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Do People in Income Poverty Use Their Income Efficiently?

A subjective well-being approach

Mariano Rojas*

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Abstract

A subjective well-being approach is followed to assess the magnitude of inefficiency in the use of income. The information comes from a Mexican survey and an X-inefficiency technique is used. The paper shows that there exists substantial inefficiency in the use of income at all income levels, even for those in income poverty. It is shown that inefficiency is significantly related to practices, attitudes, and motivations for consuming. Economic theory has focused on rising people's income to increase their economic well-being; this paper shows that reducing inefficiency in the use of income is an alternative instrument which deserves further consideration.

Keywords: subjective well-being, economic satisfaction, X-inefficiency, income poverty, Mexico
JEL classification: D1, D11, D12, D13, D61, I31

*FLACSO-México and UPAEP, email mariano.rojas.h@gmail.com

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UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

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1 Introduction

This paper states that the pursuing of greater economic well-being can be attained not only by having more resources but also by using them efficiently. There are two non-exclusive roads for increasing economic well-being: a first road is associated to the long-standing tradition of emphasizing raises in income. The second road is associated to using income more efficiently; Frank (2005: 70) suggests that 'people might have been able to spend their money in other ways that would have made them happier, yet for various reasons did not'. With few exceptions (Earl 2007; Rojas 2008a), the study of inefficiency in the use of income has been widely neglected by economics, probably because of the widespread believe that people are rational and that economic well-being is not measurable. Two emerging areas in economics: the economics of happiness and behavioural economics, have allowed for measuring economic well-being and for supporting the need of testing the validity of the rationality assumption. In consequence, it is now possible to study the existence and magnitude of inefficiencies in the use of income,[1] as well as the economic well-being benefits from reducing these inefficiencies. By borrowing from the economics of happiness and from behavioural economics the paper shows that inefficiency is substantial and that people in income poverty would substantially benefit from reducing this inefficiency.

The paper follows a subjective well-being approach to study economic well-being. The study is based on a large cross-section database from Mexico. An economic-satisfaction variable is constructed based on a vector of satisfaction questions in the economic domain of life. A thick-frontier X-inefficiency methodology is used to calculate an efficient frontier. Different indicators for inefficiency are calculated. Hence, it is possible to empirically study the role of income in generating economic well-being as well as the existence of inefficiency in the use of income. It is found that inefficiency is relatively large, that many years of income growth would be required to attain what could be achieved by reducing inefficiency, and that inefficiency is a phenomenon presented at all income levels, including the low-income ones.

Because of its magnitude and of its presence at all income levels inefficiency in the use of income is a phenomenon that requires further attention in economics. This inefficiency may emerge from social institutions such as the prevalence of a zero-sum (an even negative-sum) status-race game based on consumption goods. It may also emerge from personal factors influencing how people end up taking purchasing decisions. This paper explores the role played by some purchasing practices based on patterns, attitudes, and motivations people have for consuming. It shows that they are important in explaining inefficiency. Further research should focus on policies to reduce inefficiency as an alternative way to raise people's economic well-being. In other words, economics should be concerned not only about increasing the endowment of resources for economic well-being but also about its efficient use in the consumption side.

The paper is structured as follows: section 2 discusses the X-inefficiency concept and its application to the relationship between income and economic well-being. This section elaborates on the reasons for expecting inefficiency in the use of income to be large. Section 3 explains the database as well as the construction of the relevant variables; special

[1] The use of income refers to a concept broader than consumption, since it also incorporates savings considerations.

consideration is placed in the construction of the economic-satisfaction variable. Section 4 uses a thick-frontier approach to estimate inefficiency in the use of income and it develops several indicators for inefficiency. Section 5 studies the presence and magnitude of inefficiency in the use of income for those people classified as being in income poverty. It is shown that this inefficiency is substantial. Section 6 deals with some consumption patterns, attitudes, and motivations and it shows they are important in explaining inefficiency. Section 7 presents the main conclusions from the investigation.

2 Literature review

2.1 On the X-inefficiency concept

Leibenstein (1966) noted that firms and organizations do not work as efficiently as they could. He introduced the X-inefficiency concept to refer to an inappropriate use of the organization's resources in attaining its objectives. The concept was introduced as part of the literature on the theory of the firm. The idea of firms acting inefficiently generated a debate in the literature (Stigler 1976; Leibenstein 1978).

In the theory of the firm, X-inefficiency emerges due to administrative problems within the firms. It is understood as the result from both personal errors and organizational deficiencies. In principle, competition could drive X-inefficiency out of the market (Alchian 1950), however, Leibenstein (1975, 1976) states reasons for this not being the case.

2.2 Subjective well-being: an observable output for income use

There has been little research—but a lot of conjecture—about the existence of X-inefficiency in the income-allocation and consumption sides. The absence of a measurable output variable for people's allocation of income has led researchers to use variables such as food and nutritional intake. However, these variables are intermediate rather than final goals.

Economic theory has stressed the study of inefficiency in the production side, however, only a few papers have addressed the issue of inefficiency in the consumption side (Earl 2007; Rojas 2008a). Recent developments in behavioural economics offer many reasons to believe that inefficiency may be substantial in the income-allocation side, as well as to believe that competition forces do not perform well in reducing this inefficiency in the consumption side. The emergence of the 'economics of happiness' literature[2] provides not only the tools but also the epistemological support and academic endorsement to empirically study many presumptions in economic theory such as the presumption of human beings acting rationally in their use of income. The increasing acceptance by economists of the subjective well-being approach allows using economic satisfaction as a measurable output for income allocation.

[2] Easterlin (1974, 1995, 2001); Clark and Oswald (1994); Di Tella et al. (2001); Ferrer-i-Carbonell and Frijters (2004); Frey and Stutzer (2000, 2002); Oswald (1997); van Praag and Ferrer-i-Carbonell (2004).

2.3 Inefficiency in the use of income

The role of income in economics

Utility lost much of its well-being substance in the ordinal-utility approach. However, microeconomic theory still stresses the fundamental role of income as a mean to attain higher economic well-being. The vast literature on income poverty, as well as on economic growth, shows that economists associate income to economic well-being. Hence, economic theory recognizes that income is an important resource—maybe the most important one—for attaining economic well-being. Thus, it is possible to think of a production function—which resembles the indirect utility function—where income is the input variable and economic satisfaction is the output variable.

In a world where income is used efficiently, it is only through higher income that economic satisfaction can be raised; thus, poverty-abatement programs ought to focus on raising people's income in order to increase economic well-being. This has led to a narrow conception of poverty as low income. However, in the presence of inefficiency in the use of income, policy could also focus on the reduction of inefficiency as an alternative way to increase economic well-being. This could lead to a broader conception of poverty as low well-being (Rojas 2006, 2008b, 2009) Thus, economic research should focus not only on increasing resources but also on increasing their efficient use to generate economic satisfaction; and economists should be concerned about using economic resources efficiently as much as they are about increasing their quantity.

Economic theory and inefficiency in income use

Inefficiency in the use of income could emerge from personal errors as well as from organizational deficiencies. Inefficiency refers to the existence of a correctable mistake. It could originate from personal errors in allocating their income; in this case, persons should be willing to accept that an error exists and should be capable—probably with some assistance or information—of modifying their behaviour. Inefficiency could also originate from a social-organization deficiency, so that even if each person is acting correctly within society's norms these norms lead them to an inefficient use of their income in attaining economic satisfaction.

The existence of systematic personal errors is rejected by neoclassical economic theory based on the rationality assumption. It has been recognized that it is futile to discuss the validity of the neoclassical maximization hypothesis on the basis of people's actions because the hypothesis can always be re-formulated to make any action seem rational (Boland 1981). However, there is a substantial literature questioning this assumption and stating that systematic personal errors in consumption may be common.

Simon (1982), states that human capacities to solve relatively complex decision problems are limited. Thaler (1992) studies humans' limitations to behave as rational agents. He states that consumption theory is incomplete to model real consumers who are slow learners and heterogeneous in their cognitive capacities (Thaler 2000). He also argues for greater consideration of the role of psychological states in the behaviour of consumers by incorporating compulsive behaviour, persuaded behaviour, and self-control problems. Deci and Ryan (1985) and Kasser (2002), studied the role that psychological needs play in consumption decisions. They show that persons may follow the wrong strategy of attempting

to satisfy their underlying psychological needs through higher consumption. People following this wrong strategy make substantial expenditures while attaining little satisfaction; social and commercial persuasion may promote making these wrong consumption decisions.

Scitovsky (1976) mentioned that some persons may lack skills to make correct consumption decisions. In addition, he states that some people end up in an adverse-selection trap by spending too much in comfort and too little in stimulation which leads to less satisfaction.

Recent work from the behavioural-economics school has further questioned the rationality assumption. Thaler (1980), argues that a rational theory of consumption is prescriptive rather than descriptive. Pioneer work in behavioural economics shows that choice is sensitive to the framing of decisions (Tversky and Kahneman 1974, 1981, 1986), that decision makers do follow heuristics (Kahneman and Tversky 1982, 1984), and that decision makers are prone to prediction biases (Kahneman and Tversky 1973, 1979). Loewenstein and Schkade (1999) have shown that there may be systematic mistakes in people's prediction of their experienced utility from consumption decisions, and that people err in foreseeing adaptation and habituation processes. Hsee and Hastie (2006) and Hsee and Leclerc (1998), have further elaborated on erroneous consumption decisions. Kahneman (1994) discusses the challenges raised by behavioural studies to the rationality assumption in economics. Camerer and Loewenstein (2003) and Rabin (1998, 2002), further question the rationality assumption. Recent studies about the neurology of decision-making also support their arguments (Camerer et al. 2005).

In a recent contribution, Earl (2007) elaborates on reasons for inefficiency in consumption being possible. Some reasons for people being likely to err in their consumption decisions are:

1. The increasing complexity of products and the existence of synergies when they are jointly consumed.
2. The increasing variety of products people must choose from.
3. The acceleration in innovation and obsolescence rates of products which makes it almost impossible to keep track of all advances and complicates appropriate purchasing-timing decisions.
4. Complexity in the design of contracts for consumption of services, e.g. difficulties in foreseeing contingencies and in specifying expected results.

People's lack of training in making correct consumption decisions, in particular when changing personal and surrounding situations, make their previous consumption rules obsolete.

The argument of personal errors taking place in the consumption side is strengthened by the difficulty for market forces to play a corrective function. Persons using their income inefficiently are not driven out of the 'consumers market' by competition forces; people may remain in the market as long as they have purchasing power independently of whether their purchasing power is efficiently used.

It must be recognized that persons making income-allocation decisions are much more than the individualistic consumers portrayed by economic theory. Persons not only live in a society but they are shaped and defined as such within their society. Inefficiency in the use of income could emerge not only from personal errors but also from social organizational deficiencies. Veblen (1927), argued for the conspicuous role of consumption; Duesenberry

(1949), focused on the role of relative income in explaining savings; and Leibenstein (1950), discussed the existence of interdependent preferences.[3] Easterlin (1974) showed that happiness depends on relative income. Hirsch (1976) introduced the notions of positional societies and positional goods. Carlsson et al. (2009) and Alpizar et al. (2005) studied the positional role played by some goods. There is no research on people's capacity to accurately foresee how their relative position will be affected by the purchasing of some commodities, however, findings from the behavioural-economics school make it possible to hypothesize that status-conscious people may err by unforeseen social interactions and, in consequence, by believing that the positional attributes of a commodity will last long (Frank 2005; Cooper et al. 2001).

Status is a crucial variable in most societies, and in some of them consumption has attained a central role as status indicator. Fromm (1976) warned about the importance some societies placed on having rather than on being. Some people are more vulnerable to consumption-based status races (Hopkins and Kornienko 2004) because of their values and their upbringing (Kasser 2002; Kasser et al. 2002; Phelps 2005). Furthermore, these consumption-based status races may generate a social game where rational agents end up overspending and overworking (Frank 1985, 2000; Schor 1998, 2002; Dupor and Liu 2003).

3 Database and variables

3.1 The survey

A survey was conducted in 13 states of Mexico during November and December of 2010.[4] A stratified-random sample was balanced by household income, gender, and urban-rural areas. 1,600 questionnaires were successfully applied. The sample size is acceptable for inference across income groups in Mexico. The survey gathered information about people's subjective well-being, values, psychological needs, and consumption attitudes and motivations. Due to high insecurity in Mexico, some people did not report their income; as a matter of fact, about one-third of interviewees decided not to provide information regarding their household income.

3.2 The variables

Economic satisfaction variable (ES): five questions related to satisfaction in the economic domain of life were asked.

1. How satisfied are you with the material situation of your household (material situation)?
2. How satisfied are you with your housing conditions (housing condition)?
3. How satisfied are you with things you can purchase (purchasing situation)?
4. How satisfy are you with the amount of money you can save (savings situation)?
5. How satisfied are you with your capacity to face financial problems (financial situation)?

[3] See also Postlewaite (1998) for a discussion of the social basis of interdependent preferences.

[4] The author expresses his gratitude to CONACYT, Mexico, for a grant that financed this survey.

Each satisfaction question had a seven-option verbal answering scale, ranging from extremely unsatisfied to extremely satisfied: extremely unsatisfied, very unsatisfied, unsatisfied, neither unsatisfied nor satisfied, satisfied, very satisfied, extremely satisfied. Satisfaction questions were handled as cardinal variables, with values between 1 and 7, where 1 was assigned to the lowest satisfaction level and 7 to the highest.

The ES is constructed as the simple average of the five questions related to satisfaction in the economic domain of life.[5] The using of a simple average allows for an easier interpretation of economic satisfaction in the ordinal scale which goes from 1 (extremely unsatisfied) to 7 (extremely satisfied).

Table 1 presents some descriptive statistics for the satisfaction variables, as well as for the constructed ES. On average, people are *neither satisfied nor unsatisfied* with their economic situation. They are in between *neither satisfied nor unsatisfied* and *satisfied* with respect to their material situation, housing condition, and purchasing situation. Satisfactions with financial and savings situation are—on average—in between *unsatisfied* and *neither satisfied nor unsatisfied*. It is also observed that there is a relatively high degree of dispersion in these satisfaction variables.

Table 1: Descriptive statistics for subjective economic well-being variables

Satisfaction with	Mean	Standard Deviation
Material situation	4.85	1.37
Housing condition	5.10	1.27
Purchasing situation	4.72	1.41
Financial situation	4.21	1.76
Savings situation	4.36	1.73
Economic satisfaction	4.65	1.23

Note: 1 to 7 scale.
Source: Constructed by the author on the basis of original data.

*Economic variables***:** information about household income and number of income-dependents in the household was collected. The sample of 1,600 questionnaires had a response rate of almost 70 per cent with respect to household income,[6] hence, this investigation uses 1,098 observations.[7] A household per capita income variable was computed. Household per capita income per day ranges in the sample from about US$0.38 dollars to about US$675 dollars.[8]

Demographic and social variables: the survey also gathered information about the interviewee's education, age, and gender.

4 Computing inefficiency in the use of income

Inefficiency is measured on the basis of how far a person's economic satisfaction deviates from a *best observed practice* for their corresponding income. The efficient frontier is

[5] Factorial analysis shows that the five variables have relatively similar loads.

[6] Insecurity and violence in Mexico have increased the no response rate to income-related questions.

[7] As a matter of fact, due to lack of economic satisfaction information, 1,064 observations end up being used in the analyses.

[8] The exchange rate at the moment of the survey was of about US$1 dollar per MN$12.34 Mexican pesos.

unknown and must be estimated from information from the data set. There are three approaches to estimate the frontier: Data Envelopment Analysis (DEA); Stochastic Frontier Approach (SFA), and Thick Frontier Approach (TFA) (Bauer 1990; Bauer et al. 1993). This investigation follows TFA to estimate the highest possible level of economic satisfaction for a person with a given income.

4.1 Creating income groups

Observations are ranked from the lowest to the highest household per capita income and 20 income groups are created. Table 2 presents basic statistics for the income groups. It is observed that mean income ranges from US$0.94 in the lowest-income group to US$246.85 in the highest-income group. Groups are formed on the basis of the income distribution in the sample and aiming for a relatively similar number of observations in each group.

Table 2: Income groups

Group	N	Mean Income[1/]	Upper income level[1/]
1	38	0.94	1.26
2	72	1.51	1.70
3	47	1.85	2.03
4	49	2.10	2.21
5	48	2.37	2.59
6	79	2.70	2.70
7	49	3.15	3.24
8	65	3.51	3.60
9	58	3.94	4.05
10	66	4.57	5.27
11	62	5.40	5.40
12	37	6.21	6.62
13	45	6.86	7.20
14	44	8.27	9.00
15	45	10.85	12.16
16	52	15.87	20.26
17	43	30.21	37.82
18	62	58.00	67.53
19	56	104.48	135.06
20	47	246.85	675.31

[1/] Household per capita income per day in US$ of 2010

Note: Basic statistics.
Source: Constructed by the author on the basis of original data.

4.2 Observations in the thick frontier

Observations in each income group are classified into two groups: those observations in each income group with high economic satisfaction are assumed to belong to the frontier and their

inefficiency is assumed to be equal to zero.[9] Observations in each income group with relatively low economic satisfaction are assumed to reflect inefficiency in the use of income; these observations are placed beneath the efficient frontier.

There is no clear criterion to identify the number of observations considered as efficient in each income group. Some techniques have been advanced to identify the efficient observations such as a recursive methodology proposed by Wagenvoort and Schure (2006). However, these techniques do not get rid of arbitrariness in the decision. The decision about the number of observations placed on the frontier depends on practical reasons such as the number of observations available as well as on the desire to follow either a strict or a lenient criterion. This investigation follows a lenient criterion; with about 21 per cent of all observations placed on the frontier (228 out of 1,064 total observations are classified as efficient ones). The rest of observations in each income group are considered as inefficient. Dispersion across observations on the frontier is assumed to emerge from stochastic factors, while observations beneath the frontier are assumed to reflect inefficiency in the use of income to attain economic satisfaction.

Table 3 reports some descriptive statistics about the number of observations, the mean economic satisfaction, and the mean income for observations in and out of the efficient frontier in each income group. A good classification should imply substantial differences in economic satisfaction but not in income between observations in and beneath the frontier; the classification used in this investigation satisfies this condition.

On average, there are substantial differences in economic satisfaction between observations in and beneath the frontier. Observations on the frontier report an economic satisfaction that is much greater than those beneath the frontier. The difference ranges from 62 per cent for observation in income group five to 17 per cent for observations in income group 19.

It is also observed in Table 3 that, with the exception of the tail income groups, there are not substantial differences in mean income between observations in and beneath the frontier across income groups.[10] This is a favourable characteristic because it implies that any difference in economic satisfaction between observations in and beneath the frontier cannot be attributed to differences in income levels. In consequence, it is sound to state that differences in economic satisfaction between observations in and beneath the frontier cannot be attributed to differences in income but to differences in the way income is used to attain economic satisfaction.

[9] It is said that this methodology estimates relative-to-best-observed-practice inefficiency, because the true efficient frontier could be above the selected observations and not be observed at all.

[10] In the case of income group one, it is observed that observations on the frontier do have, on average, lower income that those observations beneath the frontier. The situation reverts for observations in income group 20.

Table 3: Economic satisfaction and income levels

Income Group	Number of Observations		Economic Satisfaction			Income[1]		
	On the frontier	Beneath frontier	Mean on the frontier	Mean beneath frontier	Ratio On/Beneath	Mean on the frontier	Mean beneath frontier	Ratio On/Beneath
Bottom 1	10	28	5.06	3.68	1.38	0.89	0.98	0.91
2	12	60	5.52	3.78	1.46	1.50	1.50	0.99
3	10	37	5.84	3.45	1.69	1.85	1.85	1.00
4	9	40	5.73	3.83	1.50	2.12	2.10	1.01
5	11	37	6.04	3.74	1.62	2.36	2.37	1.00
6	18	61	5.47	3.77	1.45	2.70	2.70	1.00
7	9	40	6.20	3.98	1.56	3.12	3.15	0.99
8	13	52	5.95	4.18	1.42	3.49	3.51	0.99
9	12	46	5.80	3.77	1.54	3.96	3.93	1.01
10	14	52	6.26	4.09	1.53	4.50	4.59	0.98
11	15	47	6.20	4.23	1.47	5.40	5.40	1.00
12	8	29	6.43	4.24	1.51	6.32	6.17	1.02
13	10	35	5.96	4.21	1.42	6.80	6.88	0.99
14	11	33	5.75	3.83	1.50	8.17	8.30	0.98
15	8	37	6.03	4.17	1.45	10.97	10.84	1.01
16	9	43	6.02	4.50	1.34	15.88	15.92	1.00
17	7	36	6.49	5.00	1.30	29.52	30.34	0.97
18	17	45	6.27	5.15	1.22	58.47	57.82	1.01
19	14	42	6.39	5.45	1.17	105.56	104.13	1.01
Top 20	11	36	6.49	5.49	1.18	282.40	235.98	1.20

[1] Household per capita income in US$ per day.

Note: Mean values along income groups for observations on and beneath the frontier.
Source: Constructed by the author on the basis of original data.

4.3 Estimating the frontier

The 228 observations considered as efficient are used to estimate the efficient frontier which represents the best observed practice in the use of income to attain economic satisfaction. Besides income, this estimation does also take into consideration some socio-demographic characteristics of the person. The following regression is run:

$$ES_i = \alpha_0^{ef} + \alpha_Y^{ef} \ln Y_i + \beta^{ef} Z_i + \mu_i \qquad i \in \text{efficient observations} \tag{1}$$

where:

ES economic satisfaction
Y household per capita income
Z refers to a vector of control variables: gender, age; β is a vector of parameters
i refers to person *i*
μ error term.

Table 4 shows the results from the econometric exercise, an OLS estimation technique is used. It is observed that income is a relevant variable in explaining economic satisfaction on the frontier, as well as age. Gender does not make a difference.

Table 4: Explaining economic satisfaction

	Coefficient	Prob.>t
(Constant)	5.4423	0.00
log Y	0.1668	0.00
Gender	-0.0384	0.53
Age	0.0065	0.00
R-squared 0.28		

Note: For observations on the frontier.
Source: Constructed by the author on the basis of original data.

It is important to state that the parameters for income, gender, and age estimated from the frontier sample are statistically different than the same parameters estimated from the whole sample. This is an important issue because it implies that the residuals from the whole-sample regression do behave in a different way than the inefficient observations computed as deviations from the frontier.

The estimated parameters in Equation (1) are used to calculate the corresponding efficient economic satisfaction for those observations beneath the frontier.

4.4 Inefficiency indicators

Different inefficient indicators can be computed for observations beneath the frontier on the basis of the estimated coefficients from Equation (1)

The corresponding efficient economic satisfaction for those observations placed beneath the frontier is computed as:

$$ES_j^{ef} = \hat{\alpha}_0^{ef} + \hat{\alpha}_Y^{ef} \ln Y_j + \hat{\beta}^{ef} Z_j \qquad \boldsymbol{j} \in \text{inefficient observations} \tag{2}$$

The difference, in satisfaction points, between the corresponding efficient economic satisfaction and the current one for an inefficient observation *j* is given by:

$$Inef_j^{Diff} = ES_j^{ef} - ES_j \qquad \boldsymbol{j} \in \text{inefficient observations} \tag{3}$$

Inefficiency, as a percentage of the efficient economic satisfaction, for an inefficient observation *j* is given by:

$$Inef_j(ES^{ef}) = \frac{\left(ES_j^{ef} - ES_j\right)}{ES_j^{ef}} * 100 \qquad \boldsymbol{j} \in \text{inefficient observations} \tag{4}$$

Inefficiency, as a percentage of the current inefficient economic satisfaction, for an inefficient observation *j* is given by:

$$Inef_j(ES) = \frac{\left(ES_j^{ef} - ES_j\right)}{ES_j} * 100 \qquad \boldsymbol{j} \in \text{inefficient observations} \tag{5}$$

5 Income poverty and inefficiency in the use of income

5.1 Classifying people as being in income poverty

Given the distribution of income in the sample, people are classified as being in income poverty if their daily household per capita income is beneath US$5 dollars. In consequence, 567 observations are classified as poor. One hundred and eighteen of these observations are on the frontier and 449 are classified as having an inefficient use of income.

5.2 Magnitude of inefficiency

Table 5 shows the computation of inefficiency indicators for those observations classified as being in income poverty and who are placed beneath the efficient frontier. In economic-satisfaction points, inefficiency ranges from 0.02 to 4.99 points. These observations are, on average, 1.79 economic-satisfaction points beneath what could be attainable for their corresponding income, based on the best observed practice. On average, inefficiency represents about 30 per cent of the efficient economic satisfaction levels. In terms of current economic satisfaction, inefficiency represents, on average, 54 per cent which means that by eliminating this inefficiency people placed beneath the frontier could increase their economic satisfaction in about 54 per cent, on average, with respect to their current satisfaction levels, with no need to increase their income.

Table 5: Descriptive statistics for inefficiency indicators

	$Inef^{Diff}$	$Inef\ (ES^{ef})$	$Inef\ (ES)$
Mean	1.78	29.91	54.31
Std. Deviation	0.98	16.53	54.34
Median	1.71	28.98	40.81
Minimum	0.02	0.36	0.37
Maximum	4.99	83.30	498.70

Note: For observations beneath the efficient frontier, and for people classified as being in income poverty.
Source: Constructed by the author on the basis of original data.

5.3 Assessing inefficiency: years of income growth

How many years of sustained income growth a poor person using their income inefficiently would need to achieve the economic satisfaction that could be attained by eliminating her inefficiency in income using? Equation (6) calculates the required number of years that a person *j* would need to attain the same economic satisfaction that could be attained by eliminating their inefficiency, under the assumption that their income grows at an annual rate of *g*. The formula assumes that additional income generates economic satisfaction at the rate estimated in Equation (1).

$$N(g)_j = \frac{\left(Inef_j^{Diff} \Big/ \hat{\alpha}_Y^{ef} \right)}{\ln(1+g)} \qquad (6)$$

Table 6 presents the number of years that would be required for a person classified as being in income poverty to achieve an economic satisfaction similar to what could be attained by eliminating inefficiency in income using. The table presents different growth rates scenarios.

Table 6: Required years of income growth to compensate for inefficiency at different annual rates of income growth

	Annual Rate of Growth in Percentage		
	4	7	10
Mean	272	158	112
Std. Deviation	149	86	61
Median	261	151	107
Minimum	3	2	1
Maximum	762	442	314

Note: For people classified as being in income poverty.
Source: Constructed by the author on the basis of original data.

At an annual rate of income growth of 4 per cent, about 272 years would be required, on average, to get an increase in economic satisfaction similar to what could be achieved by eliminating inefficiency. In other words, it could be stated that inefficiency in the use of income represents, on average, 272 years of income growth at a rate of 4 per cent. This figure ranges from three years for the less inefficient observations to 762 years for the most inefficient ones. The median inefficient observation in the sample would require 261 years of sustained income growth at 4 per cent to increase their economic satisfaction in a similar amount to what could be achieved by eliminating her inefficiency.

The higher her income grows the fewer years a person needs to attain the same goal. However, even at an annual rate of growth of 10 per cent, 112 years would be required, on average, to attain the economic satisfaction that can be reached by completely eliminating inefficiency in the use of income. In consequence, the inefficient using of income is a phenomenon from which those in income poverty are not excluded.

6 Explaining inefficiency: shopping practices

The substantial inefficiency in the use of income implies that by reducing inefficiency it would be possible for social programs to enhance their impact on the well-being of those classified as being in income poverty. Up to now, social programs have focussed on raising people's income; the abatement of inefficiency in the use of income constitutes an instrument for raising the economic well-being of the poor which could be incorporated into the design and evaluation of social programs.

The reduction of inefficiency in the use of income is a novel issue in economic theory as well as in poverty studies; thus, there is little research on its sources and on the possible ways to reduce it. The agenda of future research must identify those sources of inefficiency which

could be influenced by policy action in order to design social programs that do not only aim for increasing income but also for reducing its inefficient use. This would magnify the impact these social programs have on people's economic well-being.

This investigation takes advantage of a battery of questions regarding people's expenditure practices. People were asked to rate their degree of agreement with the following eleven statements:

1. Buying makes me feel better.
2. I make purchases even when I have doubts about my decision.
3. I use my credit card to make purchases without knowing how I will pay for it.
4. I buy things just because they are on sale.
5. I buy the same products than my friends and colleagues so as to be part of the group.
6. I usually make spontaneous purchases . . . just to do it.
7. I go shopping to entertain myself.
8. Wearing and using prestigious brands makes me feel better.
9. Fashionable clothes help me in being what I want to be.
10. I enjoy using my free time to go shopping.
11. I buy things without consideration whether I need them.

The categorical response scale goes from: I do not agree, I agree a little, I agree, I agree a lot. For the sake of simplicity and interpretation of the variables, these responses are treated as cardinal going from 1 (I do not agree) to 4 (I agree a lot). A new variable called *shopping practices* (Shop) is constructed as a simple average of the eleven responses.[11] An increase in the value of the Shop variable is associated to consumption practices that foster inefficiency.

For people classified as being in income poverty and placed beneath the efficient frontier the Shop variable has a mean value of 1.62; its standard deviation is 0.48, and its maximum value is 3.27.

Table 7 shows the results from an econometric exercise to study the impact of shopping practices on inefficiency in the use of income by people classified as being in income poverty. It is observed that these practices play a role in increasing inefficiency. A raise in one point in Shop (in a scale from 1 to 4) implies an increase of 6.5 percentage points in inefficiency (as measured with respect to the corresponding efficient economic satisfaction). This result indicates that shopping practices play a significant and substantial role in promoting an inefficient using of income.

It is clear that these practices, based on patterns and motivations, could be modified so as to reduce their presence in low-income groups. Direct education and training of people as well as regulation of the surrounding social conditions which foster these practices could be used to reduce inefficiency in the using of income.

[11] The main results from the analyses do not change when factorial analysis is applied to the eleven variables in order to construct a new variable based on principal-components analysis.

Table 7: Explaining inefficiency in the use of income ($Inef(ES^{ef})$)

	Coefficient	Prob.>t
Constant	13.56	0.00
Shopping practices	6.48	0.00
Woman	2.08	0.17
Age	0.22	0.00
R-squared 0.10		

Note: The role of shopping attitudes for people classified as being in income poverty, OLS regression.
Source: Constructed by the author on the basis of original data.

7 Conclusions

This paper has shown that there is inefficiency in the use of income to attain economic satisfaction. Inefficiency is found to be substantial, even when using a lenient criterion to define the efficient frontier. Furthermore, inefficiency is a widespread phenomenon that takes place at all income levels, even at low-income levels. This finding questions the rationality assumption in economics. It also shows how the subjective well-being approach can be used to empirically address the long-standing debate on consumption patterns and rationality.

Raising the income of the poor has been the manifested goal of the majority of social programs. This goal emerges from the understanding that greater income is associated to greater economic well-being and that by raising the income of the poor their well-being will increase. This paper has shown that the poor do not use their income efficiently. If the poor do use their income in inefficient ways then an increase in income does not necessarily ensure a raise in economic well-being. In a situation where income is not efficiently used, poverty-abatement programs which target income may end up getting people out of income poverty but having little impact in their economic well-being. In consequence, further attention to the way in which the poor use their income is needed. It has been shown that economic satisfaction can also be raised through a better use of income and that there is substantial room for this strategy. It has also been shown that some patterns and attitudes for consuming do play a role in generating inefficiency; people can be educated and trained in their consumption patterns and attitudes. Hence, social programs which aim to raise the income of the poor could be enhanced by also aiming to reduce inefficiency in the use of income. The pursuing of greater economic well-being of the poor could be based not only on having more resources but also on using them efficiently.

While economists have placed an enormous effort in understanding ways to raise people's income, little is known about personal and societal factors that foster an inefficient use of income. Economics needs to place more attention to inefficiency in the use of income and to its causes. It is clear that measures of expenditure and income are insufficient in providing information about people's well-being. The study of inefficiency in the use of income clearly falls within the scope of concern of the economics discipline: the efficient using of resources. Research in this area has been deterred by the assumption of economic agents being rational as well as by some reluctance to work with reported economic well-being measures. However, mere presumption, which is not a scientific way of knowing and understanding well-being, is the alternative to using reported economic well-being measures.

The agenda of future research must identify the sources of inefficiency and must identify those sources which could be influenced by policy action in order to design social programs that do not only aim for increasing income but also for increasing economic well-being by reducing inefficiency in the use of income.

References

Alchian, A. (1950). 'Uncertainty, Evolution, and Economic Theory'. *Journal of Political Economy*, 58: 211-21.

Alpizar, F., F. Carlsson, and O. Johansson-Stenman (2005). 'How much do we care about Absolute versus Relative Income and Consumption?'. *Journal of Economic Behavior and Organization*, 56: 405-21.

Bauer, P. (1990). 'Recent Developments in the Econometric Estimation of Frontiers'. *Journal of Econometrics*, 46: 39-56.

Bauer, P., A. Berger, and D. Humphrey (1993). 'Efficiency and Productivity Growth in U.S. Banking'. In H. Fried, C. Lovell, and S. Schmidt (eds), *The Measurement of Productive Efficiency: Techniques and Applications*. Oxford: Oxford University Press.

Boland, L.A. (1981). 'On the Futility of Criticizing the Neoclassical Maximization Hypothesis'. *American Economic Review*, 71(5): 1031-36.

Camerer, C., and G. Loewenstein (2003). 'Behavioral Economics: Past, Present, Future'. In C. Camerer, G. Loewenstein, and M. Rabin (eds), *Advances in Behavioral Economics*. New Jersey: Princeton University Press.

Camerer, C., G. Loewenstein, and D. Prelec (2005). 'Neuroeconomics: How Neuroscience Can Inform Economics'. *Journal of Economic Literature*, 43: 9-64.

Carlsson, F., G. Gupta, and O. Johansson-Stenman (2009). 'Keeping Up with the Vaishyas: Caste and Relative Standing'. *Oxford Economic Papers*, 61: 52-73

Clark, A., and A. Oswald (1994). 'Unhappiness and Unemployment'. *Economic Journal*, 104: 648-59.

Cooper, B., C. Garcia-Penalosa, and P. Funk (2001). 'Status Effects and Negative Utility Growth'. *Economic Journal*, 111: 642-65.

Deci, E., and R. Ryan (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press.

Di Tella, R., R. MacCulloch, and A. Oswald (2001). 'Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness'. *American Economic Review*, 91: 335-41.

Duesenberry, J. (1949). *Income, Saving and the Theory of Consumer Behavior*. Cambridge MA: Harvard University Press.

Dupor, B., and W.-F. Liu (2003). 'Jealousy and Equilibrium Overconsumption'. *American Economic Review*, 93(1): 423-28.

Earl, P. (2007). 'Consumer X-inefficiency and the Problem of Market Regulation'. In R. Franz (ed.), *Renaissance in Behavioral Economics, Essays in Memory of Harvey Leibenstein*. London: Routledge.

Easterlin, R. (1974). 'Does Economic Growth Improve the Human Lot? Some Empirical Evidence' In P.A. David and M.W. Reder, M.W. (eds), *Nations and Households in Economic Growth.* New York: Academic Press.

Easterlin, R. (1995). 'Will Rising the Incomes of all Increase the Happiness of All?'. *Journal of Economic Behavior and Organization*, 27(1): 35-48.

Easterlin, R. (2001). 'Income and Happiness: Towards a Unified Theory'. *Economic Journal*, 111: 465-84.

Ferrer-i-Carbonell, A., and P. Frijters (2004). 'How Important is Methodology for the Estimates of the Determinants of Happiness?'. *Economic Journal*, 114: 641-59.

Frank, R. (1985). 'The Demand for Unobservable and Other Nonpositional Goods'. *American Economic Review*, 75(1): 101-16.

Frank, R. (2000). *Luxury Fever: Money and Happiness in an Era of Excess.* New Jersey: Princeton University Press.

Frank, R. (2005). 'Does Absolute Income Matter?'. In L. Bruni and P.L. Porta (eds), *Economics & Happiness: Framing the Analysis.* Oxford: Oxford University Press.

Frey, B., and A. Stutzer (2000). 'Happiness, Economy and Institutions'. *Economic Journal*, 110: 918-38.

Frey, B., and A. Stutzer (2002). *Happiness and Economics: How the Economy and Institutions affect Well-Being.* New Jersey: Princeton University Press.

Fromm, E. (1976). *To Have or to Be?*. New York: Harper and Row.

Hirsch, F. (1976). *Social Limits to Growth.* Cambridge MA: Harvard University Press.

Hopkins, E., and T. Kornienko (2004). 'Running to Keep in the Same Place: Consumer Choice as a Game of Status'. *American Economic Review*, 94(4): 1085-107.

Hsee, C., and R. Hastie (2006). 'Decision and Experience: Why Don't we Choose what Makes us Happy?'. *Trends in Cognitive Sciences*, 10(1): 31-37.

Hsee, C., and F. Leclerc (1998). 'Will Products Look more Attractive when Presented separately or Together?'. *The Journal of Consumer Research*, 25(2): 175-86.

Kahneman, D. (1994). 'New Challenges to the Rationality Assumption'. *Journal of Institutional and Theoretical Economics*, 150: 18-36.

Kahneman, D., and A. Tversky (1973). 'On the Psychology of Prediction'. *Psychological Review*, 80: 237-51.

Kahneman, D., and A. Tversky (1979). 'Intuitive Prediction: Biases and Corrective Procedures'. *Management Science*, 12: 313-27.

Kahneman, D., and A. Tversky (1982). 'The Psychology of Preferences'. *Scientific American*, 246: 160-73.

Kahneman, D., and A. Tversky (1984). 'Choices, Values, and Frames'. *American Psychologist*, 39(4): 341-50.

Kasser, T. (2002). *The High Price of Materialism*. Cambridge MA: MIT Press.

Kasser, T., T. Koestner, and N. Lekes (2002). 'Early Family Experiences and Adult Values: A 26-Year Prospective Longitudinal Study'. *Personality and Social Psychology Bulletin*, 28(6): 826-35.

Leibenstein, H. (1950). 'Bandwagon, Snob and Veblen Effects in the Theory of Consumer's Demand'. *Quarterly Journal of Economics*, 64(2): 183-207.

Leibenstein, H. (1966). 'Allocative Efficiency v.s. 'X-efficiency''. *American Economic Review*, 56 (3): 392-415.

Leibenstein, H. (1975). 'Aspects of the X-inefficiency Theory of the Firm'. *Bell Journal of Economics*, 6: 580-606.

Leibenstein, H. (1976). *Beyond Economic Man: A New Foundation for Microeconomics.* Cambridge MA: Harvard University Press.

Leibenstein, H. (1978). 'X-inefficiency Xists: Reply to an Xorcist'. *American Economic Review*, 68(1): 203-11.

Loewenstein, G., and D. Schkade (1999). 'Wouldn't it be Nice? Predicting Future Feelings'. In D. Kahneman, E. Diener, and N. Schwarz (eds), *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*. New York: Russell Sage Foundation.

Oswald, A. (1997). 'Happiness and Economic Performance'. *Economic Journal*, 107: 1815-31.

Phelps, C. (2005). 'The Evolution of Caring'. In L. Bruni and P.L. Porta (eds), *Economics & Happiness: Framing the Analysis.* Oxford: Oxford University Press.

Postlewaite, A. (1998). 'The Social Basis of Interdependent Preferences'. *European Economic Review*, 42: 779-800.

Praag, B. van, and A. Ferrer-i-Carbonell (2004). *Happiness Quantified: A Satisfaction Calculus Approach.* Oxford: Oxford University Press.

Rabin, M. (1998). 'Psychology and Economics'. *Journal of Economic Literature*, XXXVI: 11-46.

Rabin, M. (2002). 'A Perspective on Psychology and Economics'. *European Economic Review*, 46(4-5): 657-85.

Rojas, M. (2006). 'Well-being and the Complexity of Poverty: A Subjective Well-being Approach'. In M. McGillivray and M. Clarke (eds), *Understanding Human Well-Being*. Tokyo: United Nations University Press.

Rojas, M. (2008a). 'X-Inefficiency in the Use of Income to Attain Economic Satisfaction'. *Journal of Socio-Economics*, 37: 2278-90.

Rojas, M. (2008b). 'Experienced Poverty and Income Poverty in Mexico: A Subjective Well-Being Approach'. *World Development*, 36(6): 1078-93.

Rojas, M. (2009). 'Enhancing Poverty-Abatement Programs: A Subjective Well-Being Contribution'. *Applied Research in Quality of Life*, 4(2): 179-99.

Schor, J. (1998). *The Overspent American: Upscaling, Downshifting and the New Consumer*. New York: Basic Books.

Schor, J. (2002). 'Understanding the New Consumerism: Inequality, Emulation and the Erosion of Well Being'. *Tijdschrift voor Sociologie*, 23(1): 1-14.

Scitovsky, T. (1976). *The Joyless Economy: An Inquiry into Human Satisfaction and Consumer Dissatisfaction*. Oxford: Oxford University Press.

Simon, H.A. (1982). *Models of Bounded Rationality: Economic Analysis and Public Policy*. Cambridge MA: MIT Press.

Stigler, G. (1976). 'The Xistence of X-inefficiency'. *American Economic Review*, 66 (1): 213-16.

Thaler, R. (1980). 'Toward a Positive Theory of Consumer Choice'. *Journal of Economic Behavior and Organization*, 1: 39-60.

Thaler, R. (1992). *Quasi-Rational Economics.* New York: Russel Sage Foundation.

Thaler, R. (2000). 'From Homo Economics to Homo Sapiens'. *The Journal of Economic Perspectives*, 14(1): 133-41.

Tversky, A., and D. Kahneman (1974). 'Judgment under Uncertainty: Heuristics and Biases'. *Science*, 185: 1124-31.

Tversky, A., and D. Kahneman (1981). 'The Framing of Decisions and the Psychology of Choice'. *Science*, 211: 453-58.

Tversky, A., and D. Kahneman (1986). 'Rational Choice and the Framing of Decisions'. *Journal of Business*, 59(4): 251-78.

Veblen, T. (1927). *The Theory of the Leisure Class.* New York: Vanguard Press.

Wagenvoort, R., and P. Schure (2006). 'A Recursive Thick Frontier Approach to Estimating Production Efficiency'. Oxford Bulletin of Economics & Statistics, 68 (2): 183-201.