resource allocation and income distribution process only, they must also be related to: a) the need to generate funds that will make the capital accumulation process possible, b) make payments of debts feasible, c) induce and partly finance investments and d) make the acceptance of new financial obligations possible.

In sum, the mark up is a strategic variable that changes both by market influence and decisions made by firms to meet their targets over time. Those targets are established considering the evaluation they make about future prospects of gains, given their perception of the present and future evolution of the macroeconomic context.

III The macroeconomic context in the 1990s: an overview

The 1990s is a decade marked by deep changes in Brazilian macroeconomic scenario. Two economic reforms are the most responsible for the changes in the economic environment: the end of the high inflation regime after the success of the stabilization plan known as the Real Plan, in June 1994, and the commercial and financial deregulation with the end of tariff and non-tariff barriers, which started at the end of the 1980s.

The end of the high inflation regime implied the end of contract indexation, a practice that pervaded all economic transactions.[7] In a highly inflationary context in the 1980s and beginning of the 1990s and with widely diffused contract indexation rules, the high level of effective protection allowed firms to informally index their prices on the expected inflation, estimated according to the

[6] As presented by Sylos-Labini (1969), the price equation can be written as: $p = v + qv$, where *p* is the unit price, *v* represents direct operational costs, and *qv* represents the overhead (over a standard production volume) and an acceptable profit margin per product unit.

[7] Indexation of contracts was introduced in the mid 1960s as a gradualist strategy to fight inflation. In the early 1980s, when the annual inflation rate reached 3 digits, indexation, both formal and informal, started to become generalized in the economy. Since the indexation system promoted automatic price correction based on past inflation, as it became more diffused, it made the price system downwardly rigid and more sensitive to shocks.

official exchange rate or the overnight interest rate variation. This defensive behavior by firms aimed at ensuring adequate profit margins and cash flows to preserve their financial capacity toward unexpected cost changes, and to finance investments required to keep their market share. Investment decisions on long term capital formation were strongly discouraged as, under the high inflation regime, time horizon of decisions is shortened. In this sense the degree of indebtedness was kept relatively low. On the other hand, the retention of financial assets with contractual indexation clauses played an important role in providing a liquidity buffer which served as a kind of 'insurance' against frequent upheavals in the macroeconomic scenario and economic policies.

Commercial and financial deregulations were being processed since late 1980s. At the time of the Real Plan was launched, the country had rejoined the international financial market, which allowed for a significant accumulation of international reserves. We can say that the success of the Real Plan in keeping prices under control relied, in a great extent, on the use of the fixed exchange rate as an anchor for domestic prices. Excess of external liquidity, together with high domestic levels of interest rate, caused a strong appreciation of the internal currency (*real*). So, on one hand, the opening of the economy increased competition, what contributed positively to restrict mark ups, and it was an important factor to stop the process of passing on costs pressures to final prices. On the other, the appreciation of the *real* aided to keep domestic prices under control.

Thus, from 1994 onwards the economic environment was one of a low indexation level, a permanent and successful inflation control policy, but with low growth rates. Economic policy showed a stop and go pattern, signaling to economic agents that inflationary threats would be fought by strict demand control. The main threats came from the external crisis mentioned above.

Emerging markets are in general more affected by changes in moods and opinions concerning the sustainability of their respective exchange rate. So, given the intrinsic financial fragility of recently stabilized currencies, it was necessary that assets offered to attract foreign capital produced high capital gains. In this way it was observed that the process of rapid deflation was followed by a slow drop in nominal interest rates. Real interest rates could not be reduced below certain limits established by the spreads demanded by foreign investors to acquire and keep in their portfolio assets denominated in a weak valued currency. This means that the Brazilian stabilization process was intrinsically vulnerable in direct proportion with the dependence on the entrance of foreign resources. In those conditions, the stabilization that was attained was placed under permanent threat of rupturing, and so was perceived by economic agents.

A combination of appreciated real exchange rate in a context of open economy contributed to the production of permanent current transactions deficits. The tendency to produce current account deficits would have required the implementation of structural policies aimed at equalizing the conditions of foreign and domestic competition, besides gradual adjustments to the exchange rate. However, the liberal economic policy followed, adopted as the main instrument of control of the macroeconomic policy the interest rate, which was kept at high levels, with negative impact on public and external deficits and on investment decisions in fixed capital.

Lastly, the same exchange rate appreciation that supported fast deflation, broaden the component that in the formation of the interest rate was correlated with the expectation of exchange rate devaluation. So, to keep credibility on the parity of the exchange rate, the manipulation of the interest rate was the only instrument of monetary policy used every time the *real* underwent a speculative attack. To contain the outflow of capital in the face of foreign crisis, domestic interest rate suffered sharp increases, and this happened in 1995, 1997 and 1998 after the Mexico the Asian and the Russian crisis, respectively.

From the firms' point of view, with the commercial deregulation process, they were induced to focus their activities to become more competitive. Privatizations, in turn, opened up opportunities for buying and selling companies which, together with the corporate market dynamism, leveraged the restructuring of firms in the industrial and service sectors. The sensible broadening of domestic markets brought by monetary stabilization and the overvaluation of the *real* created favorable conditions for a number of firms to respond to the competitive pressure produced by imports, through modernization and improving quality of their products. However, as already mentioned, the new more competitive scenario did not stimulate investment and growth.

Modernization implied more imports. So, after a long hibernation period the Brazilian industrial structure underwent a process of renewal/modernization of the basket of products offered, and the massive absorption of organizational and technological improvements known as productive catch up. In this sense, the real exchange rate appreciation played a dual, contradictory, role of lowering the price of foreign competing products on one hand, and of inputs and capital goods responsible for the productive modernization and diversification of production lines, on the other. It should be remarked that Brazilian industry reacted positively to the new opportunities and challenges, as the effects were shown in the industrial productivity growth. Indeed, from 1991, prior to the commercial deregulation, and 1999 labor productivity grew 8.8% per year[8]. Because the level of investment in fixed assets was very low, industrial employment severely decreased – the rate of gross capital formation as a percentage of the GDP was around 17% between 1991 and 1999. In sum, in spite of the punitive macroeconomic environment, the significant growth in productivity, opened space to the drop in production costs[9].

The real exchange rate appreciation that occurred after the Real Plan in 1994 had different impacts on price formation among the sectors. Non-tradable goods firms, mainly in the service sector, were in a better position to manage the tradeoff between the desired mark up and preservation of the market share. The same did not happen in tradable goods sector, basically from the manufacturing firms that were exposed to greater foreign competition. The appreciation of the exchange rate induced to replacement of local production for imports, mainly those that had abundant

[8] According to the monthly industrial surveys of the Brazilian Statistical Office.

[9] This finding suggests the hypothesis that although the real exchange rate dropped 48.4% between 1985 and 1998 (this result is obtained when the deflators used are the wholesale prices, when consumer price indexes are used, this drop is of 67.1%.) the drop in real prices perceived by the exporting sector was compensated by the reduction in unit costs, which in this way preserved the profit margin/mark up. Perhaps this fact explains why exports grew non-stop between 1991 and 1998, leaping from US$31.6 to US$51.1 billion in appreciated exchange rate context.

international supplier credit at low cost.[10] So, de-industrialization followed the opening of the economy.

The constant threat of a sharp devaluation of the currency added more uncertainty in the macroeconomic context, affecting negatively long run expectations. Overvaluation of the currency discouraged projects aimed at exporting, promoted a shrinking of important chains of production – also affected by predatory imports – and increased foreign property share in the domestic capital stocks.

To sum, financial and commercial deregulation and price stability significantly changed the price formation process in Brazil from mid nineties on. The commitment to maintain operational revenue, current profitability and profit margin, in a context of high uncertainty, given the vulnerability of the economy to foreign crisis and high exposition to international competition, required from firms changes in production and pricing strategies, technological restructuring, and very often the acquisition of new assets or the sale of existing ones. It can be added that, according to Cintra (2009), domestic credit was constrained in the 1990s and so investment decisions to increase fixed capital, although relatively low, had to rely on internal resources, what reinforces our argument that macroeconomic environment did not stimulated the reduction of industrial marks ups, even in a more competitive environment.

Given this macroeconomic scenario in the 1990s, the objective of the next section is to empirically investigate the influence of microeconomic and macroeconomic variables on the industrial firms' determination of the mark up. In this sense, at the macroeconomic level, it is assumed that inflation, interest and exchange rate variables, the level of commercial and financial deregulation and the domestic aggregate demand performance delimited the firms' potential cash-flows. At the microeconomic level, it is assumed that the supply price reflects the firms cost structure and market power. Given these conditioning factors, firms sought to define current mark ups to their direct average costs which, by ensuring their business profitability, generated income flows and profit margins capable of securing their expansion strategies. Hypothetically, such strategies are basically aimed at defining the adequate level of barriers again the new entrants, and ensure an adequate mix of self-financing and external financing for investment funding.

IV Determinants of mark up in the manufacturing industry in the 1990s: an econometric model

In the mark up determination model for the Brazilian industry in the 1990s, both macroeconomic and microeconomic variables were considered according to the theoretical arguments developed above. Given the availability of data, the mark ups were constructed for industrial sectors, and not firms, considering prices and average production costs as references. In this sense, changes in terms of monopoly power and changes in intra-firm cost structure were not captured[11]. We believe that even with such

[10] In our econometric study reported further on, we found that the real exchange rate had direct influence on the mark up, it being the most significant component to explain the determination of the mark up in the period.

[11] It is interesting to observe that along the nineties the mark up dispersion increased among the industrial sectors. From 1990 to 1992 the dispersion was around 0.073; in 1994 it jumped to 0.131 and then stabilized in 0.100, between 1994 and 1997; in 1999 it achieved 0.177. We can suggest that the increasing

limitation, the exercise undertaken presented interesting results that are widely consistent with the theoretical discussion presented. The effect of the macroeconomic context was captured through the behavior of the real exchange and the interest rate, and the sectors relative prices, opening degree and sectors GDPs level. The microeconomic variables were captured through sectors profit margin, investment profitability and leverage degree.

In this paper we chose to analyze the period 1990-1999 because data are available for all variables of interest (8) with the highest possible number of sectors (26). Furthermore, as mentioned in third section, this is a period characterized by many changes in the Brazilian economy. Indeed, up to 1994 it took place a process of commercial and financial deregulation in a context of high inflation with a generalized system of contract indexation – which turned the price system rigid. After the implementation of the Real Plan, in July 1994, and up to January 1999, a fixed exchange rate was used as a nominal anchor to prices and a rigid monetary policy followed, besides the deepening of the deregulation process. After January 1999, when the fixed exchange rate regime was abandoned, following a sucession of speculative attacks to the domestic currency in 1997 and 1998, an inflation targeting policy and a flexible exchange rate regime were put into practice.

In this way we built up a balanced panel data, combining microeconomic and macroeconomic variables, containing 260 observations. Our panel model is specified as follow:

$$\boldsymbol{Y_{it} = \beta_{iX} X_{it} + \beta_{iZ} Z_{it} + \eta_i + \delta D_t + u_{it}}$$

$$\boldsymbol{u_{it} = \rho_i u_{it-1} + \epsilon_{it}} \quad \text{with} \quad \epsilon \sim N(0, \Sigma)$$

for i = 1,…,M cross-sectional units observed for dated periods t = 1,…,T. And where Y_{it} is the mark up vector, X_{it} is a vector of macroeconomics variables, Z_{it} of microeconomics regressors, while η_i represents cross-section fixed effects and D_t a vector of policy dummies. u_{it} are the disturbances following an autoregressive process of order one, where $|\rho| < 1$ (i.e. strictly stationary) and ε_{it} is a white noise process. The $\sum$ is the variance-covariance matrix of order M. $\boldsymbol{\beta}_{iX}, \boldsymbol{\beta}_{iZ}, \boldsymbol{\delta}$ are vectors of coefficients. We consider the following explanatory variables:

$\mathbf{X}_{it} = [SGDP_{it}, OPEN_{it}, RPI_{it}, RER_{it}, RIR_{it}]$ and

$\mathbf{Z}_{it} = [PM_{it}, IP_{it}, LD_{it}]$.

The mark ups (**MU**) were constructed as the quotient of the production value of one sector by the sum of its respective intermediate consumption, salary and contributions[12]. The profit margin (**PM**) was obtained by dividing the sector net profit by the net operational revenue. Investment profitability (**IP**) was computed by the relation between

in dispersion is an indicative of the defensive behavior of bigger firms, with more market power, in setting their mark ups. Also it is an indicative that, in spite of augmented competition due to commercial openning of the economy and exchange rate overvaluation, big firms chose to maintain their market share. These considerations are confirmed in our econometric exercises.

[12] The methodology describing the whole set of data is in Annex.

asset equivalence result and asset balance value; and the sector leverage degree (**LD**) by the relation net debt/net worth. The sector GDP (**SGDP**) was computed by the value added methodology. The opening degree sector (**OPEN**) was obtained as the quotient between the value of imports and the difference between the value of production and net exports. The relative annual sector price index (**RPI**) was calculated as the sector producer price by the aggregated price industry. The real exchange rate (**RER**) was defined by the value of the dollar in domestic currency times the USA producer price index (PPI), divided by Brazil PPI (IPA-DI). Finally, the real interest rate (**RIR**) was obtained considering the basic interest rate of the Central Bank discounted by the inflation rate measured by the general price index.

IV.1 Econometric Procedures

Our objective is to estimate econometric models which highlight economic and intuitive arguments that explain the determination of the mark up in the Brazilian industrial firms in the 1990s and are in line with the hypotheses of the econometric theory. For this purpose, we pick up models in which a greater number of the explanatory variables presented the expected signs, as suggested by the outlined theory presented in the second section. However, it should be observed that models in which the regressors presented different signs from the expected, were also reported. Our main criterion to chose a model, though, was that the residuals were closer to be NIID.

We first carried out tests for the presence of common unit roots to all cross-sections, as well as tests with individual unit root process. We employed Levin, Lin and Chu test (LLC) which assumes common unit root process[13]. Also we preformed Im, Pesaran and Shin W-test, (IPS) and ADF – Fisher test. Both assume individual unit root process[14]. But, the power of these tests as of their size distortions are strongly affected by the size of the sample (the large of M and T). Moreover, there is the potential risk of concluding that the whole panel is nonstationary even when there is a large proportion of stationary series in the panel (Baltagi, 2007). Then careful analysis of both the individual and panel unit root test results was required to fully assess the stationary properties of the panel.

Tests were specified with individual terms or none effects. The lag length selection was based on asymptotic t-statistic (with p-value equals to 0.1), Andrews' bandwidth estimator and quadratic spectral kernel. The unit root tests results are in Table 1.There are series I(0) and I(1) and the panel cross sections may have or not a common unit root. The presence of fixed effect is crucial and tests are inconclusive. For these reasons we assume that the series are not cointegrated and let the search of cointegrating panel for furthers studies.

We then tested several econometric models. We first look at a specification with no fixed effects ($\eta=0, \forall$ i), using FGLS estimators, and with the errors being modeled as an autoregressive process of first order and with the estimator for the covariance matrix

[13] However, this test is very restrictive in the sense that it requires that all cross-sections have or do not have a unit root. Further the test crucially depends upon the independence assumption across cross-sections and is not applicable if cross-sectional correlation is present (see Baltagi, 2007, p 241-250).

[14] The small sample performance of IPC is reasonably satisfactory and has generally better performance than the LLC test. By the other side, IPS has more stable size than Fisher test for small M while in terms of the size-adjusted power the Fisher test seems to be superior to the IPS (Baltagi, 2007).

robust on the presence of generically forms of serial correlation and heterocedasticity of the residuals. In this group the variables are in level and one of the equations is specified in logs.

In the second group of equations we estimated models with fixed effects and in first differences, with and without logs. In the third group we estimated an ADL model with fixed effects and the series in levels. Two other ADLs models were estimated, one with part of the series in levels and the other part in first differences – those that are conclusively I(1), such as pointed out by the unit root tests – with and without fixed effects.

Finally a fourth group of models were estimated through the two least squares process, with and without fixed effects, assuming that all series are I(0) and that the regressors opening degree sector (**OPEN**), real exchange rate (**RER**) and the real interest rate (**RIR**) are strictly exogenous.

In general, the models specifications followed the criterion of starting from the more general to the more parsimonious specification following the analysis of common factors. Since the preliminary experiments indicated the presence of a strong serial correlation, the error term has been specified as a first order autoregressive process – AR(1). This, however, was not sufficient to eliminate the entire autocorrelation for several models. Also, a dummy for economic policy was included to reduce the size of the outliers present in the period, and this way obtain residuals closer to being Gaussian ones. The choice of the intervention periods has been done looking at each sector considering the specified model without dummies.

Table 1: Panel Unit Root Tests

SERIES	TESTS	FIXED EFFECTS P-VALUES	DECISION	NONE TERM P-VALUES	DECISION
MU	LLC	0.0013	REJECT	0.9566	ACCEPT
	IPS	0.0030	REJECT	----	-----
	ADF - FISHER	0.0017	REJECT	1.0000	ACCEPT
SGDP	LLC	0.0000	REJECT	0.3825	ACCEPT
	IPS	0.0000	REJECT	----	-----
	ADF - FISHER	0.0000	REJECT	0.9999	ACCEPT
OPEN	LLC	0.9969	ACCEPT	1.0000	ACCEPT
	IPS	1.0000	ACCEPT	----	-----
	ADF - FISHER	1.0000	ACCEPT	1.0000	ACCEPT
RPI	LLC	0.0000	REJECT	0.0000	REJECT
	IPS	0.0000	REJECT	----	----
	ADF - FISHER	0.0000	REJECT	0.0012	REJECT
RER	LLC	0.0000	REJECT	0.9970	ACCEPT
	IPS	0.0000	REJECT	----	-----
	ADF - FISHER	0.0000	REJECT	1.0000	ACCEPT
RIR	LLC	0.0000	REJECT	0,0000	REJECT
	IPS	0.0000	REJECT	----	----
	ADF - FISHER	0.0000	REJECT	0.0000	REJECT
PM	LLC	0.0000	REJECT	0,0000	REJECT
	IPS	0.0000	REJECT	----	----
	ADF - FISHER	0.0000	REJECT	0.0000	REJECT
IP	LLC	0.9999	ACCEPT	0.0026	REJECT
	IPS	0.9998	ACCEPT	----	----
	ADF - FISHER	0.9222	ACCEPT	0.3708	ACCEPT
LD	LLC	0.9944	ACCEPT	1.0000	ACCEPT
	IPS	0.9998	ACCEPT	----	-----
	ADF - FISHER	0.9071	ACCEPT	1.0000	ACCEPT
Mark up and Macro Variables	LLC	0..0000	REJECT	0.0004	REJECT
	IPS	0.0003	REJECT	----	-----
	ADF - FISHER	0.0000	REJECT	0.4480	ACCEPT
Mark up and Micro Variables	LLC	0.0000	REJECT	0.9215	ACCEPT
	IPS	0.0516	REJECT	----	-----
	ADF - FISHER	0.0039	REJECT	0.0038	REJECT
Macro Variables	LLC	0.0000	REJECT	0.0000	REJECT
	IPS		REJECT	----	----
	ADF - FISHER	0.0002 0.0000	REJECT	0.0344	REJECT
Micro Variables	LLC	0.0000	REJECT	0.1687	ACCEPT
	IPS	0.1298	ACCEPT	----	-----
	ADF - FISHER	0.0100	REJECT	0.0000	REJECT

It should be observed that the selection criterion of choosing the estimated equations which residuals presented the least serial correlation eliminated all specifications with random effects, as well SURE models. So, the models were estimated by FGLS and the coefficient of the variance matrix was estimated with the White robust estimate version, designed to accommodate arbitrary serial correlations and time-variant variances of the disturbances[15] and, corrected by the degrees of freedom. The non-significant variables were deleted from the equations.

IV.2 Results

The estimated models are presented in Table 2, 4, 6 and 8. Tables 3, 5, 7 and 9 contain reports of residuals diagnostics.[16]

The equations of the first group contain an autoregressive term to reduce the residual serial correlation. Although the autoregressive term coefficients are high, they are all statically smaller than 1. By observing the AR(1) process impulse-response functions – not reported – in the models, they are found to be stable, that is, converge to zero. The residuals are near Gaussian.

The models specified with fixed effects are more stable than the models of the first group, however they showed a high serial correlation, what in part is corrected by the FGLS estimation and the use of the White robust matrix. In fact, the effects are highly significant (p-value near to zero). But, the microeconomic variables loose explanatory importance in the model.

When the models are specified in first differences, what implies to remove the unobserved effects, the problem of serial correlation is, in part, solved what strengths inference procedures, making the estimates closer to be efficient. This finding suggests the hypothesis that the errors should be specified as a random walk across time.

The ADL models (estimates in group 3), on their turn, seem to be in the track of solving the problem of high serial correlation; however this specification without fixed effects (equation 8) presents an explosive nature. Moreover, in equation 7, the signs of the long

[15] Although the GMM estimation model is more general than those presented in the paper, estimation dynamic panel data presents many problems. We performed many trials in order to study most DPDs models as possible. Most specifications displayed reasonable diagnostic residuals. However, in all estimated models the coefficients of variables as openness degree, real interest rate, sector GDP and investment profitability were non-significant and/or had wrong signals; the relative price sector could be significant or not. In general, only the current and the lagged real exchange rate were significant and had correct (positive) signal. To sum up, the fitted models had no economic meaning because only the exchange rate matters in determining the mark up behavior. Therefore, in spite of being concerned about the simultaneity of the microeconomic variables, like profits margin and investment profitability, we chose to discard DPD/GMM estimation. Furthermore, since we did not employ lagged variables we were able to catch the long run relationship among the mark up and some intervening variables which shed light on the firm's decision process.

[16] The reports on the models presented contain the R^2 statistics, standard regression error (SER), F statistic p-value, Durbin-Watson (DW) statistic together with its *p-value* The asymmetry coefficient (sk) and the excess residuals Kurtosis (ek) are also reported. Besides the Ljung-Box statistics *p-values* [Q(p)] for the second, fourth, sixth and eighth order to test for the presence of serial correlation in the residuals; Bera-Jarque (BJ) to test the normality; Goldfeld-Quandt [GQ(h)] for the heteroskedasticity; and the BDS (bootstrap) test for independence of residuals specified with dimension 6 and distance of 0.7.

term real exchange rate and of the investment profitability are negative, what contradicts our theoretical interpretation.

In the estimation of the two stages least squares models we used as instruments all variables of this study. We employed instruments of period *t*-1 and *t*-2 and the variables openness, real exchange rate and real interest rate also in period *t*. Although the diagnosis of the residuals were good, in the model with fixed effects the openness variable did not show statistical significance, while in the model without the unobserved effect the same occurred with the variable real interest rate. These results demand further investigation in the future.

Table 2: Estimated Models – Group 1
Dependent Variable: Mark-up (White consistent covariance matrix computed)

VARIABLE	EQUATION 1		EQUATION 2 LOGS	
	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value
Constant	1.5235	7.5938 0.0000	0.9118	4.2763 0.0000
SGDP	-0.0014	3.2334 0.0014	-0.0972	-2.7250 0.0069
OPEN	-0.3450	-2.5890 0.0103	-0.3098	-2.3214 0.0212
RPI	0.0604	2.2358 0.0264	0.0593	2.5017 0.0131
RER	0.1096	4.8219 0.0000	0.0732	3.7023 0.0003
RIR	-0.0357	-1.9988 0.0468	-0.0301	-1.8473 0.0660
PM	0.0858	2.0689 0.0397	0.0475	1.5445 0.1239
IP	0.0153	3.7252 0.0002	0.0244	3.2600 0.0013
LD	-0.0904	-4.2573 0.0000	-0.1035	-3.8483 0.0002
DUM	0.0357	4.6150 0.0000	0.0268	4.5428 0.0000
AR(1)	0.9483	30.7473 0.0000	0.9451	30.1373 0.0000

Table 3: Residuals Diagnostics

Equation 1					
ITERAT= 16	R^2=0.7468	SER=0.0739	F=0.0000	DW=1.7951/0.1171	Q(2)=0.0334
Q(4)=0.0865	Q(6)=0.0729	Q(8)=0.0967	GQ(75)=0.5216	Sk=0.3824	Ek=0.2878
BJ=0.0386	BDS=0.1112				
Equation 2					
ITERAT= 15	R^2=0.7602	SER=0.0529	F=0.0000	DW=1.7944/0.1158	Q(2)=0.0480
Q(4)=0.1225	Q(6)=0.1178	Q(8)=0.1395	GQ(75)=0.5391	Sk=0.3121	Ek=0.1040
BJ=0.14200	BDS=0.1072				

Table 4: Estimated Models – Group 2
Dependent Variable: Mark-up (White consistent covariance matrix computed)

VARIABLE	EQUATION 3 FIXED EFFECTS		EQUATION 4 FE - LOGS		EQUATION 5 DIFFERENCE		EQUATION 6 DIFFERENCE LOGS	
	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value
Constant	1.2738	12.2637 0.0000	0.7896	3.8204 0.0002	-0.0032	-1.0145 0.3114	-0.0082	-3.5284 0.0005
SGDP	-0.0014	-2.3381 0.0204	-0.1023	-2.2901 0.0230	-0.0016	-4.8069 0.0000	-0.0762	-2.5470 0.0115
OPEN	-0.3130	-1.9126 0.0572	-0.2820	1.7914 0.0747	-0.4525	3.9397 0.0001	-0.5101	-3.9026 0.0001
RPI	0.1184	3.0040 0.0030	0.0794	2.6215 0.0094	0.0593	2.9366 0.0037	0.0829	3.2126 0.0015
RER	0.1062	4.1825 0.0000	0.0562	2.5097 0.0129	0.1083	4.4403 0.0000	0.1084	5.6125 0.0000
RIR	-0.1193	-6.6827 0.0000	-0.1131	-4.9850 0.0000	0.0490	3.7242 0.000	0.0565	3.2290 0.0014
PM	----	----	----	----	0.0623	2.0376 0.0000	-0.0538	-2.0891 0.0378
IP	0.0059	1.4822 0.1399	----	----	0.0221	6.4380 0.0000	0.0244	4.28882 0.0000
LD	----	----	----	----	-0.0870	5.2130 0.0000	-0.0285	-1.4575 0.1464
DUM	0.0398	5.0966 0.0000	----	----	0.0852	10.6544 0.0000	0.0590	10.6068 0.0000
AR(1)	0.5150	8.3289 0.0000	0.5305	8.6867 0.0000	----	----	----	----

Table 5: Residuals Diagnostics

Equation 3					
ITERAT= 16	R^2=0.8237	SER=0.0713	F=0.0000	DW=1.8113/0.1489	Q(2)=0.0000
Q(4)=0.0000	Q(6)=0.0000	Q(8)=0.0000	GQ(75)=0.9196	Sk=0.2242	Ek=0.3538
BJ=0.2039	BDS=0.0000				
Equation 4					
ITERAT= 13	R^2=0.8065	SER=0.0505	F=0.0000	DW=1.8672 /0.3098	Q(2)=0.0000
Q(4)=0.0000	Q(6)=0.0000	Q(8)=0.0000	GQ(75)=0.5622	Sk=0.5539	Ek=0.1104
BJ=0.2039	BDS=0.				
Equation 5*					
ITERAT= 1	R^2=0.4762	SER=0.0716	F=0.0000	DW=1.9394 /0.6431	Q(2)=0.0285
Q(4)=0.0931	Q(6)=0.1262	Q(8)=0.1318	GQ(75)=0.4932	Sk=0.3250	Ek=0.2529
BJ=0. 0989	BDS=0.0440				
Equation 6**					
ITERAT= 1	R^2=0.4419	SER=0.0517	F=0.0000	DW=1.9811/0.8851	Q(2)=0.0671
Q(4)=0.1572	Q(6)=0.2962	Q(8)=0.3192	GQ(75)=0.4662	Sk=0.2850	Ek=0.0863
BJ=0.1988	BDS=0.2160				

* H0: ρ=-0.5, p-v=0.0000. ** H0: ρ=-0.5, p-v=0.0001

Table 6: Estimated Models – Group 3
Dependent Variable: Mark-up (White consistent covariance matrix computed)

VARIABLE	EQUATION 7 ADL LEVEL - FIXED EFFECTS		EQUATION 8 ADL LEVEL/DIFFERENCE		EQUATION 9 ADL LEVEL/DIFFERENCE FIXED EFFECTS	
	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value
Constant	1.2722	8.4540 0.0000	-0.1063	-1.8192 0.0704	1.0065	10.8185 0.0000
SGDP(t)	-0.0009	-1.7031 0.0904	-0.0008	-2.0972 0.0373	----	----
OPEN(t)	-0.3223	-3.5795 0.0005	-0.4308 Differ.	-3.3495 0.0010	----	----
RPI(t)	0.1860	6.3015 0.0000	0.1622	5.1394 0.0000	0.2675	5.2138 0.0000
RER(t)	0.2004	6.3342 0.0000	0.2188	8.9159 0.0000	0.1591	6.701207 0.0000
RIR(t)	-0.1902	-6.1044 0.0000	-0.0993	-2.4992 0.0133	-0.2004	-5.4259 0.0000
PM(t)	0.0783	1.6883 0.0932	----	----	----	----
IP(t)	-0.0298	-2.7193 0.0072	0.0111 Differ.	1.9414 0.0537	0.0101	2.0009 0.0470
LD(t)	-0.0434	-2.8967 0.0043	-0.0474 Differ.	-2.4672 0.0145	-0.0617	-3.3341 0.0010
SGDP(T-1)	----	----	----	----	0.0009	1.6358 0.1037
OPEN(-1)	----	----	-0.1991 Differ.	-1.5585 0.1207	-0.3796 Differ.	-2.2522 0.1037
RPI(t-1)	-0.0661	-3.1714 0.0018	-0.1022	-3.3943 0.0000	-0.0644	-2.2327 0.0269
RER(t-1)	-0.2989	-5.4345 0.0000	----	----	-0.1131	-2.3627 0.0193
RIR(t-1)	0.1217	2.1440 0.0335	----	----	----	----
PM(t-1)	0.3065	9.2549 0.0000	0.2980	7.2546 0.0000	0.321955	6.6074 0.0000
IP(t-1)	-0.0117	-3.1518 0.0019	-0.0100	-3.3943 0.0008	-0.0109 Differ.	2.9094 0.0041
MU(-1)	0.2564	3.2197 0.0015	0.9705	24.8021 0.0000	----	----
MU(-2)	-0.1036	-1.2957 0.1969	----	----	----	----

Table 7: Residuals Diagnostics

Equation 7					
ITERAT= 1	R^2=0.8969	SER=0.0669	F=0.0000	DW=1.7934 /0.1141	Q(2)=0.1470
Q(4)=0.1150	Q(6)=0.2826	Q(7)=0.1140	GQ(64)=0.5838	Sk=0.1299	Ek=0.0292
BJ=0.7437	BDS=0.0856				
Equation 8					
ITERAT= 1	R^2=0.7958	SER=0.0744	F=0.0000	DW=1.8099/0.1460	Q(2)=0.3145
Q(4)=0.6399	Q(6)=0.7287	Q(7)=0.5892	GQ(64)=0.8720	Sk=0.3491	Ek=-0.1952.
BJ=0.1025	BDS=0.0312				
Equation 9					
ITERAT= 1	R^2=0.8511	SER=0.0689	F=0.0000	DW=1.7589 /0.0652	Q(2)=0.0753
Q(4)=0.0583	Q(6)=0.1666	Q(7)=0.0601	GQ(64)=0.6436	Sk=0.2798	Ek=-0.1397
BJ=0.2366	BDS=0.0560				

Table 8: Estimated Models - Group 4 (TSLS)
Dependent Variable: Mark-up (White consistent covariance matrix computed)

VARIABLE	EQUATION 10 NO FIXED EFFECTS		EQUATION 11 FIXED EFFECTS	
	Coef.	t-Statistic P-Value	Coef.	t-Statistic P-Value
Constant	1.5991	5.5224 0.0000	0.3619	1.1764 0.2411
SGDP	-0.0014	-2.4124 0.0168	0.0038	1.9300 0.0552
OPEN	-0.3979	-2.6644 0.0084	0.0446	0.1847 0.8537
RPI	0.0714	2.3473 0.0199	0.2297	4.4074 0.0000
RER	0.1339	5.5765 0.0199	0.2444	3.8999 0.0001
RIR	-0.0207	-0.8135 0.4169	0.0879	1.6565 0.0077
PM	0.1167	1.9295 0.0551	0.5347	4.0882 0.0001
IP	0.0234	3.2326 0.0014	0.0453	4.6250 0.0000
LD	-0.1505	-4.1207 0.0001	----	----
DUM	0.0375	3.5840 0.0004	0.0928	2.6970 0.0077
AR(1)	0.9523	31.7372 0.0000	----	----

Table 9: Residuals Diagnostics

Equation 10					
ITERAT= 1	R^2=0.7469	SER=0.0773	F=0.0000	DW=1.7974 /0.1212	Q(2)=0.0203
Q(4)=0.0558	Q(6)=0.0467	Q(7)=0.0436	GQ(64)=0.5511	Sk=0.2537	Ek=0.0043
BJ=0.3278	BDS=0.0568				
Equation 11					
ITERAT= 1	R^2=0.7758	SER=0.0842	F=0.0000	DW=2.0675 /0.6057	Q(2)=0.0436
Q(4)=0.0568	Q(6)=0.1094	Q(7)=0.0879	GQ(64)=0.2974	Sk=-0.0636	Ek=-0.0928
BJ=0.8981	BDS=0.2400				

The most interesting finding in our econometric exercises is that the sector GDP (SGDP) presented a negative sign in almost (9) selected specifications, suggesting that the mark up behavior showed a counter-cyclic behavior in the studied period.[17] Considering that mark ups did not show a trend to fall after the opening of the economy, this can be interpreted as an important indication of the defensive behavior of firms that were exposed to greater uncertainties as the macroeconomic context changed significantly in the 1990s. Higher uncertainty, in spite of the stabilization of prices from 1994 onwards, might explain why industrial firms in a more competitive scenario and showing significant productive gains did not lowered their mark ups, neither did increase their capital accumulation. In a macroeconomic context of slow growth and high uncertainties about the future, given mainly the high degree of external vulnerability of the economy, the rational choice for firms was to use their market

[17] It should be observed that Stiglitz and Weiss (1992), also assume that mark ups could present a countercyclical behavior as a result of credit rationing.

power to preserve their market share. In equation 2, for example, a 1% increase in the sector GDP induces to a drop in the mark up of approximately 0.001%.

Besides this evidence, in all the equations the signs of the relevant variables are coherent with the economic intuition. Starting with the macroeconomic variables, we observe that when the real exchange rate rose, it increased the domestic protection degree in relation to imports, also implying in the increase of the mark up. So, because a large part of the analyzed period the exchange rate was appreciated it contributed to contain the firms' mark up.

Changes in the relative producer price – a variable that captures the firm pricing power – contributed to increase in the mark up. The positive sign confirms the hypothesis that firms with market power used it to keep or broaden their market share.

In general, the rise in the real interest rate increases the burden of loans, stock loading and reduces the aggregate demand and, therefore, induces the reduction in the sector mark ups. During the 1990s, the real interest was kept at high levels and the aggregate demand constrained most of the time, a fact which also contributed to compress the mark ups. However, the estimated equations in first difference (8 and 9), indicate a positive sign to this variable, what suggests that the interest rate could have an ambiguous signal because costly loans tend to decrease the leverage degree and then the mark up. If this is the case, we would observe that income effect would be more important than the substitution effect. This reasoning would contradict the well known hypothesis that the substitution effect dominates the revenue effect.

Taking equation 2, for example, the sector opening degree has the highest negative impact, that is, a 10% increase in this variable implies a 3% drop in the sector mark ups. This result confirms the importance of foreign competition through the process of economic opening in containing tradable goods price increases.

Finally, variables that represent microeconomic relations explaining the mark up behavior – profit margin, investment profitability and the degree of leverage – presented the expected sign most of time. Profit margin directly affects mark up determination (equations 1, 2, 5 and 7 to 9). Investment profitability variable (equations 1, 2, 3, 5 and 7) showed a positive effect on the mark up, which indicates that the mark up behavior is related to the investment decision. The degree of leverage (GA) presents a negative relation with the mark up, which means that a smaller leverage power pressures the demand to generate internal funds to finance investments[18]. About this evidence we should remark that Pereira and Carvalho (2000) observed growing industrial firm leverage levels after monetary stabilization in Brazil. However, according to the authors, these levels would be relatively low when compared to the average for Asian countries in the 1990s, for example. The observation that there was an increase in the leverage power and that the investment level in fixed assets was relatively low reinforces the anticyclic behavior of the mark up, which aimed at preserving firm's market share.

As a last observation, we would mention that the main conclusions of our analysis were supported by the large majority of the models tested. So, the links among the variables

[18] We notice that no material multicolinearity was detected. We achieve this conclusion by running each independent variable against the others and computing the correspondent R^2.

proposed by our theoretical interpretation that supported our economic analysis were confirmed by most of the econometric equations. In particular, the main conclusion about the anticyclic behavior of the industrial mark up during the 1990s was established in all econometric specifications. It should also be observed that the less sophisticated specifications in econometric terms, as equations 1 and 2, produced the main results that were confirmed with the more sophisticated modeling.

V. Conclusion

This paper discussed the determinants of the mark up in the Brazilian industrial firms in the 1990s. In order to accomplish our objective we started with a brief presentation of the post Keynesian pricing theory. According to this approach, the mark up is the strategic variable that firms rule according to the perception regarding their opportunities of growth. In this perspective price changes depend on decisions about the mark up, and it is the need to accumulate internal resources aimed at financing growth that it is understood as the main motivation to the determination of the mark up. Thus, there is no automatic mechanism to explain how costs and demand pressures are passed through on prices. Post Keynesian pricing theory establishes a complex set of interactions among micro and macroeconomic variables to explain price changes in monetary economies.

With this analytical perspective in mind, we presented the macroeconomic scenario of the Brazilian economy in the 1990s. This scenario was set off by price stabilization and economic opening. A combination of domestic high interest rate, fixed exchange rate regime and high uncertainty in the external environment lead the economy to a stop-and-go pattern of growth. Opening of the economy and exchange rate overvaluation had a dual contrary effect on pricing decisions of industrial firms: it lowered production and investment costs, but it increased competition. The result was modernization of the productive structure on one side followed by de-industrialization, and price stabilization, on the other. Modernization and the recovery of productivity growth occurred with low levels of investment in fixed capital. So price stability, productivity growth and increased competition did not result in sustained economic growth pushed by an investment boom.

Mark ups did not show a trend to decrease, signaling that firms were able to preserve their profit margins. The question to be answered is why under a more competitive environment and sustained mark ups industrial firms invested little in fixed capital. One suggested possibility is that the 1990s were a period of high macroeconomic uncertainty in the economy. Firms moved from a period of high inflation regime at the beginning of the decade to price stability period after the Real Plan, which highly relayed on exchange rate stability. The second half of the decade was marked by speculative attacks on emerging economies currencies, among them the real. Sharp increase in domestic interest rates was largely used to prevent capital flight. The dependence on external flow of capital to keep price stability put the economy in a macroeconomic trap: if it grew too fast, balance of payments imbalances threatened exchange rate stability and so aggregate demand was restricted by economic policy. In this scenario, long term investment plans would be discouraged either by the high cost of finance and/or by expectations of low growth rates. A rational choice for firms would be to follow a defensive strategy, keeping market shares with low investment.

In our empirical analysis we developed several econometric exercises exploiting how micro and macroeconomic variables affected the determination of the mark up in the 1990s. An interesting result, that was confirmed in all econometric specifications, is that mark up showed an anticyclic pattern. This finding confirms our hypothesis of a defensive behavior by firms. Among the macroeconomic variables, the real exchange rate was the most important to explain the determination of the mark up. Appreciation of the exchange rate after the Real Plan reduced domestic production protection degree and therefore the exchange rate contributed to contain the firms' mark up. Other macroeconomic variables, as changes in relative price, real interest rate and economy opening showed the expected signal, however not all of them were confirmed in all econometric specifications.

References

Arestis, P., Milberg, W. (1993). Degree of monopoly, pricing, and flexible exchange rates. *Journal of Post Keynesian Economics*, vol. 16(2), Winter 1993-94.

Baltagi, B.H. (2007). *Econometric Analysis of Panel Data*. 3rd Ed. Wiltshire, GB: John Wiley & Sons Ltd.

Cintra, MAM. Credito público e desenvolvimento econômico: a experiência brasileira, in Ferreira, FMR e Meirelles, B B. *Ensaios sobre a Economia Financeira*, BNDES, 2009

Davidson, P. (1978). *Money and the real wor*ld. New York: Macmillan, 2nd edition.

Eichner, A. S. (1973). A theory of determination of the mark-up under oligopoly. *The Economic Journal*, London, MacMillan Journals, 83(332), 1184-1200.

Eichner, A. S. (1976). *The megacorp and oligopoly – micro foundations of macro dynamics*. Cambridge, Cambridge University Press.

Eichner, A. S. (1985). *Toward a new economics: essays in post-Keynesian and intuitionalist theory*. New York, M. E. Sharpe.

Fazzari, S. M. Hubbard, R. G. and Petersen, B. C. (1988). Financing constraints and corporate investment, Brooking Papers on Economic Activity, 1, 141-195.

Feijó, C. A. (1993). Decisões empresariais em uma economia monetária de produção: notas para uma teoria pós-keynesiana da firma. *Revista de Economia Política*,13(1), 82-100.

Feijó, C. A. (2002). Firms and banks interacting in a monetary production economy, in Arestis, P. Desai, M. and Dow, S. (ed.), *Methodology, Microeconomics and Keynes*, Rutledge Frontiers of Political Economy, London and New York.

Ferreira, P C & Guillén, O T de C. (2004). Estrutura competitiva, produtividade industrial e liberalização comercial no Brasil, *Revista Brasileira de Econometria*, 58(4), 507-32.

Hall, R. and Hitch, C.J. (1939). Price theory and business behavior, *Oxford Economic Papers*, no. 2.

Harcourt, G. C.& Kenyon, P. (1976). Pricing and the investment decision, *Kyklos*, 3(3), 33-50.

Hermann, J. . Financial Structure and Financing Models: the Brazilian experience over the 1964-1997 period. Journal of Latin American Studies, Cambridge, v. 34, p. 71-114, 2002.

Kalecki, M. (1971). Class struggle and the distribution of income, in *Selected essays on the dynamics of the capitalist economy*; 1933-1970. Cambridge: Cambridge University Press.

Kenyon, P. (1979). Pricing, in A. S. Eichner (ed), *A guide to post-keynesian theory*. White Plains, N.Y.: M. E. Sharpe.

Penrose, E. (1959). *The theory of the growth of the firm* Oxford: Basil Blackwell (2nd edition, 1980.

Pereira, T.R. and A. Carvalho,(2000). Desvalorização cambial e seu impacto sobre os custos e preços industriais no Brasil- uma análise dos efeitos de encadeamento nos setores produtivos, IPEA, Texto para Discussão no. 711, Brasília.

Shapiro, N. (1981). Pricing and the growth of the firm, *Journal of Post Keynesian Economics*, 4(1), Fall.

Shapiro, N.& Sawyer, M. (2003). Post Keynesian price theory, *Journal of Post Keynesian Economics*, vol. 25, no. 3,

Stiglitz, J E and Weiss, A (1992). Asymetric information in credit markets and its implications for macroeconomics, *Oxford Economic Papers*, , (44), 4, pp. 694-724.

Sylos-Labini, P (1969). *Oligopoly and technical progress*, Cambridge (Massachusetts), Harvard University Press.

ANNEX: TABLE 1- MARK UPS – MANUFACTURING INDUSTRY

Sectors	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg.	DP
1) NON-METALLIC MINERALS (MNM)	1.33	1.41	1.38	1.40	1.49	1.46	1.40	1.39	1.42	1.69	1.44	0,10
2) NON-FERROUS METALLURGY(MNF)	1.24	1.27	1.25	1.23	1.34	1.34	1.29	1.28	1.26	1.40	1.29	0,05
3) SIDERURGY(SID)	1.17	1.20	1.24	1.27	1.25	1.26	1.25	1.23	1.21	1.34	1.25	0,06
4) OTHER METALLURGICAL(OSI)	1.09	1.13	1.14	1.16	1.22	1.19	1.18	1.16	1.14	1.30	1.17	0,06
5) MACHINES AND TRACTORS(MTR)	1.31	1.31	1.42	1.63	1.55	1.51	1.56	1.47	1.47	1.60	1.48	0,12
6) ELECTRIC MATERIAL(MEL)	1.21	1.22	1.30	1.26	1.25	1.25	1.24	1.17	1.17	1.19	1.23	0,04
7) ELECTRONIC EQUIPMENT(EQE)	1.37	1.38	1.38	1.41	1.47	1.49	1.51	1.39	1.34	1.24	1.40	0,08
8) AUTOMOBILES, TRUCKS AND BUSES(VAL)	1.16	1.21	1.20	1.23	1.27	1.29	1.31	1.29	1.23	1.20	1.24	0,05
9) OTHER VEHICLES AND PARTS(OUP)	1.16	1.14	1.19	1.22	1.24	1.23	1.21	1.14	1.10	1.12	1.17	0,05
10) PAPER AND PRINTING(PAG)	1.16	1.25	1.16	1.10	1.13	1.20	1.17	1.13	1.11	1.48	1.19	0,11
11) RUBBER INDUSTRY(BOR)	1.25	1.25	1.28	1.30	1.31	1.32	1.37	1.32	1.28	1.46	1.31	0,06
12) CHEMICAL ELEMENTS(ELQ)	1.30	1.36	1.40	1.67	1.60	1.54	1.50	1.53	1.48	1.93	1.53	0,18
13) PETROLEUM REFINEMENT(RPE)	1.33	1.28	1.46	1.79	1.64	1.56	1.45	1.49	1.66	2,14	1.58	0,25
14) MISCELLANEOUS CHEMICALS(QDI)	1.25	1.27	1.23	1.25	1.24	1.21	1.27	1.21	1.20	1.50	1.26	0,09
15) PHARMACEUTICS AND PERFUMERY(FAR)	1.36	1.24	1.41	1.49	1.48	1.42	1.39	1.47	1.49	1.48	1.42	0,08
16) PLASTIC ARTICLES(PLA)	1.36	1.32	1.29	1.36	1.33	1.38	1.46	1.30	1.30	1.46	1.36	0,06
17) TEXTILE INDUSTRY(TEX)	1.29	1.23	1.23	1.25	1.23	1.25	1.26	1.23	1.19	1.17	1.24	0,03
18) CLOTHING ARTICLES(VES)	1.30	1.25	1.29	1.25	1.26	1.25	1.29	1.25	1.26	1.17	1.26	0,04
19) FOOTWEAR MANUFACTURING(CAL)	1.08	1.11	1.24	1.23	1.18	1.17	1.22	1.14	1.07	1.00	1.14	0,08
20) COFFEE INDUSTRY(CAF)	1.15	1.16	1.12	1.24	1.25	1.25	1.20	1.15	1.16	1.28	1.19	0,06
21) PROCESSING OF VEGETABLE PRODUCTS(BE)	1.19	1.25	1.29	1.29	1.25	1.20	1.32	1.22	1.21	1.23	1.25	0,05
22) ANIMAL SLAUGHTER(ABA)	1.10	1.10	1.09	1.14	1.15	1.16	1.18	1.13	1.13	1.29	1.15	0,06
23) DAIRY INDUSTRY(LAT)	1.14	1.13	1.13	1.14	1.14	1.18	1.22	1.19	1.23	1.23	1.17	0,04
24) SUGAR INDUSTRY(ACU)	1.15	1.14	1.11	1.16	1.16	1.11	1.10	1.05	1.04	1.32	1.14	0,08
25) VEGETABLE OILS MANUFACTURING(OVE)	1.14	1.18	1.26	1.17	1.17	1.15	1.14	1.21	1.23	1.25	1.19	0,04
26) OTHER FOODSTUFFS(ALI)	1.14	1.16	1.20	1.21	1.20	1.21	1.23	1.22	1.23	1.30	1.21	0,04
AVERAGE	1.22	1.23	1.26	1.30	1.30	1.29	1.30	1.26	1.25	1.38	1.30	0,07
STANDARD DEVIATION	0,09	0,08	0,10	0,17	0,15	0,13	0,12	0,13	0,15	0,25		
VARIATION COEFFICIENT	0,07	0,07	0,08	0,13	0,11	0,10	0,10	0,10	0,12	0,18		

Source: Brazilian Statistical Office (IBGE) Input-Output Matrix (1985, 1990 a 1998); Getulio Vargas Foundation (FGV) Wholesale Price Index (IPA); Foreign Trade Foundation (FUNCEX) cost indicators. Own calculations.

Methodological Annex - Definition of the variables

MU = mark up, constructed as the quotient of the value of production of one sector by the sum of its respective intermediate consumption, salary and contributions, obtained from the input-output matrix of Brazil from 1985 and 1990 to 1998. For the year of 1999 mark up was estimated using the quotient of the variation of the sector IPA – the Brazilian wholesale price index from the Getúlio Vargas Foundation (FGV) - and the sector cost variation index from the Foreign Trade Foundation (FUNCEX). Table in the Annex contains the annual mark up estimates for the 26 sectors. The last line and column contain the annual and sector averages and standard deviations, respectively.

SGDP = sector GDP; obtained from the National Accounts computed by the Brazilian Statistical Office (IBGE).

OPEN = imports penetration coefficient, calculated as the quotient of the value of imports by sector and the difference between the sector value of production and its net exports, all estimates obtained from the input-output matrix produced by IBGE.

RPI = relative annual sector producer price index, calculated by dividing the sector wholesale price index (IPA) by the manufacturing industry index. The monthly indexes were aggregated by the annual average. For the petroleum refinement sector (RPE) it was constructed an index based on the annual prices of petroleum, computed by the National Agency of Petroleum (ANP).

RER = real exchange rate, defined by the value of the dollar in domestic currency times the USA producer price index (PPI), divided by the FGV wholesale price index, both indexes, August 1994=100. The real exchange rate was calculated for the month and aggregated by the annual average.

RIR = annual real rate of interest; obtained considering the nominal basic rate of interest (SELIC) determined by the Brazilian Central Bank, discounted by the inflation rate obtained through the monthly general price index (IGP-DI) from FGV.

PM = profit margin; calculated as Net Profit/Net Operational Revenue available at *Gazeta Mercantil Annual Balance.*
IP = investment profitability, calculated as Asset Equivalence Result/Asset Balance Value from *Gazeta Mercantil Annual Balance.*
LD = sector leverage degree, calculated as Net Debt/Net Worth from *Gazeta Mercantil Annual Balance* considering the relation.

Finally, it should be added that the primary data used in this paper was obtained from a survey originally developed for ECLAC- Economic Commission for Latin America (Miranda *et al*, 2001). Despite the availability of the mark up series for the period from 1985 to 2000 we chose to analyze in this paper a shorter period (1990-1999) that contained data for all variables of interest (8) and the highest possible number of sectors (26). In this way we built up a database of balanced panel (balanced panel data), containing 243 observations.