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Inter-American Development Bank
Office of Evaluation and Oversight
Working Paper: OVE/WP-02/09
January, 2009

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Inter-American Development Bank
Washington, D.C.

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ABSTRACT

It has become common wisdom amongst monetary policy professionals that central banks in Latin America should adopt inflation targeting. Pure inflation targeting implicitly assumes a social loss welfare function dependent on only inflation. In this paper using subjective well-being survey data for Latin America we present evidence that both inflation and unemployment reduce well-being; where the cost of inflation in terms of unemployment, hence the relative size of the weights in a social well-being function, is about one to eight, almost double of that found for OECD countries. The weighted misery index differs in level (is higher) and change (an increase rather than a fall) from the commonly used unitary weighted index and from that of the pure inflation targeters for the period 1997 to 2006. In addition, the trade-off—and therefore the misery index—differs across subgroups, for example the young (aged 18-24 years) and left-leaning citizens are more concerned with unemployment than inflation. Thus advocates and practioners of inflation only targeting are, and increasingly so, divorced from the wellbeing of LAC citizens who are increasingly left leaning and with the youth, who given the population pyramid, are also increasing as a proportion of the population. The evidence presented in this paper, combined with the low frequency of happiness data, may not be sufficiently convincing for central banks to adopt happiness-targeting rule. However, happiness data would be useful to inform policy makers regarding the optimal disinflation policy or at least allow consciousness of the potential discontent of different sub-groups of the population of different disinflation strategies.

Keywords: Happiness, Life Satisfaction, Inflation, Unemployment, and Misery Index

JEL Classification: I31, D60, D31, O54, C30

INTRODUCTION

"*Economic policy must deal with tradeoffs, and macroeconomics deals particularly with tradeoff between unemployment and inflation.*" Frey (2008). Indeed, inflation and unemployment are perhaps, for policy makers, the two most important macroeconomic policy targets and of direct concern for ordinary citizens. As any student of monetary policy knows, the general policy problem is cast as one of minimising a social welfare loss function, defined over inflation and unemployment space, subject to a short-term Phillips relation. In a dynamic setting, often complemented with estimations of the sacrifice ratio, the policy problem is to determine the optimal path of disinflation policy.

In practice, the empirical estimation of a welfare loss function is dropped. In fact a pure inflation targeting monetary regime has an implicit loss function that only includes inflation. Since the adoption of inflation targeting by Chile in 1991, other Latin American countries, partly due to its promotion by the IMF, have adopted some variant of an inflation targeting monetary regime. However, as Swenson (2005) states "*Although inflation targeting central bankers normally acknowledge that they are flexible inflation targeters, they are normally not very explicit or transparent—and probably not very consistent—about the relative weights they attach to the stability of variables other than inflation*". Nonetheless, a recent study of seven Latin American countries concluded, "*… for most countries, the interest rate setting … does not take into account exchange rate changes or the output gap.*" (Carvalho A., and M. Moura, 2008). Given the Okun relation between output and unemployment, they presumably do not take into account the unemployment rate.

The objective of this paper is to determine the weights on unemployment and inflation in the social welfare function of Latin American countries, i.e. to estimate the cost of inflation in terms of unemployment. The weights in the citizens' loss function are estimated directly using happiness data, hence avoids the problems with a priori imposition of a preference structure, normally a quadratic loss function (see Woodford 2001).

Happiness data is obtained from surveys.[1] The literature using this data under the broad concept of well-being uses interchangeably happiness and life satisfaction. Most studies on unemployment-inflation-happiness use life satisfaction. While the concepts are somewhat different, responses in different surveys are highly correlated. Also, a number of validation studies suggest that happiness questions reveal something meaningful regarding well-being. Self-reported

[1] Cross-country studies use mainly: World Values Survey (http://www.worldvaluessurvey.org/) and Euro-Barometer (http://ec.europa.eu/public_opinion/index_en.htm). In this paper we use the Latin-Barometer.

happiness has high test-retest correlations and correlates well with variables used in psychometric analysis. For example, happiness scores correlate well with the demographic characteristics of the respondents across countries, which would not be so if the data was just noise[2]. Thus the inflation-unemployment-happiness research assumes that self-reported happiness scores are a measure of true utility with a high signal to noise ratio.

The estimated weights are used to draw out the ramifications for monetary policy particularly by contrasting citizen's preferences with those of inflation targeting central bankers. They are also used to contrast with those weights estimated for OECD countries. Indeed, most studies on happiness draw almost exclusively on data from OECD countries and as far as we know there is no inflation-unemployment-happiness study on Latin America. A priori we expect different estimations for Latin American countries relative to OECD countries as the Latin American countries are subject to more shocks, have higher volatility, greater persistence, and have little to no social safety nets—particularly unemployed insurance schemes—relative to OECD countries.

The paper is structured as follows. First, we briefly review the literature on inflation-unemployment-happiness that uses country panel data. Second, we present our research strategy discussing the data and methodology used. Third, we present our estimations of the unemployment-inflation trade-off for the general population and for sub-groups. We end the article with a discussion of the ramifications of our findings.

[2] For a literature review, refer to Di Tella and MacCulloch, 2006

LITERATURE REVIEW

Research on happiness has taken off; there are today "about 10,000 articles on happiness" (Johns and Ormerod, 2008). There are already a number of reference works on the use of happiness data in economics (Frey 2008; Di Tella et al, 2006). In this section we briefly review only the sub-literature on the relation between happiness, inflation, and unemployment that uses cross-country panel data.

In general, the sub-literature focuses on developed countries pertaining to the OECD. The central concern is to determine the cost of inflation in terms of unemployment for a given level of happiness, which is taken to be the implicit utility constant trade-off between inflation and unemployment. The unemployment effects considered are both societal (society becomes more fearful of unemployment) and personal (people who lose their jobs). Researchers have found that both inflation and unemployment reduces happiness, but where a percentage point increase in unemployment has a greater impact on unhappiness than does a percentage point increase in inflation. There is a range of estimates of the unemployment-inflation's marginal rate of substitution, from 1.6 times (Blachflower, 2007), to double (Di Tella et al, 2001) to 4.7 times (Wolfers, 2003).[3] The trade-off is also sometimes calculated for sub-groups (Di Tella and MacCulloch, 2007) as costs of business cycles may differ for different groups (rich versus the poor) or their are different view points according to different political partisans (left versus right).

The empirical estimation of the trade-off faces two main problems: an ordinal categorical independent variable that needs to be cardinalised and the mix of macroeconomic and microeconomic data. The first problem is that the data on subjective well-being is ordinal. For instance, a typical life satisfaction question is: "would you say that you are: (a) very satisfied, (b) fairly satisfied, (c) not very satisfied, (d) not at all satisfied?" The most common early approach to cardinalisation was to assign values from 1 to 4 for the previous categories, and to calculate the average well-being as the simple average of these assigned values. More recent alternatives include calculating the percent reporting being happy (the proportion of the population that reports being very satisfied and fairly satisfied thus yielding a scaling from 0 to 1), an ordered logit index or ordered probits (where the former assumes a fatter tail relative to the latter). Nonetheless, the alternative methods of aggregating subjective happiness data

[3] The relation between volatility of inflation and unemployment with happiness has been less studied; the exception is Wolfers (2003). This issue is important to the discussion whether policy makers should target inflation and unemployment levels or their volatility. Data limitations preclude an investigation of this issue in this paper.

yield highly correlated estimates according to Stevenson and Wolfers (2008). The second key estimation problem derives from the mixing macro and micro data, which according to Moulton (1990) would probably result in a spurious regression. The problem is resolved either by two-stage estimation (first a regression of happiness on micro variables and then the average of the resulting residuals on macro variables) used by Di Tella et al (2001) or clustered errors technique (Fischer, 2005) by clustering errors at the country-year level used by, among others, Wolfers (2003).

Micro control variables in the estimations generally include typical socio-demographic variables: gender, age, marital status, education, income (both absolute and relative), labour market status, and size of the city. The macroeconomic variables used are country level inflation and unemployment rates. Blanchflower (2007) also includes the maximum adult lifetime inflation to test whether individual's experience of high-hyperinflation episodes reduces well-being.

THE RESEARCH STRATEGY: DATA AND METHODOLOGY

Data

The main source of information used in this paper is repeated cross sections of seventeen countries covered by the Latin-Barometer for the period 1997-2006. The Latin-Barometer is a public opinion survey conducted annually since 1995 in the 18 Latin American countries and is similar in design and thematic focus to the Euro-Barometer. The surveys are nationally representative with some exceptions[4] and have a sample of 1,000 interviews per country. We do not consider the Dominican Republic because information for the country is only available since 2005. The Latin-Barometer was not executed in 1999 and the information about well-being is only available since 1997, with the exception of the years 1998 and 2002. Thus the final sample used consists of 119 country–years (17 countries times 7 years) and covers about 120,000 individuals.

The information about well-being comes from the following life satisfaction question, which is the same as the one in the Euro-Barometer: "Would you say that you are: (a) very satisfied, (b) fairly satisfied, (c) not very satisfied, (d) not at all satisfied?" We coded the responses by assigning the integers 1 to 4 for each category from least to more life satisfaction. This provides the four ordered categorical dependent variable.

[4] Only since the year 2006 are all the surveys nationally representative. The surveys of Argentina, Bolivia, Brazil, Colombia, Chile, Paraguay, and Peru had an urban bias, especially before 2002.

Methodology

We estimate the following ordered probit specification:

$$Life\text{-}Satisfaction_{ict} = \beta_1\, unemployment_{ct} + \beta_2\, inflation_{ct} + \beta\, micro\ variables_{ict} + country\ fixed\ effects + year\ fixed\ effects + \varepsilon_{ict}$$

Where Life-Satisfaction is the proxy for the utility of individual *i*, living in country *c*, in year *t*. Unemployment is open unemployment rate and inflation is the annual percentage change in the consumer price index. In the analysis for sub-groups the same regression specification is estimated individually for each sub-group. The regressions use sample weights and employ the Moulton error correction procedure by clustering the errors at the country-year level to avoid the underestimation of the standard errors of the coefficients of unemployment and inflation.

The micro variables include the typical demographic variables: gender, age, education, marital status, labour market status, and size of the city. We also include in the regression the wealth of the individual decomposed in two components: relative wealth and reference wealth. The wealth of the individual is based on an index comprised of 8 assets: television, refrigerator, computer, washer, telephone, car, own house, and an additional house. We calculate the reference wealth as the average of the wealth index by country, year, gender and age group. Following Graham and Felton (2006), we calculate the relative wealth as the difference between the wealth of the individual and his or hers reference group's wealth[5]. We also include individual's lifetime's highest inflation rate calculated as the highest annual inflation experienced by an individual during his adult life (i.e. 18 years or more).

[5] Graham and Felton evaluated the importance of relative income on individuals' well-being. For this purpose, using the 2004 Latin-Barometer, they included in a life satisfaction regression the wealth of a reference group defined as the average wealth of respondents by country and city size and a relative wealth defined as follows:

Relative wealth = individual wealth – reference's group wealth

A simple algebraic manipulation shows that the sum of the defined relative wealth and the wealth of the group of reference equals the individual wealth. Thus the individual wealth is included in the regression decomposed in two components. The statistical significance and size the coefficients of the components indicate their relative importance to well-being. We defined the group of reference as the average of the wealth index by country, year, gender, and groups of age (18-24, 25-34, 35-44, 45-54, 55-64, and 65+) instead of country, year, and city size. Our results support the findings of Graham and Felton: relative wealth matters in Latin America to well-being.

RESULTS

General Unemployment-Inflation Trade-Off

Table 1 presents the estimated coefficients of the ordered probit specification. Both unemployment and inflation lower life satisfaction.[6] Following Wolfers (2003), an intuitive approach to interpret the coefficients of unemployment and inflation is to consider them "effect sizes". As such, their effect on life satisfaction can be measured by scaling the standard deviation of the distribution of the latent variable of the ordered probit model. The latent variable is assumed to have a normal distribution (with $\mu=0$ and $\sigma=1$). Figures 1 and 2 present the shift of the distribution when unemployment and inflation are raised 10 percentage points. The estimated coefficients of unemployment and inflation are 2.3 and 0.3, reflected in shifts to the left of 0.23 and 0.03 standard deviations.

Another approach is to calculate the probability of being on each category of life satisfaction associated with a particular set of independent variable values. The probability of an observed outcome for a given set of values is the area under the distribution curve of the latent variable between a pair of cut points (Long and Freese, 2006). The Figures include the predicted probabilities of being on each category by the model and the probabilities when all variables are held constant with the exception of increases in inflation and unemployment. For example, the model predicts that 6.7% of the individuals are "not at all satisfied" with life and that an increase of ten percentage points of unemployment increases the predicted probability to 10.0 percent.

[6] We do not report in detail the effect of micro-variables on happiness, as it is not the objective of the article. Nonetheless, the regressions shows that younger married men (relative to women or divorced or older), with tertiary education (relative to primary or secondary education), that are wage earners (relative to self-employed, unemployed, or inactive), living in small cites (relative to large cities) are the happiest group. Interestingly, it is the not absolute size of wealth but the relative wealth that matters for happiness (same as that found by Graham and Felton). The age effect on happiness has a "U" shape as found in other studies. Our finding, however, of greater happiness of formal wage earners relative to the self-employed (excluding professional and owners) is the opposite to that found in the literature (see Frey 2008).

Table 1
Life Satisfaction and Unemployment-Inflation Ordered Probit Results. [7]

Dependent variable: Reported Life Satisfaction	Coefficient	Std. error
Macroeconomic variables		
Unemployment rate	-2.2626*	[1.3136]
Inflation rate	-0.3158***	[0.1121]
Trade-off (Unemployment/Inflation)	**7.2**	
(95% confidence interval) /1	(4.8 - 10.7)	
Trade-off (includes the direct effect of unemployment)	**7.8**	
(95% confidence interval) /1	(5.6 - 11.4)	
Variables at the individual level		
Size of the city		
20,000 habs. or less	0.0743***	[0.0232]
20,001 - 100,000	0.0479***	[0.0182]
100,001 or more	(reference)	
Wealth Index		
Reference /2	0.0491	[0.0366]
Relative /3	0.0752***	[0.0036]
Demographic		
Age	-0.0165***	[0.0018]
Age Squared	0.0002***	[0.0000]
Male (Dummy)	0.0215**	[0.0092]
Education		
No education	(reference)	
Primary	0.0194	[0.0122]
Secondary	0.0566***	[0.0144]
Tertiary	0.0923***	[0.0236]
Marital Status		
Single	(reference)	
Married	0.0399***	[0.0105]
Divorced or Widowed	-0.0444***	[0.0157]
Employment Status		
Wage earners	0.0271**	[0.0110]
Self-employment: Professional and Owners	-0.0063	[0.0172]
Self-employment: Agriculture and Informal	-0.0441***	[0.0113]
Personal unemployment	-0.2115***	[0.0229]
Inactive	(reference)	
Maximum inflation experienced (Age 18+)	-0.0005*	[0.0003]
/cut1	-1.2401	[0.2431]
/cut2	-0.1029	[0.2382]
/cut3	0.9356	[0.2332]
Observations	121,547	
Pseudo R-squared	0.07	

[7] 1/ Bias-corrected confidence interval based on 500 bootstrapped repetitions. /2 Average by country, year, gender and group of age. /3 Equal to the individual's wealth minus the reference group's wealth.
Robust standard errors are in brackets, * Significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1
Effect of a 10-Percentage Points Increase in Unemployment

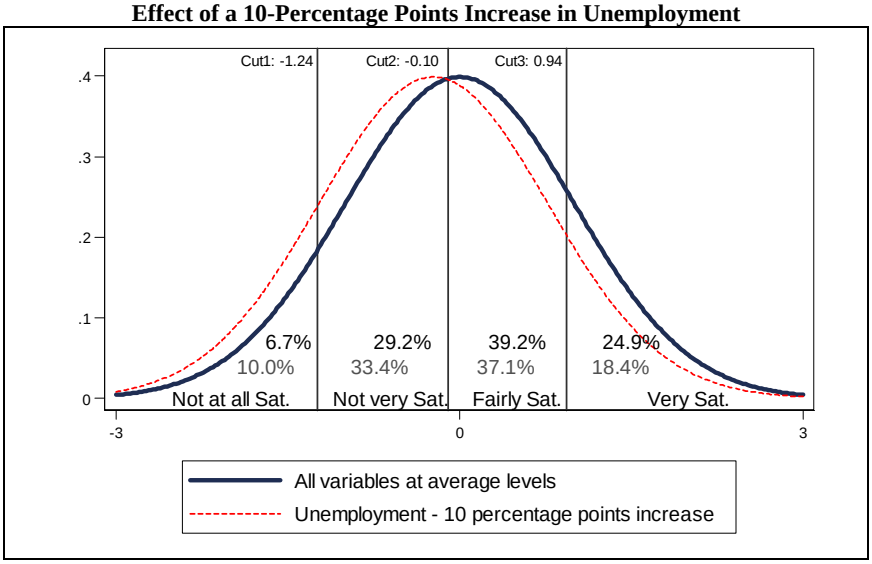
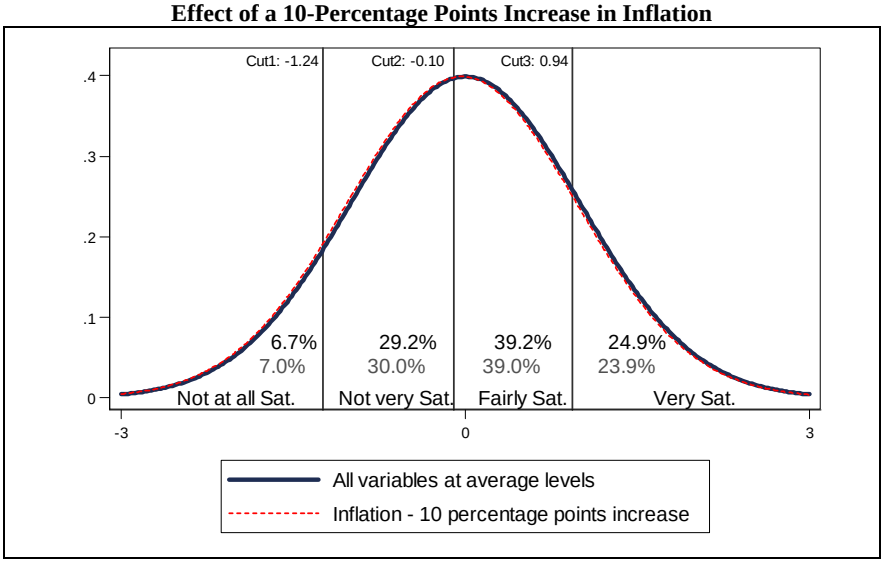


Figure 2
Effect of a 10-Percentage Points Increase in Inflation



Both approaches lead to the same conclusion: unemployment has a higher impact than inflation on life satisfaction. Assuming that over the relevant range utility is linear, hence the margin and average is equal, the unemployment-inflation trade-off, equal to $\beta 1/\beta 2$, for Latin America has a value around seven.

However, this figure underestimates the trade-off, as it does not include the cost of unemployment on the unemployed. Thus to the previously estimated indirect effect of unemployment on life satisfaction has to be added the direct effect of the unemployed (Di Tella et al 2001). The population that actually becomes unemployed experiences a cost measured by the coefficient of unemployment (-0.21) multiplied by the percent increase in unemployment (in this case, 10). The final cost of the rise of unemployment by 10 percentage points in well-being is 0.230+0.021=0.251. Taking into consideration the direct effect of unemployment on life satisfaction, the marginal rate of substitution between inflation and unemployment increases to a value around eight (0.251/0.03).

Unemployment significantly reduces subjective well-being, both personally and for society as a whole. That people suffer from unemployment even though not personally affected suggests that they do so, perhaps, because of the fear of becoming unemployed or due to non-selfish emphatic behaviour towards those who are unemployed. The effect is much larger than that for OECD countries possibly due to the absence of effective unemployment schemes in LAC. However, as Frey (2008) points out, the unemployment-happiness relation is not just one of income loss but to a large extent also due to psychological and social factors suggesting that the negative effect on well-being would be mitigated but not eliminated with an unemployment insurance system.

The above calculations may still underestimate the impact of unemployment and inflation on life satisfaction as they ignore the long-term impacts of both variables on happiness. According to set point theory (see Heady and Wearing 1992) individuals react to negative events and then shift back over time towards their baseline values of happiness. In this case the individual's history does not matter. However, if this theory is empirically rejected then individual case history regarding inflation and unemployment does matter. Lucas et al (2004) using data from Germany finds the negative effect of unemployment does not totally disappear overtime even though the individual is re-employed. Without panel data the temporal impact of unemployment cannot be estimated, however, whether lifetime inflation experiences permanently reduce happiness can. The estimated coefficient is -0.0005 about five times larger than that estimated by Blanchflower. The larger magnitude is to be expected given the high to hyper-inflation experiences in LAC relative to OECD countries.

Unemployment-Inflation Trade-Off for Sub-Groups

A key research topic has been the distribution of the burden of business cycle fluctuations across different groups. Estimations of the trade-off by sub-group levels test the hypothesis that the trade-off differs between groups hence might account for the different opinions regarding the optimal response to shocks. To test this hypothesis we re-estimate the regression for different groups of countries (high-low inflation, high-low unemployment, etc.), for sub-groups of demographic features (education level, young-old, etc.), and partisan beliefs held (right-left).

The estimated coefficients of the same specification but estimated separately for different subgroups are show in Table 2. The first set of sub groups analysed is sub-group of countries: highest and lowest in terms of GDP per capita (PPP constant 2005 international $)[8], inflation[9], and unemployment[10]. The following was found: unemployment appears to be more important than inflation for the group of countries with highest GDP per capita; the opposite holds for the countries with the lowest GDP per capita. An unexpected result is the positive and significant coefficient of inflation for the countries with highest GDP per capita. This result implies that for this group of countries higher inflation is related with higher life satisfaction. Other unexpected result is that the countries with the lowest inflation have lower (relative to the entire sample) unemployment-inflation trade-offs and are more concerned with inflation than the countries with highest inflation[11]. The group of countries with the highest unemployment have a much greater trade-off relative to the entire sample. Finally, as expected, unemployment is more important in countries with high unemployment and inflation is more important in countries with low unemployment. A similar but less stable pattern holds when inflation is considered instead of unemployment.

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[8] The highest GDP per capita countries are: Chile, Mexico, Argentina, Venezuela, Uruguay, and Panama. The lowest: Costa Rica, Brasil, Ecuador, Perú, Colombia, El Salvador, Guatemala, Paraguay, Bolivia, Honduras, and Nicaragua.

[9] The highest inflation rate countries are: Ecuador, Venezuela, Honduras, Costa Rica, Uruguay, and Colombia. The lowest inflation rate countries are: Mexico, Nicaragua, Paraguay, Guatemala, Brazil, Argentina, Bolivia, Chile, Peru, El Salvador, and Panama.

[10] The highest unemployment rate countries are: Colombia, Argentina, Venezuela, Uruguay, and Ecuador. The lowest unemployment countries are: Nicaragua, Paraguay, Brazil, Chile, Peru, Bolivia, El Salvador, Costa Rica, Honduras, Guatemala, and Mexico

[11] The unexpected results may be due to the behaviour in Venezuela that is an outlier as it has the highest reported life satisfaction but simultaneously has the highest inflation rate. Venezuela is also included in the group of countries with high GDP per capita. However, dropping Venezuela from the sample does not change the results because other countries (i.e. Costa Rica) exhibit a similar behaviour—relatively high inflation or GDP per capita and high life satisfaction.

Table 2
Inflation and Unemployment Tradeoffs by Sub-Groups [12]

	Unemp. rate	Unemp. (Yes)	Inflation rate	Trade-off /1	Trade-off /2	Sample
Unrestricted sample	-2.26*	-0.21***	-0.32***	**7.2** (4.8 - 10.7)	**7.8** (5.6 - 11.4)	121,547
A. Groups of countries (Avg. 1997-06)						
1) High GDP per cap. ($9,808)	-3.83***	-0.26***	0.87**	**-4.4** (-6.5 - -3.2)	**-4.7** (-7.2 - -3.4)	44,642
2) Low GDP per cap. ($5,050)	-0.78	-0.17***	-0.39***	2.0 (0.5 - 4.3)	2.5 (1.0 - 5.1)	76,905
3) High Inflation (16.1%)	-3.17***	-0.21***	-0.27***	**11.8** (7.3 - 22.9)	**12.5** (8.7 - 27.2)	43,448
4) Low Inflation (5.6%)	-1.89	-0.22***	-0.16	12.1 (-11.4 - 310)	13.5 (-13.7 - 338)	78,099
5) High Unemp. (13.9%)	-5.64***	-0.19***	-0.15	38.4 (24.0 - 104)	39.8 (24.8 - 111)	44,810
6) Low Unemp. (7.4%)	0.43	-0.22***	-0.98***	-0.4 (-1.2 - 0.1)	-0.2 (-1.0 - 0.4)	76,737
B.1) Groups of age						
1) 18-24	-3.34**	-0.13***	-0.28**	**11.8** (6.4 - 50.6)	**12.2** (6.9 - 40.6)	26,632
2) 25-34	-2.66*	-0.24***	-0.41***	**6.4** (4.1 - 12.8)	**7.0** (4.4 - 13.0)	30,110
3) 35-44	-1.37	-0.20***	-0.30**	4.5 (0.6 - 10.1)	5.2 (1.1 - 13.2)	25,291
4) 45-54	-2.50*	-0.32***	-0.35*	**7.2** (3.0 - 22.4)	**8.1** (3.1 - 22.0)	16,773
5) 55-64	-1.77	-0.20***	-0.13	13.8 (-13.3 - 643)	15.4 (-22.6 - 667)	12,911
6) 65 +	-2.55**	n.a.	-0.29	8.7 (1.8 - 293)	n.a.	9,830
B.2) Age cohort						
1) Born 1975-1988	-3.76***	-0.16***	-0.26**	**14.2** (8.6 - 51.9)	**14.8** (9.5 - 44.1)	38,746
2) Born 1960-1974	-2.28*	-0.21***	-0.31**	**7.5** (4.1 - 14.4)	**8.1** (4.2 - 13.9)	40,005
3) Born before 1960	-1.51	-0.26***	-0.31**	4.8 (2.3 - 9.6)	5.7 (2.7 - 11.9)	42,796
C) Groups of education level						
1) No education	-2.32	-0.25***	-0.53***	4.4 (2.2 - 7.6)	4.8 (2.4 - 8.0)	31,371
2) Primary	-2.39*	-0.20***	-0.30**	**7.9** (4.2 - 14.3)	**8.5** (4.9 - 15.0)	42,377
3) Secondary	-2.47*	-0.20***	-0.19*	**13.3** (6.4 - 88.4)	**14.4** (7.0 - 83.4)	36,354
4) Tertiary	-0.88	-0.19**	-0.44***	2.0 (-1.7 - 7.4)	2.4 (-1.7 - 8.2)	10,295
D) Political identification (Scale: 0 to 10)						
1) Left (0-2)	-3.27**	-0.20***	-0.35*	**9.4** (4.2 - 28.1)	**10.0** (4.7 - 53.0)	14,699
2) Center (3-7)	-2.1	-0.22***	-0.40***	5.2 (3.1 - 8.3)	5.8 (3.8 - 9.3)	57,494
3) Right (8-10)	-0.3	-0.17***	-0.48***	0.6 (-1.4 - 3.9)	1.0 (-0.7 - 4.2)	23,338

[12] 1/ Trade-off: β Unemployment / β Inflation, and 2/ Trade-off: [(β Unemployment + β Unemployed) / β Inflation]. Bias-corrected confidence intervals based on 500 bootstrapped repetitions. The symbols *, **, ***, indicate that the coefficient is significant at the 10, 5, 1 per-cent level respectively. Bold typeface signals that both inflation and unemployment coefficients are significant at statistical conventional levels.

The second set of sub-groups is by socio-demographic features of the respondents. By age, the estimated trade-offs show that the youth 18 to 24 years of age have a higher trade-off than the rest of groups of age and the entire sample. On average the age group 18-24 is about 37% of the population and given the population pyramid it is expected to increase. Regarding cohorts the population born before 1974 and 1960 experienced higher inflation, and consequently they worry more about inflation than unemployment; their trade-offs are lower than the one for the population born from 1975 to 1988. The estimated trade-offs by sub-groups by education level show an inverted "U" shape, with the highest being for the population with secondary education. These patterns correspond to the unemployment incidence by sub-groups, as shown in Figures 3.

Figure 3
Estimated Unemployment-Life Satisfaction Coefficients by Sub-Groups According their Unemployment Rate

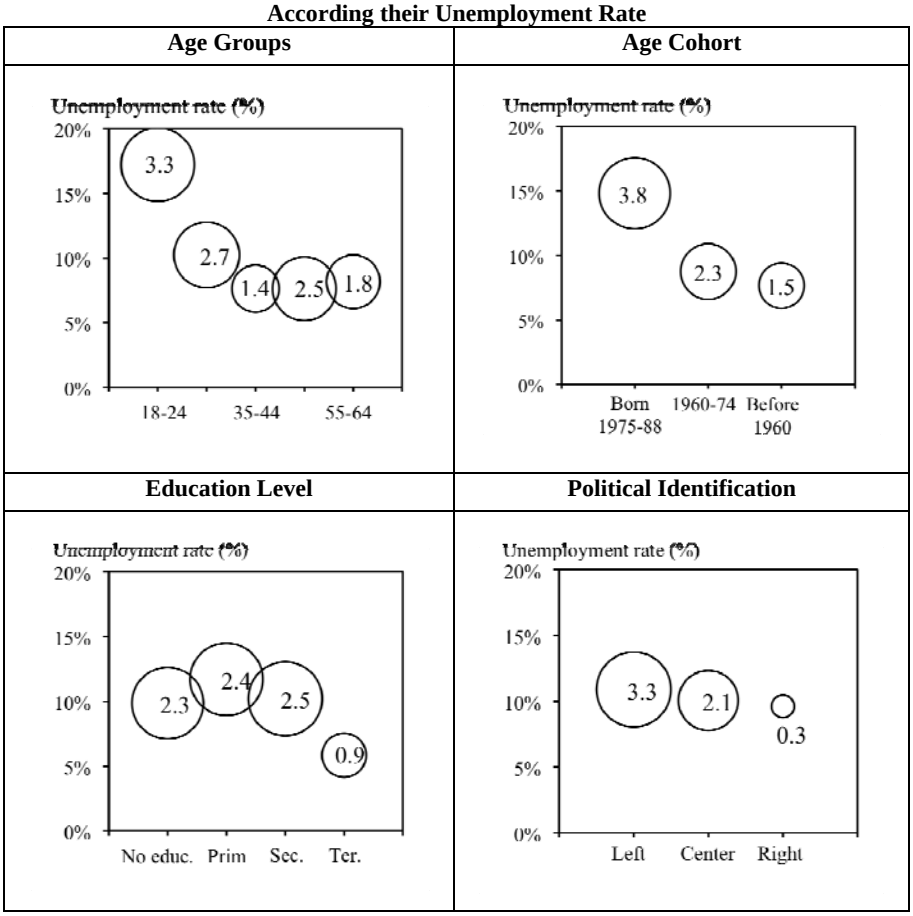


Figure 3 presents the estimated unemployment coefficients and unemployment rate by sub-groups. The unemployment rate is calculated from the Latin Barometer survey and is plotted for each category along with the size of the estimated coefficient from the ordered probit models. For example, the youth 18 to 24 years of age have an unemployment rate of 17 and an estimated coefficient of 3.3 whilst the following age group has an unemployment rate of 10 and an estimated coefficient of 2.7. There is a positive relation between the unemployment rate coefficients and the unemployment incidence, with the exception of political identification.

The third set of subgroups is by political partisans. The Latin-Barometer survey asks the respondents about their identification with a political ideology according to a 0 to 10 (Left to Right) scale with the possibility to declare non-identification. There is a sharp difference in the trade-off for partisans. Left-wingers (0-2) care more about unemployment than inflation. The trade-off is ten, higher than that found for the general population. Right-wingers (8-10), in contrast, care about inflation but not about unemployment. The implied trade-off, although not statistically significant, is one. These results are similar to that found by Di Tella and MacCulloch (2005) but inconsistent with Di Tella and MacCulloch (2007) who find they cannot reject the null hypothesis of equality of trade-offs between left and right-wing partisans. Based on the confidence intervals, our estimations show that the equality of trade-offs for Latin America can be rejected.

The majority of the population in Latin America self-identify around the middle of the political identification scale and one in five do not declare identification to a particular ideology; however, the relative importance of the left has increased in this period. Figure 4 shows the average political identification scale of the Latin American population that declared partisanship.

Considering that the middle point of the scale is five, the average is slightly biased to the left. Table 3 shows a simple trend estimation of the size of the population who self-identify themselves as right or left partisans. Most countries, twelve out of seventeen, have an increasing proportion of the population who self-identify with the left. Seven countries appear to be moving left (measured by a positive slope for left and a negative slope for right). Two countries, Brazil and Paraguay, seem to be moving right. Chile and Ecuador are moving to the center plus apolitical categories, while Colombia, El Salvador, Mexico and Nicaragua are moving towards a bi–polar distribution; more left and more right-wing partisans.

Figure 4
Political Identification Trend /a

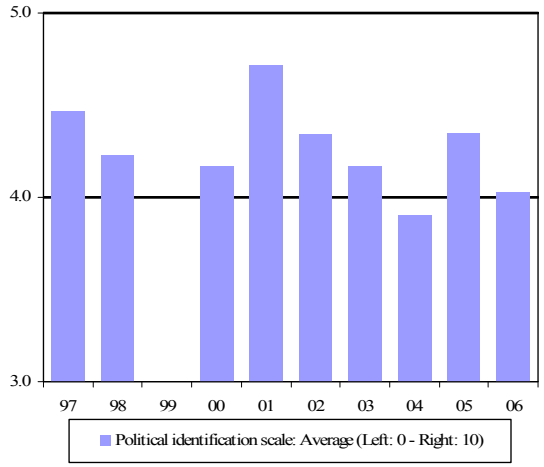


Table 3
Trends towards Par-Tisanship /b

Countries	Left	Right
Leaning to the Left		
Argentina	0.06	-0.47
Bolivia	0.28	-0.01
Costa Rica	0.25	-1.50
Honduras	0.48	-1.88
Panama	0.79	-1.88
Peru	0.81	-0.22
Uruguay	0.36	-0.79
Venezuela	0.57	-0.41
Leaning to the Right		
Brazil	-0.19	0.48
Guatemala	-1.75	0.10
Paraguay	-0.04	0.38
Leaning to the Center		
Chile	-0.37	-0.15
Ecuador	-0.58	-0.93
Leaning to the Left and the Right		
Colombia	0.59	0.25
El Salvador	0.11	1.30
Mexico	0.90	0.04
Nicaragua	0.80	0.78

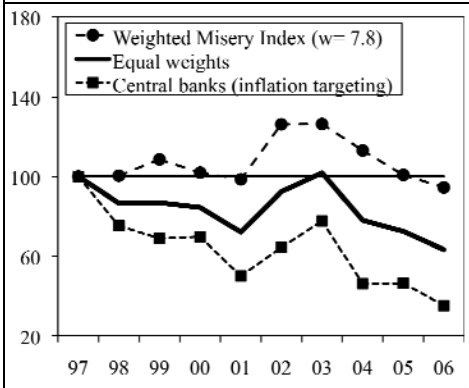
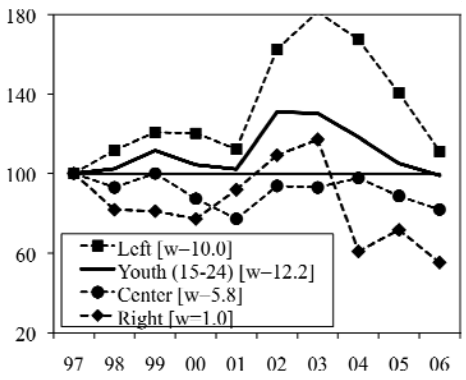
a/ Country averages weighted by the country population that declared identification with a political ideology in each country and year.

b/ Estimated coefficients in a regression $\rho = \alpha + \beta t$, with ρ and t denoting the proportion of partisan in the total population and time. The coefficients have been scaled by a factor of 100.

Misery

A useful way to illustrate the estimated trade-offs is the evolution of weighted misery index for each sub-group. The traditional misery index is usually the simple sum of the unemployment and inflation rates. The evolution of the traditional misery index and the inflation-unemployed weighted index for LAC and for inflation targeters is shown in Figure 5.a. The misery index for partisans and youth is shown in Figure 5.b.

Figure 5
Misery Index. Trends and Comparison

a. Central Banks, Equal Weights, and Weighted Indexes	b. Political Partisanship and the Youth
	

The different weighted misery indexes are based on the ordered probit trade-off estimations. The sum of inflation, and unemployment times the trade-off is calculated for each country. Then, the population-weighted average (i.e. the rates for Mexico and Brazil have a higher impact) is calculated for each year and referenced to the value in 1997. A double weighting occurs for political partisanship and the youth, their proportion of the country population is also considered.

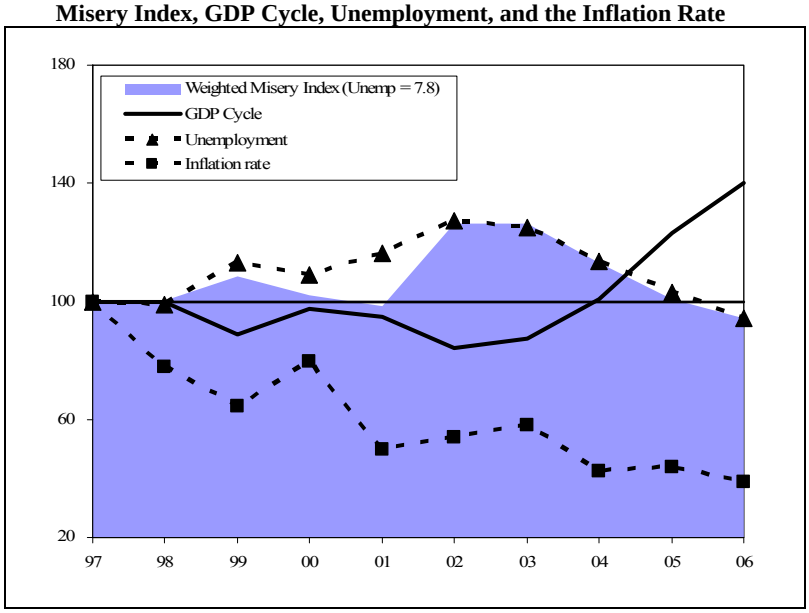
The country population and share of the youth per country is from United Nations estimations.

The typically used non-weighted misery index and inflation "targeters" index give false signals; while they show that misery has fallen since 1997 the weighted index shows the opposite: an increase in misery until 2003 when it begins to fall but remains above the level of 1997 until 2006. Figure 5.b shows that left-wing partisans and the youth have been much more miserable than those of the right and the center. In general, for different groups the misery index shows different levels and different patterns of the direction of change.

To contextualise the misery index patterns we show in Figure 6 the evolution of average unemployment, inflation, life, satisfaction; and, to identify economic crisis, the evolution of the real gross domestic product of Latin America. As can be seen during the period 1997-2006 Latin America went through an economic crisis. Crisis is defined as an absolute drop in GDP for more than one year. The GDP fell from 1997 onwards and only recovered to the pre–crisis level in 2004. However, unemployment fell back to its pre-crisis level only by 2006. The inflation rate fell continuously, although not monotonically, from 1997 onwards. What drove the increase in misery was unemployment. Only

when unemployment fell back to its pre-crisis level did misery fall back to its pre-crisis value.

Figure 6
Misery Index, GDP Cycle, Unemployment, and the Inflation Rate



DISCUSSION

Macroeconomists and policy makers assume that unemployment and inflation are two "bads", that is they reduce social welfare. The policy-relevant question is if there is a trade-off between them then, what is the marginal rate of substitution hence the optimal disinflation policy?

In this paper we present direct evidence that unemployment and inflation reduce happiness. The evidence shows, however, that unemployment causes more unhappiness than inflation. Unlike OECD countries where the unemployment to inflation trade-off, i.e. the cost of inflation in terms of unemployment for a constant level of happiness, is about four, in Latin America it is about eight. Further, the trade-off differs substantially across subgroups. For the young (aged 18-24 years) it is higher at twelve. There is also evidence that the political leaning of a person effects the size of the trade off; left leaning citizens are more concerned with unemployment, with a trade off of ten, while right leaning citizens do not care about unemployment only inflation. Thus right-wing partisans are in line with those monetary professionals who advocate pure inflation targeting rule for central banks. However, such advocacy is increasingly divorced from the opinions of LAC citizens who are increasingly left leaning and

with the youth who given the population pyramid will also increase as a proportion of the population.

Using the estimated trade off in a misery index reveals that the weighted misery index differs in level (it is higher) and change (with an increase rather than a fall) from the commonly used non-weighted index and from that of the pure inflation targeters. Thus the latter two give false signals.

Therefore, should central bankers target happiness instead of inflation? Perhaps not, the evidence presented in this paper, combined with the low frequency of happiness data, may not be sufficient but is in line with the conclusion of Di Tella and MacCulloch (2007): "Against this backing, we argue that happiness data can be quite useful to central banks". The fact that unemployment is more costly than inflation is particularly relevant in discussions of the desirability of gradualist relative to draconian monetary policy options. Using happiness data to inform policy makers regarding the optimal disinflation policy or at least obtaining consciousness of the discontent of a given disinflation strategy would not violate Mishkin's (2002) KISS (Keep It Simple Stupid) principle for inflation targeting.

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