From a Miracle to a Disaster: the Brazilian Economy in the last 3 decades

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Arlton Teixeira§

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Abstract

In this paper we ask if the Cass-Koopmans model can account for the behavior of the Brazilian economy from 1970 to 1998. We divide this period in two subperiods. In the first one, the 70s, the GDP per capita grew at 5.05% a year. In contrast with GDP per capita TFP grows only until 1974, declining in the rest of the decade. After 1974 the growth rate of GDP per capita was sustained through an increasing investment share of GDP due to the increment in the public (government plus state owned enterprise) and in the private investment. To increase private investment with a declining $TFP$, government subsidies to the private sector goes from 1% of GDP to 4% in the second half of the 70s. In the second subperiod, the 80s and 90s, $TFP$ as well as GDP per capita decrease until 1993, increasing since. Here we also find in the second half of the 80s that investment share is increasing while $TFP$ is decreasing. In this second case it goes up mainly as a result of the increment of relative price of capital. Once the investment series is adjust for this government behavior as well as the relative price changes, the neoclassical theory is able to fairly describe the investment behavior, hence the dynamics of the Brazilian economy during the period under study.

1 Introduction

The performance of the Brazilian economy in the post war II can be clearly divided in two subperiods. In the first one, that ends in the beginning of the 80s,
Brazil was one of the fastest growing economies (see Figure 1). In the second one, that starts in the beginning of the 80s, the Brazilian economy started a depression that lasted until 1993 (See Bugarin et al (2002)).

In this paper we study the Brazilian economy from 1970 until 1998 thorough the lens of the Cass-Koopmans model. We ask if the performance of the Brazilian economy could be explained by the behavior of the technological progress measured by the growth rate of the Total Factor Productivity ($TFP$ henceforth) (Cole and Ohanian (2004), Kehoe and Prescott (2002), Prescott (2002) and the special issue of Review Of Economic Dynamics (2002)).

![Figure 1: Brazilian GDP Per Working Age Relative to the US (in %)](image)

Our main results are the following. In the first sub period the Brazilian economy grows during the whole time. But the engine of growth changes. From 1970 until 1974 the engine of growth is $TFP$. From 1974 until 1979 $TFP$ decreases but the economy grows due to the increment in the capital stock, driven by an increment in public (government plus state owned enterprise) and private investment.

Even though the Brazilian GDP per working age grew on average at 5.05% in the 70s, $TFP$ stopped growing in 1974, decreasing in the rest of this decade. To sustain the growth rate without technological progress, the government increased the investment share of the GDP from 20% to 26% of the GDP in the first half of the 70s to 26% to 32% in the second half. This increment was planned and
implemented by the government with the II National Development Plan.\footnote{See Geisel (1974), Gaspari (2004) and Malan and Bonelli (1977).} The increment of the investment share was done directly through the increment of the public investment (government plus stated owned enterprize) and, indirectly, subsidizing private investment (see Figures 8-9). Total government subsidy to the private sector went from 1% to 4% of GDP in the 70s. Due to the government behavior in the 70s our conclusion is that the Cass-Koopmans model has to be adapted to account for the behavior of the Brazilian Economy.

In the second sub period, 1980-98, $TFP$ decreases until 1993 and then starts recovering. In this period the Cass-Koopmans model can reasonable well account for the behavior of the Brazilian economy. We should stress two points with respect to this subperiod. First, hours worked differs with respect to the model’s prediction. Particularly, after 1993 the model predicts that hours worked should start increasing, but it does not. In fact, it keeps decreasing until 1998. Second, price of structure relative to consumption goods has a sharp increase in the second half of the 80s. Our intuition for these facts are the following. First, the decline in hours worked per worker after $TFP$ has started increasing in 1993 is due to the new constitution of 1988 that reduced the work week from 48 to 44 and the increase of tax on labor input implemented by the government in the beginning of the 90s.\footnote{See Gonzaga, Menezes and Camargo (2003) for a more detailed analysis.} Second, the increment in the price of structure (mainly real state) can be explained by the increasing demand for risk free assets. In the second half of the 80s some stabilization plans recurrently changed the rules of the financial market. Besides, in 1989 we had a presidential election where many candidates defended the default of the public debt (that in fact took place in march of 1990). To protected themselves investors start buying real state.

This study is organized as follows. Section 2 presents the Cass-Koopmans model and computer simulations after calibrated the model using Brazilian data. Section 3 and 4 introduce changes in the in the benchmark case presented in Section 2 to adapt it to the Brazilian case. Section 5 concludes.

## 2 The Cass-Koopmans model and the Brazilian economy

In this section we will run computer simulations using a version of the Cass-Koopmans model. We follow the approach developed by Kehoe and Prescott (2002). Therefore data used to has been detrended, using the rate of technological progress of the US from 1930 to 2000 that is equal to 2%.

There is a representative agent with perfect foresight over the exogenous pro-
ductivity shocks to the economy. The utility function of the representative agent is given by

$$E\left\{ \sum_{t=0}^{\infty} [\beta(1 + \eta)]^t [\log(c_t) + \alpha \log(1 - h_t)] \right\}$$  \hspace{1cm} (1)$$

Where $c_t$ is consumption in period $t$, $h_t$ is the amount of time allocated by a consumer to market activities, $\eta$ is the growth rate of population and $\beta \in (0, 1)$. Since there is no distortion in our model economy the allocation found in the competitive equilibrium is similar to the allocation found by the solution of the planner’s problem. That is, to maximize Equation 1 subject to

$$c_t + k_{t+1} - (1 - \delta)k_t = z_t(1 + \gamma)(1 - \theta)t k_t \theta h_t^{1 - \theta}$$  \hspace{1cm} (2)$$

Where $\theta$ is the capital share and $z_t(1 + \gamma)(1 - \theta)t$ is the total factor productivity ($TFP$ henceforth). The $TFP$ can be separated in two parts. The first one is given as the growth rate and is given by $(1 + \gamma)(1 - \theta)t$. The second one $z_t$ is the productivity shock which law of motion is given by

$$z_{t+1} = 1 - \rho + \rho z_t + \epsilon_t$$  \hspace{1cm} (3)$$

$\epsilon_t$ is assumed to be a white noise process and $\rho \in (0, 1)$.

The next step is the calibration of our model using Brazilian data. In the period 1950-1980, the population growth rate is $\eta = 2.9\%$ and the average growth rate of technical progress is $\gamma = 1.3\%$ using the growth rate of the GDP per capita equal to $\gamma = 2\%$ and $\theta = 0.35$. We also set the depreciation rate equal to $9\%$. Using the Euler Equation we get $\beta = 0.9$ for the average of the capital output ratio of 1.62 calculated for the 1970-1980. The stylized facts for the Brazilian economy shows that agents spend 40% of total available time for market activities. Using this value in the Euler equation for a 7 days work week we get $\alpha = 1.28$. From an estimation of an AR(1) regression in a detrended $TFP$ we get $\rho = 0.97$.

To simulate the model we set the initial values for the variables equal to their 1970 value. The results are showed in the figures below. The bold lines represent the data and the dot lines represent the model simulation.

As we see looking at Figures 2 and 3, the Cass-Koopams model cannot account for the behavior of the Brazilian economy for the whole period. In particular investment and capital stock go in the opposite direction from the one predicted by the model in the 70s. Hours also show a discrepancy between the model and the data in the second half of the 80s.
With respect to the observed series of worked hours it is not straightforward to understand this finding. One possibility that we think should be considered is the institutional framework introduced by the Brazilian 1988’s new constitution. In 1988, Brazil adopted a new Constitution that brought many institutional changes. In particular, a mandatory reduction in the workweek hours was introduced. Moreover, given the objective of pursuing a more balanced public sector budget and a remarkable decentralization of tax revenues brought about by the reformed Constitution, many new contributions (taxes) were created from 1989 on. These distortions increases even further the taxation on labor input as well as on labor income that affects the agents’ optimal inter-temporal decisions. These changes in the tax system increased the Brazilian tax share on GDP from 22.4% in 1988 to 31.7% in 1998.

To study the behavior of investment and capital stock we will divide the analysis of the whole period in two subperiods: 70s and 80s and 90s. To understand the behavior of investment in the 70s we separate public investment (government plus state owned enterprise) from private. First, public investment increased in the second half of the 70s, while $TFP$ was reducing (see Figures 4 and 5). Second, private investment also increased in the second half of the 70s, while $TFP$ was declining (see Figures 4 and 5). We do not want to explain public investment decision, since the government does not necessarily follow price signals. But, the
private investment decision does follow. To understand the behavior of private investment and make it compatible with the Cass-Koopmans model we need to look at the subsidies. Government subsidies to the private sector went from 1% to 4% of the GDP in the 70s (see Figures 9). This increment in the public investment as well as private investment through government subsidies kept the GDP per working age increasing in the rest of the decade, even after $TFP$ has started.

Figure 3: Data (..) and Model Economy(-)
decreasing.

Figure 4: Private, Total and Model Aggregate Investment (1970=1)

3 The Brazilian economy in the 70s: a miracle

In this section we will, first, give some evidence that the Brazilian economy changed its behavior between 1970 and 1980 in terms of its growth rate. This change justifies the study of the economy in two subperiods: 70s and 80s and 90s. Second, we will carefully study the Brazilian economy in the first sub period: 1970-1979. During this decade the Brazilian economy shows an average growth rate of the GDP per capita of 5.05%. It is a period where the performance of the Brazilian economy is associated with the economic miracle.

First let’s compare the Brazilian economy in in the 70s with the 80s and 90s to show that the Brazilian economy abruptly changed since 1980 in terms of its growth rate. To perform this we will make use of a growth account (for a more details see Kehoe and Prescott (2002)).

Suppose that the economy aggregate production function is given by

\[ Y_t = A_t K_t^\theta H_t^{(1-\theta)} \]

where \( K_t \) is the aggregate capital stock, \( H_t \) is the total hours, \( \theta \) is the capital share and \( A_t \) is the total factor productivity (henceforth \( TFP \)).
Using the equation above we can decompose the growth rate of the output per worker in 3 parts: the one due to the growth of $A_t$, the one due to the growth of $K_t$ and finally the one due to the growth of $H_t$.

Divide the last equation by $L$, the working age population, take log of the resulting expression and we get

$$
\log \left( \frac{Y_t}{N_t} + s \right) - \log \left( \frac{Y_t}{N_t} \right) = \frac{1}{1 - \theta} \left[ \log A_{t+s} - \log A_t \right] / s + \theta \left[ \log \left( \frac{K_{t+s}}{Y_{t+s}} \right) - \log \left( \frac{K_t}{Y_t} \right) \right] / s + \left[ \log \left( \frac{H_{t+s}}{N_{t+s}} \right) - \log \left( \frac{H_t}{N_t} \right) \right] / s
$$

(4)

Using a capital share of 0.4 the growth accounting of the Brazilian economy in the two sub periods is ($Y$ is the annual GNP, $N$ is the working age population and $H$ is total number of hours worked)

<table>
<thead>
<tr>
<th>Period</th>
<th>change in $Y/N$ due to $TFP$</th>
<th>due to $K/Y$</th>
<th>due to $H/N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-1980</td>
<td>5.05</td>
<td>1.50</td>
<td>2.14</td>
</tr>
<tr>
<td>1981-1998</td>
<td>0.28</td>
<td>-0.62</td>
<td>1.09</td>
</tr>
</tbody>
</table>

Using the results from the growth account we can see the sharp contrast between the performance of the Brazilian economy in the two sub periods. First the growth rate of the GDP per working age person drops from 5.05% in the 70s to 0.28% in the 80s and 90s. Second, $TFP$ that was growing at 1.5% in the 70s decreases during the 80s and 90s at annual rate of 0.62%. Finally hours worked also decreased in the 80s and 90s in contrast to the 70s.

Now that we have given evidence for different performance between the 70s and the 80s and 90s, lets analyze the first subperiod. The Brazilian economy grows during the whole 70s, but the main source of growth is quite different across the years (see on Table 2).

<table>
<thead>
<tr>
<th>Period</th>
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<tr>
<td>1971-1980</td>
<td>5.05</td>
<td>1.5</td>
<td>2.14</td>
<td>1.41</td>
</tr>
<tr>
<td>1971-1974</td>
<td>9.24</td>
<td>5.48</td>
<td>0.88</td>
<td>2.87</td>
</tr>
<tr>
<td>1975-1980</td>
<td>2.27</td>
<td>-1.15</td>
<td>2.97</td>
<td>0.44</td>
</tr>
</tbody>
</table>

First, the main source of growth of the GDP per working age person in the first half of the 70s is $T F P$. In contrast, in the second half of the 70s the main source of growth is capital. Second, if the growth rate of $T F P$ is 5.48% in the first half of the 70s, in the second it is negative and equal to -1.15%. Third, the growth rate of the GDP per working age person though positive in the second half of the 70s is more than 3 times smaller than in the first half of the 70s.

If we followed the Cass-Koopmans model we should see the GDP per working age person declining in the second half of the 70s since the $T F P$ is decreasing. Instead, what we see is the engine of growth switching from $T F P$ to capital. Capital stock keeps growing even after $T F P$ has stopped increasing and has started decreasing very fast (see Figure 5).

![Figure 5: Total Factor Productivity (Brazil 1970 - 1998)](image-url)

To understand the behavior of the capital stock we should look at the aggregate investment. Clearly, the Cass-Koopmans model seems incapable of accounting for the behavior of neither aggregate capital nor aggregate investment in the second half of the 70s.
3.1 Aggregate Investment

The capital stock in Brazil is not computed based on the firm’s balance sheets. All available capital stock series depend, in some degree, on the investment series or, as it is officially available, on the gross capital stock formation. Hence, the path of the later is key in order to understand the behavior of the former.

The present section describes the behavior of the Brazilian investment series. We will give emphasis to its source, private and public (government plus state owned enterprise). As we will see this differentiation is important to understand the behavior of the Brazilian Economy.

![Figure 6: Aggregate Investment as a Share of GDP (Brazil 1970 - 1998)](image)

Figure 6 shows the Brazilian investment as a share of GDP for 1970-1998 (both in real terms). Investment increased significantly in the 1970s. The average investment share grew from 16.42%, between 1947 and 1969, to 25.26%, in the 1970s reducing to 20.05% between 1980 and 2000.

Following the Cass-Koopmans model, we should expected the investment to reach a peak during the period of 1970-1974, when the Brazilian economy (and the technological progress) was growing very fast and not in the second half of the 70s when $TFP$ was already declining. But, in fact the peak of the investment share happened in the second half of the 70s when $TFP$ was decreasing rapidly (see Figures 6 and 5).

When we separate public from private investment we can see what happened.
Right after $TFP$ has started declining, public investment increases fast. In Figures 7 we can see a sharp increment in the share of public investment from both components, government and stated owned enterprise. Figure 7-(b) shows that the share of the public investment in the aggregate investment went from 32.3% between 1970-74 to 40% between 1975-79 (between 1975-78 it reached 42.5%). Clearly public investment increased fast in the 70s compensating, at least in part, the decline in $TFP$, keeping GDP per capita growing.

![Graph](a) Share of the State Owned Enterprisers in the Aggregate Investment (Brazil 1970 - 1998)

![Graph](b) Share of Government Plus State Owned Enterprizes in the Aggregate Investment (Brazil 1970 - 1998)

**Figure 7:**

Even though public investment could have disregarded the rate of return of capital, private investment should not follow the same pattern. If $TFP$ is reducing then private investment should also reduce since the return of capital decreases with $TFP$. But when we look at Figure 8 we see that in the 70s not only public but also private investment increased after $TFP$ had started decreasing.

To understand the behavior of private investment we need to look at the government subsidies to the private sector. As we can see in Figure 9 in the second half of the 70s government subsidies to the private sector as a share of GDP increased from less than 1% in the beginning of the 70s to 4% in 1980. In Figure 10 we plot both series of private investment and subsidies as a share of GDP. It is clear the effect of the subsidies over the private investment. Even though $TFP$ was declining in the second half of the 70s, government subsidies were enough to increase private investment, keeping the growth rate of the economy.
Figure 8: Private and Public Investment as a Share of GDP (Brazil 1970 - 1998)

Figure 9: Government Subsidies to the Private Sector as a Share of GDP (Brazil 1970 - 1998)
In summary, in the first half of the 70s when $TFP$ was increasing the share of public and private investment in the aggregate investment is constant. In the second half of the 70s public and private investment increased. In this period the increment of public plus private investment was enough to compensate the reduction in the $TFP$, keeping the growth rate of the GDP per capita.

![Figure 10: Subsidies and Private Investment as a Share of GDP (Brazil 1970 - 2000)](image)

The behavior of the public investment and government subsidies to the private sector can be understood looking at the objectives pursued by the Brazilian government plan called II National Development Plan. As a response to the First Oil shock, the Brazilian government elaborate a national plan trying to keep the same average growth rate of the GDP per capita reached in the first half of the 70s.

If the main objective of the government is to keep the growth rate of the GDP per capita and there is no technological progress (in fact, $TFP$ was decreasing), accumulation of capital can keep the economy growing. Clearly, in this case you are disregarding all prices and the increment in the stock of capital is not efficient, but the economy can grow as long as you can finance the new investment. In fact, after 1974 Brazil was running huge deficits in current account. These deficits were being financed by loans in the international market.

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4 The Brazilian economy in the 80s and 90s: a disaster

In this section we will analyze the Brazilian economy in the 80s and 90s. We will follow the same steps given above to study the Brazilian economy in the 70s. The growth account of the Brazilian economy for the period 1981-1998 is given below on Table 3 (\(Y\) is the annual GNP, \(N\) is the working age population, \(K\) is the capital stock and \(H\) is total number of hours worked).

Table 3 - Growth Accounting of the Brazilian GDP per Working Age Person (%)

<table>
<thead>
<tr>
<th>Period</th>
<th>change in (Y/N)</th>
<th>due to TFP</th>
<th>due to (K/Y)</th>
<th>due to (H/N)</th>
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</thead>
<tbody>
<tr>
<td>1981-1998</td>
<td>0.28</td>
<td>-0.62</td>
<td>1.09</td>
<td>-0.17</td>
</tr>
<tr>
<td>1981-1988</td>
<td>1.06</td>
<td>-1.63</td>
<td>1.22</td>
<td>1.47</td>
</tr>
<tr>
<td>1989-1992</td>
<td>-3.86</td>
<td>-5.41</td>
<td>3.08</td>
<td>-1.53</td>
</tr>
<tr>
<td>1993-1998</td>
<td>2.02</td>
<td>3.92</td>
<td>-0.41</td>
<td>-1.49</td>
</tr>
</tbody>
</table>

First the growth rate of GDP per working age is quite low for the whole period, but it varies a lot across the subperiods shown above. Second, except for the last subperiod, capital accumulation played a major role to avoid a negative growth rate of the GDP per working age person. TFP is declining at an increasing rate from 1980-1992. TFP becomes the engine of growth only in the last subperiod when the rate of technological progress becomes again comparable with the one observed in the 70s. Finally, since 1989 the amount of hours worked is declining. With respect to the decline in the amount of hours worked since 1989 it is not straightforward to understand but we want to stress two possibilities. The first one is the implementation of the new Constitution of 1988 that reduced the workweek from 48 to 44 hours. The second one is tax on labor. Since the beginning of the 90s the Brazilian Federal government has been increasing tax. These distortions increases even further the taxation on labor input as well as on labor income that affects the agents’ optimal inter-temporal decisions. These changes in the tax system increased the Brazilian tax share on GDP from 22.4% in 1988 to 31.7% in 1998.

In this subperiod the Cass-Koopmans model can reasonable well account for the behavior of the Brazilian economy, except for the behave of hours worked. To show this point we reproduce Figures 3 just for the sub period analyzed in this section, that is 1980-1998. The results are in the Figure 11-12.
4.1 Price of Investment Relative to Consumption and the Capital Stock

In this section we will explain some corrections that we made in the series of investment to control for changes in the price of investment relative to consumption goods. Without this adjustment the Cass-Koopmans model cannot account for the behavior of investment and capital stock in the Brazilian economy after the second half of the 80s.

Investment here is the sum of spending on structure, machine and equipment and durable consumption goods. The price of each one of these categories relative to consumption is constructed as the ratio of a wholesale price index specific to the each category of investment and a general consumer price index. In the second half of the 1980s up to the early 1990s, the price of each one of these categories of investment relative to consumption increased. In particular, the price level of the structure sector grew much faster than the price level of the economy. Since structure is around of 70% of all investment, the increment in the relative price of structure had a big effect on the price of investment relative to consumption (For a more careful analysis see Carneiro and Werneck (1993) and Bacha (1993)).

Bacha (1993) suggests four possible reasons for the increase in the relative price of investment along the 1980s (that also happened in Argentina and Colom-
(a) Consumption (Brazil 1980 - 1998)

(b) Investment (Brazil 1980 - 1998)

(c) Capital (Brazil 1980 - 1998)

(d) Hours Worked (Brazil 1980 - 1998)

Figure 12: Data (..) and Model Economy(-)

We suggest another reason for the increase in the relative price of investment

bia): (i) the real devaluation of domestic currency; (ii) the increases of "listed" prices of investment goods and construction contracts to compensate for higher expected inflation; (iii) the substitution of less efficient domestically produced capital goods for more efficient imported ones; (iv) the oligopolistic behavior of domestic capital good producers.
goods, especially construction in Brazil. We think this increment is due to several shocks that hit the economy during the 1980s and early 1990s. During this period, the Brazilian economy lived with very high rates of inflation. Trying to stabilize and to decrease the high inflation rate the government implemented the so-called "heterodox plans". From 1986 to 1991, Brazil experienced six of those plans. The main instrument of these plans consisted of price "freeze", prohibiting firms to change prices. These plans increased the instability of the Brazilian economy, once the agents had the right incentives to look for hedges. The most common mechanism of protection under those increasingly unstable situation consisted of real state purchases as apartment buildings, pushing up their relative prices. A second shock that strongly hit the Brazilian economy was the government default on its internal debt in 1990. This default came as part of another "heterodox plan", known as "Collor Plan". This scheme was named after the elected president who passed this bill in the Congress in March 1990. Prior to this (expected) default, the agents tried to protect their savings, shifting their demand toward real state items. This shift also contributed to increase the relative price of investment goods.

This relative price effect has crucial implications due to the fact that it can cause an overestimation in the spending on investment in structure. Consequently, it overestimates investment and the capital stock series as well. Since we use the perpetual inventory method, this annual overestimation acts cumulatively on the capital stock series. This drives in turn the capital stock series up, even during the recession, whereas in our model economy capital stock is going down. This effect does not appear in the investment series because it is a flow variable. Hence, each annual overestimation does not sum up over time in this series as it does with capital.

To show the effect of the relative price adjustment over investment and capital stock we computed these series with and without correcting for this changes in relative prices and compare them with the one predicted by the model. The results are shown in Figures 13 and 14 below.

Figure 13 shows three investment series. The first one refers to the data investment without correcting for changes in relative prices. The second series is the same data corrected for the relative price variation. As we can see, once the investment series is corrected for changes in the relative price of investment goods to general prices of the economy, this series shifts down. As expected, the overestimation of investment due to this relative price phenomenon is substantial during the second half of the 1980s.

In Figure 14 we can see that once the investment series is corrected for relative price changes, the capital stock series is also recomputed. This graph shows three series of capital stock. The first one from the top corresponds to the capital stock series based on the raw investment series. The second series is constructed with the adjusted investment series for changes in relative prices. As we can see
Figure 13: Investment, Brazil (1980-1998): Data, Corrected Data and Model

Figure 14: Capital Stock Series, Brazil (1980-1998): Data, Corrected Data and Model
once the investment series is corrected for this relative price changes, the newly obtained capital stock series shifts down in a considerable manner. Then, an artificial series is computed using the standard growth model. In this case, the capital stock obtained with the relative price corrected investment series is used to set the initial capital stock of the model economy. It is remarkable that now this artificial capital stock series (the lowest series in the graph) is able to mimic the declining behavior of the corrected capital stock data.

5 Conclusion

In this paper we ask if the Cass-Koopmans can account for the behavior of the Brazilian economy from 1970 to 1998. As we saw with some adjustments the Cass-Koopmans model can reasonable well can account for the observed behavior.

In the 70s we have to separate public (government plus state owned enterprise) from private investment. While the private investment can be explained by the Cass-Koopmans model once we introduced subsidies, the public investment has to be understood as an attempt by the government to keep the economy growing even after $TFP$ has started decreasing.

In the 80s and 90s the model also performs well. In this subperiod we have to control for changes in the relative prices. This adjustment is necessary because the increase in the price of investment relative to consumption in the second half of the 80s overestimate investment and, consequently, the capital stock. Once we control for changes in the relative price, the Cass-Koopmans model can fairly well account for the behavior of the Brazilian economy.

A problem still left to be explained is why $TFP$ has declined so much and for such a long time (almost 20 years, from 1974 until 1992). We raise some possibilities. First it is the huge amount of public companies created during the 70s. As it is well known public companies have smaller productivity than private companies (See Schmitz (2001), Megginson and Netter (2001)). Public companies low productivity can also drive down private companies productivity (See Schmitz and Teixeira (2004)).

Second, Brazilian economy initiate in 1974 a period of increasing barriers to trade in the international market (the Law of Informatica is an example). These barriers lasted until the end of the 80s and they were completely eliminated only with the trade liberalization of the beginning of the 90s. There is an increasing amount of evidence that trade restrictions reduces productivity (See Muendler (2002), Herrendorf and Teixeira (2004) and Wacziarg and Welch (2003)).

Last but not least the combination of two facts: government subsidies to private companies and an old bankruptcy law. These two elements together, in a closed economy, can keep inefficient companies in business reducing aggregate
productivity and technological progress.

References


