Deindustrialization, Indexation and Inflation in Brazil

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Abstract: The paper is motivated by the empirical notion that developing countries endure higher average inflation than developed economies and takes up the recent Brazilian experience as a case study of non-monetary causes of inflationary persistence. The country's well-documented de-industrializing trend has unearthed primary pressures that set a floor to inflation levels. The framework allows for inter-sector dynamics in an indexed economic setting to account for two primary pressures, namely: (i) the increase in the services sector´s share of total value added in aggregate output combined with (ii) the change in the behavior of State-supervised prices. The rationale departs from a simple inflation accounting exercise and the assumption of price and wage rigidity. De-industrialization implies permanent changes in the composition of aggregate supply and in the relative prices of tradable and non-tradable goods; if sectional prices are downwardly inflexible, inflation must rise to restore consistency to the system. Self-sustaining cost-shift inflation is thus explained on the basis of structural changes swaying the economy towards labor-intensive sectors. The latters' sluggish innovating thrust sets limits to increases in labor productivity, while labor market inter-sector dynamics and widespread indexation render prices inflexible downwards. Finally, the State-supervised prices adds an institutional propagation mechanism, in which the exercise of a clear mark-up rule over headline CPI inflation imparts further persistence to inflation trends. Empirical evidence is then garnered to support the analytical claim that de-industrialization engenders a upward bias to inflation rates in Brazil.

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Introduction

After a decades-long coexistence with high inflation, the Brazilian economy underwent a bold monetary reform in July 1994 – termed, henceforth, *Real Plan* - and achieved a successful and sustained disinflation. Two decades later, inflation presents downwardly rigid patterns and often dominates public agenda. We provide an alternative story to the country's inflation trends, in contrast to the vast literature that focuses credibility, fiscal dominance and interest-

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rate inertia. The paper entertains the hypothesis that the institutional framework that followed the stabilization attempt established a new breeding ground for a downwardly rigid inflation, which is likely to entail higher costs to conventional demand-management-based monetary policy.[2] To a large extent, the Real plan redirected some and reinforced other distributive effects stemming from the preceding commercial and financial opening of the economy, coupled with the reduction in the role of the State in the economy. Such transformations affected the Brazilian productive structure and, consequently, its price-output dynamics.

Our working hypothesis rests on empirical evidence regarding two possible sources of pressure on inflation levels in Brazil between 1994 and 2010, namely: (1) the inter-sector imbalance between those producing tradable and non-tradable goods, and (2) the inflationary behavior of State-supervised prices. These pressures are tied to the structural changes undergone by the Brazilian economy in the last 25 years, and have been largely overlooked in both academic and policy debates. Our effort is chiefly directed at parsing out the combined effects of a resilient indexation system - inherited from the high inflation period – and these structural transformations. In oceanographic terms, we sidestep the tides (impulse-response functions of inflation to short-run monetary policy) to tackle the determinants of the long-run mean sea levels. A particular implication of this study is policy related. The repertoire of inflationary pressures stemming from institutional and structural forces reinforced previously embedded rigidities in the price system, thus rendering disinflation measures more costly to society. Our conclusions raise doubt as to the actual long-term disinflationary effects of interest-rate policy - and its auxiliary overvalued-currency side effect. In the face of slow-moving and irreversible changes in the economy's productive structure, this policy may actually backfire.

The argument is organized in four sections beyond this introduction. The first outlines the inflationary problem in Brazil in the last two decades. Second section briefly outlines the motivation for this paper, tying it to the broader international scope of inflation rates with respect to the stage of development. The third offers an inflation accounting exercise that will organize our account of the transmission channels between relative prices and the inflation rate, as well as the institutional forces impinging on the latter. Fourth section presents some

[2] It is not far-fetched to state that persistent inflation has become a dominant aspect of Brazilian economic reality. In hindsight, from 1980 up to 1994, when a major disinflation took place with the Real plan, Brazil had four currencies, five price and wage freezes, nine stabilization plans, eleven price indexes to measure inflation, sixteen different wage policies, twenty-one proposals for external debt payment and fifty-four changes in price policy. Accumulated inflation in the fifteen-year period hit an impressive figure of 30.000.000.000 %. (Franco 2005). In the nineteen-year period since disinflation in 1994 until December 2014 Brazil has endured around 247% cumulative inflation, if read by the Broad Consumer Price Index (IPCA-IBGE).

empirical evidence of the foregoing analytical argument. Fifth part weaves all arguments together in one straightforward rationale of Brazilian structural inflation. The last section concludes the paper, pointing to some directions for further research on the subject.

1. Stabilization, Institutional Changes and Inflationary Inertia in post-1994 Brazil

In July 1994, following the monetary reform, the Real Plan's macroeconomic policy adopted a nominal anchor centered on the exchange rate, serving as the main control variable over inflation (Bogdanski et al 2000). The imbalances that followed disinflation measures launched in 1994 escalated progressively along the four and a half years subsequent to disinflation measures. The fixed exchange-rate nominal anchor deteriorated sharply as a sequence of crises broke out in developing countries that had some form of exchange-rate control. Mexico in 1995 underwent the "Tequila Crisis". Two years later, in 1997, massive capital flights erupted a large-scale financial crisis in the East Asian countries. In 1998, Russia was subdued by the same pressure on its currency, and Brazil followed suit in January 1999. Under the strains of these external shocks, a new economic policy was announced a few months later, sponsored by the International Monetary Fund, under the terms of a loan provided to alleviate the severe currency crisis. The overvalued exchange rate was allowed to float after a period of capital flight in early January that year.

The Macroeconomic Stabilization Program (PEM, in Portuguese) consisted of fiscal austerity (enacted by the Fiscal Accountability Act, approved by the Senate in the year 2000), a floating exchange rate and an inflation-targeting regime to monetary policy. The new program placed the focus of macroeconomic management on the interest-rate-based inflation target regime. Inflation targeting has been the main focus of economic policy ever since, and has been fairly successful in maintaining price rises within the intervals stipulated by inflation targets along most of the 2000s, and has reduced inflation volatility (Bevilacqua *et al*. 2007; Catao *et al*. 2008). Nonetheless, when conflated with historical inflation patterns in developed countries (within the 1-3% range), the levels of inflation targets in Brazil (4.5% per year) are high (Barbosa, 2008, p. 193). However under control, inflation levels display a downward resistance and a systematic attraction of inflation rates to the upper limit within the target

range. Both aspects raise concerns over the effectiveness of the instruments available to the monetary authority (Tombini & Alves 2006).[3]

Year	Target (a)	Inflation Rate (b)	Deviation (b-a)	Volatility within Year: Headline CPI (IPCA)	Volatility within Year: Interest rate (SELIC)	Volatility within Year: Real GDP
1999	8,00	8,94	0,94	5,70%	0,61%	0,14%
2000	6,00	5,97	**-0,03**	22,35%	0,28%	0,17%
2001	4,00	7,67	3,67	2,75%	0,48%	0,15%
2002	3,50	12,53	9,03	2,74%	0,40%	0,12%
2003	4,00	9,30	5,30	3,25%	0,33%	0,07%
2004	5,50	7,60	2,10	1,24%	0,42%	0,13%
2005	4,50	5,69	1,19	13,67%	0,37%	0,13%
2006	4,50	3,14	**-1,36**	5,25%	0,50%	0,14%
2007	4,50	4,46	**-0,04**	1,70%	0,46%	0,14%
2008	4,50	5,90	1,40	1,15%	0,32%	0,14%
2009	4,50	4,31	**-0,19**	1,97%	0,33%	0,10%
2010	4,50	5,91	1,41	10,54%	0,41%	0,15%
2011	4,50	6,50	2,00	1,70%	0,31%	0,13%
2012	4,50	5,84	1,34	4,94%	0,39%	0,16%
2013	4,50	5,91	1,41	7,18%	0,38%	0,14%
2014	4,50	6,00	1,50	1,13%	0,31%	0,11%
Average	**4,75**	**6,60**	**1,85**	**5,45%**	**0,39%**	**0,13%**

Table 1 – Inflation Targeting Regime Performance – 1999-2013 – various indicators. Source: Central Bank of Brazil. (*) Targets have a tolerance fluctuation range of ± 2%. (**) Volatility indicators denote percentage variations of the Standard Deviations of Monthly Indices within fiscal years.

The tenets of the economic policy scheme that ensured inflation remained under control until the last quarter of 1998 did not survive the currency crisis. The exchange rate was allowed to float and, a few months later, inflation targeting (IT) became the monetary policy regime, whereby the short-term interest rate was established as the inflation control mechanism.[4] It is without question that this regime has been the determinant factor for the Brazilian Central Bank´s growing credibility in managing monetary policy.[5] A quick glance at

[3] Jaloretto (2006) also found no pressure coming from government's recourse to seigniorage financing of public deficits, which are almost entirely financed by public debt.

[4] Further details on outcomes of the inflation targeting regime in Brazil can be found in Barbosa (2008) and Bevilacqua et al. (2007).

[5] Further measures to support stabilization were launched soon thereafter. First, the Fiscal Accountability Act (in 2000) constrained municipal, state and federal governments' ability to run deficits and increase debt and set

the performance track of the IT regime (Table 1) reveals that both interest-rate and inflation volatilities within fiscal years have been consistently low.

Despite its achievements, inflation targeting in Brazil has witnessed headline CPI inflation hovering some 2% (6.6% per year on average) above targeted rates (4,75% per year). Regardless of the explanation entailed, the data reveals sizeable inflationary persistence in Brazil, to which much empirical work has been devoted to explain. Figueiredo e Marques (2009) show the existence of inertia in Brazil and detect a long-memory phenomenon embedded in the data-generating process. Tejada e Portugal (2001), Campêlo e Cribari-Neto (2003), Cribari-Neto e Cassiano (2005) e Araújo e Santos (2004) follow the same lines, and attempt to provide quantitative evidence on the effects – both temporary and permanent – of inflationary (or deflationary) shocks on the long run inflation trends in Brazil. Fasolo e Portugal (2003) formulate a nonlinear Phillips curve to the Brazilian economy and conclude in favor of a high persistence of inflation between 1990 and 2002, which is explained by an autonomous inertial component to price behavior (Roache 2013, Braga 2013 e 2014).

Persistent inflation requires some level of price, wage, structural and institutional rigidity. A downwardly rigid behavior of prices may be related to a variety of causes, amongst which we could cite: informational asymmetries and market imperfections, a permanently expansionary fiscal, credit and monetary policies due to inadequate policy regimes (e.g. fixed exchange rates or inefficient taxation schemes), the indexation of contracts and prices and the Government control over specific prices. These rigidities are likely to amplify the impacts of random shocks, both internal and external, which may render some key macroeconomic prices more volatile - such as the exchange rate or the interest rate -, thereby allowing transient impacts to be absorbed by inflation trends.

Persistence of inflation in time series data in OECD countries in the post-War era has been fairly well documented (see Fuhrer 2009). In fact, the European Central Bank has set up its own institutional branch to oversee the phenomenon: the *Eurosystem Inflation Persistence Network* (see Marques 2004 and O'Reilly & Whelan 2004). Persistence itself is quite encompassing and leaves few economies unaffected. It is thus a matter of degree on which we ponder: is there any relationship between the level of economic development and the observed inflation persistence across countries?

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primary deficit targets to cover debt obligations. Second, the De-indexation Act (in 2001) prohibited any formal contract in the economy from setting automatic price adjustment clauses for periods shorter than one year.

2. Economic Development and Inflation: bad policies or hidden connections?

The recent empirical literature on development economics has been timid about this problem. Most studies undertake the task of verifying correlations between inflation and growth; needless to say that taking the first difference of output behavior is bound to dispense with important information regarding the levels of variables. Even so, the only study on the matter seems to be Bruno and Easterly (1998), which have found no correlation between growth rates and inflation in a sample of countries, although they were mostly focused on high inflation experiences.[6] The fact that the majority of countries managed to curb inflation in the 1990s - and to keep it under control ever since - paved the way to the notion that an era of "Great Moderation" had finally begun (Rogoff 2004). The problem of inflationary persistence became indelibly detached from development concerns.

As a result, no empirical study has been able to account for what simple descriptive statistics reveal, namely, that low- and middle-income countries are prone to have higher inflation scores than high-income countries (see Figure 1). One possible explanation for such a gap in the literature may be the difficulty in finding general statements from country-specific empirical data. This is hardly any surprise. There is a high variance of inflation scores within these low- and middle-income sub-samples, which clearly owes to their heterogeneous institutional and productive frameworks.

Difference in inflation scores is then frequently – and squarely - ascribed to credibility of governments, the quality of institutions of monetary policy, practical arrangements in Central Banking and technical aspects of inflation indices. Notwithstanding the truth they carry, these elements overlook shared economic and structural features related to each country's stage of development. This empirical divide in the data – albeit anecdotal – is a real phenomenon yet in search of a theory. However, the difficulties in building one are quite daunting, for it must take heed of the productive structure, degree of openness, distributive profiles (policy-induced and otherwise), as well as several institutional and historical specificities. These aspects taken together may reveal deep-seated sources of downward inflexibility of prices, which add up to - and enhance - the more close-to-surface mechanisms making up for the persistence of inflation.[7]

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[6] Two papers back in the late 1950s undertoook this task. Wu Tai (1959) and Bhátia (1960) also found no clear relationship between economic growth and inflation. Both were also constrained by the idea that development was a synonym with growth, a very common connotation at the time.

[7] The literature on this matter has summarized four basic aspects: (1) interest rates on government bonds and public utility services are indexed to inflation rates, the latter embedding a autoregressive term in the economic structure of costs and the former limiting the wealth effect of rising interest rates and increases interest payments

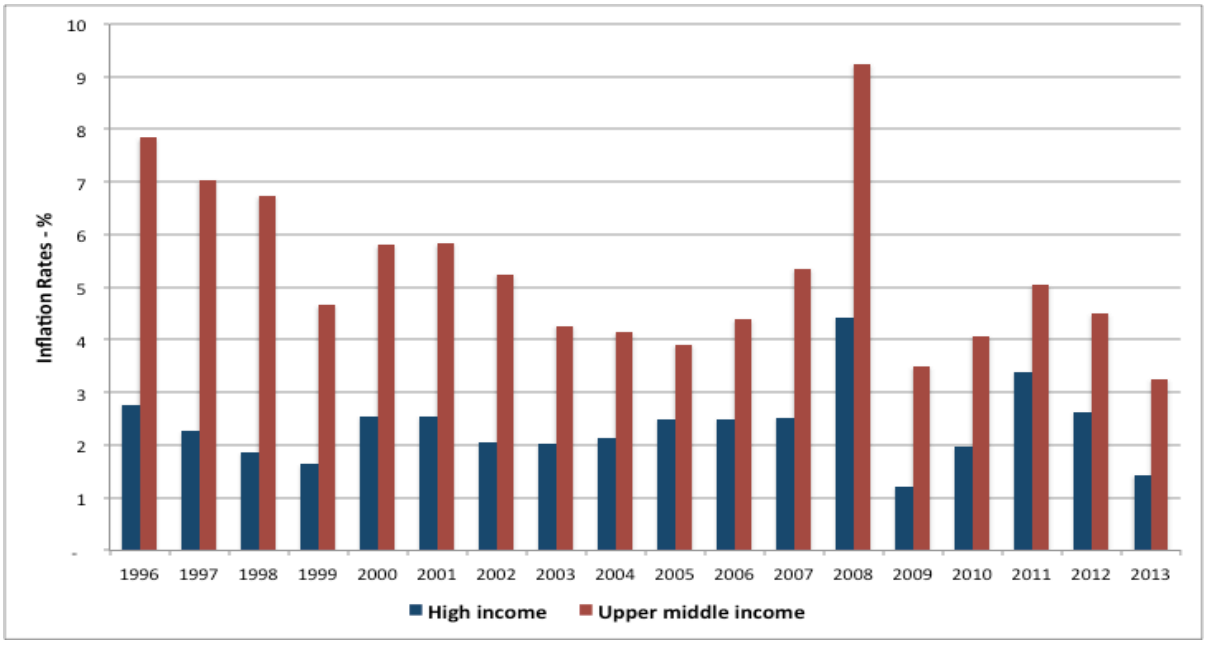

Figure 1 - Inflation Rates for Country Groups classified according to income levels – 1996-2013. Source: World Bank.

Our claims regarding Brazil rest on the working hypothesis that, similarly to the process of biological evolution of organisms, the connection between inflation and development can only be grasped at the group level, where some common set of forces sustains inflation rates in developing countries above those endured by high-income countries. Countries sharing the same stage of development may have varying inflation trends, but in each case the latter seems to be bound by a structural "inflation floor" with no counterpart as regards a structural "inflation ceiling"; note that the latter is commonly imposed by short-term monetary, credit and fiscal policies, while nothing is said about the former. Although this paper does not advance theoretical statements in the direction mentioned above, we believe our case study of Brazil may prove useful in shedding light on other developing countries' experience with inflation.

3. Structural Change, price rigidity and inflation persistence

The determinants of price patterns are intricate and thus do not subject easily to empirical decomposition into separate and independent components. Supply and demand schedules undergo simultaneous determination, leading to the empirical problem of identifying an

on the public debt in the process of curbing inflation; (2) private sector adopts indexation clauses in contracts, hindering the effects of disinflation measures; (3) supply shocks are frequently besetting the economy through the exchange-rate channels and are highly insensitive to interest-rate-based correctional measures; and (4) inflation targeting protocol requires the Central Bank to pursue a pre-established inflation rate, which might come to pre-index the economy through the price-expectation channel, therefore setting a "floor" to inflation rates. All of these forces are in fact at play, but they fail to provide a full picture, for they overlook or assume away some very important structural and historical-institutional traits to which we now turn.

instrumental variable that can provide some information about the pricing process. Furthermore, during a process of development, the productive structure undergoes sharp changes in relative prices. The practical impossibility of enhancing productivity simultaneously in all sectors implies that some sectors present more elastic supply than others, which engenders a dual productive system (see Chenery 1975).

In a seminal influential paper, Olivera (1964, p. 325) spelled out the consequences of a relative price variation upon the money price level. He further underlined that, in the presence of any degree of nominal price inflexibility, such changes in the general price level are not reversible. This means that, following a displacement of equilibrium relative prices, restoring the previous position will not wipe off the increase in the price level brought about by an alteration of that situation. In fact, a movement aiming to reset the previous configuration of relative prices would most likely cause an additional increase in money prices. Thus, if adjustments are carried out in oscillating patterns, the total increase in the latter is bound to be much greater, depending on the amplitude and frequency of the intervening fluctuations.

Olivera divided the economy between the technologically backward agricultural sector and the industrializing sectors. As rising wages in the industrial sectors met a rigid food supply, relative prices could only be made consistent with the productivity differentials between these two sectors by way of higher inflation. Once industrialization was fairly advanced, technological spillover effects would increase the productivity of agriculture and these rigidities were likely to succumb (see Greenwald & Stiglitz 2006). Influenced by the challenges faced by developing economies in the 1960s and by the focus of catching-up policies, the Latin American structuralist school failed to anticipate the development problems faced by fully industrialized countries, namely: the process of deindustrialization.

In that regard, Colin Clark's (1957) and Fuchs's (1968) influential hypothesis stated that an industrialized economy progresses by shifting aggregate demand from manufacturing towards services sector. Rowthorn & Rasmawamy (1999, p. 19-20) have suggested that deindustrialization should not be readily construed as a symptom of a country's failure in nurturing a competitive manufacturing structure, but inkling of a country's economic maturity, usually linked to rising standards of living. This "natural" trend is caused, the

authors argue, by North-south dynamics led to a displacement of manufacturing employment towards labor-abundant developing economies.[8]

One of the implications of this structural change is the shifting of resources from technologically progressive sectors (mostly manufacturing) to those typically more labor-intensive (services in general), which face downwardly rigid cost structures. Baumol (1967 and 2012) and Baumol, Blackman & Wolff (1985) indicated that wages in the service sectors tend to change according to productivity rates in the technologically progressive sectors, independently of the former's own productivity scores. Developed economies undergoing this process are thus more prone to suffer from a "cost disease", that is, a rising pressure on the general level of prices owing to an increasingly more costly provision of services, which can only be curbed by raising productivity - or diminishing costs - in non-manufacturing sectors.

Matters are much blurrier when it comes to developing economies, where the catching-up process led to the settlement of industry but not necessarily to the establishment of innovation-producing sectors. This shortcoming implies that deindustrialization is likely to come at the cost of having a more commodity-concentrated export profile and a hypertrophied services sector.[9] The economic structure becomes more rigid and more susceptible to external shocks, both underlying forces acting upon inflation; in short: random shocks are coupled with highly absorptive inflation trends.

The combination of inflation and these structural changes has not been, thus far, framed in a uniform theoretical approach. Our attempt here seeks to contribute to this latter

[8] The authors found that deindustrialization in developed economies was caused primarily by "*interactions among shifts in the pattern of demand between manufactures and services, the faster growth in productivity of manufacturing as compared to services, and the associated fall in the relative price of manufactures*". The increase in the share of services in the composition of output has thus been understood as a "natural" outcome of a successful process of economic development (p. 14). The paper's focus is set on the Asian countries, particularly China, South Korea and India, sidestepping the heterogeneity among the countries composing the Global South. By these authors' standard, Brazil is placed in a somewhat interesting position, for it has undergone a large-scale process of industrialization in the post-War period without ever completing the transition to a mature economy whilst witnessing a declining share of manufacturing in aggregate output in the last twenty five years, which has led some authors to diagnose this deindustrializing pattern as premature. (Bresser Pereira 2014, Bresser Pereira, Marconi & Oreiro 2014).

[9] A spawning literature has dealt with the various dimensions of the problem. We refer the reader to Dasgupta & Singh 2006, Cimoli, Fleitas & Porcile 2013 and Canuto, Fleischhaker & Schellekens 2015. On a more positive approach towards services-related structural change, Nordås & Kim (2013) find that in low-income countries, that "*better services contribute to moving up the value chain in industries where a country already has technological capacity and comparative advantage, but better services alone may not stimulate product differentiation in sectors where a country is far from the competitive edge* – at least not in the short run". More specifically to the Brazilian case, Bresser Pereira, Marconi & Oreiro 2014, Marconi, Rocha & Magacho (2013) and Rocha, Magacho & Marconi (2015) provide important contributions to the debate on deindustrialization and the challenge of sustaining productivity. Gabriel, Oreiro & Jayme Jr 2015 frame the problem in a North-South technological gap model.

endeavor by suggesting the channels through which a premature deindustrializing process (see Rodrik 2015), particularly for the case of Brazil, affects the economy's price-output dynamics and, therefore, its inflation patterns. In what follows, we provide next an inflation accounting framework to unveil the channels of transmission between the deindustrializing trend and inflation in Brazil.

4. Some inflation accounting

The general price level is formally denoted by $P = (P_N)^{\alpha}(P_T)^{1-\alpha}$; that is, a weighted average of both the freely adjusting industrial and agricultural and some services, termed herein tradable goods prices (or P_T) and the downwardly rigid prices, which include both Services and State-managed prices, or non-tradable goods prices (or P_N). The markup behavior is depicted in the ϕ term. Taking logs on both sides and deriving them with respect to time we can formally define the inflation rate as follows:[10]

$$\pi = \alpha\hat{P}_N + (1-\alpha)(\hat{P}_T) \tag{3}$$

where hats over variables signify time changes. The manufacturing and agricultural sectors account for the tradable goods prices.[11] Prices in these sectors are a combination of unit costs of production that rise proportionally with unit labor costs ($\widehat{ULC}$) and costs of non-labor inputs ($\widehat{CI}$).

$$\hat{P}_T = \beta_T(\hat{\phi}_T + \widehat{ULC}) + (1-\beta_T)\,\widehat{CI}$$

or (4)

$$\hat{P}_T = \beta_T\left(\hat{\phi}_T + \hat{w}_T - \hat{q}_T\right) + (1-\beta_T)\left(\hat{e} + \hat{P}_I + \hat{c}\right)$$

where tradable goods price rises amount to variations in markups ($\hat{\phi}_T$) plus the net result of changes in wages minus labor productivity variation ($\hat{w}_T - \hat{q}_T$). Changes in prices of non-labor inputs depend, respectively, on the changes of exchange rate, of prices of imported goods and of the quantity requirements of inputs for domestic production ($\hat{e} + \hat{P}_I + \hat{c}$). The parameter β_T (> 0) the weight of labor inputs in overall costs of tradable goods production.

The non-tradable inflation reflects the variations in both services and state-managed prices. Price changes of services ($\hat{P}_S$) are determined by changes in both markup by firms

[10] We adopt continuous time to keep notation simple.
[11] We assume for the sake of simplicity that all non-labor inputs are supplied by imports.

($\hat{\phi}_S$) and the differing rates of growth of wages and the sector's average labor productivity ($\hat{w}_S - \hat{q}_S$). State-managed prices ($\hat{P}_{SM}$) follow some rule of price adjustment as a proportion to current inflation plus an exogenous markup ($\hat{\phi}_{SM}$) over one-year-lagged inflation. This markup may be either a future-revenue-anticipating factor aimed at self-financing investments in capacity expansion ($\hat{\phi}_S > 0$) or an eventual leeway for government-driven price controls as has recently taken hold for both electricity and gasoline prices ($\hat{\phi}_S > 0$). Thus, formally we attain equation (4):

$$\hat{P}_N = \beta_N \hat{P}_S + (1 - \beta_N)\hat{P}_{SM}$$

or (5)

$$\hat{P}_N = \beta_N(\hat{\phi}_S + \hat{w}_S - \hat{q}_S) + (1 - \beta_N)(\pi + \hat{\phi}_{SM})$$

By (3)-(5), after some arrangements we obtain the synthesis of our basic inflation accounting:

$$\pi = \Omega.\{\hat{\phi} + \alpha[\beta_N(\hat{w}_S - \hat{q}_S)] + (1 - \alpha)[\beta_T \widehat{ULC} + (1 - \beta_T)\,\widehat{CI}]\} \quad (6)$$

Equation (6) is a simple organizing device to guide us through the analytical rationale of price adjustments of which we will provide empirical evidence. First, the magnifying term $\Omega = \left[\frac{1}{1-\alpha(1-\beta_N)}\right]$ indicates that inflation levels tend to elevate when the weight of non-tradable goods in the price index (α) increases and the share of State-supervised prices in non-tradable price index ($1 - \beta_N$) increases. Within the range of this magnified effect, we have a few relationships worthy of note. To explain the markup behavior, we first assume, as usual, that tradable goods are subject to competition by imported goods, whereas non-tradable ones are sheltered from it due to location-dependent output. This aspect is captured by the markup rules followed by firms, defined as the sum of the rates of change in sectional markups as in

$$\hat{\phi} = \alpha\beta_N\hat{\phi}_N + (1 - \alpha)\beta_T\hat{\phi}_T + \alpha(1 - \beta_N)\hat{\phi}_{SM} \quad (7)$$

The non-tradable sector's markup is further defined as $\phi_N = \phi_N(\hat{e}, \lambda_N)$, a function of exchange rate variations and some degree of market power, respectively; we assume $\phi'_N(\hat{e}) < 0$ and $\phi_N{}'(\lambda_N) > 0$. The tradable sector's markup can likewise be written as $\phi_T = \phi_T(\hat{e}, \lambda_T)$, where $\hat{e}$ and λ_T represent, respectively, the protection from international competition by increasing prices of imported finished goods and some form of non-market protection (i.e. industrial policy) that raises the firms' market power in this sector. We assume, finally, that $\phi_T{}'(\hat{e}) > 0, \phi_T{}'(\lambda_T) > 0$.

Therefore, the economy-wide markup behavior ($\hat{\phi}$) will depend on net effect of each sector's possibility of increasing prices due to market and non-market considerations. Next, the price change differential between services and tradable goods exerts pressure in the expected direction, that is, if services prices outpace those of tradable goods, we can expect a rise in inflation levels. In addition, the upward pressure stemming from prices of tradable goods is fueled by the changes in the exchange rate and in the cost of imported intermediate goods. At last, a constant cost-push force on inflation levels are ascribed to the State-managed prices' component that accounts for the markup over current inflation ($\hat{\phi}_{SM}$). So that if $\hat{P}_S = \hat{P}_T = 0$, then $\pi = \Omega[\alpha(1-\beta_N)]\hat{\phi}_{SM}$.

In order to get a clear view of the cost-push force originated in the labor market, let us rewrite equation (4). We further decompose $\hat{P}_S$ and $\hat{P}_T$ and assume, for the sake of simplicity, that $\hat{\phi} = \hat{e} = \hat{P}_I = \hat{c} = \hat{\phi}_{SM} = 0$ to yield equation (6a)

$$\pi = \Omega[\alpha\omega_{ST} + \beta_T(\hat{w}_T - \hat{q}_T)] \tag{6a}$$

where $\omega_{ST} = [\beta_N(\hat{w}_S - \hat{q}_S) - \beta_T(\hat{w}_T - \hat{q}_T)]$ represents the wage rate differential between the service sector and the tradable goods sector corrected for the respective sectors' productivity growth rates. If $\omega_{ST} > 0$ the level of inflation is likely to rise with downward rigidity. Conversely, innovation can boost productivity rates of growth ($\hat{q}_T, \hat{q}_S$) leading to $\omega_{ST} < 0$ and alleviating pressure originated in the tradable goods sector [second term on right hand side of (5a)], and thus exerting downward pressure on inflation levels. The key to this simplified result rests on the assumption of independence of the behavior of wages in the non-tradable sectors with respect to past inflation rates and to productivity scores in the tradable sectors. If we take these links into account, a nonlinear relationship emerges in the wage rate differential term: $\omega^{\star}{}_{ST} = \{\beta_N[\hat{w}_S(\pi, \hat{q}_T) - \hat{q}_S] - \beta_T(\hat{w}_T - \hat{q}_T)\}$, whereby the "cost disease" effect is acknowledged in $\hat{w}'_S(\hat{q}_T) > 0$ and the wage-indexation scheme is represented by $\hat{w}'_S(\pi) > 0$. By this token, even if wages in the tradable sectors grow in tandem with the latter's productivity advances, the non-tradable sectors are likely to undergo wage pressures due to relative wage pairing up with the tradable sector.[12]

The foregoing framework allows us to depict analytically both long-term pressures impinging on inflation levels. The **structural change**s entail the enlargement of the services sector's share of output, which, depending on the pace of this change, amounts to a widened

[12] It is still not clear to what extent this emulative behavior is sanctioned by the existence of formal and informal index-linking of prices in non-tradable sectors to past inflation rates. At the risk of overanalyzing, we can state the above non-tradable wages, in analytical terms, as follows: $\hat{w}_S[\pi, \hat{q}_T(\pi)]$.

gap in inter-sector productivity growth rates ($\hat{q}_T - \hat{q}_S$) that, according to equation (6a) increases ω_{ST} and hence π. Secondly, **State-managed prices** are defined according to a regulatory environment furnished to oversee newly privatized public utilities companies. Such institutional underpinning exerts a constant pressure on inflation levels by both its indexation component and the exogenously determined markup rate over inflation. The propagation effect (Ω) transmitted by State-supervised prices are dependent on the weight of such goods' prices $(1 - \beta_N)$ in the non-tradable price index, and becomes even more inflationary (disinflationary) when the exogenous markup rate increases (decreases), since $\frac{\partial \pi}{\partial r} = \Omega[\alpha(1 - \beta_N)] > 0$.[13] With this preliminary framework in mind, we shall turn to the empirical evidence of these forces impinging on inflation trend in Brazil.

5. Deindustrialization, Rigid Prices and Inflation: a working hypothesis

The structural "inherent momentum" of inflation in Brazil can be decomposed broadly in two factors, namely, tradable/non-tradable relative prices and State-supervised prices. The first relates to the increase in the services sector´s growth rates and its relationship to real exchange rate levels, whereas the second refers to the new regulatory environment that leads privatized public utilities companies to raise this prices above inflation rates. Both elements stem from long-term processes, the first being strictly structural, the second a hybrid of primary and propagating factors.

Taken together these components account for around 28% of IPCA (Broad Consumer Price Index), reflecting their importance in daily expenditures of households in the income bracket from one to forty minimum wages.[14] In both these sectors, productive capacity and variations in productivity imply a varying supply of basic goods and services, which tends to

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[13] An immediate extension of the above accounting exercise would fit easily into a conflicting claims framework. This would allow the analysis of the patterns of income **distribution and the effects of Clark's law** on inflation, as seen above in the section 3. According to our accounting scheme, the increase in average income levels fueled the increase in households' outlays for the non-tradable sector, increasing its weight in the price index (α), provided that $\frac{\partial \pi}{\partial \alpha} = \frac{1-\beta_N}{[1-\alpha(1-\beta_N)]^2} > 0$. Adding this aspect would deliver a more complete story of inflation, by unveiling non-market forces that impinge upon the behavior of prices in a systematic fashion, given their institutional character; for instance, we could cite the government-driven policies of labor empowerment and institutionalized wage indexation affect ω_{ST}, which incites reaction by firms through price adjustment to costs increases via markup changes ($\hat{\phi}$) dependent on $\phi'_N(\lambda_N)$ and $\phi'_T(\lambda_T)$. However, these influences are nonlinearly related to the dynamical development of productive capacities by each economy. Its immense complexity would, thus, lead us to far astray from our present goals.

[14] The major administered/regulated/State-managed prices are: 1) defined at the federal level: oil by-products, electricity fees, telephone and postal services fees, minimum wage; 2) defined at local governments' levels: water and swages fees, public transportation, property taxes. Still, 'managed' should not be understood as 'controlled', for a substantial part of these prices are public utility fees whose adjustments are based on concession contracts, which leave no room for discretion. (Bogdanski et al.,2001).

generate inevitable adjustments in prices and quantities in downstream sectors. Also, firms in such sectors follow price-setting rules that combine an index-linking component with a varying markup over costs. The former element builds further persistence into time series, whereas the second implies "exogenous shocks" on price trends, provided the markup rules follow non-market criteria negotiated in contracts of public utilities between private companies and the government. Next, we marshal some evidence on both sets of pressures.

5.1 Deindustrializing trends and the inter-sector productivity differentials

A strong linear relationship between the output trends of services and manufacturing has misled economists into thinking that prices in the former sector would mirror adjustments in quantity. Therefore, it is usually assumed that a decrease in prices of manufactured goods due to a slowdown of income-fueled demand will likewise affect prices of non-tradable goods and services through the same channel and in the same direction. However, this would take hold only if prices in these sectors were fairly flexible. As we claim below, this is not the case; hence the relevance of this very specific channel that imposes a downward rigidity of inflation levels.

Turning to sectional prices, the behavior of the three main groups of prices in Brazil, in Figure 2, makes clear that prices of services outpace industrial prices. Moreover, the acceleration of the State-supervised prices stands out after the year 2000. In the Brazilian case, that has induced aggregate investment to get locked in the services sector, not being able to incorporate new activities endowed with substantial economies of scale (Baltar 2013, p. 13).[15] That is, once investments are steered towards more service-oriented activities (Figure 3), in response to diminished profitability in manufacturing, they are unlikely to be reversed; this lock-in effect imposes a stronger sensibility of internal prices to exchange rate volatility.

Messa (2012) used input-output analysis to state that, between 2000 and 2009, services sectors not only showed sluggish productivity, as they entailed the lowest linkage effects upon the other sectors. In fact, it has negative inducement linkage effects upon the growth of manufacturing, while demand for services did have a positive – however small - effect on the demand for manufactured goods.

[15] In addition, the services sector is suspected of facing lower average productivity when compared to secondary sector, although evidence on this is scant and controversial (see Rowthorn & Rasmawamy 1997). For more details on the Brazilian case, see Aldrighi & Colistete (2013).

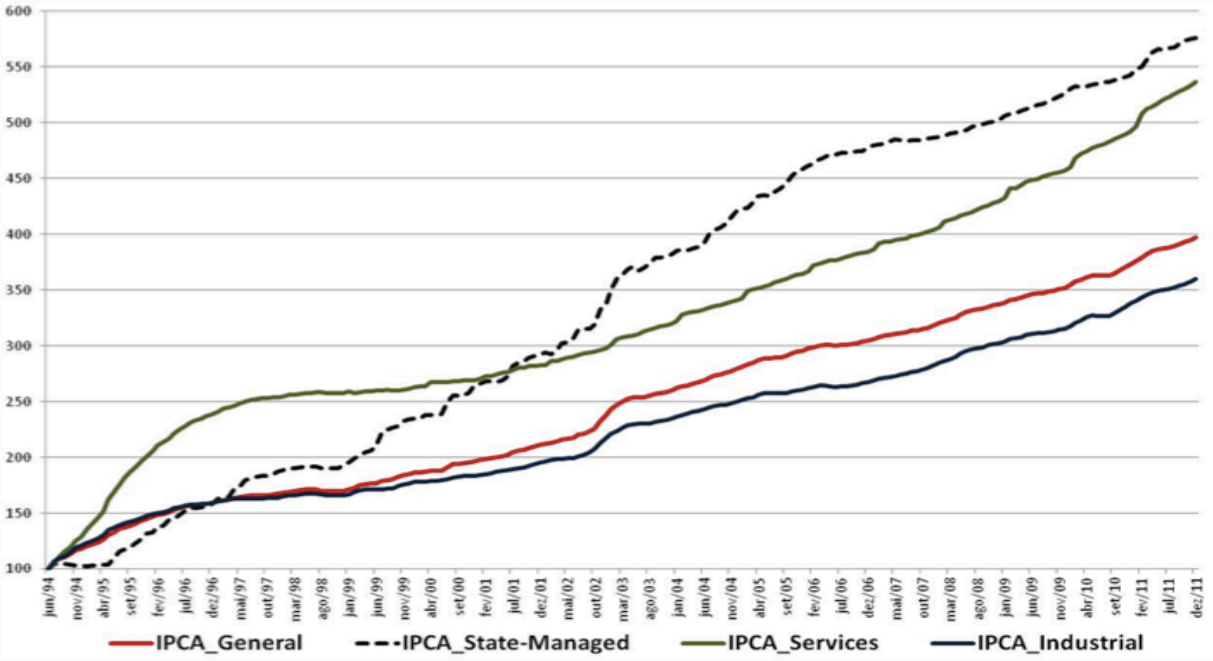

Figure 2 – Headline Consumer Price Index – IPCA-GENERAL – by large categories (June 1994 = 100). Source: Brazilian Institute of Geography and Statistics (IBGE).

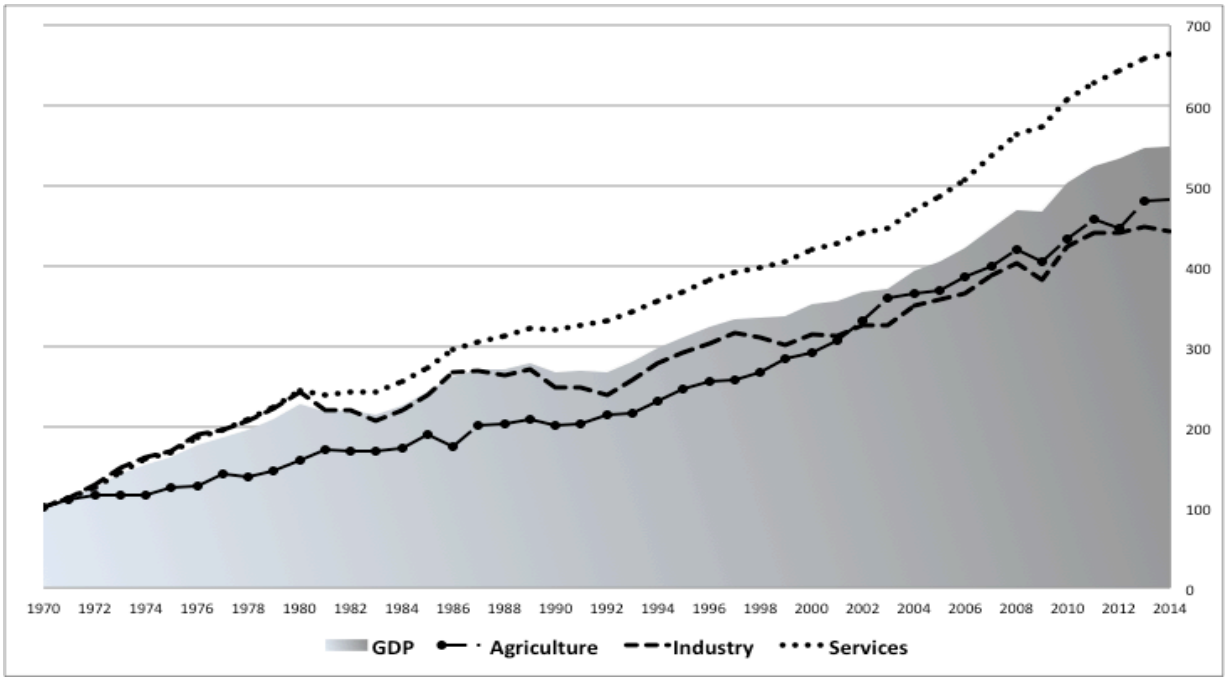

Figure 3 – GDP and Sectional Real Growth Trends - yearly data (1970 = 100). Source: Brazilian Institute of Geography and Statistics (IBGE).

A closer look at indicators for the services sector, in Figure 4, indicates that a sizeable proportion of this sectors growth has to do with increased employment and lagging wages, not with increased productivity. Services rely extensively on human labor and therefore comprehend an inherent cost-push element: wages are autoregressive due to a widely spread system of formal and informal indexation; it is also tied to wages with manufacturing. Economic growth boosts overall wages, which feeds into inflation indices; when the occasional slump arrives, wages in services are kept by the inertial component reliant on

indexation, which is clearly depicted between 2010 and 2014, when the sector's output plummets while its prices keep rising.

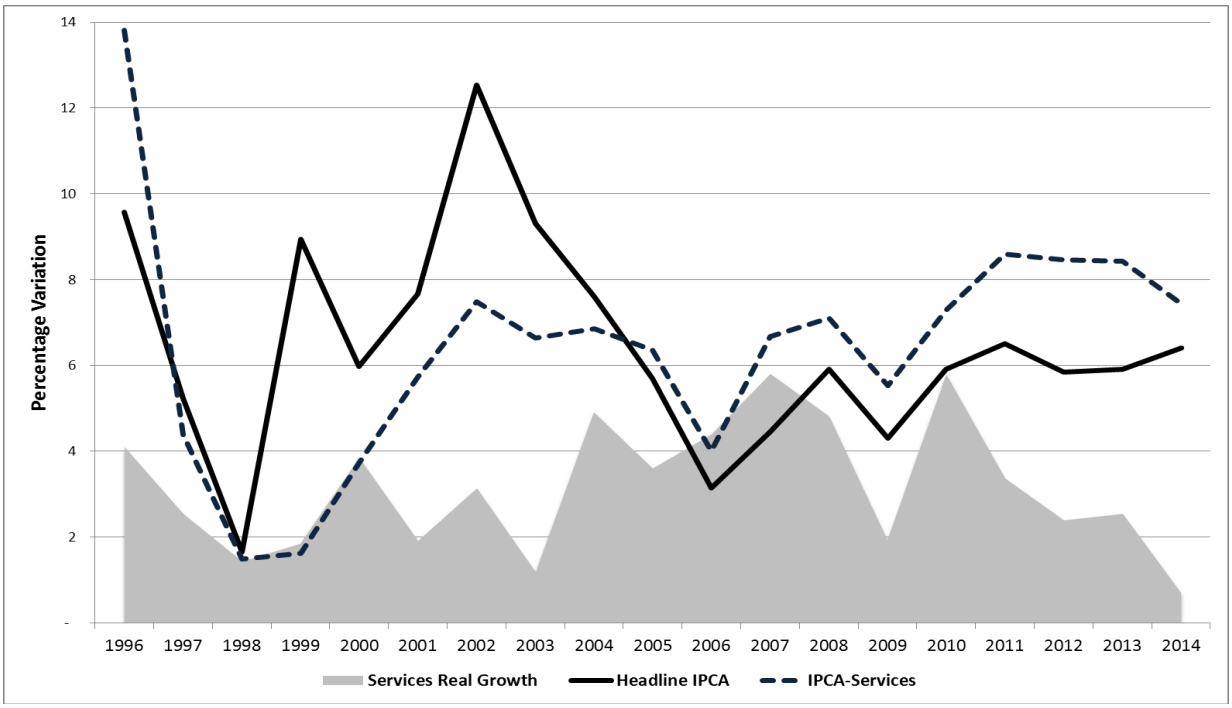

Figure 4 – Comparative Rates **–** GDP Implicit Deflator, Services Sector Output Real Growth Rates, Headline and Sectional CPI Inflation **–** Yearly Percentage Variations. Source: Central Bank of Brazil.

These features alone would not amount to any problem, were it not for the 70% share that services take up from the Brazilian output (Aldrighi & Colistete 2013) and the overly lagged-inflation-sensitive Brazilian price structure (Braga 2013). Furthermore, sheltered from the direct discipline of the exchange rate - which constrains price-setting behavior in manufacturing - prices of services have ampler scope to pass cost rises on to prices, further fueling inflation. Finally, services are situated at the end of the supply chain, which makes their prices more susceptible to absorb cost-shifts coming from upstream sectors; if some of these latters' price-setting rules are also mechanically influenced by lagged-inflation, both ends of the pricing stream are tied in a circular chain of price rises. Let us turn to them.

5.2 State-Supervised Prices

From the evidence marshaled in Figure 5, it becomes clear that State-Supervised prices (506% increase) are, along with prices of services (535%), the period's great victors in the inter-sector distributional struggle following stabilization, between July 1994 and December 2013.

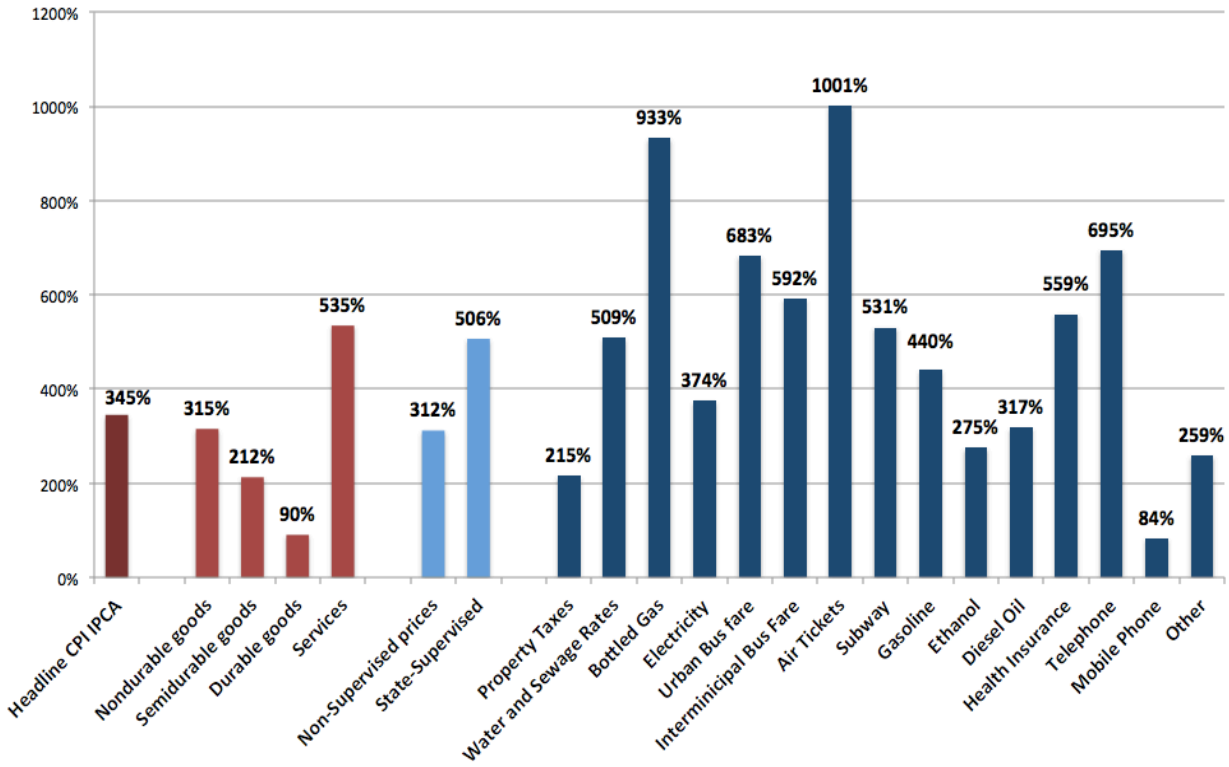

Figure 5 – Accumulated Inflation from July 1994 to December 2014 **–** sorted by different categories: Headline CPI Inflation (IPCA), Nondurable, Semi-durable, Durable Goods, Services, Non-Supervised vs. State-Supervised Prices and Components of State-Supervised Price Index (*dark blue bars on the right hand side of the chart*). Source: Central Bank of Brazil.

State-Supervised prices relate to public utilities, such as telecommunications, electricity, health insurance, taxes, public transportation etc. They are strategically situated upstream along the productive chain (basic inputs of production), and hence are likely to be amplified, affecting downstream sectors' output costs. Both structural and institutional aspects of inflation can be found here. The structural aspects have to do with technical possibilities of production, which vary within the group. But the institutional dimension is the one that arrests our attention when it comes to inflation. These prices are closely regulated by public sector agencies and strict contract clauses, and are thus partly independent from aggregate supply and demand conditions.

Franco (2006, p. 251) noted that the new regulatory environment that resulted from the process of privatization of State-owned companies, in the 1990s, has induced a change in strategic price behavior on the part of the private companies that acquired the rights to exploit the market potential for public utilities and services. Braga (2013) has shown that this sector provides a clear example of profit inflation, whereby firms anticipate future revenues through price rises in order to finance investments in future capacity expansion. Given the monopolistic structure of the market for such goods and services, a low price elasticity of demand and regulatory measures endorse such pricing behavior.

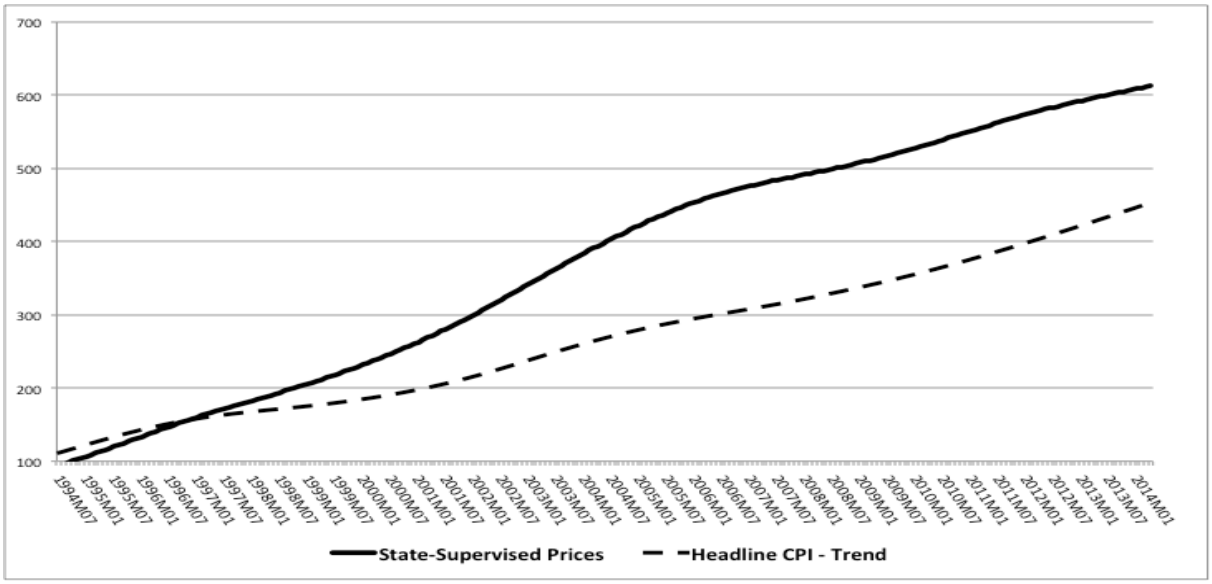

Figure 6 – Headline CPI Inflation trend (HP filter, smoothing factor 14400), State-supervised prices and Estimated Mark-up for State-Supervised Sectors ($\hat{\phi}_{SM}$) - July 1994 to December 2014 **–** Author's Calculations. Data Source: Central Bank of Brazil.

Figure 6 displays this behavior by way of tracking State-supervised prices and the headline inflation trend (this latter obtained by means of Hodrick-Prescott Filter with a smoothing factor of 14400). In addition, the blue line indicates de deviations of State-supervised prices from the headline inflation trend, denoted by $\hat{\phi}_{SM}$ in equation (5). The data show that most State-supervised prices outpace inflation in systematic fashion, which supports our analytical inflation accounting scheme in equations (4) and (5); also, they reveal that such factor has stabilized, although strong inflation persistence is noted in the behavior of supervised prices.

It stands to reason that, despite the weights ascribed to these goods in the consumer's basket, a non-explosive inflation requires consistency of the system to be brought by adjustment of other set of prices. The evidence invites the suspicion that these candidate prices are the ones most affected by the exchange rate, namely, those of tradable goods (durable and semi-durable products). In short, due to this structural and institutional pressure, even if economy-wide wages, productivity and labor input requirements were to have equal rates of change between tradable and non-tradable sectors, inflation would still have a nonzero value.[16] We turn next to how these aspects hang together.

[16] Martinez & Cerqueira (2013) and Braga (2013) decompose the inflation índices in their various components. Their results largely undergird our analysis that both services and State-managed prices have risen to become relevant pressures on inflation.

5.3 Deindustrialization and inflation rigidity: an empirical rationale

It is commonly believed that inflation can be controlled not only by means of demand contraction via interest rate channels, but also through an exchange rate channel. An appreciated currency, the argument goes, cheapens tradable goods to a greater extent than the rise in non-tradable price rises, thereby decreasing average price levels. This is the commonly stated argument used in standard short-term inflation targeting debates. Our claim is that such an explanation overlooks the long-term forces that may offset and even supersede this supposedly positive result.

The appreciation of the domestic currency does convey, in fact, the acclaimed disinflationary effects of reducing the costs with non-labor imported inputs faced by the tradable sector whilst compressing the profit margins due to increased competition by imported finished goods. However, this outcome tends to release resources from the distressed tradable sector to the non-tradable sector, which still faces sustained demand carrying over from periods prior to appreciation. This lagged effect of manufacture activity on services leads to the luring in of workers, now facing greater job insecurity in the tradable goods sectors, to the non-tradable sectors. An increased wage bill ensues in this latter, provided these sectors' heavy reliance upon human labor input. If the economic system is able to generate highly productive opportunities for labor inputs forgone by the tradable sector, the wage increase can be at least partly offset by enhanced productivity. If it is not, as is suspected of Brazil, unskilled workers tend to be accommodated in precarious job conditions, hence with lower productivity and a more inelastic supply of services ($\downarrow \mu \rightarrow \uparrow \hat{P}_R$, according to equation 2).

In the foregoing case, a larger wage bill for low-productivity employment implies upward-pressing costs ($\uparrow \omega_{ST}$, as per equation 6a), which are then transmitted on to prices, given the "natural" protection from external competition enjoyed by non-tradable sectors - shown by $\phi'_N(\hat{e}) < 0$ and $\phi'_N(\lambda_N) > 0$ in equation 7. Hence the causality shown by equation (2) running from relative price changes between tradable and non-tradable sector to inflation levels ($\downarrow \mu \rightarrow \uparrow \hat{P}_R \rightarrow \uparrow \pi$). Between the year 2000 and 2009, unit labor costs (US$ per man/hour) varied from US$ 3.6 to US$ 6.8, a 90% increase. (DIEESE, 2011, p. 224).[17]

[17] Agriculture faces more complex and adverse dynamics and is thus assumed to face near-neutral effects due to the volatility in international prices, which may or may not provide offsetting forces to devaluation, via increased net exports. It suffices to recognize that, after 2003, the international boom stoked up commodities international prices, which stands in support of our admittedly *ad hoc* assumption. It is nonetheless

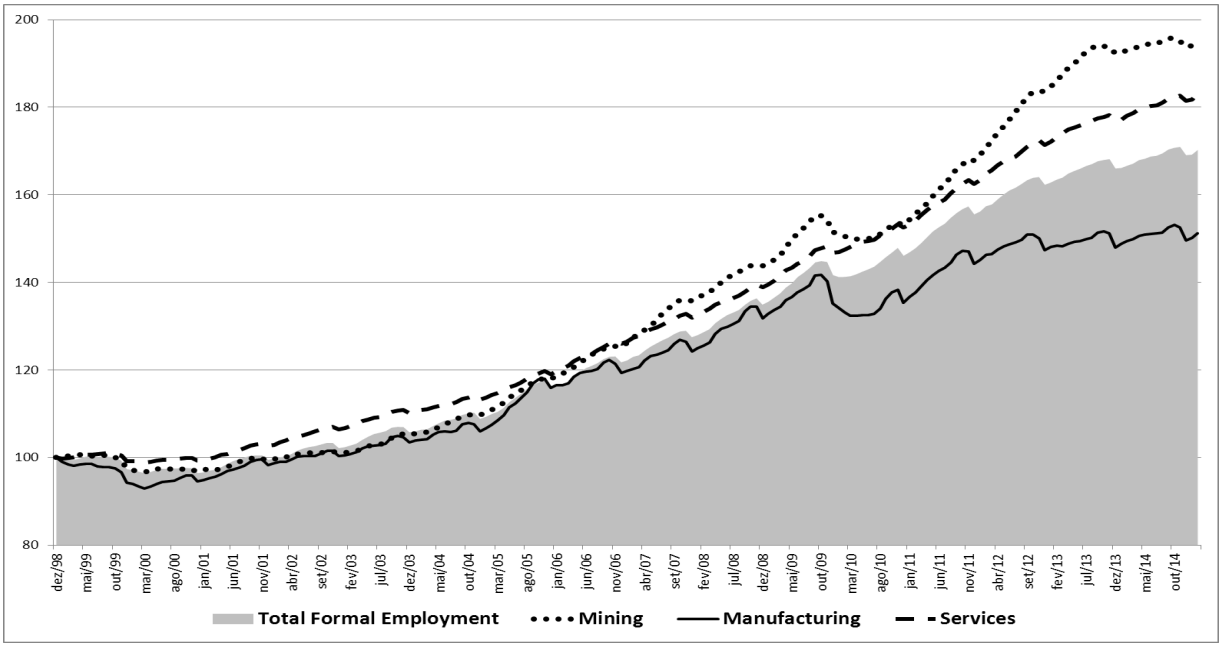

Figure 7 – Formal Employment – by selected aggregate sectors (December 1998 = 100) - Source: Brazilian Institute of Geography and Statistics (IBGE) – Monthly Employment Survey – past methodology (IBGE/PME antiga).

It follows from the foregoing statement that, if prices of manufactured goods are held down in the face of rising income levels, household outlays are channeled to non-tradable services. Once this holds, labor demand is shifted toward labor-intensive production of services, which faces lower productivity scores (Figure 7). The latter implies higher costs and, given overall labor market legal institutions, there emerges a higher propensity to transmit costs rises onto prices.

Figure 8 conveys the labor market dynamics between services and manufacturing. Note that inter-sector employment gap $\left(\frac{Employment\ in\ Services}{Employment\ in\ Manufacturing}\right)$ grows along the decade, whereas the inter-sector wage gap $\left(\frac{Manufacturing\ Wages}{Services\ Wages}\right)$ also rises in the period - although with a sharp dip in 2007, from which the wage gap quickly recovered in 2008 and stabilized in the following years. These data suggest that employment growth has been accompanied by rising labor compensations in the services sector, which tend to follow wage trends enjoyed by labor allotted to manufacturing.

acknowledged that prices of foodstuff and other agricultural goods have significant, albeit transient, primary effects on inflation, and second-order ones via cost-of-living adjustments of wages.

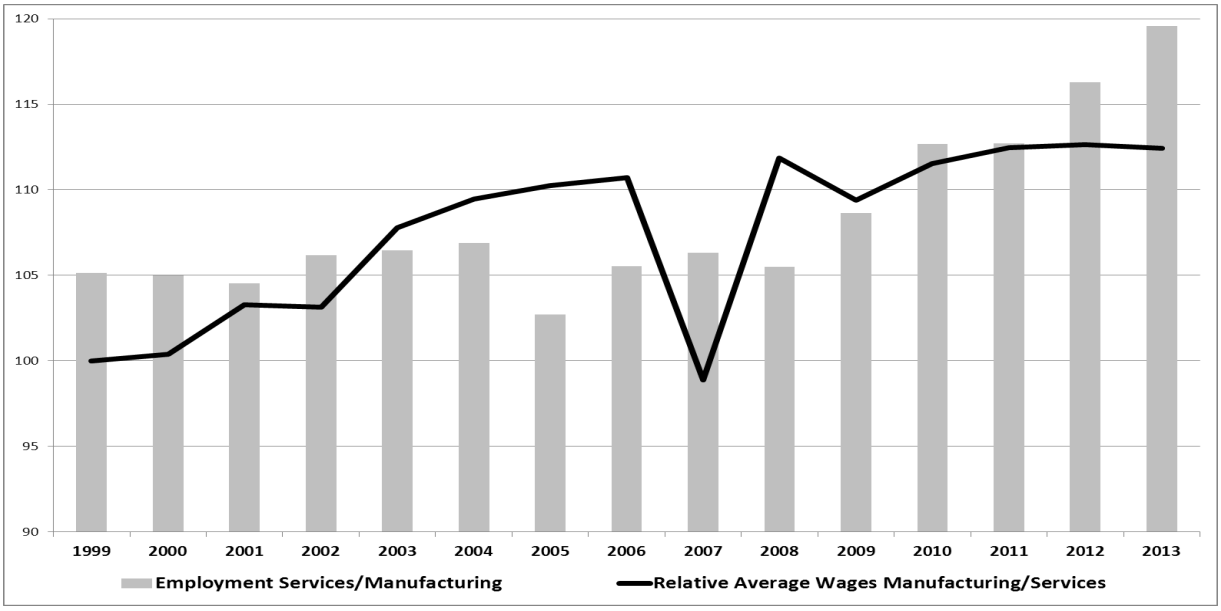

Figure 8 – Employment Ratio (Services/Manufacturing) and Relative Average Labor Compensations (Manufacturing/Services) (December 1998 = 100) - Source: Brazilian Institute of Geography and Statistics (IBGE) – Monthly Employment Survey – past methodology, and Ministry of Labor and Employment (MTE).

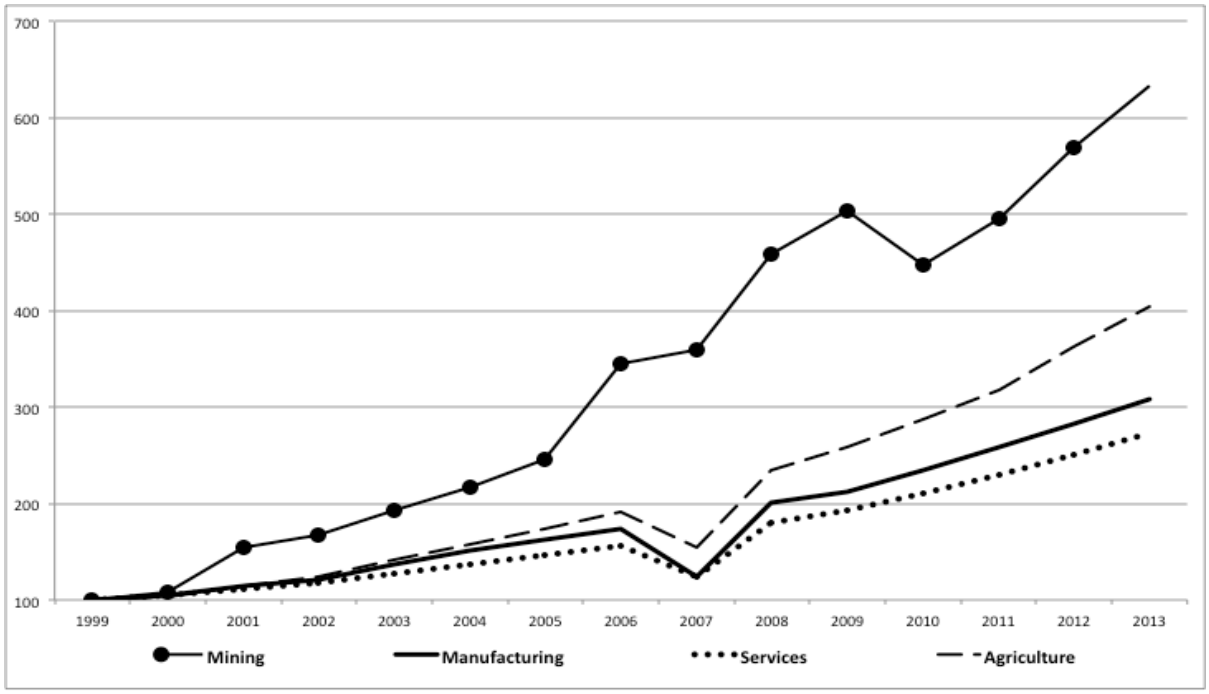

Figure 9 - Average Labor Compensations – By Sector (*author's own calculations*). Source: Brazilian Ministry of Labor and Employment (CAGED-MTE).

Moreover, the presence of hidden unemployment imposes qualitative restrictions on the nature of newly created job opportunities. Thus a greater share of the labor force is pushed onto tasks characterized by lower productivity and lower job security - at least, when it is compared to industrial-sector economies of scale. Figure 9 portrays the primary-sector-oriented labor market with soaring labor remunerations in extractive and agricultural sectors. However, even with highly mechanized productive apparatuses, those engaged in these

sectors still endure precarious labor conditions and high job insecurity.[18] Table 2 builds further on this job allocation pattern. Note that non-registered labor reaped an increase of 200% in average real earnings from September 2001 to December 2013, with both registered and self-employed lagged behind changes in average earnings perceived by overall occupied people. Non-registered labor is connected to temporary contracts (which may involve both skilled and unskilled labor) and underemployment (such as house maids, retails sales persons, private security personnel and so forth).

Occupied Workers	Registered	Nonregistered	Self-employed	Private Sector	Public Sector
132%	124%	200%	99%	148%	175%

Table 2 – Accumulated Change in Real Average Earnings, sorted by type of labor contract and by sector (private or public), from September 2001 to December 2013. Source: Author's calculations based on the Monthly Employment Survey (new methodology) - Brazilian Institute of Geography and Statistics (IBGE).

In sum, there are two baseline supply-side upward pressures lurking beneath Brazilian inflation, namely, the large effect that deindustrialization-fueled services inflation exert over the price index and the self-sustaining pressure arising from the State-managed price changes. Both have an auto-regressive component built in their price setting behaviors. This downwardly rigid price behavior is explained by the widespread indexation that runs rampant in the economy, as stated previously, which can be either formally stated in contracts or informally practiced by backward-looking price-setters. Adding harm to foul, the public utilities companies (termed in "State-supervised prices" in Figure 7) present pricing strategies that, given their upstream location in the price structure and the infrastructural nature of their activity, tend to impose a floor to price adjustments by firms positioned downstream in the production process. This is a however a slow-moving phenomena. Its effects take time to be captured by the array of economic indicators that inform economic policy and, given that conventional theory to a large extent establishes what is to be measured and how to interpret the data, this underlying chain of causation tends to go unnoticed.

Concluding remarks

Our paper ties the de-industrializing trend of the Brazilian economy to the emergence of a lower bound to inflation rates. Two primary pressures were analyzed, namely: the increase in

[18] Agricultural workers are usually sub-contracted and not formally employed, due to the highly seasonal nature of agricultural production. Therefore, employment in this sector oscillates sharply throughout the year, an indication of poor job security.

the tertiary sector´s share of total value added in aggregate output and its relationship to exchange rate variations and the new regulatory environment that leads privatized public utilities companies to price rises above inflation rates. This was done by way of an inflation accounting framework spelling the aspects worthy of note, and by a simple two-sector model that divided the economy in tradable and non-tradable sectors. In such a scheme, long-term forces affecting the composition of both supply and demand were considered, which include the structural changes undergone by the Brazilian economy shortly before and following the Real plan. We made the case that Brazilian inflation presents downward inflexibility due, amongst other causes, to a de-industrialization process, which has been enhanced by exchange rate volatility.

Our preliminary analytical results provide a valuable insight into Brazilian inflation's recent history based on primary pressures arising from relative price changes. At least two interconnected channels of transmission become active under an appreciating domestic currency, namely: (1) a furthering of deindustrialization (which takes a toll on the economy's productivity) and thereby, (2) the impairment of medium- and long-term engines of economic growth via substitution of imports for domestic output. Manufacturing sector faces growing distress, for productivity increases are not sufficient to offset labor costs increases, while profit margins are squeezed due to exchange rate appreciation. Besides, the forces that slow down the manufacturing sector (falling exchange rate) leave the non-tradable-goods-producing sectors fairly free to adjust prices upwards. An increase in labor costs then aggravates the burden of adjustment forced upon the industrial sector as a result of an appreciation of the domestic currency.

In a nutshell, the disinflationary effects of an appreciated currency are impaired by the sluggish productivity growth of the non-tradable sectors, as a reaction to the diminishing share of manufacturing in total employment and output. As a consequence, non-tradable goods and services become more prominent in the economy. Since these sectors are to a large extent protected from external competition, their prices are less flexible and thus more prone to downward rigidity in the face of shortages of demand. In turn, a less-than-fully-adjusting relative price structure exerts primary pressures on average price levels, thereby sustaining inflation rates, in the absence of unanticipated shocks. Therefore, an oscillating exchange rate alternates inflationary rises transmitted by tradable goods (under depreciation) and non-disinflationary results (under appreciation), hence the exchange-rate-fueled inflation persistence.

We concluded our story with allusion to State-supervised prices, which have gone over a cycle of inflation-outpacing behavior. Not only an index-linking practice was in effect –which by itself would ingrain inertia into the memory of the price system – sectors overseen by the new regulatory agencies managed to reap a larger piece of the income pie, by adding a varying markup over the headline CPI inflation trend. This forward-looking behavior acted as a lever on the lower bound imposed on inflation rates.

Our intent was to provide both some evidence and a rationale for the interplay of these structural forces, in order to tell a different story about inflation, one that singles out the inflexibility of the price structure. The argument is couched on a long-standing Latin American structuralists' claim that the imbalance between the composition of demand and that of supply combined with the failure of the price system to fully adjust to structural changes – especially downwards – tends to excite distributional conflicts among economic groups – however defined -, thereby making inflation the promptest – albeit not the only - way to restore consistency to the economic system. The reason why inflation is a recurrent adjusting variable should not be solely construed as the favorite policy "choice variable" of an inflation-tolerant government. Although there might be more than occasional truth to this statement when it comes to Latin America, inflation persistence in Brazil has also to do with an entrenched inflationary memory in society's institutions, reflected most clearly on the persistence of indexation practices, even after disinflation.

Therefore, in the context of partially institutionalized backward-looking price-setting behavior, the institutional changes that followed disinflation and the ensuing structural reforms on the recent history of Latin America have both altered the terms and the nature of the underlying conflicts that sustain inflation, requiring sharper changes in monetary policy in order to counteract these forces. If these structural pressures are found to be significant, a sizeable portion of structural inflation inertia and persistence remain unexplained by conventional demand-pull inflation models for their untrammeled reliance on expectations as an explanatory device (see Roache 2013).[19] Moreover, monetary policy informed by these models' conclusions is likely to impose higher costs to disinflation and stabilization measures when applied to different institutional schemes, such as in Brazil (see Segura-Ubiergo 2012).

[19] Quoting Roache at some length: "In almost all cases, including Brazil, downward persistence does not exhibit any clear trend and is not statistically significant. This strongly suggests that **inflation persistence is typically asymmetric and biased to the upside and this is where the hard-won gains in credibility from inflation targeting come from**" (Roache, 2013, p. 19 – Inflation Persistence in Brazil – IMF WP 14/55)

Further, if monetary policy is not neutral in its effects, inflation targeting monetary policy may instill further instability in the output-price dynamics, rendering its measures ever more ineffective. One of them is slightly touched upon by the foregoing analysis, namely: interest rate increases attempting to curb inflation by way of currency appreciation may be partly self-defeating. However, several other issues can be raised as to the neutrality of an interest-rate based policy, but we did not pursue them here.

A second topic this paper sidestepped concerns the role income distribution plays in inflation trends. We believe this to be crucial in the Brazilian case. The fast-paced process of policy-guided income distribution accounts for an important propagating mechanism of underlying pressures. Distributive patterns resulted largely from three different effects: (1) the wealth and income effects associated with lasting disinflation; (2) full-blown redistributive policies (such as the federal conditional cash-transfer program Bolsa Família, amongst several other grants provided by the government, not to mention systematic and increasing expenditures in healthcare, education and social security, and the minimum wage and index-linking of overall wages); and (3) an international commodity price inflation that fostered a foreign currency bonanza along from 2003 until 2008, when the financial crisis broke out. The combination of rising incomes in the bottom brackets of the distribution schedule with an appreciated exchange rate has shifted the bulk of newly created aggregate demand onto services, decreasing the share of household expenditures in both agricultural and manufactured products, which suggests the occurrence of a variant of Engel's law in Brazil. However, there is still scant empirical evidence in support of such claim, although the massive income redistribution, bolstered by a downward trend in real exchange rates, was accompanied by a sustained increase in the growth rate of output in the services sector. This latter's importance in our inflation story is beyond dispute, but it deserves by itself greater attention than the one permitted by the narrow limits of a paper and shall be pursued in future endeavors.

Finally, the foregoing evidence further suggests that the interpretation of structural inflation patterns in the post-Real plan period is not only very fruitful but is likely to be extended to other experiences as well. Further research in this area will provide greater support for the view that inflation is tightly connected to development issues and not only to, albeit important, central banking good practices.

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