

# Standard-of-living aspirations and economic cycles

David de la Croix\*

February 29, 2000

## Abstract

Past experiences and social forces have been incorporated into tastes in order to analyze various microeconomic issues. We use these “extended preferences” to model the making of standard-of-living aspirations and study their effect on macroeconomic variables. We concentrate first on consumption behavior when there is habit formation. Such behavior is in accordance with several empirical facts and has important policy implications. Secondly, long term issues are analyzed assuming that children become habituated to a standard-of-living whilst still with their parents. This introduces a powerful mechanism responsible for long-term oscillations. We investigate in the third part whether habits applied to wage formation explain key labor market stylized facts.

JEL Classification numbers: E24, E32, O41.

Keywords: Tastes, habit formation, cycles, fair wage, catching-up.

\* National Fund for Scientific Research and IRES, Université catholique de Louvain, Place Montesquieu 3, B-1348 Louvain-la-Neuve, Belgium. Ph + 32 10 47 34 53. Fax + 32 10 47 39 45. E-mail delacroix@ires.ucl.ac.be. I am thankful to Jacques Drèze for his suggestions on an earlier draft. The financial support of the PAI program P4/01 is gratefully acknowledged.

## Introduction

One of the main tasks of macro-economists is to explain why there are fluctuations in output and employment and why growth is not a steady process.

Three different ways to explain the existence of fluctuations can be found in the literature. The first one, which is the mainstream approach, considers stochastic disturbances affecting the fundamentals of the economy. These shocks can take the form of productivity shocks, fiscal shocks, tastes shocks ... Shocks and propagation mechanisms are studied by the use of calibrated theoretical models or by econometric techniques. The second approach looks at mechanisms that can be responsible for fluctuations in the absence of exogenous shocks. In this case, it is the non-linear, complex, nature of the economy that generates endogenous fluctuations. In the third approach, the fundamentals are not sufficient to determine the actual growth path of the economy. The way expectations are coordinated plays then a crucial role in selecting the type of equilibrium that will emerge. Shocks to expectations, like pessimistic waves, can then be responsible for fluctuations.

For these three approaches, the elaboration of models which can propagate cycles through empirically realistic mechanisms is a central challenge: One of the findings of Hodrick and Prescott (1980) is that the deviations of output from trend display a moderately high degree of persistence. Accordingly, one of the major tasks of the dominant paradigm, is to build models that account for this persistence, without needing to assume that the exogenous shocks themselves are highly persistent. This proves to be a difficult task and it is often objected to real business cycle models that the persistence displayed by output is simply the mirror of the persistence of the shocks. In other words, the model does not bring any insight as far as persistence is concerned.

A main objective for studying models which are able to generate endogenous cycles is to set-up a theory of fluctuations that can compete with the dominant paradigm. A variety of mechanisms may be responsible for self-driven oscillatory phenomena. As stressed by Boldrin and Woodford (1990) in their survey, the construction of examples that allow endogenous cycles in the case of empirically realistic mechanisms and parameters is one of the main challenges of this line of research. Using a scalar overlapping generations model Grandmont (1985) shows that complicated cycles may occur if savings are sufficiently decreasing in the interest rate. An extension of this model to account for elastic labor-supply shows that cycles are possible even though savings are not a decreasing function of the interest rate. In this case, the production factors should be highly complementary (Reichlin, 1986).<sup>1</sup> Finding a propagation mechanism that neither requires a negative effect of the interest rate on savings nor low values of the elasticity of substitution in production is on the research agenda.

One of the relevant propagation mechanisms can be the adaptation of preferences – or tastes – to the environment. Accordingly, we intend to show in this paper the contribution of such set-ups to the explanation of fluctuations. We shall in particular focus our attention on three specific forms of endogenous adaptation of preferences. These are respectively the formation of consumers' habits, the inheritance of standard-

---

<sup>1</sup>Another overlapping generations model is proposed by Farmer (1986) in which cycles arise only if the government pursues a particular policy, namely, a policy of fixing the value of the deficit. As in Reichlin (1986), low values of the elasticity of substitution in production are required for cycles to occur.

of-living aspirations and the formation of the fair wage.

Before studying these cases we present some selected stylized facts on growth and cycles.

## 1 Selected facts on growth and cycles

### 1.1 Long-run growth

One problem to study long-run growth is the lack of data over a very long period of time. There is some partial evidence, however, that economic growth was very slow before 1700. Real wages and per capita GDP were roughly the same in 1700 as they were 2000 years before (see Jones (1999) and the references therein). For the recent past, Maddison (1995) has performed a huge task of building GDP and population series for many countries over more than one century. Figure 1 presents the GDP per capita of selected years for the whole set of countries for which the data are available (i.e. starting in 1820). Each point broadly reflects the standard-of-living of one generation in one country. The first fact that emerges clearly from this picture is that growth is a monotonic process at this frequency and that the standard-of-living of successive generations is rising over time.

### 1.2 Long cycles

The fact that there is positive growth in the long-run does not imply that long-run growth rates are constant. To illustrate this, we take GDP per capita series and extract their long-run component using a very smooth moving average of the Hodrick and Prescott (1980) filter type.<sup>2</sup> Figure 2 displays the long-term component for two countries. Clearly, the trend does not grow at a constant rate. There are very long periods of time during which growth is low, followed by lasting booms. This also stresses that predicting growth over long periods of time is a hazardous game.

If one goes further and computes the growth rate of the long-term component, one finds that the growth rate attains a peak approximately every 30 years. However, it is not possible to prove that these fluctuations at low frequencies come from the functioning of the economic system itself rather than from the filtering procedure. Note however that the presence of long-term cycles is broadly consistent with what we know on growth over a long period of time (see for instance the spectral estimates of the Kondratieff cycle by van Ewijk (1982) and Reijnders (1990) and the study by Solomou (1986)).

---

<sup>2</sup>Note that there exists an infinity of arbitrary ways to decompose a given series into a long-term trend and a cycle.

Figure 1: GDP per capita in the world

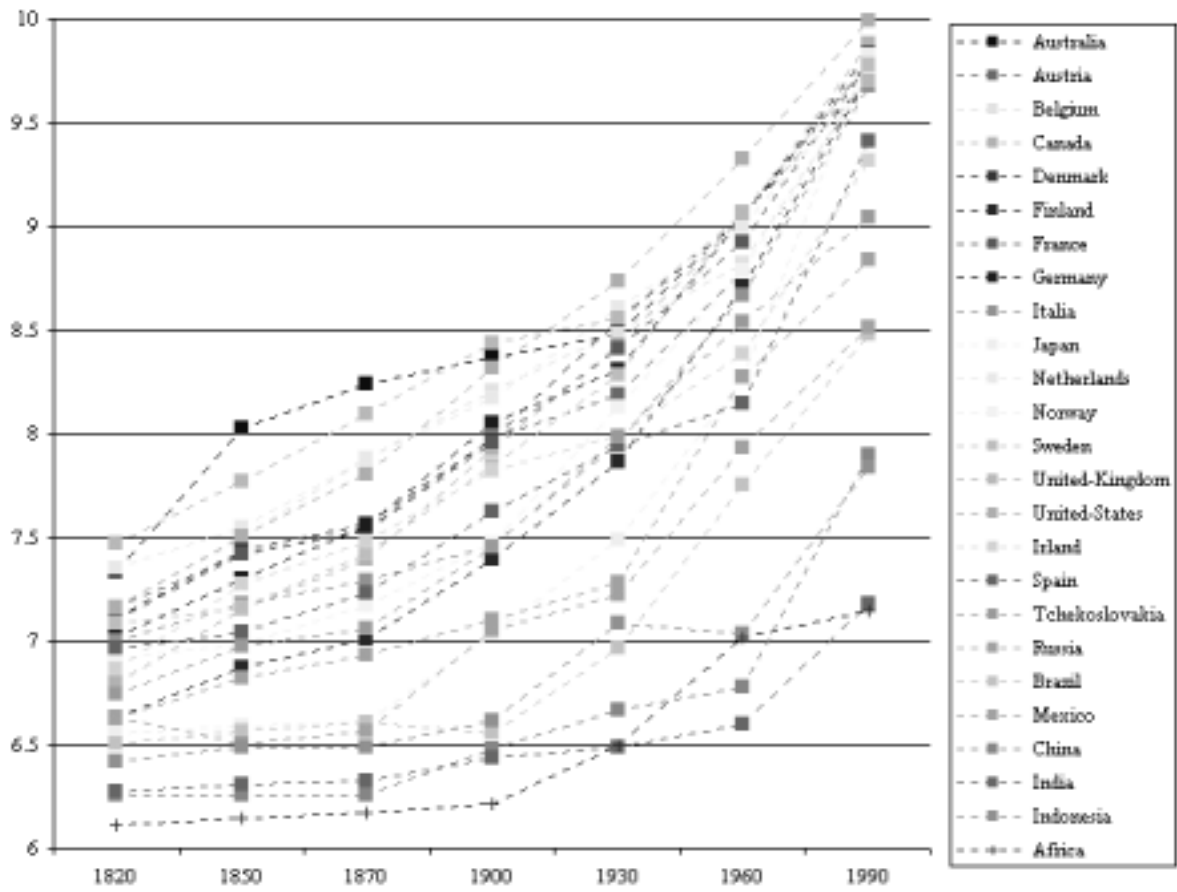
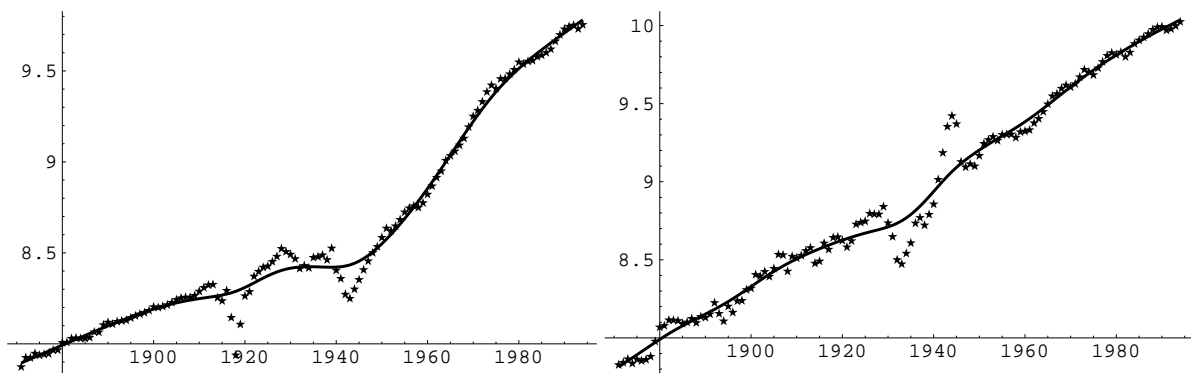


Figure 2: GDP trend - Belgium and USA



### 1.3 Short cycles

The short-term cycles have been widely documented in the real business cycle literature (see for instance Prescott (1998)) as well as in the applied econometric literature. The standard theory is able to document a wide series of stylized facts. There are however many puzzles left and we would like to mention some of them here.

*The equity-premium puzzle:* Returns on the stock market exceed the return on Treasury bills by an average of 6 percentage points, in the US. This strong risk-premium is puzzling in the context of an economy populated by agents endowed with standard preferences (Mehra and Prescott, 1985).

*The excess smoothness puzzle:* Consumption is slow to adjust to innovations in income and the changes in consumption are related to averages of previous innovations (Campbell and Deaton, 1989).

*The international risk sharing puzzle:* Output is more highly correlated across countries than consumption. This weak correlation of consumption levels is in contradiction with international risk sharing (Backus, Kehoe and Kydland, 1992).

### 1.4 Satisfaction

A fourth set of facts is less conventional. It relates to the results of surveys dealing with the overall satisfaction of people.

Neo-classical growth theory suggests that utility increases with consumption and, as a consequence, with wealth. Accepting that satisfaction and instantaneous utility are equivalent, this implies that the rich should feel more satisfied than the poor, that reported satisfaction levels should be higher in more developed countries and that satisfaction should grow in line with wealth. As a matter of fact, only the first of these three consequences of standard models seems to be weakly verified.

According to various studies, international differences in satisfaction are very small and almost unrelated to economic prosperity.<sup>3</sup> Surveys undertaken by Gallup simply consisted of asking a question on people's satisfaction in different parts of the world. "These are some puzzles about these results. Why are the impoverished Latin Americans so satisfied? Are Europeans really less happy than Americans and Australians?" (Argyle, 1987, p103).<sup>4</sup>

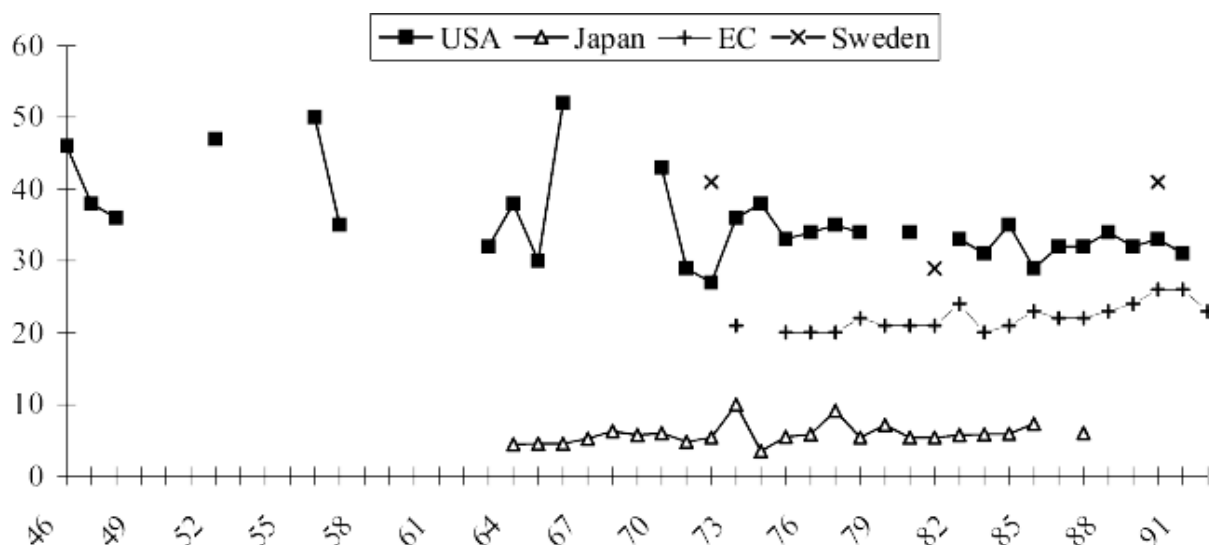
The Gallup type studies give useful information on the non-existence of the simple link consumption  $\rightarrow$  utility only if satisfaction levels are comparable across countries, i.e. if the preference orderings are monotonically related. If this is not the case, one has to use a method that is robust to cultural discrepancies and, possibly also, to other

---

<sup>3</sup>This conclusion of various aggregate studies is to some extent contradicted by panel data analysis, such as in Veenhoven (1994).

<sup>4</sup>A second study of the Gallup type comforts the idea that there is no positive association between wealth and satisfaction. "The results are ambiguous. The four lowest income countries are neither at the top nor at the bottom of the table" (Easterlin, 1974, p 108). Another useful source for making international comparisons of satisfaction is the survey carried out twice a year in the EC (Euro-barometer). The inference about a positive association between wealth and satisfaction relies heavily on the observations for two countries, Denmark and Greece. The other eight countries do not display any clear association.

Figure 3: Percentages “very happy” over time.



sources of bias such as translation problems. Such a study has been carried out by Cantril (1965) and further analyzed by Easterlin (1974). People were asked to imagine the best possible life and the worst possible life they could lead. They then had to say where their present life fell on a scale from 0 to 10. “The inference about a positive association (between wealth and satisfaction) relies heavily on the observations for India and the USA. (...) the values for Cuba and the Dominican Republic reflect unusual political circumstances. (...) there is not much evidence, for these 10 countries<sup>5</sup> of a systematic association between income and happiness. (...) a similar lack of association would be found between happiness and other economic magnitudes such as income inequality.” (Easterlin, 1974, p 105-106). Even if the methods and concepts of happiness studies are subject to criticism, one conclusion is that there is no evidence at the aggregate level in favor of the idea that wealth buys satisfaction.

Despite continually rising prosperity in the developed countries, there were considerable fluctuations in the percentage of those who said they were very satisfied. In Figure 3 we compare the US data gathered by Veenhoven (1993) with EC data from the Euro- barometer (some data points for Japan and Sweden are also displayed). The observed fluctuations for the USA and the astonishing constancy for EC 10 data are two puzzles which standard models are confronted with. Note finally that, behind the aggregate variable for EC 10, the various European countries display very contrasting experiences (de la Croix and Deneulin, 1996).

---

<sup>5</sup>Nigeria, Egypt, Philippines, Panama, Brazil, Yugoslavia, Japan, Poland, Israel, West Germany.

## 1.5 Labor market

One major challenge of macroeconomics is to propose rigorous and convincing explanations of why real wages may be rigid and why employment fluctuates largely in response to shocks. Indeed, the inspection of the U.S. business cycle characteristics of the labor market aggregates shows that the volatility of labor input is high and greater than the volatility of wages. Moreover, the correlation between wages and output is moderate (see Cooley and Prescott (1995)). The standard Real Business Cycle model, see e.g. King, Plosser and Rebelo (1988), fails to fit these facts. Solving this “business cycle puzzle” has become one of the most challenging task for the RBC research program.<sup>6</sup>

Moreover, the contrast between the US pattern of the labor market and its European counterpart has attracted wide attention (see e.g. Card, Kramarz and Lemieux (1996)). Indeed, in the last two decades, the US labor market was characterized by constant or even declining real wages and rising employment, while the European labor market experienced steadily rising real wages and falling employment, and a substantial and persistent high level of unemployment.

## 2 The principle of extended preferences

The standard approach to economics is to assume that agents maximize an objective function with preferences that depend at any point in time on the control variables chosen at that time (consumption, leisure ...). In the simplest growth model one has:

$$u(c_{it})$$

where  $u$  is the instantaneous utility function and  $c_{it}$  is the consumption at time  $t$  of individual  $i$ . The preferences under which the utility function is derived are, by definition, independent of past choices and others' choices. This simplification is quite useful to address many economic issues, but it is fair to recognize that most economic models have adopted a very naive approach to the determination of utility and that a large number of choices depend very much on past actions and inter-individual relationships. As stressed by Frank (1989), there is a lack of context: “The neoclassical economic model of choice abstracts from context, saying that utility depends only on the level of consumption. (...) one must not only know the relevant levels of consumption, but also have an appropriate frame of reference within which to evaluate them.”

Accordingly, the standard microeconomic approach to preferences has been extended by Becker (1996) and others to incorporate past experiences and social forces into tastes in order to analyze issues like addiction, peer pressure, catching-up, ... We can thus use these “extended preferences” to model the making of standard-of-living aspirations and their effect on macroeconomic variables. An extended utility function can be written

$$u(c_{it}, s_{it})$$

where  $s_{it}$  is a stock variable that represents the level of aspirations, habits ..., of individual  $i$ . We shall now analyze to what extent these mechanisms provide plausible

---

<sup>6</sup>See for instance the contributions of Christiano and Eichenbaum (1992) and Fève and Langot (1994).

frameworks to understand how fluctuations in output and employment are propagated. The question is now to specify how the stock variable  $s_t$  is formed.

### 3 Personal capital

A first class of models consider that  $s_{it}$  is built from the past actions of the agents:

$$s_{it} = s(s_{it-1}, c_{it-1}) \quad (1)$$

In this case  $s_{it}$  is called a “personal capital”. The easiest example is habit formation. The past consumption of the agent modifies its desire to consume today. Tastes thus evolve as a function of the agent’s decision.

#### 3.1 Principle

The idea dates back to Duesenberry (1949), has been used in many empirical studies and has been applied in general equilibrium set-ups by Wan (1970) and Ryder and Heal (1973). It amounts to assume that tastes are changing and that these changes depend on past decisions (i.e. past consumption levels or expenditure levels). Things are judged by the extent to which they depart from a baseline of past experiences. Experiences that are salient or extreme and relevant to other experiences imply important changes in instantaneous satisfaction. However, another important aspect of habit formation is that, “gradually, the most positive events will cease to have impact as they themselves are absorbed into the new baseline against which further events are judged”, see Brickman, Coates and Janoff-Belman (1978). This is a consequence of adaptation, a theory developed by biologists and psychologists, “which is a mechanism for acquainting us with changes in the environment. If the same stimulation continues, adaptation gradually counteracts its effects to the point where it may no longer be sensed or its quality becomes neutral” (Helson, 1964). The power of adaptation has been explored by Brickman, Coates and Janoff-Belman (1978). They study whether quadriplegic patients are just as satisfied some time after their accident as other people. The impact of their accident is completely eroded by an habituation process. Some authors then claim that happiness is totally relative and that the initial gain or loss in satisfaction after a big shock is completely eroded by habituation to the new consumption standard. Economists would then have in mind a utility function of the form:

$$u \left( \frac{c_{it}}{s_{it}} \right)$$

where the function (1) is homogeneous of degree one. This is of course an extreme case of habit formation.

A related problem in the context of habit formation is to capture the degree of forward looking behavior of the agents (see Pashardes (1986) and Muellbauer (1988)). The agent is called myopic if in each period he takes into account his consumption history but does not recognize the impact of his present consumption on his future tastes and decisions. In contrast, a “rational” agent refers to one who takes into account the effect



of his current decision on his future tastes. This was an important debate in the seventies but now all rational expectations models assume no particular myopia on behalf of the consumers. Let us now explore in more details the macroeconomic consequences of habit formation.

### 3.2 Macro-economic implications

Several papers in the literature show that habit formation is helpful to explain the fact that the return on the stock market exceeds so much the return on risk-free deposits. The first attempt to do so (Constantinides, 1990) was criticized because it implied counter-factual high risk aversion. Subsequent research has shown (Boldrin, Christiano and Fisher, 1995) that this equity premium puzzle can be accounted for without assuming counter-factual risk aversion if one assumes both habit formation and a multi-sector technology with limited mobility of factors.<sup>7</sup> The main force at work is a general equilibrium feature: as agents with habits have an additional motive to smooth their consumption, they will extensively sell and buy assets in the face of unexpected shocks. When the stock of capital is fixed, the price of assets is more volatile, and, other things being equal, the equity premium is increased.

The second implication of models with habit formation is obviously to smooth consumption. This is a nice property as standard models tend to over-estimate the sensitivity of consumption to income shocks. With habit formation, the response of consumption to income shocks is smaller, and the response to a distributed lag of past permanent incomes is positive (see Winder and Palm (1996) and Seckin (1999)).

To smooth consumption in the face of income shocks agents obviously need to adjust their saving rate. This implies that investment is more volatile with habit formation. As a consequence, a negative shock will have deeper consequences in the future as investment is more depressed than in standard models because agents try to adjust slowly their consumption level.

With respect to the international risk sharing puzzle, Fuhrer and Klein (1998) first show that habits are important in the G7 countries aggregate consumption and second that the introduction of habit formation makes the puzzle even worse than what we think. Indeed, in the face of common shocks to interest rates, habits can generate positive international correlations, even in the absence of risk sharing.

On the econometric side, the habit formation model has been used in empirical studies of consumer behavior (see Ferber (1973) for a survey). If we only consider relatively recent contributions, Muellbauer (1988), Eichenbaum, Hansen and Singleton (1988), Ferson and Constantinides (1991) and Ogaki and Park (1998) find that habit formation helps to account for consumption dynamics. Winder and Palm (1996) show in an explicit model that “ignoring habits or other forms of nonseparability may explain the frequent rejection of the life cycle hypothesis”. Finally, de la Croix and Urbain (1998) show that habit formation can be useful to obtain stable preference parameters in household’s Euler equations.

---

<sup>7</sup>The resolution of the equity premium puzzle by means of habit forming preferences is however still at stake (Otrok, Ravikumar and Whiteman, 1998)).

### 3.3 Comparison with the best previous experience

Modigliani (1949) introduces the highest past income in the consumption function. Following Michalos (1980), the best previous experience is one of the two main determinants of aspirations and of the goal-achievement gap, which itself explains quite well the reported levels of satisfaction. His study is carried out over twelve specific domains (e.g. health, family life etc.) and his conclusion seems rather robust. When comparisons are made with the best previous experience, the function (1) is of the form:

$$s_{it+1} = \max[s_{it}, c_{it}]$$

This introduces a unit root in the model and the economy displays path dependency. In this framework, reported satisfaction depends on the whole history, including the initial level of habits. This case provides interesting elements for explaining international differences in reported satisfaction.

## 4 Social capital

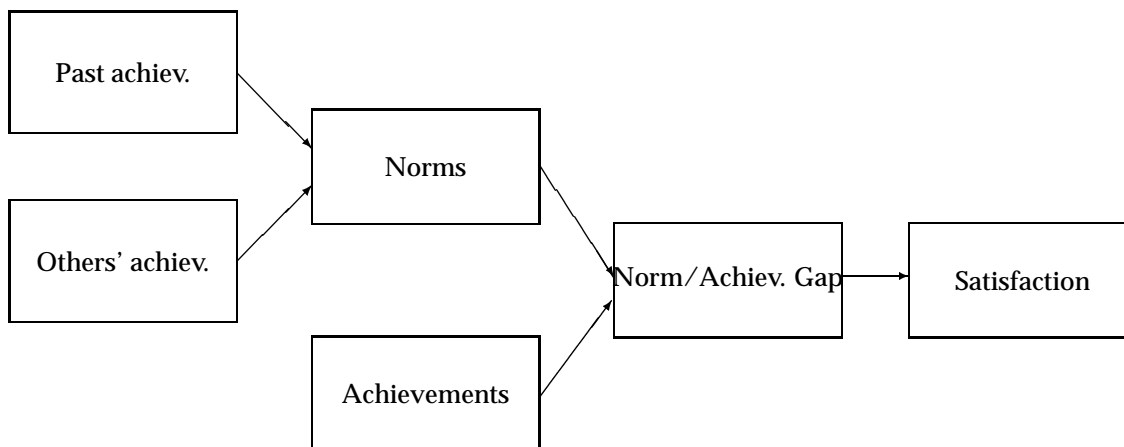
In the personal capital case the stock of habits is built from the personal past experience of the agent. An alternative is to suppose that aspirations are built from the past consumption of a reference group of agents, either peers or the whole society. This is the social capital case also called in the literature the “catching-up with the Joneses” approach. The main references are Abel (1990) and Campbell and Cochrane (1995). The stock  $s$  is now given by:

$$s_{it} = s(s_{it-1}, c_{t-1})$$

where  $c_{t-1}$  is aggregate consumption.

### 4.1 Principle

The norm-achievement gap model often presented in the psychological literature can be seen as embedding both personal and social capital. According to Michalos (1980), “the hypothesis regarding satisfaction as a function of the gap between aspiration and achievement has been almost uniformly successful.” In this model satisfaction is a function of the perceived gap between goal and achievements, and the goal is a function of previous personal experience and other achievements. This norm/achievement gap model follows the following scheme:



Norms are fed by (real and/or imaginary) comparisons with one's own and with other persons' past. The studies of Michalos (1980) conclude, on the basis of questionnaire data, that comparisons with the most-liked previous experience and with a reference group of other people are the main factors of the norm/achievement gap and, hence, of satisfaction. Using the terminology of Scitovsky (1976), the "enjoyment of novelty" may come from comparisons with the past, and "satisfaction of status" from comparisons with other people.

## 4.2 Macro-economic implications

The key difference between social and personal capital models is that social capital postulates a consumption externality. Indeed, the future norms of the society are formed from the current and past consumption choices of its members. Each individual member does not internalize the effect of his current choice on social norms and thus on his future tastes. Agents who increase their consumption do not take into account their effect on the aggregate desire of all other agents to catch-up. This externality allows room for beneficial government intervention. Optimal – first-best – policies can take different forms depending on the structure of the model.

- If there are different types of goods, it is obvious that the optimal policy consists in taxing the positional goods. The possibility is explored in a growth model by Cooper and Garcia-Peñalosa (1999). This taxation allows to reduce the aggregate desire to catch-up.
- In the face of exogenous shocks on income, Ljungqvist and Uhlig (1999) show that it can be optimal to adopt a Keynesian policy. Indeed, in a model without capital, pro-cyclical taxes allow to cool down the economy when it is overheating following a positive shock. As households cannot smooth consumption as much as they wish it is optimal to avoid over-consumption during expansion periods.
- On the contrary, when capital is introduced, the catching-up with the Joneses model leads to too smooth consumption. It is then optimal to amplify the effect of the shocks by means of taxes (see Lettau and Uhlig (1999) and de la Croix

(1998)). This illustrates that reducing the variance of consumption is not always an optimal policy.

Government spending policies can also help in reducing the externalities. In models with a direct effect of government spending on utility including possibly some habituation mechanism, there are potential cross effects with the norms derived from private consumption. An example of the positive role of government spending on externalities is provided by Ng (1987) in a static framework: the external cost of the resources used to produce private goods which are imposed on others through relative-income effects no longer exists in the case of public expenditure on pure public goods. The production of public goods is thus a mean to reduce the inter-individual externalities. An extension of this to a dynamic setting is left for future research.

Finally, Layard (1980) suggests to alter utility functions in order to reduce the importance of externalities. Education policies could play a role so as to make people more altruistic and less concerned about their status. The effect of education on the norm-achievement gap is not straightforward, however, as some empirical studies show that the positive effect of education on satisfaction can be offset by the fact that education may lead to higher aspirations and, hence, frustrations (see e.g. Woittiez and Theeuwes, 1995.) In order to analyze such policies, it is necessary to explicitly introduce human capital to the model (or, at least, leisure) and to assume that the function describing how norms are built depends either on the level of human capital or on the time spent on leisure.

## 5 Family capital

Let us now turn our attention to another form of endogenous tastes, more adapted to the study of long-run issues. It is a framework in which agents evaluate their own consumption with respect to a baseline that depends on the consumption of their parents when they were still living with them. Indeed parents' influence on children is not limited to resource transfers or human capital transfers. Becker (1992) notices that "The habits acquired as a child or young adult generally continue to influence behavior even when the environment changes radically. For instance, Indian adults who migrate to the United States often eat the same type of cuisine they had in India, and continue to wear the same type of clothing.(...) Childhood-acquired habits then continue, even though these would not have developed if the environment when growing up had been the same as the environment faced as an adult.(...)" A comprehensive survey of evidence of vertical transmission (i.e. from parents to children), including the fear of insects but also career aspirations, is provided in Boyd and Richerson (1985). These vertical transmission mechanisms are modelled in different strands of literature. All of them lead to the conclusion that intergenerational taste externalities are particularly important for thinking about long term evolution processes like growth.

## 5.1 Principle

The inter-generational spill-over can take the form of what social scientists call social capital (to be distinguished from the concept of social capital used above). Following Coleman (1990), physical capital is wholly tangible, being embodied in equipment; human capital is embodied in the individuals through skills and knowledge; social capital is embodied in the relations among persons. The family relationships are important vectors of social capital allowing for intergenerational spill-overs. Chapter 22 of Coleman (1990) analyses how different family structures generate social capital and how the decline in the role of the family in recent decades can be important for the social capital of the next generations. In Coleman (1990), social capital can be seen as a vector of growth; he does not investigate situations in which some sort of social capital can hamper the growth process.

The most comprehensive analysis of inter-generational spill-overs can be found in the work of Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985). They study cultural transmission across generations, and in particular, the link between the transmission of culture and the transmission of genes.

After having assessed the huge importance of social learning within the family, Boyd and Richerson (1985) build different models in which the distribution of beliefs, attitudes and values in a population is transmitted and modified. The most important source of ambiguity is the empirical difficulty to disentangle cultural inheritance from genetic inheritance. However, linking the models of cultural transmission to models of genetic evolution helps to determine the circumstances under which natural selection might favor the modes of cultural transmission observed among human beings. Given detailed assumptions about the structure of cultural transmission and the nature of the environment, they predict the kinds of culturally transmitted behaviors that should characterize a particular population.

In Cavalli-Sforza and Feldman (1981), the vertical transmission of culture is measured using the Stanford survey of beliefs and values. Vertical transmission appears clearly important concerning dietary habits, religious habits, sports participation and political interest. The authors next study the interaction between the inheritance of culture, the inheritance of genes and the environment. One interesting aspect is that cultural selection is distinguished from natural selection. Cultural selection is determined by the acceptance or refusal by the individual after his exposure to the trait. Cultural selection is important to determine the type of dynamics that can emerge. For instance, negative reactions to examples set by parents may generate cyclical dynamics. Once cultural selection has occurred, the Darwinian fitness of the trait is tested. Indeed, the inheritance of a trait can alter the viability of the next generation, depending on how this trait “fits” with the process of natural selection. This can lead to unstable dynamics, and to the extinction of some traits. Their socio-biological approach is not that far from the economic approach, in which the role of the natural selection is played by market forces.

## 5.2 Modelling inter-generational taste externalities

In a simple general equilibrium model, inter-generational taste externalities can be modelled in the following way. Using the same notation as above, the instantaneous utility depends on a stock variable  $s_t$  which is here interpreted as family capital. We thus have  $u(c_t, s_t)$  and we may distinguish two cases depending on the sign of the inter-generational spill-over.

When  $u'_s > 0$ , the consumption of the parents has a positive influence on the utility of their children. This is the case for instance when the children learn an “art-of-living” with their parents; this stock of cultural knowledge presents some durability and still exerts a positive influence when the children become adults. The effect of  $s$  on the consumption behavior of the new adult depends on  $u''_{cs}$ . If  $u''_{cs} < 0$ , the desire to consume is reduced by the stock of cultural knowledge, when for instance the agents have learned how to withdraw a maximum satisfaction from what they consume, and we say that they are repleted. If  $u''_{cs} > 0$  the desire for consumption is increasing with the parents’ consumption and we say that there is addiction.

When  $u'_s < 0$ , which is the case studied in this paper, parents’ consumption has a negative influence on children’s utility. As in the psychological models of the “goal-achievement gap”, the instantaneous satisfaction depends on the gap between the actual consumption and the aspirations, i.e., the consumption of the previous generation. If  $u''_{cs} < 0$ , the aspiration effect generates distaste. If  $u''_{cs} > 0$ , which is the interesting case, the aspirations serve as a benchmark consumption level determining a goal to reach for the new generation. They induce a desire of catching-up, pushing the new generation to consume more than what their parents did. The utility function used in de la Croix (1996, 2000) and de la Croix and Michel (1998, 1999) displays this catching-up effect. They use the following utility of a representative individual:

$$\log(c_t - s_t) + \beta \log(d_{t+1})$$

where  $c_t$  is the consumption when adult,  $d_{t+1}$  is the consumption when old and  $\beta$  is the psychological discount factor. Aspirations  $s_t$  are linked to the consumption of the parents when adults:

$$s_t = \gamma c_{t-1}$$

As  $u''_{cs} > 0$ , the aspiration effect induces a desire of catching-up, pushing the new generation to consume more than what their parents did. We also assume that the depreciation rate of aspirations (i.e. forgetting) is high so that they no longer affect the evaluation of consumption when old. This simplifying assumption proxies the idea that aspirations are less important for older persons.<sup>8</sup>

---

<sup>8</sup>This is supported by the empirical observation that reported satisfaction increases from the age of 30 onwards. On the basis of their empirical study on job satisfaction, Clark, Oswald and Warr (1996) conclude that “the rise in job satisfaction at these ages could come from *reduced aspirations*, due to a recognition that there are few alternative jobs available once a worker’s career is established (...). Alternatively, aspirations themselves could remain the same but older workers might put less weight on such comparisons (...).”

### 5.3 Macro-economic implications

As stressed by Easterlin (1971), income growth from one generation to another is a two-edged sword. His argument is that “in a steadily growing economy, successive generations are raised in increasingly affluent households and hence develop successively higher living aspirations.” This “intergenerational taste effect” is a *negative* externality making the future generations more and more demanding along the growth process. This is dramatically illustrated by the results of a survey of the experience in a rapidly growing economy – Taiwan – analyzed by Freedman (reported by Easterlin (1974)): “Only 20 percent of the respondents said their financial position had improved during the last five years, although real per capita income increased about 40 percent during that period.”

How the negative externality linked to inherited standard-of-living aspirations interacts with positive inherited human capital is studied in de la Croix (2000) who wonders whether the interaction of inherited higher skills and higher aspirations could explain why development and economic growth are not as successful and widespread as the standard theory predicts. For instance, if aspirations rise faster than productivity, households can be tempted into lowering savings and/or education spending in order to maintain the growth of their consumption. This mechanism can be responsible for oscillations around the balanced growth path. The economic rationale for oscillations in this case is the following: The spill-over from one generation to the next has two components: (a) savings of the old generation finance the capital stock required to produce and to pay the wages of the young generation; this process that transforms income/savings of the old into income for the young displays decreasing returns; (b) past consumption levels of the parents generate standard-of-living aspirations for the young generation, leading them to spend more on consumption; this process displays constant returns. At one point, due to the decreasing returns in the production process, the bequest in terms of higher wages is not sufficient to cover the bequest in terms of higher aspirations. This leads to a drop in savings to maintain the standard-of-living and induces a recession. When the consecutive impoverishment is strong enough, aspirations revert to lower levels, allowing a rise in savings and the start of an expansion period. Depending on the relative strength of the two effects and on the current state of the economy compared to its stationary state, this process can either converge, or explode.

A second implication of the model is the existence of a poverty trap: for some initial conditions, the economy is led to a no-growth stationary state. This model can thus explain differences in income levels and growth rates across countries in terms of (slight) differences in fundamentals and initial conditions. The difference with the existing literature on the subject, surveyed by Benhabib and Gali (1995), Galor (1996) and Azariadis (1996), is that the initial conditions include, in addition to the standard levels of human and/or capital stock variables, an initial level for the stock of norms/aspirations. This model implies that the economies will be divided into two classes as a function of their initial combination of aspirations - human capital: one class experiencing a positive growth rate (that may furthermore oscillate over time) and one class characterized by low or no growth. This dualisation may take place even if the initial distribution of initial conditions is concentrated. This is in accordance with the description of convergence proposed by Quah (1996) in which two convergence

clubs emerge with their own basin of attraction. The presence in one of our examples of a repelling limit cycle reinforces the idea of small basins of convergence around endogenous growth stationary states. Notice that the picture proposed by Quah (1996) does not exclude the transition of a poor country to the club of the rich; in our model this would be explained by a favorable initial mix of aspirations and human capital in this poor country.

A third consequence is the occurrence of a decline scenario. In the existing literature, education below a critical level may lead to a poverty trap and economies starting with a too low stock of human capital may be unable to reach the higher stationary state. This remains true in our framework, yet countries starting with too *high* education spending may also end in a poverty trap. In that case, the high revenues generated by the high human capital stock may rapidly induce a boom and high standard-of-living aspirations. If aspirations rise too rapidly compared to the potentialities of the economy, savings are depressed and investment in education and physical capital drops.

An empirical question implied by the above theoretical research consists in analyzing whether excessively high aspirations can effectively slow growth. A documented example concerns the Golden sixties in the U.S. and the consecutive recession. In the model, recession periods are preceded by a time of high aspirations, and hence, low satisfaction. Easterlin (1974) and Easterlin (1995) use the happiness survey carried out by the American Institute of Public Opinion (Gallup) in the years 1946-1970 and by the National Opinion Research Centre (University of Michigan) since 1957. The conclusion that can be drawn from the two independent surveys is that there was a decline in happiness between the late 1950s and the mid-1960s. The drop in happiness came in a boom before the drop in growth that started in the mid sixties. This view is also corroborated by the comprehensive study of Campbell (1981) based on 45 happiness surveys. He concludes first that there was a swing in American happiness with a peak in the late fifties, and second that movements in happiness sometimes occur in direct opposition to what one would have expected on the basis of economic trends. Further research on the idea that aspirations above a critical level can be a cause of economic stagnation for certain developing countries could be pursued using cross-sectional data.

## 6 The fair wage

Habit formation and social norms mechanisms can be helpful to understand labor market characteristics. For countries where unions play an important role, the utility of the union may depend on the history of wages, making an income cut undesirable to the union. Stated differently, the unions' utility function may depend on the growth of wages, i.e., the level of past wages is progressively included in the reservation wage. Union's habit formation relates to "built-in" taste changes depending on past decisions. The assumption that "A once and for all increase tends after a period to be forgotten and assumed part of the accepted wage structure" was applied to unions by Kotowitz and Portes (1974) and de la Croix, Palm and Pfann (1996). Frank and Hutchens (1993) relate this idea to the empirical evidence that people prefer jobs with rising wage profiles.



Another promising line of research relies on an extension of the efficiency wage model.

## 6.1 Principle

Assuming that productivity and workers' effort are affected by the wage paid by the firm, efficiency wage theories have been judged to be very promising given the goal of understanding labor market characteristics (see e.g. Blanchard and Fischer, 1989, p.463). Danthine and Donaldson (1995) list four kinds of efficiency wages: (a) those that discourage shirking by raising the opportunity cost of being fired (shirking model), (b) those that reduce quits (turnover cost model), (c) those that improve the applicant pool (screening model), (d) those that improve efforts by improving morale with a fair wage (gift exchange model). These theories have first been developed in static models, explaining the existence of involuntary unemployment in terms of the optimal response of firms to workers' behavior. For instance, in the gift exchange model of Akerlof (1982), the effort of an individual worker depends on a comparison between the current wage and a norm which includes the salaries perceived by other workers, the level of unemployment and unemployment benefits, and the actual wage of the individual in previous periods. Notice that this last element has been omitted in the various subsequent analyses because the majority of them are performed in static frameworks.

The optimal response of the firm to this behavior is to offer a wage above the market-clearing level in return for which workers would provide a higher level of effort. This view of labor relationships is supported by a large number of studies both in applied economics and experimental psychology. A representative study in this category which precedes the theoretical formulation of the efficiency wage models is the one of Adams and Rosenbaum (1962). The agents in this experiment were male college students who were hired on a part-time basis to conduct interviews at a given salary per hour. After completing an extensive questionnaire, agents in the control group were informed that they were suitably qualified for the job. In the experimental group, agents were told that their questionnaires revealed them to be under-qualified, but that they would be hired and paid the preestablished rate nevertheless. This manipulation led agents in the experimental group to feel they were overpaid compared to the agents in the control group. The results revealed that the agents in the experimental group conducted more interviews per hour than those in the control group, thereby lending support to the theory.

Several papers pursuing the efficiency wage route embed shirking or gift exchange motives in the framework of stochastic dynamic general equilibrium models.<sup>9</sup> The hopes generated by the efficiency wage theories were then strongly dashed by these studies.

In a gift exchange set-up, Danthine and Donaldson (1990) conclude that "The most striking implication to emerge from these data is the inability of our gift exchange example to account for the business cycle puzzle. This result is important because it

---

<sup>9</sup>Up to our knowledge, the two other types of efficiency wage models have not been analyzed within stochastic dynamic general equilibrium models.

demonstrates that in efficiency wage models involuntary unemployment (...) is not synonymous with wage sluggishness. (...) most of the adjustment to productivity shocks is in terms of wages. There is almost no adjustment in terms of quantities." A similar disappointment with regard to efficiency wage theories can be found in models of the shirking category as in Uhlig and Xu (1995) and Gomme (2000). Uhlig and Xu (1995) find that, in order to reproduce an adequate level of employment variability, they need to assume implausibly large movements in the technological shock. The reason is that effort moves counter-cyclically, because the wage norm depends negatively on unemployment. Gomme (2000) also finds that wages are too volatile and too pro-cyclical compared to the data.

Taking inspiration from what has been developed on consumers habits and social norms, it is possible to extend the gift exchange model of Danthine and Donaldson (1990) allowing for the reference wage to include past wages of the individual himself or of others. Indeed, the conclusion that efficiency wage considerations based on the gift exchange paradigm are not sufficient to resolve the business cycle puzzle (Danthine and Donaldson, 1995) seems too hasty because the aforementioned studies have never used the original idea of Akerlof (1982) that the wage norm depends also on past wages. It is fair to recognize that this time-non-separability in the disutility of effort could not have been analyzed in the initial static studies of gift exchange models, but it seems feasible and desirable to use it in the more sophisticated dynamic models of the RBC type. This position is reinforced by the bunch of empirical studies which stress the importance of inter-temporal wage comparisons for effort and job satisfaction.

For instance, examining the benchmarks used in the evaluation of payments, Goodman (1974) found that an important proportion of respondents to his survey used their own payment in the past as a comparison standard. Another interesting study has been carried out by Lord and Hohenfeld (1979). They compared the performance of baseball players who were paid less one season than they were the season before. Using their own salaries during the previous year as a basis for comparison, they were expected to have felt underpaid. As the theory predicts, these players lowered their performance. A more recent micro-econometric study of Wadhvani and Wall (1991) uses a panel on U.K. manufacturing enterprises to estimate their production function (including the effort function). They allow the wage norm to depend on past wages and show that there is some evidence in favor of this dependence. Additional inference on the role of past wages on effort can be done by analyzing job satisfaction studies. Using a panel data on British employees, Clark (1996) provides evidence that job satisfaction is strongly positively correlated with the change in the worker's payment between the two waves of the panel.

Very recently the survey undertaken by Bewley (1998) brings interesting insights to model wage behavior. He interviewed business people, labor leaders and counselors of unemployment people in the US to understand why wages were almost never declining. The key result is that firms dislike pay cuts because they hurt morale. Good morale promotes high productivity, less turnover, and a good company reputation that helps recruiting. Pay cuts hurt morale because of discomfort from reduced living standards and because of an insult effect – workers associate pay increases with approbation and reward. A key point of the survey is that morale depends on the level of wages, but most importantly, on wage changes.

Applying the terminology of Becker (1996) to our problem, the inclusion of past wages in the norm can be achieved in two distinct ways: (a) The personal norm includes the relevant past wages perceived by the individual; (b) The social norm incorporates the influence of past actions by peers and others. This distinction is crucial for the type of dynamics which will emerge from the model. In the personal norm case, the firm recognizes the impact of the current wage on the future effort levels of its workers. In the social norm case, the firm has no control on the “social capital” of its workers since it is mainly determined by the situations of peers and relevant others. In the majority of the mentioned empirical studies, the authors have implicitly in mind the social norm case. However, in a fully specified dynamic model with rational expectations, the alternative of the personal norm case could also be of interest.

## 6.2 Macro-economic implications

Collard and de la Croix (2000) evaluate whether incorporating past wage comparisons in gift exchange models can help to solve the business cycle puzzle related to the labor market and hence promote a new direction for research. The evaluation of the performance of the model is carried out using standard real business cycle techniques, including the comparisons between the properties of the data generated by a stylized calibrated model and those from the real world. The moments on which the comparison will bear are essentially the volatility and the correlation of hours and wages with respect to output. They also examine the ability of the model to mimic the dynamic pattern of wages and hours.

In both social and personal norm models, the high variability of employment and the low variability of wages are reproduced without requiring additional features such as nominal rigidities, tastes shocks or indivisible labor. The social norm model also allows to mimic closely the slightly positive actual correlation between real wages and employment. In the personal norm case, fair wage considerations induce a propagation mechanism that magnifies the effect of productivity shocks on activity and implies a pro-cyclical effort.

de la Croix, Palm and Urbain (2000) propose a dynamic model in which a representative firm chooses employment and a wage level designed to motivate its employees. The effort of these employees depends both on the level and on the growth rates of wages compared to those of the alternative wages (i.e. in the rest of their sector). With the aim to understand wage and employment dynamics, the implications of this model are confronted with data for manufacturing sectors in US, Germany, Great-Britain and France. Their conclusion is twofold. First, the implications of the model seem in accordance with the non-stationarity present in the data and the restrictions imposed on the dynamics are not rejected. Parameter constancy is not rejected in three countries among four.<sup>10</sup> Second, effort is less sensitive to wage growth comparisons in the US than in the three European countries. European workers seem more attached to previous wage conditions and put more weight on wage increases. According to these results, the optimal wage growth set by the firm is more sensitive to the level of unemployment in the US than in Europe.

---

<sup>10</sup>From a practical point of view, parameter constancy appears as a necessary but not sufficient condition for robustness to the Lucas critique.

## 7 Summary and conclusion

One of the major challenges of research in macroeconomics is to explain why there are economy-wide movements in output and employment. Different approaches have been pursued to model fluctuations, including shocks to fundamentals, endogenous cycles and self-fulfilling expectations. For all approaches, the elaboration of frameworks that can propagate cycles in the case of empirically realistic mechanisms is one important challenge. Our aim was to study the contribution of habit formation set-ups and standard-of-living aspirations to the explanation of fluctuations.

The standard approach to economics is to assume that agents maximize an objective function with preferences that depend at any point in time on the control variables chosen at that time (consumption, leisure). These preferences are, by definition, independent of past choices and others' choices. This simplification is quite useful to address many economic issues, but it is fair to recognize that a large number of choices depend very much on past actions and inter-individual relationships. Accordingly, the standard microeconomic approach to preferences has been extended to incorporate past experiences and social forces into tastes in order to analyze issues like addiction, peer pressure, catching-up. Our aim is to use these "extended preferences" to model the making of standard-of-living aspirations and their effect on macroeconomic variables; we then analyze to what extent these mechanisms provide plausible explanations of why growth is not a steady process and how fluctuations in output and employment are propagated.

In the first part we concentrate on the consumption behavior when there is habit formation. We show that such behavior can be in accordance with several empirical facts and has important policy implications. Long term issues are analyzed in the second part in which we assume that children become habituated to a certain standard-of-living whilst still with their parents. We show that this assumption introduces a powerful mechanism that can be responsible for long-term oscillations. As the labor market is a key element of the macroeconomic dynamics, we investigate in the third part whether habit formation set-ups applied to wage formation can explain the relative volatility of wages and employment and the persistence of unemployment at high levels.

We conclude that the microeconomic approach to extended preferences can be fruitful to analyze macroeconomic issues like cycles and growth. Including past consumption expenditure in the utility function is helpful to model the desire to maintain or enhance inherited standard-of-living. The notion of fair wage as depending on the history of wages, either personal or social, is also important to understand labor market facts. Many further extensions are possible. In pursuing this line of research, one should however keep in mind that when one puts things like status into the utility function one should be careful not to lose the discipline standard economic modelling provides (Postlewaite, 1999). A careful analysis of both the theoretical and empirical foundations of the modelling choices is thus required to build parsimonious macroeconomic models with endogenous tastes.

## References

Abel, A. (1990) "Asset prices under habit formation and catching up with the Joneses". *American Economic Review Papers and Proceedings*, 80:38-42.

Adams, J. and W. Rosenbaum (1962) "The relationship of worker productivity to cognitive dissonance about wage inequalities". *Journal of Applied Psychology*, 46:161-164.

Akerlof, G. (1982) "Labor contracts as partial gift exchange". *Quarterly Journal of Economics*, 97:543-569.

Argyle, M. (1987) *The psychology of happiness*. Methuen.

Azariadis, C. (1996) "The economics of poverty traps - part one: complete markets". *Journal of Economic Growth*, 1:449-486.

Backus, D., P. Kehoe and F. Kydland (1992) "International real business cycles". *Journal of Political Economy*, 100:745-775.

Becker, G. (1992) "Habits, addictions and traditions". *Kyklos*, 45:327-345.

Becker, G. (1996) *Accounting for Tastes*. Harvard University Press.

Benhabib, J. and J. Gali (1995) "On growth and indeterminacy: some theory and evidence". *Carnegie-Rochester Conference Series on Public Policy*, 43:163-211.

Bewley, T. (1998) "Why not cut pay?" *European Economic Review*, 42:459-490.

Blanchard, O. and S. Fischer (1989) *Lectures on macroeconomics*. MIT.

Boldrin, M., L. Christiano and J. Fisher (1995) "Asset pricing lessons for modeling business cycles". Working Paper, NBER.

Boldrin, M. and M. Woodford (1990) "Equilibrium models displaying endogenous fluctuations and chaos". *Journal of Monetary Economics*, 25:189-222.

Boyd, R. and P. Richerson (1985) *Culture and the evolutionary process*. University of Chicago Press.

Brickman, P., D. Coates and R. Janoff-Belman (1978) "Lottery winners and accident victims: Is happiness relative?" *Journal of Personality and Social Psychology*, 36:917-927.

Campbell, A. (1981) *The sense of well-being in America*. McGraw-Hill.

Campbell, J. and J. Cochrane (1995) "By force of habits: a consumption-based explanation of aggregate stock market behavior". Working Paper, NBER.

Campbell, J. and A. Deaton (1989) "Why is consumption so smooth?" *Review of Economic Studies*, 56:357-374.

Cantril, H. (1965) *The pattern of human concerns*. Rutgers University Press.

Card, D., F. Kramarz and T. Lemieux (1996) "Changes in the relative structure of wages and employment: comparison of the United States, Canada and France". Working Paper, NBER.

Cavalli-Sforza, L. and M. Feldman (1981) *Cultural transmission and evolution: a quantitative approach*. Princeton University Press.

Christiano, L. and M. Eichenbaum (1992) "Current real business cycle theories and aggregate labor-market fluctuations". *American Economic Review*, 82:430-450.

Clark, A. (1996) "Are wages habit forming? evidence from micro-data". Working Paper, OCDE.

Clark, A., A. Oswald and P. Warr (1996) "Is job satisfaction U-shaped in age?" *Journal of Occupational and Organizational Psychology*, 69:57-81.

Coleman, J. (1990) *Foundations of social theory*. Belknap - Harvard.

Collard, F. and D. de la Croix (2000) "Gift exchange and the business cycle: the fair wage strikes back". *Review of Economic Dynamics*, 3:166-193.

Constantinides, G. (1990) "Habit formation: a resolution of the equity premium puzzle". *Journal of Political Economy*, 98:519-543.

Cooley, T. and E. Prescott (1995) Economic growth and business cycles. In T. Cooley, editor, *Frontiers of Business Cycle Research*. Princeton University Press.

Cooper, B. and C. Garcia-Peñalosa (1999) "Status effects and negative utility growth". University of Oxford.

Danthine, J.-P. and J. Donaldson (1990) "Efficiency wages and the business cycle puzzle". *European Economic Review*, 34:1275-1301.

Danthine, J.-P. and J. Donaldson (1995) Non-walrasian economies. In T. Cooley, editor, *Frontiers of Business Cycle Research*. Princeton University Press.

de la Croix, D. (1996) "The dynamics of bequeathed tastes". *Economics Letters*, 51:89-96.

de la Croix, D. (1998) "Growth and the relativity of satisfaction". *Mathematical Social Sciences*, 36:105-125.

de la Croix, D. (2000) "Growth dynamics and education spending: the role of inherited tastes and abilities". *European Economic Review*, p. forthcoming.

de la Croix, D. and S. Deneulin (1996) "Relativité de la satisfaction et croissance économique". *Actes du 12ème congrès des économistes belges de langue française*, 1:153-169.

de la Croix, D. and P. Michel (1998) "Altruism and self-refrain". Working Paper, Department of Economics, Université catholique de Louvain.

de la Croix, D. and P. Michel (1999) "Optimal growth when tastes are inherited". *Journal of Economic Dynamics and Control*, 23:491-518.

de la Croix, D., F. Palm and G. Pfann (1996) "A dynamic contracting model for wages and employment in three European economies". *European Economic Review*, 40:429-448.

de la Croix, D., F. Palm and J.-P. Urbain (2000) "Labor market dynamics when effort depends on wage growth comparisons". *Empirical Economics*, p. forthcoming.

de la Croix, D. and J.-P. Urbain (1998) "Intertemporal substitution in import demand and habit formation". *Journal of Applied Econometrics*, 13:589-612.

Duesenberry, J. (1949) *Income, saving, and the theory of consumer behavior*. Harvard University Press.

Easterlin, R. (1971) "Does human fertility adjust to the environment?" *American Economic Review Papers and Proceedings*, 61:399-407.

Easterlin, R. (1974) Does economic growth improve the human lot? some empirical evidence. In P. David and M. Reder, editors, *Nations and Households in Economic Growth*. Academic Press.

Easterlin, R. (1995) "Will raising the incomes of all increase the happiness of all?" *Journal of Economic Behaviour and Organization*, 27:35-46.

Eichenbaum, M., L. Hansen and K. Singleton (1988) "A time series analysis of representative agent models of consumption and leisure choice under uncertainty". *Quarterly Journal of Economics*, 103:51-78.

Farmer, R. (1986) "Deficits and cycles". *Journal of Economic Theory*, 40:77-88.

Ferber, R. (1973) "Consumer economics, a survey". *Journal of Economic Literature*, 11:1303-1342.

Ferson, W. and G. Constantinides (1991) "Habit persistence and durability in aggregate consumption". *Journal of Financial Economics*, 29:199-240.

Fève, P. and F. Langot (1994) "The RBC model through statistical inference: an application with French data". *Journal of Applied Econometrics*, 9:S11-S35.

Frank, R. (1989) "Frames of references and the quality of life". *American Economic Review, papers and proceedings*, 79:80-85.

Frank, R. and R. Hutchens (1993) "Wages, seniority, and the demand for rising consumption profiles". *Journal of Economic Behavior and Organization*, 21:251-276.

Fuhrer, J. and M. Klein (1998) "Risky habits: on risk sharing, habit formation, and the interpretation of international consumption correlations". working paper 6735, NBER.

Galor, O. (1996) "Convergence? inferences from theoretical models". *The Economic Journal*, 106:1056-1069.

Gomme, P. (2000) "Shirking, unemployment and aggregate fluctuations". *International Economic Review*, forthcoming.

- Goodman, P. (1974) "An examination of referents used in the evaluation of pay". *Organizational Behavior and Human Performance*, 12:170-195.
- Grandmont, J.-M. (1985) "On endogenous competitive business cycles". *Econometrica*, 22:995-1037.
- Helson, H. (1964) *Adaptation-level theory: an experimental and systemic approach to behavior*. Harper and Row.
- Hodrick, R. and E. Prescott (1980) "Post-war U.S. business cycles: an empirical investigation". mimeo.
- Jones, C. (1999) "Was an industrial revolution inevitable : economic growth over the very long-run". Stanford University.
- King, R., N. Plosser and S. Rebelo (1988) "Production, growth and business cycles: I". *Journal of Monetary Economics*, 21:196-232.
- Kotowitz, Y. and R. Portes (1974) "The tax on wage increases". *Journal of Public Economics*, 3:112-132.
- Layard, R. (1980) "Human satisfactions and public policy". *Economic Journal*, 90:737-750.
- Lettau, M. and H. Uhlig (1999) "Can habit formation be reconciled with business cycle facts?" *Review of Economic Dynamics*, forthcoming.
- Ljungqvist, L. and H. Uhlig (1999) "Tax policy and aggregate demand management under catching up with the joneses". *American Economic Review*, forthcoming.
- Lord, R. and J. Hohenfeld (1979) "Longitudinal field assessment of equity effects on the performance of major league baseball players". *Journal of Applied Psychology*, 64:19-26.
- Maddison, A. (1995) *Monitoring the world economy 1820-1992*. OECD.
- Mehra, R. and E. Prescott (1985) "The equity premium: a puzzle". *Journal of Monetary Economics*, 15:145-161.
- Michalos, A. (1980) "Satisfaction and happiness". *Social Indicators Research*, 8:385-422.
- Modigliani, F. (1949) "Fluctuations in the saving-income ratio: A problem in economic forecasting". *Studies in Income and Wealth*, 11.
- Muellbauer, J. (1988) "Habits, rationality and myopia in the life cycle consumption function". *Annales d'Economie et de Statistique*, 9:47-70.
- Ng, Y.-K. (1987) "Relative-income effects and the appropriate level of public expenditures". *Oxford Economic Papers*, 39:293-300.
- Ogaki, M. and J. Park (1998) "A cointegration approach to estimating preference parameters". *Journal of Econometrics*, 82:107-134.



- Otrok, C., B. Ravikumar and C. Whiteman (1998) "Habit formation: a resolution of the equity premium puzzle?" Working Paper, University of Iowa.
- Pashardes, P. (1986) "Myopic and forward looking behaviour in a dynamic demand system". *International Economic Review*, 27:387-397.
- Postlewaite, A. (1999) "Social arrangements and economic behavior". Working Paper, Paper presented at the international conference on Social interactions and economic behavior.
- Prescott, E. (1998) "Business cycles research: Methods and problems". Working paper 590, Federal Reserve Bank of Minneapolis.
- Quah, D. (1996) "Empirics for economic growth and convergence". *European Economic Review*, 40:1353-1375.
- Reichlin, P. (1986) "Equilibrium cycles in an overlapping generations economy with production". *Journal of Economic Theory*, 40:89-102.
- Reijnders, J. (1990) *Long waves in economic development*. Elgar.
- Ryder, H. and G. Heal (1973) "Optimal growth with inter-temporally dependent preferences". *Review of Economic Studies*, 40:1-31.
- Scitovsky, T. (1976) *The joyless economy*. Oxford University Press.
- Seckin, A. (1999) "Consumption with habit formation". Cirano, Montréal.
- Solomou, S. (1986) "Non-balanced growth and Kondratieff waves in the world economy, 1850-1913". *Journal of Economic History*, 46:165-169.
- Uhlig, H. and Y. Xu (1995) "Effort and the cycle: cyclical implications of efficiency wages". Working Paper, CentER (Tilburg).
- van Ewijk, C. (1982) "A spectral analysis of the Kondratieff-cycle". *Kyklos*, 35:468-499.
- Veenhoven, R. (1993) *Happiness in nations: subjective appreciation of life in 56 nations 1946-1992*. Erasmus University Rotterdam.
- Veenhoven, R. (1994) "Is happiness a trait - tests of the theory that a better society does not make people any happier". *Social Indicators Research*, 32:101-160.
- Wadhvani, S. and M. Wall (1991) "A direct test of the efficiency wage model using UK micro-data". *Oxford Economic Papers*, 43:529-548.
- Wan, H. (1970) "Optimal saving programs under intertemporally dependent preferences". *International Economic Review*, 11:521-547.
- Winder, C. and F. Palm (1996) "Stochastic implications of the life cycle consumption model under rational habit formation". *Recherches Economiques de Louvain*, 62:403-412.
- Woittiez, I. and J. Theeuwes (1995) "Well-being and labour market status". Working Paper, Tinbergen Institute.