**Measuring the Profit Rate at Historical and Current Costs in a High Inflation Context**

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ABSTRACT

A debate in Marxist literature concerns to the methodology for measuring the profit rate at historical and current costs. This paper investigates this question looking at the Brazilian case, a country with medium to high inflation, in the 1955-2008 period. The results support that the historical price method to compute the profit rate is inconsistent with the Brazilian economic history. The inflation rate determines the cyclical movements and the trend of the profit rate at historical prices. It increases in years of rising inflation and declines in years of falling inflation. The path of the profit rate, measured at current prices, remains unaffected by the inflation rate. The findings underscore the importance of measuring the profit rate at current prices.

Keywords: profit rate, capital stock, Brazil

JEL Codes: E01, B51.

RESUMO

Um debate atual na literatura marxista diz respeito à metodologia de cálculo da taxa de lucro a preços correntes ou a preços constantes. O presente artigo investiga esta questão examinando o caso brasileiro no período 1955-2008. Os resultados mostram que a taxa de lucro medida a preços históricos é inconsistente com a história econômica brasileira. A taxa de inflação determina o movimento cíclico e a tendência da taxa de lucro calculada a preços históricos, ela aumenta nos anos de aceleração da taxa de inflação e cai nos anos de queda da taxa de inflação. A trajetória da taxa de lucro medida a preços correntes não é afetada pela taxa de inflação. Os resultados mostram à relevância de medir a taxa de lucro a preços correntes.

Palavras chaves: taxa de lucro, estoque de capital, Brasil

JEL Codes: E01, B51.

Área Anpec: Economia Política

**1. Introduction**

The debate about the causes of the structural crisis of 2008 has provoked a controversy over the methodology of measurement of the profit rate. The scholars associated with the temporal single system (TSS) interpretation of the Marxian theory of value pointed out that the profit rate must be measured at historical costs. Among these are Kliman (2011) and Freeman (2009). This conception contrasts with the larger group of scholar who computes the profit rate at historical costs. Members of this group include Weisskopf (1979), Bowles, Gordon and Weisskopf (1986), Dúmenil and Lévy (1993, 2011) and Bakir and Campbell (2009).

The central difference between both groups is in their measurement of capital stock employed to estimate the profit rate. It is calculated as the ratio between profits (flux variable) and net fixed capital (stock variable). The scholars associated with TSS suggest that net fixed capital stock must be measured at historical prices, the capital goods are valued at acquisition prices. In contrast, the other larger group recommends that capital stock must be measured with current prices, the capital goods are valued at current year prices.

Basu (2013) highlights the existence of a threshold rate of change in the price of capital goods that constantly maintains the difference between the historical and current stocks of fixed capital. He calculated the profit rates for the US economy using the two methods and found similar trends in the profit rate at historical and current costs. Roberts (2009) found similar results in the US and England. Both measures would be equal if the prices were constant over time.

This paper estimates the profit rate for Brazil, a country with high and persitent inflation, in the 1955-2008 period, using historical and current costs. The GDP price deflator increased at 64.7% annually beweent 1955 and 2008. Moreover, the country experienced years of raising and declining inflation. The highest annual rate of inflation was 2737% in 1990 and the lowest was 4.2% in 1998. The Brazilian case helps to illuminate the debate over the measurement of the profit rate at historical and current costs.

The results reveal that the inflation rate dominates the cyclical movements and the trend of the profit rate and the output capital ratio measured at historical costs. The evolution of the profit rate at historical costs was at odds with the fundamental economic and political events of the Brazilian economy over the period of study.

This paper is organized as follows. Section two presents a method to estimate the capital stock at constant, current and historical costs and provides a discussion about the effects of the inflation rate in the measurements of the profit rate and the output capital ratio at historical and current costs. Section three depicts a brief background of the GDP growth and the inflation rate in Brazil. Section four investigate the evolution of the profit rate and the capital output ratio at historical and current costs in the 1955-2008 period. Section five concludes with a summary of the main results.

**2. Measuring the rate of profit at historical and current costs**

In the Marxian tradition, the profit is the driving force of capitalism. Money capital is advanced in order to produce more money, that is, profit. The profit rate captures the degree of valorization of the total capital advanced and the velocity in which capital expands. It plays a central role in the dynamics of the capitalist system, regulating the processes of accumulation, technical change and distribution, capitalist competition, and the degree of capacity utilization with which firms operate. Moreover, the profit rate represents a key variable for analyzing capitalism’s long-term tendencies.

The profit rate is computed by the ratio of total profits generated during a period of time (flow variable) with total advanced capital (stock variable). This broad definition of the profit rate is denominated by Duménil and Lévy (1993) as the profit rate *à la* Marx. The profit rate is calculated as:

 (1)

Where *Z* denotes the total profits and *K* is a measure of the nonresidential fixed capital stock. In order to better understand its determinants, it is useful to decompose the profit rate as:

 (2)

where *X* is the output at current prices. The profit share*, π*, a proxy for the rate of surplus value, reflects the effects of income distribution between capital and labor on the profit rate, whereas output-capital ratio, *ρ*, a proxy for the organic composition of capital, mirrors the effects of technology. This idea resembles Marx’s (1981) analysis of the profit rate in terms of distribution and technology.

The profit rate, when the nonresidential capital stock is measured at historical cost, is expressed by:

 (3)

The profit rate, when the nonresidential capital stock is measured at currents prices, is calculated by:

 (4)

The perpetual inventory method (PIM) is a common method of computing the nonresidential capital stock. The PIM estimates that the net capital stock consists of cumulating investment flows, deducting the depreciation and asset retirement. OECD (2001, 2009) discusses the statistical procedures to measure the capital stock in many developed countries.

The nonresidential capital stock by the end of the period can be computed as:

 (5)

where *I* is the gross fixed capital formation and *D* is the consumption of fixed capital. By successively inserting *Kt-1* in the above expression, it is written as (Todsen, 1997):

 (6)

where *d* is the depreciation function, *s* the age of the asset and *L* themaximum life of the asset.

The capital assets can be value at historical prices, the assets are valued at their acquisition prices, current prices, the assets are valued at the prices of the current year, and at constant prices, the assets are value at prices of a seleted year. At constant prices, the nonresidential capital stock is computed by

. (7)

At current prices, it is measured by

. (8)

At historical cost, it is calculated by:

. (9)

where *η* is the inflation rate in the capital goods.

The fundamental difference in the computation of the profit rate is the measurement of the nonresidential capital stock at historical or at current prices. Therefore, it is important to consider that:

. (10)

There are three cases to consider . First, if the inflation rate is positive, then the nonresidential capital stock at current prices is greater than its value at historical prices and . Second, if the infation rate is negative, the nonresidential capital stock valued at current price is lower than its value at historical prices and . Third, if the prices of the capital goods are constant, the inflation rate is equal to zero, both measures of the nonresidential capital stock are equal and .

In an interesting paper, Basu (2013) discusses the percentage difference between current cost and historical cost measures of the profit rate over time. Following Basu (2013, p. 297), the analisys shows under what condition the percentual change in the profit rate measured at current cost is equal to the profit rate at historical costs. Both measures will be equal when:

 → . (11)

The percentage change in the profit rate measured at historical cost is equal to the percentage change in the profit rate at current prices when the inflation rate in the capital goods in the first and in the last periods are equal. If the inflation rate is rising, the percentage change in the profit rate measured at historical prices increases faster than the percentage change in the profit rate at current prices. The opposite happens if the inflation rate is declining. Therefore, the inflation rate in the capital goods has a fundamental effect over the relative differences between the measures of the profit rate.

Another important aspect is the effect of inflation in the path of the profit rate. Writing the equations (3) and (4) in growth rates:

 (12)

 (13)

The trajectory of the profit rate depends on the evolution of income distribution between profits and wages and on the growth rate of output-capital ratio. Under the hypothesis that the distribution of income is constant,, which corresponds to a constant rate of surplus value, the trajectory of output-capital ratio determines the path of the profit rate. For historical prices, the output-capital ratio is expressed by:

 (14)

where *pX* denotes the price deflator and *XR* the real output. In terms of growth rates, (14) is written as:



 (15)

Thus, the output-capital ratio at historical prices rises with the inflation in the output deflator and the expansion in real output and falls with the accumulation of capital at historical cost. Inflation plays a key role in the growth of the output-capital ratio measured at historical cost. If the inflation rate is expanding, the output-capital ratio measured at historical cost will increase if the price of output relative to the price of capital goods remains constant, ,and for some cases in which there is a fall in the relative price,.

The output-capital ratio at current prices is calculated by:

 (16)

where *pR* is the price of output relative to the price of capital goods. Expressing (16) in growth rates:

 (17)

Therefore, the output capital ratio at current prices rises whenever the price of output in relation to the price of capital,,increases; the real output expands and growth rate of nonresidential capital stock at constant prices declines.

**3. An overview of output and inflation in Brazil**

The history of the Brazilian economy might be summed up by an analysis of three interconnected variables: output growth, inflation rate and profit rate. In this paper, we briefly investigate the evolution of the inflation rate and the output, examining the profit rate in the next section.

After the Second World War, we can highlight three phases in the Brazilian economy: the import substitution industrialization (ISI) up to the late 1970s, the neoliberal era, during the 1980s and 1990s, and a combination of elements of these models with greater social inclusion after 2003.

As expected, these phases combine different historical record on output and inflation. The 1950s to early 1970s was a period of high economic growth with moderate and rising inflation; the 1980s and early 1990s combined a high inflation with a reduced economy growth; the middle 1990s to early 2000s was associated with low inflation and diminished economic growth. After 2003, the low inflation was accompanied by a moderate expansion in the growth rate.

During the ISI, the industrial sector drove the economic growth. The GDP expanded at 7.3%, while the industry increased its share of GDP from 26.3% in 1953 to 44.1% in 1980. There were two economic booms, followed by rising in inflation. The first one was from 1955 to 1960, when Brazil went through a rapid industrialization process. Led by the expansion of the consumer durable and capital goods sectors, the GDP expanded at an annual compound growth rate of 7.7% between 1953 and 1962. The inflation rate, whose average was 17% in the 1950s, rose from 25.6% in 1960 to 89.5% in 1964.

The high inflation rate was one of the excuses for the military coup in 1964 that overthrew the popular government, reaffirming the capitalist class power. After launching a stabilization program to control inflation, a series of institutional reforms were implemented that reshaped the financial markets, the tax system and the labor markets. The second economic boom from 1968 to 1973 represented the economic apex of the military dictatorship. During the Economic Miracle, as this period is known, the annual compound growth rate of GDP was 10.6% and manufacturing expanded at 14%. The average inflation rate was 21.9% in that period.

With the crisis of the Golden Age and first oil shock in 1973, the ISI model showed its limits. The military dictatorship answered the international crisis implementing the Second National Plan of Development that aimed to extend ISI to intermediary goods and to greatly expand energy production. The investment boom was led by state enterprises and was financed by massive foreign loans through recycling of petrodollars. The external debt rose from US$ 14.9 billions in 1973 to US$ 55.8 billions in 1980.

Despite the decline of the Brazilian average growth rate after 1973, its performance was still strong. For the period 1973-80, the GDP annual average rate of growth was 6.6%. Perhaps, the most obvious sign of the crisis was the acceleration of the inflation which rose from 29.6% in 1973 to 92.1% in 1980.

In the early 1980s, Brazil embarked on a process of reforming their institutional framework in order to build up the neoliberal one. In the 1980s, the debt crises lead to economic instability, with the country displaying reduced economic growth and intense inflationary problems. Brazil started its economic liberalization program during the mid-1980s. The average annual growth rate of GDP was 2.2% during the 1980. The “lost decade” combined inflationary pressures with stagnant growth.

Several economic plans were designed to fight inflation. None of them succeeded in the task. The inflation rate went from 82.1% in1980 to 248.5% in 1985, peaking at 2,736.9% in 1990. In the early 1990s, Brazil fully embraced the neoliberal model. In 1993, the inflation rate was 1,996%. A new plan, known as the Real Plan, was designed to contain the inflationary process. The plan consisted of two parts. First, a new currency, the Real, linked to the dollar was adopted and a set of short term economic policies were implemented to fight inflation. Second, neoliberal reforms were implemented to spur growth. The inflation rate dropped to 77.6% in 1995, achieving 7.64% in 1997. The Real Plan was a success in controlling inflation and a failure in reviving economic growth. The GDP rose 1.8% per year between 1989 and 2003.

After 2003, fueled by international demand for commodities and changes in the economic policy there was a rise in the GDP growth rate. It expanded at 4% between 2003 and 2008. The inflation rate was under control. The new economic strategy combined a rise in public investment and in the real wage with a high real interest rate, displaying elements of a developing model with a neoliberal one. Table 1 summarizes the GDP growth rate in the period of study.

Table 1. Brazilian GDP annual growth rate (%), 1953-2008

(compound annual growth rate)

|  |  |
| --- | --- |
| Period | gX |
| 1955-2008 | 4.90 |
| 1955-1973 | 7.44 |
| 1955-1962 | 7.64 |
| 1962-1973 | 7.30 |
| 1973-1989 | 4.45 |
| 1973-1980 | 6.81 |
| 1980-1989 | 2.62 |
| 1989-2003 | 2.21 |
| 1989-1994 | 2.19 |
| 1994-2003 | 2.23 |
| 2003-2008 | 4.70 |

Source: Appendix

**4. Profit rate at historical and current costs in Brazil**

Figure 1 exhibits the profit rate at historical and current costs and the inflation rate over the period 1955-2008. As expected, the profit rate at historical costs is higher than at current costs. The difference between them rises with a higher inflation rate and declines with a lower inflation rate.

Both series declined in the long term perspective. In 2008, the profit rate at historical costs represented 28.9%, and the profit rate at historical cost represented 31.4% of their 1955 levels. The percentual change in the profit rate at historical costs is higher than at historical costs since the inflation rate in capital goods in the 2000s is smaller than in the 1950s.

The downward trend in the series occurred in distinct periods of time. This trend of the profit rate at historical costs was relatively flat between 1955 and the early 1990s, declining sharply after 1994, when inflation was controlled by the Real Plan. The trend of the profit rate at historical costs declined up to the late 1980s, when it slowly started to increase.



**Figure 1**. The profit rate at historical and current costs and the inflation rate, Brazil, 1955-2008

Source: Appendix

The profit rate at historical costs has a much higher variance than at current costs. The cycles displayed by the profit rate at historical costs suggests a strong correlation with the periods of raising and declining inflation in the Brazilian economy. In the 1950s, the profit rate at historical costs fell, expanding rapidly in the early 1960s, reaching its highest level in 1965. It then declined from the mid-1960s to the late 1970s. The profit rate at historical costs boomed during the “lost decade” and the early 1990s, the period of high inflation. After the control of the inflationary process in 1994, the profit rate at historical costs fell sharply until the late 1990s, showing a smooth decrease in the 2000s.

It is very difficult, if not impossible from a Marxian perspective to employ the profit rate at historical costs to understand key events of the Brazilian economic history. For instance, the military coup in 1964 and the adherence to neoliberalism in the early 1990s would have happened in periods of thriving profit rate. Moreover, the institutional changes in both cases resulted in declining profitability. In countries with a history of chronic inflation, like Brazil, the use of the profit rate at historical prices may produce inadequate results.

The profit rate at historical costs has four main phases. It declined between 1955 and the early 1960s, stabilized between 1963 and 1973, fell rapidly between 1973 and the late 1980s, and rose moderately from the early 1990s to 2008. The military coup and the adoption of neoliberalism occurred during periods of declining profitability and the institutional changes they promoted were able to stabilize or raise the profit rate. It is possible to understand the main economic and political events that shaded the Brazilian economy over the last decades with the profit rate at current costs.

**4.1. The decomposition of the profit rate at historical costs**

This section discusses the determinants of the profit rate at historical costs through its decomposition in the output capital ratio at historical costs and the profit share. There are two important results in Table 2. Firstly, the output capital at historical prices drove the profit rate. Between 1955 and 2008 the profit rate at historical costs declined 2.19% per year, while the output capital ratio at historical costs fell 2.21% per year. Secondly, the profit share expanded 0.03% per year in the period of study, playing a smaller role in the movements of the profit rate at historical costs.

Table 2. Decomposition of the profit rate at historical costs, Brazil, 1955-2008

(compound annual growth rate)

|  |  |  |  |
| --- | --- | --- | --- |
| Period | rH | ρH | π |
| 1955-2008 | -2.19 | -2.21 | 0.03 |
| 1955-1973 | -0.53 | -0.75 | 0.22 |
| 1955-1962 | 2.96 | 2.52 | 0.43 |
| 1962-1973 | -2.75 | -2.84 | 0.09 |
| 1973-1989 | 1.34 | 1.82 | -0.48 |
| 1973-1980 | -1.02 | -0.93 | -0.08 |
| 1980-1989 | 3.17 | 3.96 | -0.79 |
| 1989-2003 | -7.67 | -8.31 | 0.65 |
| 1989-1994 | 6.03 | 5.87 | 0.16 |
| 1994-2003 | -15.27 | -16.19 | 0.91 |
| 2003-2008 | -4.07 | -3.30 | -0.77 |

Source: Appendix

Table 3 displays the decomposition of the output capital ratio into inflation rate, real GDP growth rate and capital accumulation at historical costs. The inflation rate and capital accumulation at historical costs were the main determinant variables of the output capital ratio at historical costs. The real GDP growth rate had a minor role in the definition of the output capital ratio at historical costs, particularly after 1980.

Table 3. Decomposition of the output-capital ratio at historical prices, Brazil, 1955-2008 (compound annual growth rate)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Period | ρH | ηX | XR | KH |
| 1955-2008 | -2.21 | 64.66 | 4.90 | 71.77 |
| 1955-1973 | -0.75 | 28.36 | 7.44 | 36.55 |
| 1955-1962 | 2.52 | 23.98 | 7.64 | 29.10 |
| 1962-1973 | -2.84 | 31.15 | 7.30 | 41.29 |
| 1973-1989 | 1.82 | 87.28 | 4.45 | 89.91 |
| 1973-1980 | -0.93 | 38.85 | 6.81 | 46.59 |
| 1980-1989 | 3.96 | 124.95 | 2.62 | 123.61 |
| 1989-2003 | -8.31 | 106.11 | 2.21 | 116.64 |
| 1989-1994 | 5.87 | 271.05 | 2.19 | 267.37 |
| 1994-2003 | -16.19 | 14.48 | 2.23 | 32.89 |
| 2003-2008 | -3.30 | 6.87 | 4.70 | 14.88 |

Source: Appendix





**Figure 2**. The output capital ratio at historical costs and the inflation rate, Brazil, 1955-2008

Source: Appendix

Figure 2 shows that the output capital ratio at historical costs is positively associated with the inflation rate. An important question is, under what conditions the movements of the output capital ratio at historical prices represents technical change. A positive answer for this question would be the case of constant prices. However, it is just a theoretical possibility. If the output capital ratio at historical prices represents technical change, then the question is why the inflation rate does not keep raising in the capitalist society.

**4.2. The decomposition of the profit rate at historical costs**

Table 4 shows the decomposition of the profit rate at historical costs in the period 1955-2008. It dropped 2.34% annually between 1953 and 2008. The time profile of the profit rate at historical costs does not present the same ups and downs of the rate of profit at historical costs. As before, the output-capital ratio determines the movements of the profit rate.

Table 4. Decomposition of the profit rate at historical costs, Brazil, 1955-2008

(compound annual growth rate)

|  |  |  |  |
| --- | --- | --- | --- |
| Period | rC | ρC | π |
| 1955-2008 | -2.34 | -2.37 | 0.03 |
| 1955-1973 | -1.46 | -1.68 | 0.22 |
| 1955-1962 | -4.14 | -4.57 | 0.43 |
| 1962-1973 | 0.24 | 0.15 | 0.09 |
| 1973-1989 | -8.09 | -7.61 | -0.48 |
| 1973-1980 | -7.67 | -7.59 | -0.08 |
| 1980-1989 | -8.41 | -7.62 | -0.79 |
| 1989-2003 | 1.81 | 1.16 | 0.65 |
| 1989-1994 | 2.97 | 2.81 | 0.16 |
| 1994-2003 | 1.16 | 0.25 | 0.91 |
| 2003-2008 | 1.3 | 2.07 | -0.77 |

Source: Appendix

Table 5 displays the decomposition of the capital output ratio at current costs. It rises with the relative prices and real GDP growth rate and declines with capital accumulation. From 1955 to 2008, capital productivity declined 2.37% per year. However, it displayed three phases. Firstly, it declined at 1.68% annually between 1955 and 1973; secondly, it fell sharply from 1973 to 1998; thirdly, it increased at 1.16% from 1989 to 2003 and 2.07% between 2003 and 2008.

Table 5. Decomposition of the output-capital ratio at current costs, Brazil, 1955-2008

(compoundannual growth rate)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Period | ρC | PR | XR | K |
| 1955-2008 | -2.37 | -0.9 | 4.9 | 6.37 |
| 1955-1973 | -1.68 | -0.5 | 7.44 | 8.62 |
| 1955-1962 | -4.57 | -3.26 | 7.64 | 8.95 |
| 1962-1973 | 0.15 | 1.26 | 7.3 | 8.41 |
| 1973-1989 | -7.61 | -3.84 | 4.45 | 8.22 |
| 1973-1980 | -7.59 | -1.97 | 6.81 | 12.43 |
| 1980-1989 | -7.62 | -5.3 | 2.62 | 4.95 |
| 1989-2003 | 1.16 | 1.53 | 2.21 | 2.58 |
| 1989-1994 | 2.81 | 3.1 | 2.19 | 2.48 |
| 1994-2003 | 0.25 | 0.66 | 2.23 | 2.64 |
| 2003-2008 | 2.07 | 0.28 | 4.7 | 2.91 |

Source: Appendix

Between 1955 and 1962, the rate of profit at current costs declined 4.24% annually due to a fall of 4.57% of the capital output ratio. These were the construction years of Brasília and the implementation of the automobile industry which is reflected in the expansion of 7.64% in GDP and 8.95% in the real net fixed capital stock.

The profit rate and output capital ratio at current costs increased between 1962 and 1973. The process of rapid capital accumulation was similar to the previous cycle; however, there was an expansion in the relative prices. The military dictatorship implemented a series of institutional reforms in the labor and financial markets to reduce inflation and to stimulate growth. The Brazilian Central Bank was inaugurated in 1964. The result was a rapid economic growth in late 1960s, early 1970s.

The end of the Golden Age in 1973 represented a turning point in the ISI in Brazil. During the implementation of massive investments of the Second National Plan of Development, the profit rate declined sharply due to falling output capital ratio. The impressive growth rate of the real net fixed capital stock was the predominant factor of this fall. The 1980-1989 years marked the end of the military dictatorship. The fall in the profit rate and in the output capital ratio was influenced by the rising prices of capital goods.

After 1989, the profit rate expanded due to rising output capital ratio. After the adoption of neoliberalism, the price of the capital goods declined relative to GDP deflator. In 1994 the inflation was controlled and the neoliberalism embarked on a new phase. The profit share increased at 0.91% per year. The expansion in the profit rate did not result in higher economic growth. It is a characteristic of neoliberalism. The average growth rate of net fixed capital stock in the 1989-2003 period was lower than in the lost decade.

During the 2003-2008 period the profit rate at historical costs increased due to the expansion in the output capital ratio; the profit share declined in these years. The rise in the real GDP was the principal component of the rising output capital ratio.

**5. Final remarks**

The paper discusses the methodology for measuring the profit rate at historical and current costs in Brazil, a country with a history of medium to high inflation in the 1955-2008 period. From a Marxian perspective, the path of the profit rate is fundamental to understand the performance of the capitalist economies.

Section two compares the computation of the net fixed capital stock at historical and current costs and the effects of the inflation rate over the path of the profit rate and the output capital ratio at historical and current costs. Section three summarizes the paths of the Brazilian GDP and inflation in the period of study. The Brazilian historical record on inflation is relevant to understand the effects of inflation in the measurement of the profit rate and this can shed light on the debate.

The results on section four support the measurement of the profit rate at historical costs. The path of the profit rate at historical costs is at odds with key events in Brazilian history. It declined in the first years of the military dictatorship, expanded in the lost decade, and fell during the neoliberal years. The main results of the paper can be summarized as:

1. The profit rate at historical costs was higher than at current costs;
2. The path of the output capital ratio determines the movements of the profit rate;
3. The profit rate and the output capital ratio at historical prices increase in the years of rising inflation and fall in the years of declining inflation;
4. The inflation rate affects not only the level of the profit rate and the output capital ratio at historical prices, but also their cyclical movements and their trends;
5. The output capital ratio at historical costs represents the technological variable under very stringent theoretical conditions;
6. The path of the profit rate measured at current prices is not affected by the inflation rate. The profit rate at historical prices allows an accurate measurement of the profit rate in the context of high inflation, functioning as the central variable in understanding the dynamics of capitalism in developing economies.

**6. References**

Basu, D. 2013. Replacement versus Historical Cost Profit Rates: What is the difference? When does it matter?"*Metroeconomica*, v. 64, n. 2, p. 293–318.

Bakir, E., and A. Campbell. 2010. Neoliberalism, the Rate of Profit and the Rate of Accumulation. *Science & Society*, v. 74, n. 3, p. 323-342.

Bowles, Gordon and Weisskopf (1986).Power and Profits: The Social Structure

of Accumulation and the Profitability of the Postwar U.S. Economy,*Review of Radical Political Economics*, v. 16, n. 1 & 2, p. 132-167.

Duménil, G., and D. Lévy. 1993. *The economics of the profit rate*: competition, crises and historical tendencies in capitalism. Aldershot: Edward Elgar.

Duménil, G., and D. Lévy. 2011. *The Crisis of Neoliberalism*. Cambridge: Harvard University Press.

**Heston, A., R.Summers, and B. Aten. 2006. *Penn World Table Version 6.2*. Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.Available in:**http://pwt.econ.upenn.edu8. Downloaded: 3/2/2008.

IBGE. 1990. *Estatísticas Históricas do Brasil*: séries econômicas, demográficas e sociais de 1550 a 1988. Rio de Janeiro: IBGE.

IBGE. 2003. *Estatísticas do Século XX*. Rio de Janeiro: IBGE. CD-Room.

IBGE. 2010. *Sistema de Contas Nacionais – Brasil 2004/2008*. Rio de Janeiro: IBGE. CD-Room.

Kliman, A. 2011.*The failure of capitalist production:*underlying causes of the great recession. London: Pluto Press.

Marquetti, A. 2000. Estimativa do estoque de riqueza tangível no Brasil, 1950-1998. *Nova Economia*, v. 10, n. 2, p. 11-38.

Marx. K. 1981. Capital: a critique of political economy. Volume III.Harmondsworth: Penguin.

OECD. 2001. *Measuring Capital:* A Manual on the Measurement of Capital Stocks, Consumption of Fixed Capital and Capital Services. Paris: OECD.

# OECD. 2009. *Measuring Capital*: OECD Manual 2009, Second Edition. Paris: OECD.

Roberts, M. 2009. *The Great Recession*: profit cycles, economic crisis - a Marxist view

**Available in:** <archive.org/details/TheGreatRecession. ProfitCyclesEconomicCrisisAMarxistView>, Downloaded: 5/3/2015.

Todsen, S. 1997. Capital stock and consumption of fixed capital in the Norwegian national accounts.*Economic Survey,* v. 4, p. 38-43.

Weisskopf, T. 1979. Marxian crisis theory and the rate of profit in the postwar US economy.*Cambridge Journal of Economics*, v. 3, n. 4, p. 341-78.

**Appendix**

This appendix presents the information sources and procedures used to build the database employed in this article. The main difficulty in conducting long-term empirical studies of the Brazilian economy is to find a consistent way of organizing information. National accounts began to be published in Brazil in 1947. The last major methodological change in the System of National Accounts took place with the publication of Sistema de ContasNacionais – Brasil, Referência 2000. The alterations were made to bring it more into line with the System of National Accounts 1993. In the future, there will have to be further amendments to adapt the country’s national accounts to the System of NationalAccounts 2008.

The data for real GDP and the GDP deflator were obtained from IBGE (1990) and IBGE (2003) for the 1952-1985 period. The data for 1995-2008 was taken from IBGE (2010). Owing to changes in methodology, 1995 GDP is 8.84% greater in IBGE (2010) than in IBGE (2003). The data for 1986-1994 was calculated by taking real GDP growth rates from IBGE (2003) and increasing them by distributing that 8.84% over the period. Thus, the data source for real GDP is IBGE (2003) for 1985 and IBGE (2010) for 1995. The differences between the series were adjusted right across the 1986-1994 period. A similar procedure was used for the other variables. The number of workers for the 1995-2008 period were calculated from IBGE (2010). Census year data was also taken from IBGE (1990). The information needed to complete the years without data was taken from Heston, Summers and Atten (2006). It should be noted that IBGE (2003) gives the number of workers for the years from 1990 to 1995.

Worker´s wage and wage share data for 1995-2008 were taken from IBGE (2010) and, in the case of census years, from IBGE (2010). Mixed income is divided into two parts, with one being added to wages and the other to the operating surplus. In the years for which no information was available, the average wage was estimated econometrically. The net stock of non-residential fixed capital was estimated using the perpetual inventory method. The source of information on gross fixed capital formation was IBGE (2003) from 1947 to 1985 and IBGE (2010) from 1995 to 2008. To connect the two series, a procedure similar to the one used to calculate GDP was employed for the years from 1986 to 1994. The data source for the years prior to 1947 is Marquetti (2000). The perpetual inventory method employed in this study is similar to the one used by the Bureau of Economic Analysis. The rate of depreciation is calculated as R / T, where R is the rate at which an asset value declines and T is the lifespan of the asset. There are two main differences with the methodology of the Bureau of Economic Analysis. First, R is taken as being equal to 2, in line with the double declining balance depreciation method. Second, the asset is withdrawn when it reaches its average lifespan. Because of the enormous differences in gross capital formation in machinery and equipment and non-residential building between IBGE (2003) and IBGE (2010), the capital goods category consists of just one asset. The working life of this asset is 30 years. Fixed capital consumption is measured as the sum of the net fixed capital stock and gross fixed capital formation at the start of the period, minus the net fixed capital stock at the end of the period