

Can Psychology Improve our Understanding of Puzzles of Intertemporal Consumption at the Macroeconomic Level?

Remarks about the Brazilian case

Patrícia Fonseca – patifonseca@gmail.com

Dr. Roberta Muramatsu – rmuramatsu@uol.com.br

Abstract

Psychological Economics as well as Economic Psychology have contributed significantly to our understanding of patterns of individual choice behavior that are often regarded as intertemporal anomalies. The starting point of the current work is the idea that the behavioral economic approach and its underlying conceptual tools also enable us to account for puzzles of intertemporal consumption at the macroeconomic level. More precisely, this paper aims to offer complementary explanations for three Brazilian puzzles of consumption/savings behavior: (a) increasing private savings in the highly inflationary economic environment at the end of the 1980s; (b) a significant drop of the private savings rates in 1990; and (c) the growing private consumption trend followed by indebtedness in a stable macroeconomic scenario offering concrete possibilities for improved consumption plans. Specifically we suggest that the behavioral concepts, such as projection bias, dread factor, loss aversion, hyperbolic discounting and self-control can potentially enrich the conventional understanding of the abovementioned anomalies. Finally, we conclude that a greater explanatory power can be yielded from the attempt of including more realistic psychological underpinnings in the economic analysis.

Keywords: Behavioral Economics; Consumer/Savings Behavior; Anomalies

1. Introduction:

Understanding the emotions people experience at the time of consuming, or deferring consumption, is critical for understanding and predicting the intertemporal trade-offs they make

George Loewenstein, *Out of Control*, p. 430

There is a long standing tradition within economics suggesting that the ultimate goal of science is to predict choice behavior patterns regardless of the causally significant psychological processes for actual judgment and decision-making. This was largely so due to the deductive structure of economic explanatory mode – inferences are mostly derived from a compact set of axioms of rational preferences and expectations.

This methodological strategy has been under revision since the last decades in response to the limited predictive success of standard economic models of choice. It is widely known that the vast literature on anomalies coming from various domains of economic decisions has given boost to the development of behavioral economics and economic psychology, agendas concerned with grounding their simplified theoretical statements (assumptions) on empirical evidence. In search for more explanatory treatments of puzzles or rational choice anomalies, practicing economists went beyond explaining manifest behavior by invoking economic incentives that could justify their emergence and persistence.

Some behavioral economic constructs like myopia, hyperbolic preferences, self-control and weakness of the will have improved the quality of our explanations and predictions of economically relevant anomalies, such as dynamically inconsistent consumption patterns. As a result, economists might have a better grasp of the conditions under which suboptimal behavior occur and eventually learn how they disappear.

The starting point of this paper is the view that incorporating explicitly some insights from psychology

into economic models of choice allows for a better understanding of some puzzles of intertemporal consumption behavior detected at the level of individual decision-making that do not disappear at the aggregate level of the market. More precisely, we focus on three anomalies of intertemporal choice in the Brazilian macroeconomic life: (a) increasing private savings in the highly inflationary economic environment at the end of the 1980s; (b) a significant drop of the private savings rates in 1990; and (c) the increasing private consumption trend followed by overindebtedness in a stable macroeconomic scenario offering concrete possibilities for improved consumption plans. Specifically, we aim to explain these puzzles in terms of projection bias, loss aversion, dread, hyperbolic preferences and self-control problems.

In order to deal with the foregoing tasks the remainder of this paper is structured as follows. Section 2 specifies our strategy for empirical analysis of the Brazilian intertemporal consumption path from 1981 to 2007. Section 3 presents the Brazilian enigma of increasing private savings behavior in a highly inflationary environment (rather than the expected growing private consumption behavior). In addition, we provide a psychological economic interpretation of such an instance of precautionary savings in terms of projection bias, loss aversion and dread. Section 4 discusses the puzzle of the significant drop in private savings rate after an unsuccessful price stabilization program called Collor Plan in the early 1990s. We suggest that this anomaly of intertemporal consumption is understood in terms of emotional reactions like dread and loss aversion. Section 5 analyzes a third intertemporal choice anomaly - increasing patterns of private consumption behavior and overindebtedness in a macroeconomic environment where consumption planning is feasible. We explain this deviation from prediction by standard theory in terms of self-control problems, hyperbolic preferences and projection bias that appear in an institutional environment of abundant credit that does not fit together with myopic preferences. Section 6 engages in scrutinizing some emotional and rational motives underlying the puzzling phenomena under study. Finally, section 7 wraps the overall argument up and conclusions will follow.

2. Data and Method

With the aim to investigating the explanatory power of conventional models of intertemporal consumption and to detect dynamically inconsistent patterns of behavior in the Brazilian economy, we embarked on an empirical analysis of private consumption and private savings from 1981 to 2007 (Modigliani and Brumberg, 1954; Friedman, 1957; Hall, 1978).

Our constructed series of private consumption over time has annual frequency⁶. The private savings time series is also annual and its construction is based on Reis et al (1998)⁷. We regarded levels of income, interest rates and inflation as macroeconomic incentives shaping actual intertemporal consumption decisions. The selected income levels are based on a deflated series of GDP per capita. In order to study the influence of the price level, we employed a monthly time series called IGP-DI index. We used a monthly series of market interest called Over/Selic interest rate and deflated it by the Brazilian Consumer Price Index called IPC from the Brazilian Institute for Demography and Statistics (named IBGE).⁸

In the second empirical treatment of this paper we tried to measure credit behavior associated with private consumption by means of a series of the balance of credit operations involving agents' check

⁶ We build up a series of private consumption by subtracting the aggregate series of final aggregate consumption from final consumption of the public sector. Both series were drawn from IPEADATA database (www.ipeadata.gov.br) and were deflated by the implicit GDP deflator index (2006 is the reference year).

⁷ Following Reis et al (1998)'s methodology, the proxy variable of Brazilian private consumption is Private Savings = Domestic Savings (Current Account Net Balance with the rest of the world + Gross Formation of Physical Capital) – Government Sector Savings (Gross Formation of Physical Capital of Public Administration, Construction, Utilities and Equipment) – Financial Needs of the public sector, federal government and central bank including currency exchange devaluation – Expenditure Needs of the Public Sector with States, Cities and Municipalities with currency devaluation included. All time series data was withdrawn from IPEADATA database and weighted by the implicit GDB deflator index.

⁸ In order to deflate the interest rates, we employed the Consumer Price Index from IBGE. This is because it has been an official deflator since Cruzado Plan (1986) and many adjustments were based on it. In order to grasp how inflation evolved in the period we employed another official consumer price index called IGP-DI. This is because of official price indexes were influenced by some methodological changes during the 1980s and as such would distort our calculations.

accounts and credit cards. As a measure of default and personal insolvency we considered non-payments of credit card invoices and check account loans transcending 90 days. The foregoing pieces of information were selected so as to focus our analysis on credit transactions shaping individual consumption decisions. We draw information about monthly series of credit transactions and personal indebtedness from the Brazilian Central Bank system in the period 2000-2007 and deflated them by the Brazilian Consumer Price Index named IPCA. The very choice of this deflator index is based on the weight that it gives to expenditures with the consumption goods and services that are strongly related to credit card and check account transactions.

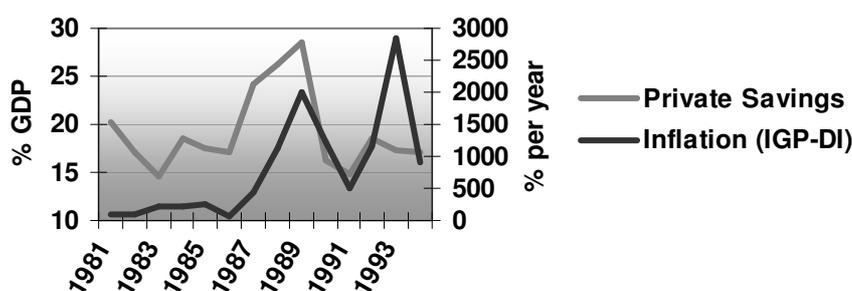
Based on our empirical analysis, we detected three puzzling moments in which private consumption and savings behaviors deviate from predictions by conventional models and do not fit well with existing macroeconomic incentives. We suggest that insights from economic psychology and behavioral economics better our understanding of why and how these anomalies take place

3. The first puzzle – increasing private savings in the highly inflationary environment

“The period encompassing the early 1980s until the mid 1990s is rather interesting and peculiar provided that a trajectory of high inflation coincides with substantial growth of private savings rates.” (Reis et al 1998, p. 234)

Brazilian economists often regard the 1980s as the ‘lost decade’. This is because it gave rise to a trend of very high inflation rates accompanied by extremely low GDP growth rates. We put forth the idea that this environment gave rise to puzzling patterns of intertemporal consumption behavior. Figure 1 highlights a puzzling phenomenon - temporal coincidence between high inflation and increasing private savings – that cannot be explained or predicted by conventional accounts of intertemporal consumption choice. Standard economic theory predicts that high inflation distorts individual choice over time to the extent that it gives material incentives to immediate rather than future consumption (savings). Yet empirical evidence of growing private savings trend during accelerating inflation in Brazil at the end of the 1980s prompt us to explain why individuals would be willing to save (procrastinate consumption) in an environment where procrastination is very costly due to the systematic rise of price level

Figure I
Inflation and Private Savings rates in Brazil from 1981 to 1994.



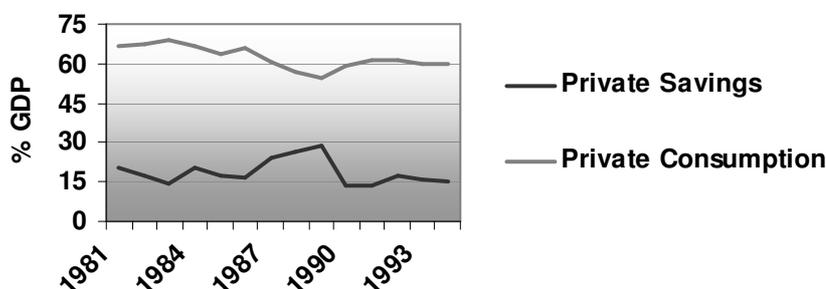
Source: author’s elaboration based on IPEADATA series (see Method for series’ construction details)

It is worth noting that the high inflation rates of the period ranging from 100% per year in the early 1980s to enormously high levels of 2013% per year in 1989 offer strong disincentive to savings and investments due to high risks associated with future outcomes. In a nutshell, intertemporal decisions in a hyperinflationary environment is inevitably biased towards immediate consumption provided that individuals cannot make effective plans about what the future may bring in terms of income devaluation. If this is so, it seems quite reasonable to rely on the standard model so as to predict that private savings will decrease due to the erosion of individual purchasing power and available real income over time (HALL, 1978). The model of rationality as optimization of outcomes would predict immediate consumption. Yet it is important to stress the existence of a very important institutional feature in the Brazilian economy that influenced significantly individual consumption over time, the so-called generalized price indexation of public bonds, financial assets, wages and most contractual

relations. This implied that all the crucial prices of the economy were legally adjusted based on previous inflation rates. The purpose of this economic institutional device was to keep agent's purchasing power stable. Yet the high level of indexation of Brazilian economy failed to coordinate price setting and expectations of actual inflation and predicted inflation. Rather, it gave rise to distorted inferences about future outcomes.

The widespread phenomenon of price indexation in Brazil seems to offer incentives to immediate consumption in response to an environment where accelerating inflation resulted from efforts to adjust contracts from previous inflation and expectations of even higher inflation rates in the future. The macroeconomic scenario of the 1980s is composed of very low GDP growth rates, ineffective inflation controls, low investment rates, decreasing public sector savings rate accompanied by surprisingly growing private savings rates. (REIS ET AL, 1998; EDWARDS, 1995). Not only had there been an increase in the private savings levels in Brazil during a period converging on hyperinflation, but a decreasing trend of private consumption could be observed. Figure 2 highlights this apparently counterintuitive pattern.

Figure II
Private Consumption and Savings rates from 1981 to 1994.



Source: author's elaboration based on IPEADATA series (see Method for series' construction details)

Based on the above graph (Figure 2) and Table 1, we can detect a path of increasing private savings to the extent that Brazilian savings in 1985 corresponded to R\$245 billion, R\$374 billion in 1987 and R\$458 billion in 1989. Private consumption instead decreased significantly given that the 1986 level corresponded to R\$994 billion, R\$880 billion in 1988 and R\$868 billion in 1989.

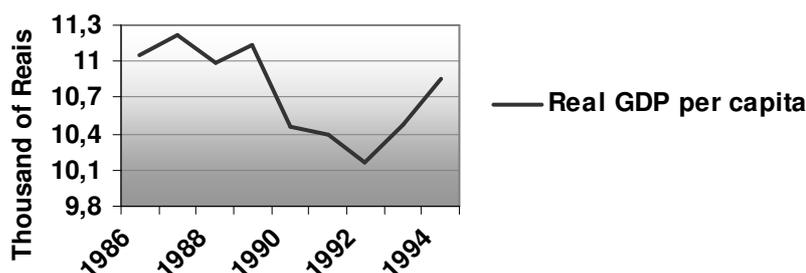
Table I
Private Consumption and Private Savings from 1983 to 1994.

Period	Private Consumption (bilions)	Private Savings (bilions)	Period	Private Consumption (bilions)	Private Savings (bilions)
1983	R\$ 844	R\$ 181	1989	R\$ 868	R\$ 458
1984	R\$ 867	R\$ 260	1990	R\$ 909	R\$ 213
1985	R\$ 890	R\$ 245	1991	R\$ 953	R\$ 208
1986	R\$ 994	R\$ 254	1992	R\$ 948	R\$ 264
1987	R\$ 945	R\$ 374	1993	R\$ 969	R\$ 259
1988	R\$ 880	R\$ 406	1994	R\$ 1.013	R\$ 255

Source: author's elaboration based on IPEADATA series (see Method for series' construction details)

Reis et al (1998, p. 234) put forth the idea that private savings of the period increased in such a way that the path of domestic Brazilian savings was positive despite the negative savings of the public sector. It is important to stress that Brazilian low income levels are often regarded as disincentives to savings behavior to the extent that saving is less attractive when income is low (DIAMOND e VARTIAINEN, 2007, p. 33). To complicate matters Brazilian macroeconomic policies of the 1980s led to significant devaluation of currency and real income, and difficulties with intertemporal consumption decisions (MODIANO, 1990) and increase of poor income distribution among individuals. Figure III sheds light on real income deterioration of the period, which turned out to be 30% of the purchasing power of Brazilian minimum wage. (MORAES, 1999)

Figure III
Real GDP per capita in Brazil from 1986 to 1994.



Source: IPEADATA

With the aim to understand the growing rates of private savings during the 1980s that achieved 30% of the GDP, some economists hypothesized that the puzzling trend could be explained by positive real interest rates. Nevertheless, some empirical research led to the conclusion that “the effect of real interest rate on private consumption is negligible” in Brazil (GLEIZER, 1991, p. 63). Some other economists like Reis et al (1998) e Gomes (2007) offered some econometric studies that also come to similar conclusions. With this in mind, we suggest an interpretation of this anomaly that relies on insights from behavioral economics and economic psychology.

3.1 Psychological interpretations for the first puzzle

Persistently high inflation certainly biases agents’ expectations about what the future will bring and therefore distort choice over time. This is largely so because the price system cannot perfectly reflect and coordinate buyers’ and sellers’ willingness to pay and to accept. Friedman (1977) e Okun (1971) stressed the direct relationship between inflation and uncertainty.

The Brazilian economist Joao Vitor Issler (1991) states that uncertainty increased significantly with accelerating inflation. According to him, the period raging from 1972 to 1985 inflation shifted from 15% to 243% per year, while the period of 1986 to 1989 this variation shifted from 60% to 2.013% per year. Moreover, increasing uncertainty about future inflation and perception of high risks and dangers were also due to a series of unsuccessful macroeconomic stabilization programs.

To illustrate, from 1986 to 1989 there were three ineffective inflation stabilization programs (Cruzado Plan in February of 1986, Bresser Plan in June of 1987 and Summer Plan in January of 1989), strongly based on price freezes that gave rise to many distorted outcomes, such as insufficient supply of many consumption good and resulting black markets. The subsequent periods were characterized by strong changes of currency exchange and interest rates and increasing instability of economic fluctuation and worsening income distribution (Reis et al 1998, p. 242-243).

In 1987 Brazil faced a currency crisis, which led to default and subsequent negotiation with International Monetary Fund. According to Carneiro and Modiano (1990), the growing uncertainty about the future contributed significantly to devaluation of Brazilian exchange rates and growing external debt. Additionally, the mismatch between monthly adjustments of prices and wages amplified the perception of radical uncertainty. In response to such environment with negative expectations, it is reasonable to imagine that individuals would draw on such feelings of danger so to predict their best future courses of action.

In this paper, we tentatively argue that three behavioral factors help us explain the rise of savings in a highly inflationary scenario, the so-called loss aversion and projection of preferences biased by feelings of fear (dread) and anxiety.

In our perspective, perception of high price instability, income corrosion and currency devaluation does not only influence the way an individual project their future outcomes, but also bias her predicted preferences towards precaution. Persistent inflation taught people that inflation decreases their economic opportunities and consequently well-being (HASLAG, 1997). Individuals learned that the level of economic activity is constrained by an inflationary environment and certainly adjusted their

expectations of future preferences to that. We are inclined to suggest that that expectation of negative future economic outcomes and anxiety resultant from them are consistent with individual usage of an affect-driven choice procedure or heuristic of the type “if I doubt that my consumption needs can be guaranteed over time, I had better save part of my current income”. Putting it somewhat different, individual’s prediction of pessimistic outcomes and her strong aversion to economic losses guide their precautionary savings behavior (DARDANONI, 1991). In this case, patterns of precautionary saving can be explained in terms of individual efforts to anticipate fear and anxiety accompanying pessimistic preferences about the future economy in an accelerating inflationary environment. In light of the literature of psychological economics and economic psychology, we suggest that individuals predicting a future loss in their wealth will adjust their preferences and forego immediate consumption so as to circumvent dread feelings and anxiety associated with waiting for lower future outcomes (Muramatsu e Fonseca, 2008). This adds to our understanding of why the pattern of savings behavior in Brazil during the second half of the 1980s fit well with the interpretation in terms of precautionary (psychological) motives. It seems that strong uncertainties about the future led agents to opt for a foregone gain associated with savings. Some economists like Reis et al tested the hypothesis of precautionary savings and founded positive evidence that challenges the standard explanation by reference to optimal allocation of financial assets.

We acknowledge that some individuals’ decisions over procrastinated consumption in the 1980s were also guided by cognitive processes, such as attention, memory and learning emerging in an environment of persistent inflation that gradually motivated agents of high income groups to allocate part of their wealth on special financial goods and services that were fully indexed, such as overnight accounts.

Yet we put forth the idea that the increasing rates of private savings accompanied by decreasing private consumptions indicate that individuals revised their patterns of intertemporal consumption. Even though some institutional devices like price indexation of some financial goods and services offered an extra incentive to procrastinate consumption, they do not seem to be sufficient to explain why people forego immediate consumption in an inflationary scenario where the cost of waiting for tomorrow’s inevitable lower consumer is high. Alternatively, we supplement the explanation of precautionary savings by suggesting that loss aversion, projection bias and anxiety associated with waiting for lower payoffs improve our understanding of why the highest rates of private savings rate in Brazil emerged during a scenario of accelerating inflation and enormous uncertainty. In what follows we try to organize our ideas and exploring theoretically our conjecture that the projection bias refine the account of precautionary savings.

3.2 Formalizing the precautionary savings hypothesis – the projection bias model.

George Loewenstein, Ted O’Donoughe e Matthew Rabin (2003) come up with the model of projection bias so as to better understand the empirical puzzles of intertemporal choice. The model is based on an empirical critique of the unrealistic assumption of ‘constant discounted utility maximization’ and alternative account in terms of affect-driven inference (MURAMATSU, 2006, p. 109). Formally, the projection bias hypothesis is presented in terms of predicted and actual preferences.

Consider an individual with actual preferences at period τ represented by $u(c_\tau ; s_\tau)$, where c_τ is her consumption at τ and s_τ is her visceral state at τ . Assume that her prediction of her preferences at $t < \tau$ is $\hat{u}(c_t ; s_t/s_\tau)$, where s_t is her visceral state at t . Projection bias emerges because individual prediction of her preferences $u(c_\tau ; s_\tau/s_t)$ is somewhere between her actual preferences at τ , $u(c_\tau ; s_\tau)$, and her preferences $u(c_\tau ; s_t)$. In this perspective, individuals are assumed to understand the qualitative change of their preferences over time, but cannot predict correctly the direction and magnitude of such changes.

The attempt to model conflicting time preferences, it is assumed that individuals aim to maximize their perceived intertemporal utility $\sum_t \delta^t \hat{u}_t$. Yet the actual time preference can be represented by:

$$(1) U^t = \sum_{\tau=t} \delta^\tau u(c_\tau ; s_\tau),$$

where $u(c\tau ; s\tau)$ is the instantaneous utility of the period τ ; $\delta \leq 1$ is a discount factor; and T is her temporal choice horizon. The model suggests that if an individual exhibits a projection bias due to the activation of any particular visceral state (e.g. hot state) at period t will be s_t , and her inferences will be based on:

$$(2) \hat{U}^t = \sum_{\tau=t}^T \delta^{\tau-t} \hat{u}(c\tau ; s\tau; s_t),$$

Inspired by the above formal treatment and some empirical evidence from the Brazilian economy, we try to supplement the interpretation of precautionary savings. We suppose that an individual can be either fearful about what the future will bring (hot state) or calm and careful (cold state). Consider that $s_t = A$ (anxiety and fear) or NA (cold state of non-anxiety). Suppose that an individual has to deal with the following intertemporal decision – immediate consumption or procrastinated consumption (saving), where $c_t = C$ represents immediate consumption and $c_t = S$ corresponds to later consumption or saving for tomorrow. Then, we have

$$(3) \quad U(c\tau ; s\tau) = \begin{array}{ll} u_{CA} & \text{if } c\tau = C \text{ (consume now) e } s\tau = A \text{ (anxiety)} \\ u_{CNA} & \text{if } c\tau = C \text{ (consume now) e } s\tau = NA \text{ (not anxiety)} \\ u_{SA} & \text{if } c\tau = S \text{ (save for tomorrow) e } s\tau = A \text{ (anxiety)} \\ u_{SNA} & \text{if } c\tau = S \text{ (save for tomorrow) e } s\tau = NA \text{ (not anxiety)} \end{array}$$

Let us assume that an individual at period 0 (now) needs to decide how much she wants to consume at period 1 (one year). Based on the pieces of evidence on private savings and consumption, we formulate the following hypothesis: Anxiety and dread feelings resulting from the uncertain environment of accelerating inflation in Brazil of the 1980s distorted individuals' intertemporal decisions towards procrastinated consumption. We can systematize this presupposition as follows:

$$(4) \quad u_{SA} - u_{CA} > u_{SNA} - u_{CNA}.$$

In this case, a person under the impact of projection bias will opt for saving for tomorrow if and only if,

$$(5) \quad \hat{u}(S, s1/s0) > \hat{u}(C; s1/s0)$$

This is so because the perceived utility captures the influence of current visceral factors on predicted preferences and utilities. Empirical evidence suggests that individuals living in a highly inflationary scenario become anxious and insecure about the future and they will save, if and only if,

$$(6) \quad \hat{u}(S, NA/A) > \hat{u}(C, NA/A)$$

With a simple projection bias, $\hat{u}(S, NA/A) = (1-\alpha) u_{SNA} + \alpha u_{SA}$,

$$\text{whereas } \hat{u}(C, NA/A) = (1-\alpha) u_{CNA} + \alpha u_{CA}.$$

Thus, an individual will save under the following circumstances,

$$(7) \quad u_{SNA} - u_{CNA} > -\alpha [(u_{SA} - u_{CA}) - (u_{SNA} - u_{CNA})] \\ u_{SA} - u_{CA} > (1 - \alpha) [(u_{SA} - u_{CA}) - (u_{SNA} - u_{CNA})]$$

Given the conjecture that $u_{SA} - u_{CA} > u_{SNA} - u_{CNA}$, we suggest that individuals might overestimate their preferences for procrastinated consumption because they project their current preferences and visceral states into future, and this led them to save for tomorrow. Yet we recognize that some experimental designs are needed to reinforce our conclusions.

In the next section, we present and analyze a second enigma of Brazilian pattern of intertemporal consumption behavior. We argued that that the precautionary pattern of increasing savings behavior

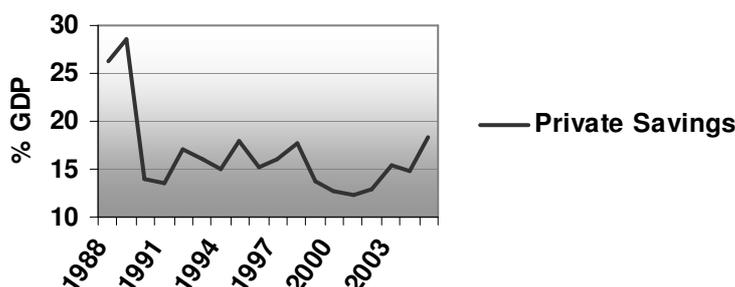
(consumption procrastination) is triggered by affective as well as cognitive factors and was shifted in 1990 after an unsuccessful price stabilization program that changed the perceived incentives to save for an uncertain tomorrow.

4. The second puzzle – the significant drop of private savings

In March of 1990, the fourth unsuccessful Brazilian price stabilization plan was implemented, the so-called Collor Plan I. Just like previously mistaken programs that resulted in even higher inflation movements, Collor Plan also involved price controls and little efforts of adjustments of public sector internal and external debts freezes. Unlike others, it attempt to fight against inflation by announcing a different measure that prohibited agents to have access to a large portion of their financial assets. This freeze of 70% of banking goods and assets of individuals led to a strong reduction of market liquidity and economic activity and therefore allowed for a rapid but non-sustainable price level reduction (NAKANO, 1990; BRESSER-PEREIRA, 1991; MORAES, 1999)

The presidential act called Medida Provisória 168 stated that individuals could only withdraw from their bank accounts and/or savings accounts the maximum sum of NCz\$50.000, which corresponded to less than US\$1.000 and any other higher sum allocated in financial assets were confiscated by the government (NAKANO, 1990). This led to an immediate reduction of economy’s means of payment. (BRESSER-PEREIRA, 1991). This institutional reform took many agents by surprise and led to a strong decrease of the already constrained credit market in Brazil. Figure IV shows a strong decrease in private savings in 1990 and later in 1991 and it never extrapolated the low rates of 15% GDP even for Brazilian standards.

Figure IV
Private Savings rates after the 1990 institutional reform



Source: author’s elaboration based on IPEADATA series (see Method for series’ construction details)

Table II highlight the magnitude of the institutional reform and its impact on private savings behavior. As we can see, the change is significant. In 1990, private savings turned out to represent 13,92% GDP approximately R\$213 billion, whereas it corresponded to 30% GDP in 1989, approximately R\$458 billion.

Table II
Private Savings from 1985 to 1992

Variables \ Period	1985	1986	1987	1988	1989	1990	1991	1992
Private Savings (%GDP)	17,55%	16,92%	24,07%	26,16%	28,56%	13,92%	13,46%	17,12%
Private Savings (bilions of Reais)	R\$245 bi	R\$254 bi	R\$374 bi	R\$406 bi	R\$458 bi	R\$213 bi	R\$208 bi	R\$ 264 bi

Source: author’s elaboration based on IPEADATA series (see Method for series’ construction details)

It is important to stress that the empirical data used for our savings time series draws on estimates of gross formation of capital (instead of bank account balances or demand for treasury bonds). If this is

so, we cannot understand the great decrease in savings in terms of new forms of allocation of cashed financial wealth. That course of action remained limited by the legal device that permitted government confiscation of assets for 18 months (second semester of 1991). We suggest that Collor 1 led agents to rethink their intertemporal consumption decision strategies and subsequent preference for immediate consumption. This is due to objective new incentives like the end of high remuneration of banking services as well as psychological motives under the label of loss aversion that gives an affect-driven reason for immediate gratification. The latter suggests that individuals respond more sensitively to perceived losses than gains (RABIN, 1998). One important implication is that the institutional reform gave room for expectations of future confiscation of financial goods and this offered a disincentive to save for tomorrow. Unfortunately, the unstable macroeconomic environment and non-transparent political and economic institutional devices biased individual's preferences for immediate consumption, which in turn yield some obstacles for future positive outcomes. In a nutshell, Collor plan might gave rise to distortions of individual's time preferences tradeoffs that are sometimes interpreted in terms of myopia.

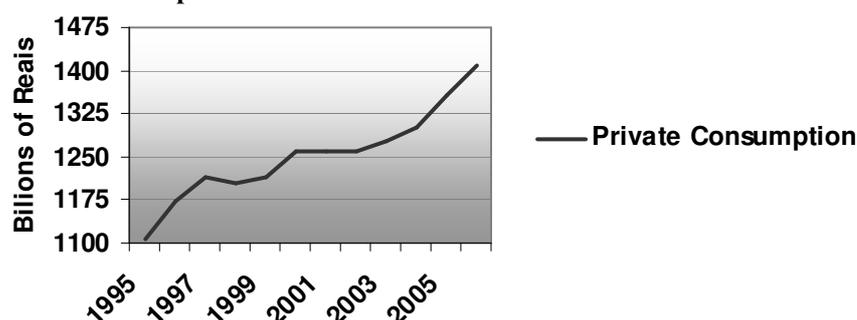
5. The third puzzle – Consumption, indebtedness and stabilization

Another apparently puzzling pattern of intertemporal consumption behavior is a result of the successful price stabilization program in 1994 called Real Plan. The latter effectively fought against inflation and therefore opened room for improved consumption planning.

In order to guarantee a commitment to price stabilization, the Brazilian monetary authority, Central Bank of Brazil, has allowed for high real interest rates in the market. In 1998 the real interest achieved the peak of 27% per year, which could be taken as a high incentive for saving and large disincentive for immediate consumption. This is very in tune with many models of intertemporal consumption like Friedman (1957), Modigliani and Brumberg (1954) and Hall (1978), since a high increase in real interest rates lead, ceteris paribus, individuals to procrastinate consumption (CAVALCANTI, 1993, p. 203).

Yet empirical evidence comes to challenge the above conception. Despite the high real interest rates, private consumption has increased significantly since 1994 (ALÉM and GIAMBIAGI, 1997). Figure V shows this pattern. To illustrate, private consumption was approximately R\$1.1 trillion in 1995 and it achieved R\$1.41 trillion in 2006. In less than 10 years, private consumption increased approximately 28% in Brazil and the GDP growth increased 31.4%. This leads us to suggest that higher consumption results from income growth.

Figure V
Private Consumption in Brazil since 1995



Source: authors elaboration based on IPEADATA series (see Method for series' construction details)

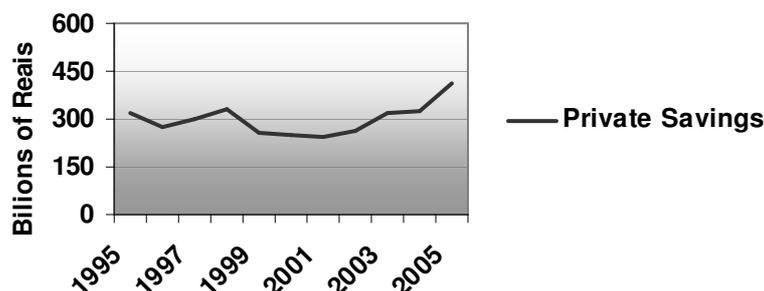
At the same time, private savings behavior has not exhibited the same vigorous pattern, especially when it is contrasted with the private savings path of the second half of the 1980s. Table III shows that after the institutional shock called Collor plan the private savings rates shifted to the approximate level of 14% GDP and seems to have difficulty in achieving the 1989 level. Figure VI indicated that the trend of growing private savings has been recovered but nothing compared with the consumption path. Figure VII presents the evolution of Brazilian per capita income.

Table III
Private Savings and Consumption rates as GDP percentage from 1994 to 2005.

Anos	Poupança Privada (% PIB)	Consumo Privado (% PIB)	Anos	Poupança Privada (% PIB)	Consumo Privado (% PIB)
1994	15,0	59,6	2000	12,8	64,3
1995	18,0	62,5	2001	12,4	63,5
1996	15,3	64,7	2002	12,9	61,7
1997	16,0	64,9	2003	15,4	61,9
1998	17,8	64,3	2004	14,8	59,8
1999	13,7	64,7	2005	18,3	60,3

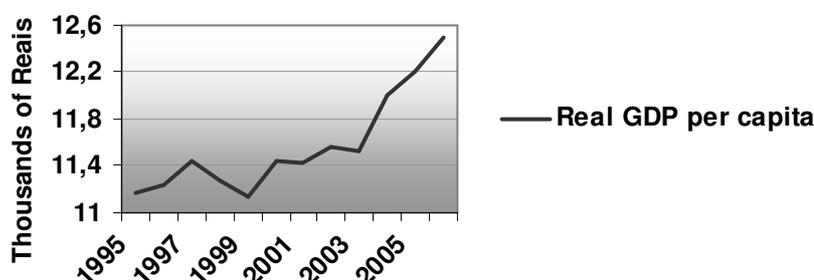
Source: author's elaboration based on IPEADATA series (see Method for series' construction details).

Figure VI
Private Savings in Brazil since 1995



Source: author's elaboration based on IPEADATA series (see Method for series' construction details)

Figure VII
Real GDP per capita in Brazil from 1995 until now



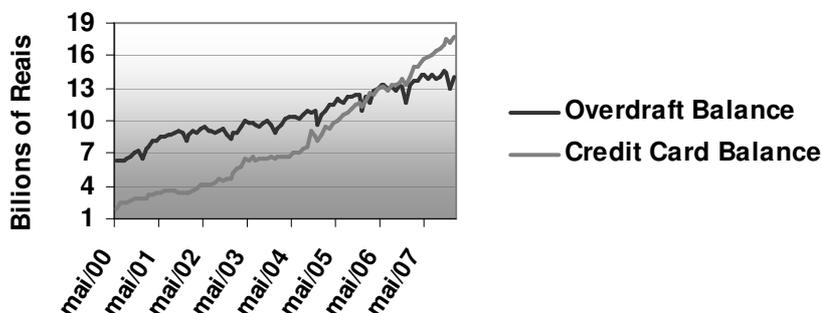
Source: IPEADATA

The empirical data motivate us to suggest that income gains in the Brazilian economy post stabilization have been directed to improved consumption levels rather than higher saving behavior. This is understandable due to the fact that individuals of low income that could not consume many goods become able to do this so. Yet the incapacity to recover the levels of private savings of Brazilian late 1980s even in a growing and stable environment gave boost to the hypothesis that economic agents' time preferences were adjusted to lower but certain immediate outcomes. This sheds extra light on the phenomenon of myopic preferences (hyperbolic discounting)

The pattern of credit behavior in Brazil highlights the problems of self-control problems. A series of innovations in financial institutions after price stabilization led to the possibility of growing individual loans and overindebtedness. We suggest that this pattern reveals individual's time preferences maladapted to a new macroeconomic environment.

Figures VIII and IX present the pattern of individual credit transactions and the evolving trend of default and consumer indebtedness. We selected the available data that would allow us to investigate the impact of the growing volume of credit in distorted intertemporal consumption decisions.

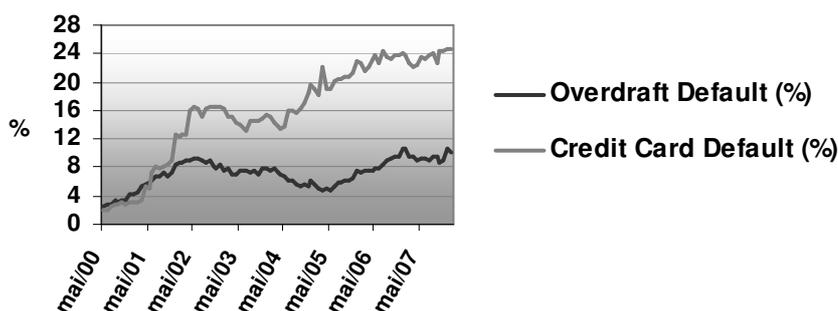
Figure VIII
Consumer Credit Operations since 2000.



Source: BCB-DEPEC (Economic Research Department of the Brazilian Central Bank)

As we can see, since 2000 the credit volume that individuals have contracted by means of their bank accounts doubled. Their credit transactions with credit cards improved 17 times, from R\$ 1 billion in 2000 to R\$18 bi on 2007.

Figure IX
Credit Card and Overdraft Default (up to 90 days) since 2000.



Source: BCB-DEPEC (Economic Research Department of the Brazilian Central Bank)

Nevertheless, failures to pay loans and credit card invoices increased dramatically. Since 2000 the percentage of defaults in the bank account loans shifted from 3% para 10% from all available credit just like Figure IX demonstrates. In the credit card market, the default rates increased from 2,5% to 25% of the total credit in the period. According to Robert Hall, “consumers appraise their economic well-being in an intelligent way that involves looking into the future” (1978, p. 985). Yet the Brazilian credit market seems to indicate something quite different – individuals can make systematically suboptimal intertemporal consumption decisions in a tempting vast credit market. This opens room for a behavioral account of why this happens.

5.1 Psychological interpretations for the third puzzle

Since 1994 there have been significant changes in Brazilian financial institutions that resulted in an increasing consumption credit supply. The growth of personal, extended installment payment horizon and great access to credit cards contributed to the large increase in consumption of goods and services (ALÉM e GIAMBIAGI, 1997). This changed individual’s intertemporal choice possibilities. Nevertheless, such institutional innovations might bring problems – in an environment of vast credit, individuals are often tempted to make new loans and underestimate their budget constraints. Given that individuals have limited capacity for evaluating carefully the risks and benefits of paying high interest rates in the revolving consumption credit markets, many often succumb to the temptation of

buying goods that are actually out of their reach. In Brazil refinancing their consumption debts has led to personal bankruptcy and growing difficulty in resisting temptation of making new loans.

This is very much in tune with Webley and Nyhus's words. To them, "behavior is a result of the experienced intensity of temptations, and the ability to execute self-control in situations where there is a conflict between short-term (e.g. spending now) and long-term (e.g. solid household economy) (1998, p. 6)". In our interpretation the concept of hyperbolic preferences represent this time preference conflict rather accurately. Hyperbolic discounting sheds lights on why immediate gratification is so tempting and offer reasons for people to underestimate its consequences (KILBORN, 2007). Hyperbolic discounting sheds light on the empirical evidence suggesting that agents often face self-control problems and conflicting time preferences. Based on Strotz (1955), we can suggest that consumers often plan to save for tomorrow but often change their mind when there is a chance of immediate consumption (and future payment).¹³

Financial innovations facilitate individual's access to immediate consumption gratification. Yet a vast credit supply due to a very liquid money market can lead individuals to underestimate the advantages of consumption procrastination and risks of deviating from previous intertemporal consumption plans (MEIER e SPRENGER, 2007; KILBORN, 2007). In this case, the model of intertemporal consumption with hyperbolic discounting acknowledges that some financial innovations in credit transactions can distort individual savings behavior (LAIBSON, 1997; HEUKELOM, 2007). Despite the fact that "consumer credit has come to be regarded positively as empowering consumers to make better lives for themselves by leveraging future earning potential" (KILBORN, 2007, p. 14), we cannot underestimate that credit markets are not yet structured in a way so as to allow individuals to get informed about the existing costs and benefits associated with immediate consumption patterns. It seems that most consumer credit transactions in the Brazilian economy after price stabilization are used to anticipate consumption and have increased rather than stabilized individuals' impatience. This carries the challenging implication of growing indebtedness, default and suboptimal patterns of choice (MEIER e SPRENGER, 2007; HEUKELOM, 2007).

The emerging credit markets might contribute to better planning of consumer decisions, but they also offer temptations that complicate self-control problems in the Brazilian scenario after Real Plan. The end of inflation tax and GDP income growth gave rise to great optimism about what the future conditions and this seems to weaken savings behavior guided by precautionary motives. In addition, individuals have difficulty predicting future outcomes and underestimate the negative consequences of financing goods at high market interest rates (KILBORN, 2007; DIAMOND e VARTIAINEN, 2007) and this led them to default and bankruptcy. Many people appeal to credit transactions to undermine their budget and go on re-financing old loans in an attempt to 'find a way out'. (CALDER, 1999; KILBORN, 2007). According to Reis et al, the impatience levels of Brazilian consumers is very high and this sheds light on the need of thinking about institutional designs that create some incentives for agents to strategies of commitment savings.¹⁴ This is because individual well-being depends on their capacity to plan their consumption possibilities and make decisions based on their permanent (rather than temporary) income.

We are inclined to suggest that time conflicting preferences detected by the model of hyperbolic discounting help us understand why individuals cannot stick to their intertemporal consumption plans (Issler and Rocha, 2000; Gomes, 2004 e Gomes and Paz 2004). Furthermore, it might inspire a debate over how to inform agents about the temptations of immediate consumption because this puts a severe constraint on future outcomes achieved through saving behavior. In the behavioral economic literature individuals aware of their hyperbolic preferences might effectively engage in sustainable consumption

¹³ The phenomenon of hyperbolic discounting have an impact on individual indebtedness challenges the standard account of credit behavior only in terms of income conditions. (MEIER e SPRENGER, 2007)

¹⁴ Reis et al estimate a discount rate varying from 0.9 to 0.8. To them, the estimated values are surprisingly high even though they expected high rates of impatience due to the level of Brazilian GDP per capita and history of accelerating inflation (1998, p. 264).

planning if they limit their future options to commitment strategies (DIAMOND e VARTIAINEN, 2007). One example is to save for tomorrow through a retirement plan or wealth allocation in illiquid assets (ibid).¹⁶ The underlying idea of this commitment strategy is to prevent the future self from deviating from plans made by the previous self. In our perception, informing agents about the sources of their dynamic inconsistency contributes to the very effectiveness of consumption planning.

6 – Cognition and emotion in the economical incentives' perception

“Before credit was widely available to consumers, these biases remained largely in the shadows” (KILBORN, 2007, p. 22)

In this paper, we claim that Brazilian consumers at the end of the 1980s resisted to immediate consumption and increased their private savings even in an environment of accelerating inflation, whereas after price stabilization yielding clearer incentives for effective intertemporal consumption decisions gave rise to patterns of growing immediate consumption accompanied by stable savings. In our perspective, these puzzles are resolved by understanding how emotional as well as cognitive factors shape perception of available economic incentives associated with immediate and future consumption and therefore guide choice behavior.

We are inclined to suggest that sometimes emotional factors sometimes bias individual perception of the choice task and activate some choice heuristics, which in turn gave rise to suboptimal courses of action. Just like economists investigate change in demand conditions by separating substitution and income effects, we propose an account of intertemporal choice behavior that specifies how emotion and cognition interact to produce actual behavior (including those taken as anomalies). It is reasonable to expect that when emotion and cognition conflict, they might bring about patterns of behavior that cannot be expected by traditional choice theory because it remains silent about emotional processes causally significant for judgment and decision-making in the real world.

At the end of the 1980s, cognitive factors informed agents that in an environment of growing price levels and decreasing individual purchase power the best course of action would be immediate consumption because most people remained unable to protect their income from the corrosive effects of inflation. Yet it is likely that strong negative emotions (associated with fear and anxiety about what the future would bring in an unstable macroeconomic scenario) spoke louder to agents than higher order cognition. This at least partly explains why individuals opted for precautionary savings behavior.

After the successful stabilization program in the 1994, we detected a rather distinct pattern of behavior that is brought about by joint interaction of emotion and cognition. Higher order cognition might inform about incentives associated with procrastinated consumption in an environment of stable prices and growing possibilities of optimal consumption planning due to institutional improvements in consumer credit markets. However, empirical evidence suggests that positive emotions arising from a liquid financial market shaped individual perception of the possibilities of anticipating consumption and this gave rise to accelerating patterns of indebtedness and self-control problems and consequently moderate savings in a scenario of GDP per capita growth.

In this case, an improved understanding of intertemporal consumption puzzles (that do not necessarily disappear at the aggregate level of the market) requires us to scrutinize how emotional and cognitive processes work together to guide agent's perception of their opportunity set and produce actual choice over time. It does payoff to reunify economics and psychology if we engage in truly explaining actual decision-making happens, why individuals sometimes select courses of action associated with suboptimal outcomes and how to design public policy that is able to shape individuals incentives for satisfactory intertemporal consumption choices without constraining their autonomy.

6. Conclusions and Insights for Further Research

This paper draws on developments within the sister disciplines of economics and psychology so as to identify and resolve some intertemporal consumption anomalies in the Brazilian economy. We

¹⁶ For instance, Americans aware of their hyperbolic preferences devised a commitment strategy called Christmas clubs, which consists of an investment account that can only be cashed in the Christmas time.

advanced the thesis that affective states (visceral factors included) guide consumption and savings decisions in quite significant ways. We went on to suggest that such emotional factors offer an interesting explanation of the rise of savings in an inflationary environment and also add to our understanding of why a completely distinct scenario with vast consumer credit devices yielding objective incentives to higher future consumption activated positive emotions that in turn gave rise to overconsumption and indebtedness. Inspired by behavioral concepts like loss aversion, dread, impatience, hyperbolic discounting, weakness of will and self-control problems, we are inclined to state that improvement in credit transactions might lead to approximately optimal patterns of intertemporal decisions if they are accompanied by institutional devices that inform individuals about the costs and benefits of anticipating (and postponing) consumption and inspire commitment strategies against their conflicting time preferences.

Yet we are aware that many of our results depend on further empirical research. Given the difficulty with getting systematic and disaggregated data of intertemporal consumption behaviors in Brazil, we recognize the need to design experiments to find out whether and how puzzling savings behavior in Brazil are triggered by visceral states among other affective factors. In addition, it might be useful to advance in econometric studies in tune with Reis et al (1998) so as to have a better grasp of how macroeconomic uncertainty increases individual level of impatience and guide savings decisions. We are currently working on a study to corroborate our hypothesis that Collor Plan took a measure of financial assets confiscation that biased Brazilian preferences towards immediate consumption. Until now some tests indicate a significant structural break in a private savings time series in 1990.

We end up by suggesting that economists, struck with the puzzle of decreasing savings rate and growing consumer indebtedness in various countries, dig deeper into the sources of time conflicting preferences and investigate how emotion and cognition guide perception of opportunities and selection of intertemporal consumption alternatives. This is a very important task because it carries significant implications for individual well-being and for achievements of a stable environment conducive to Pareto efficient allocations and long term economic growth.

7. References

ALÉM, A.C.; GIAMBIAGI, F. Aumento do investimento: o desafio de elevar a poupança privada no Brasil. **Revista do BNDES**, Brasília, n. 8, p.3-30, dez. 1997.

ANGELETOS, G. M. ET AL. The hyperbolic consumption model: calibration, simulation, and empirical evaluation. In: LOEWENSTEIN, G.; READ, D.; BAUMESTEIR, R. (Coords.) **Time and Decision**. New York: Russel Sage Foundation, 2002.

BANCO CENTRAL DO BRASIL (BACEN). Online data available <<http://www.bacen.com.br/>>. Internet.

BACEN. **Relatório Trimestral de inflação**. Relatório de dezembro de 2006. Disponível em: <<http://www.bcb.gov.br/htms/relinf/port/2006/12/ri200612c1p.pdf>>. Acesso em: 21 fev. 2008.

BRESSER-PEREIRA, L. C. **As incertezas do Plano Collor**. Texto para discussão de 1991. Disponível em: <<http://www.bresserpereira.org.br/papers/1990/90-IncertezasDoPlanoCollor.pdf>>. Acesso em: 12 fev. 2008.

CALDER, L. G. **Financing the american dream: a cultural history of consumer credit**. 1 ed. Princeton: Princeton University Press, 1999.

CAMERER, C., LOEWENSTEIN, G.. Behavioral Economics: past, present and future. In: CAMERER, C.; LOEWENSTEIN, G.; RABIN, M. (Coords.) **Advances of Behavioral Economics**. Princeton: Princeton University Press, 2004.

CAMPBELL, J.; MANKIW, G. Consumption, income, and interest rates: reinterpreting the time series evidence. **NBER Working paper series**. Cambridge, n. 2924, p. 1-45, abr. 1989.

- CARNEIRO, D.; MODIANO, E. Ajuste externo e desequilíbrio interno: 1980-1984. In: ABREU, M. P. (Coord.) **A ordem do progresso**. 17. ed. Rio de Janeiro: Campus. 1990.
- CARROLL, C. D.; SAMWICK, A. A. How important is precautionary saving? **The Review of Economics and Statistics**. Cambridge, n. 80, p. 410-419, aug. 1998.
- CAVALCANTI, C. B. Intertemporal substitution in consumption: an American investigation for Brazil. **Revista de Econometria**. Rio de Janeiro, n.13, p. 203-229, nov. 1993.
- DARDANONI, V. Precautionary savings under income uncertainty: a cross sectional analysis. **Applied Economics**. London, n.23, p. 153-160, jan. 1991.
- FRIEDMAN, M. Nobel lecture: inflation and unemployment. **Journal of Political Economy**. Chicago, n.85, p.451-472, jun. 1977.
- DIAMOND, P.; VARTIAINEN, H. **Behavioral economics and its applications**. 1.ed Princeton: Princeton University Press, 2007.
- EDWARDS, S. **Why are Latin America's saving rates so low?** Trabalho apresentando na “First Annual Latin American Conference on Development Economics” no Rio de Janeiro em 1995. Disponível em: <<http://ideas.repec.org/a/eee/deveco/v51y1996i1p5-44.html>>. Acesso em: 13 dez. 2008.
- FERREIRA, V. R. M. **Psicologia Econômica: origens, modelos, propostas**. Tese (Doutorado em Psicologia) - Programa de Estudos Pós-Graduados em Psicologia Social, Pontifícia Universidade Católica de São Paulo, São Paulo, 2007.
- FREDERICK, S. LOEWENSTEIN, G.; O'DONOGHUE, T.. Time Discounting and Time Preference: A Critical Review. In: BAUMEISTER, R.; LOEWENSTEIN, G.; READ, D. (Coords.) **Time and Decision: economic and psychology perspectives on intertemporal choice**. New York: Russel Sage Foundation, 2004.
- FRIEDMAN, M. **A Theory of the Consumption Function**. 1. ed. Princeton: Princeton University Press, 1957.
- GLEIZER, D. L. Saving and real interest rates in Brazil. **Revista Brasileira de Econometria**. Rio de Janeiro, n.11, p. 63-92, abr. 1991.
- GOMES, F. A. R. Consumo no Brasil: Teoria da renda permanente, formação de hábito e restrição à liquidez. **Revista Brasileira de Economia**. Rio de Janeiro, n.58, p. 381-402, jul.-set. 2004.
- GOMES, F; PAZ, L. Especificações para a função consumo: testes para países da América do Sul. **Pesquisa e Planejamento Econômico**. Rio de Janeiro, n. 34, p. 39-55, abr. 2004.
- GOMES, F. A. R.; ISSLER, J. V.; SALVATO, M. A. Principais características do consumo de duráveis no Brasil e testes de separabilidade entre duráveis e não duráveis. **Revista Brasileira de Economia**. Rio de Janeiro, n.59, p. 33-60, jan.-mar. 2005.
- GOMES, F. A. R. Consumo no Brasil: comportamento otimizador, restrição de crédito ou miopia? In: ENCONTRO BRASILEIRO DE ECONOMETRIA, 29, 2007, Recife, **Anais...**Rio de Janeiro: FGV, 2007.
- HALL, R. Stochastic implications of the life cycle permanent income hypothesis: Theory and evidence. **Journal of Political Economy**. Chicago, n. 86, p. 971-987, dez. 1978.
- HASLAG, J. H. **Output, growth, welfare and inflation: a survey**. Artigo da Seção Economic Review do Federal Reserve Bank of Dallas de 1997. Disponível em: <<http://dallasfed.org/research/er/1997/er9702b.pdf>>. Acesso em: 15 fev. 2008.

- HEUKELOM, F. **Who are the behavioral economists and what do they say?** Texto para discussão da Universidade de Tinbergen de 2007. Disponível em: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=964620>. Acesso em: 09 fev. 2008.
- IPEADATA. Disponibiliza dados sobre a atividade econômica. Disponível em: <www.ipeadata.gov.br>. Acesso em: 24 fev. 2007.
- ISSLER, J. V. Inflation level and uncertainty: evidence using Brazilian data. **Revista Brasileira de Economia**. Rio de Janeiro, n. 45, p. 473-482, jul.- set. 1991.
- ISSLER, J. V.; PEGURIER, F.J.H. Inflação, incerteza e a América Latina. In: ENCONTRO BRASILEIRO DE ECONOMETRIA, 20,1998, Vitória, **Anais...**Rio de Janeiro: FGV, 1998, p. 185-204.
- ISSLER, J. V.; ROCHA, F. P. Consumo, restrição à liquidez e bem estar no Brasil. **Economia Aplicada**, São Paulo, n.4, p.637-665, out.-dez. 2000.
- KAHNEMAN ET AL. Experimental tests of endowment effect and the coase theorem. **Journal of Political Economy**. Chicago, n.98, p. 1325-1348, dez. 1990.
- LAIBSON, D. Golden eggs and hyperbolic discounting. **Quarterly Journal of Economics**. Cambridge, n.112, p. 443-477, mai. 1997.
- LAIBSON, D.; REPETTO, A.; TOBACMAN, J.. Self Control and Saving for retirement. **Brookings Papers on Economic Activity**, Washington, n.1, p.91-196, mar. 1998.
- LEWIS ET AL. **The new economic mind – the social psychology of economic behavior**. 1.ed. London: Harvester/ Wheatsheaf, 1995.
- KILBORN, J. J. Behavioral economics, overindebtedness, and comparative consumer bankruptcy: searching for causes and evaluating solutions. **Emory Bankruptcy Developments Journal**. Atlanta, n. 22, p.13-38, out. 2005.
- LOEWENSTEIN, G. Anticipation and the valuation of delayed consumption. **Economic Journal**. n. 97, p. 666-684, set. 1987.
- LOEWENSTEIN, G. Emotions in Economic Theory and Economic Behavior. **American Economic Review**, Papers and Proceedings of the One Hundred Twelfth Annual Meeting of the American Economic Association. n. 90, p. 426-432, mai. 2000.
- LOEWENSTEIN, G e ANGNER, E. Predicting and honoring changing preferences. In: LOEWENSTEIN, G.; READ, D.; BAUMESTEIR, R. (Coords.) **Time and Decision**. New York: Russel Sage Foundation, 2002
- LOEWENSTEIN, G.; O'DONOGHUE, T.; RABIN, M. Projection Bias in the Predicting of Future Utility. **Quarterly Journal of Economics**, Cambridge, n.118, p. 1209-1248, nov. 2003.
- LUCAS Jr., R. E. Econometric policy evaluation: a critique. In: BRUNNER, K.; MELTZER, A. (Coords.) **The Phillips curve and labor markets**. 1.ed. North Holland: Carnegie Rochester, 1976.
- MEIER, S.; SPRENGER, C. **Impatience and credit behavior: evidence from a field experiment**. Texto da plataforma IDEAS de 2007. Disponível em: <<http://ideas.repec.org/p/fip/fedbwp/07-3.html>>. Acesso em: 23 jan. 2008.
- MODIANO, E. A ópera dos três cruzados. In: ABREU, M. P. (Coord.) **A ordem do progresso**. 17. ed. Rio de Janeiro: Campus. 1990.
- MODIGLIANI, F.; BRUMBERG, R. H. Utility and the consumption function: an interpretation of cross-section data. In: KURIHARA, K. K. (Coord.). **Post Keynesian Economics**. New Brunswick: Rutgers University Press, 1954.

- MORAES, A. C. Plano Brasil Novo. In: KON, Anita (Coord.) **Planejamento do Brasil II**. São Paulo: Perspectiva, 1999
- MURAMATSU, R. **Emotions in Action**: an inquiry into the explanation of decision-making in the real economic world. 2006. Tese (Doutorado em Economia) – Erasmus Institute for Philosophy and Economics, Erasmus University Rotterdam, Rotterdam, 2006.
- MURAMATSU, R.; HANOCH, Y. Emotions as mechanism for boundedly rational agents: the fast and the frugal way. **Journal of Economic Psychology**. Oxford, n. 26, p.201-211,abr. 2005.
- MURAMATSU, R; FONSECA, P. Psicologia e Economia na explicação da escolha intertemporal. **Revista de Economia do Mackenzie**. São Paulo, n. 6, p. 87-112, jun. 2008.
- NAKANO, Y. As fragilidades do Plano Collor de Estabilização. In: FARO, Clóvis de. (Coord.) **Plano Collor, Avaliações e Perspectivas**. Rio de Janeiro: Livros Técnicos e Científicos, 1990.
- OKUN, A. M. The mirage of steady inflation. **Brookings Papers on Economic Activity**. Washington, n. 2, p.485-498, fev. 1971.
- PAZ, L. S. Consumption in Brazil: myopia or liquidity constraints? A simple test using quarterly data. **Applied Economics Letters**. Oxford. n.13, p. 961-964, dez. 2006.
- RABIN, M. Psychology and Economics. **Journal of Economic Literature**, Pittsburgh, n. 36, p. 11-46, mar. 1998.
- RABIN, M. A Perspective on Psychology and Economics. **European Economic Review**, n. 46, p. 657-685, mai. 2002.
- REIS, E.; ISSLER, J. V.; BLANCO, F. e CARVALHO, L. Renda permanente e poupança precaucional: evidências empíricas para o Brasil no passado recente. **Pesquisa e Planejamento Econômico**. Rio de Janeiro, n.28, p. 233-272, ago. 1998.
- SAMUELSON, P. A Note on Measurement of Utility. **The Review of Social Studies**, n. 2, p. 155-161, fev.1937.
- SHAFIR, E.; DIAMOND, P.; TVERSKY, A. Money illusion. **The Quarterly Journal of Economics**. Cambridge, n.112, p. 341-374, abr. 1997.
- SHEA, J. Myopia, liquidity constraints, and aggregated consumption: a simple test. **Journal of Money, Credit and Banking**. Columbus, n.27 p. 798-805. 1995.
- SIMON, H.A. **Models of Man**. 1.ed. New York: John Wiley, 1957.
- STROTZ, R. H. Myopia and inconsistency in dynamic utility maximization. **The Review of Economic Studies**, Cambridge, n. 23, p. 165-180, mar. 1955.
- THALER, R.; BENARTZI, S. Myopic loss aversion and the equity premium puzzle. **Quarterly Journal of Economics**, Cambridge, n.110, p.73-92, fev. 1995.
- VAN BOUWEL, J. **Towards a framework for pluralism in Economics**. Texto do Post Autistic Economics Review, n. 30, Disponível em: <<http://www.paecon.net/PAERreview/issue30/VanBouwel30.htm>>. Acesso em: 12 fev. 2008.
- WEBLEY, P.; NYHUS, E. **Dynamic approach to consumer debt**. Texto do RePEc de 2001. Disponível em: <<http://www.inomics.com/cgi/repec?handle=RePEC:eee:joepsy>>. Acesso em: 15 jan. 2008.
- WORLD BANK POLICY AND RESEARCH BULLETIN. **Why do savings rates vary across countries?** Pesquisa do Banco Mundial de 1999. Disponível em: <<http://www.worldbank.org/html/dec/Publications/Bulletins/prb10,1.pdf>>. Acesso em: 11 nov. 2007.

