E C O N O M I C S B U L L E T I N

Money Illusion: Are Economists Different?

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Abstract

We carried out a survey among a large group of undergraduate students of different disciplines and different years to test whether the study of economics or scientific majors influences the degree by which people are affected by money illusion. We find significant differences between first-year students, suggesting the presence of a selection bias towards money illusion in humanities students and away from it in economics and science students. In addiction, comparing economics students of different years, we do not find evidence of a learning effect.

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1 Introduction

The presence of a bias toward a nominal evaluation has often been found in experiments and surveys. For example, an interesting paper by Shafir et al. (1997) has concluded that money illusion is widespread among agents, who systematically depart from standard economic prescription by attending to nominal instead of real value of transactions. A recent literature on the currency changeover in Europe has also brought the attention on the relevance of this phenomenon (see, e.g., Kooreman et al., 2004; Cipriani and Cannon, 2006; Marini et al., 2007). A question that has remained largely unexplored is whether in this context the study of economics influences people's attitudes towards nominal vs. real changes. Are economists less prone to money illusion? If so, is it because some self-selection mechanism drives the most "rational" people (at least in the sense assumed by standard economic models) into studying economics? Or is it a learning effect? To answer these questions, we interviewed a large sample of students from different departments at an Italian University.

We find that first year economics and mathematics students are less likely to suffer from framing effects given that their judgement about an action does not vary with the framing of the question. In other words, it seems that these students exhibit a greater propensity for a "rational" evaluation of actions than humanities students. These differences, however, do not change when studying economics, i.e., we do not find evidence of a learning effect when we compare economics students across different years. Our results could explain the traditional reluctance of economists to consider money illusion as a cause of nominal inertia in theoretical models: perhaps economists, like economics students, are less inclined to be affected by the representation of a problem in real or nominal term than non-economists and hence likely to dismiss the importance of money illusion.

The paper proceeds by discussing the survey design and the results in Section II. Section III draws conclusion.

2 Survey Design and Main Results

At the beginning of the academic year 2006-2007 we conducted a survey of undergraduate students enrolled at the University of Verona. We interviewed first-year students from 5 different departments: Economics (coded as ECON), Law (LAW), Mathematics and Computer Science(MATH), Foreign Languages (LANG), and Tourism (TOUR), and final year economics students. All students were asked to fill a questionnaire at the beginning of a lecture during the first week of term, which ensures that students had not yet been exposed to any economics training at university level. We control for previous exposure to economics by including the high school type in the estimation. This timing of the survey allows to test for differences in the perceptions of the real effects of nominal changes, i.e., for the presence of a representation or framing effect, between economics and other students. The survey was anonymous, and all students were instructed that there were no right or wrong answers. Additional control variables such as ability (as measured by the high school graduation marks) and family background (parental education and sector of activity) were also collected in the questionnaire, see Table 1. Descriptive statistics on these control variables can be found in Table 2. All students in the survey were asked (randomly) either version A or version B of the following question, taken from Kahneman

et al. (1986).

> **Question A**. A company is making small profits. It is located in a community experiencing a recession with substantial unemployment but no inflation. There are many workers anxious to work at the company. The company decides to decrease wages and salaries 7% this year. Please rate this action as:
>
> Completely Fair Acceptable Unfair Very Unfair
>
> **Question B**. ... with substantial unemployment and inflation of 12% ... The company decides to increase salaries only 5% this year. Please rate this action as:
>
> Completely Fair Acceptable Unfair Very Unfair

Preliminary results are presented in Table 3. The four possible answers are grouped to generate the proportion of students rating the action as fair (Completely fair, Acceptable) or unfair (Unfair, Very unfair). Under the hypothesis of no framing effect the proportions of students rating the action as unfair should be similar under the two different versions of the question. These proportions are remarkably similar for ECON students (29.73% versus 28.02%) and for MATH students (36.36% versus 38.39%). However, there are large differences for students coming from other departments. For instance, 47.54% of LAW students consider the actions unfair in version A which reduces to 20.69% in version B; for TOUR students, the proportion is 43% and 21.53% and finally for LANG students the proportion is 60% and 28.21% respectively in version A and B[1].These differences suggest that students just enrolled in the Economics and Math departments have a greater ability to uncover the real effects of nominal changes and do not suffer from money illusion. Finally, we also report the Pearson's chi-square test of the null hypothesis that the student's stance on the fairness of the real wage cut decision is unrelated to the college enrollment decision. The null hypothesis can be rejected in both versions of the question suggesting some association between college choice and fairness.

To get a deeper look at the magnitude of the phenomenon, we consider a Probit model where the binary dependent variable "fairness" (1 if the action is rated as fair, 0 otherwise) is modeled as a function of enrollment department, gender, high school type, graduation mark, and family background both in terms of parents' education jobs. We also distinguish between first-year economics students and third-year economics students to uncover a possible learning effect after exposure to Economics courses. To gauge how the judgement on the fairness of the real wage cut depends on the coding of the question, for each department we introduce an interaction term "Frame∗Department " which will capture the differential effect of the frame within students of a given department (Frame is equal to 0 when the student received version A of the question, 1 otherwise). An interaction term is also included for third-year economics students to assess the presence of learning. Table 4 reports the estimation results.

[1]As a comparison, in Kahneman et al. (1986), 62% of respondents (version A) in a telephone survey of 125 households rated this action as unfair while only 22% rated it as unfair in version B. In a mail survey of 150 business executive, Gorman and Kehr (1992) found that 49% rated it unfair as framed in version A while only 2% in version B.

When no conditioning variables are included in the Probit regression (column (1)), first-year students from the different departments receiving version B of the question have a similar view of the fairness of the real wage cut. When we control for individual ability, proxied by High School type and graduation marks, and family background, measured as parents' education and job, MATH students are more prone to judge the wage cut as unfair (the relevant coefficient is significant at a 10% level). Students answering to version A of the question exhibit a very different behavior: focussing on first-year students, ECON and MATH students do not suffer from any frame effect, their coefficients are small and not statistically significant, whereas responses from students enrolled in LAW, TOUR and LANG display a remarkable bias upon the coding of the question given that the corresponding coefficients are significant irrespective of the presence of conditioning variables. Again, these students seem less capable of disentangling nominal and real effects and they appear to suffer from money illusion.

An interesting issue is whether economics students display some learning because of the exposure to formal economics classes where the difference between nominal and real changes is emphasized. According to our results, third-year economics students suffer form money illusion as much as first-year economics students do: a test of the null hypothesis "Frame*Econ1=Frame*Econ3" gives a value of 0.19 with a p-value of 0.66%, thus the null hypothesis of no learning effect cannot be rejected. Finally, the coefficient of Econ3 is also not significantly different from zero suggesting that students' opinion on te fairness of the real wage cut do not change after taking economics classes.

3 Conclusions

We find that first year students in the economics and mathematics departments are less likely to suffer from framing effects, given that their judgement about the fairness of a firm's decision does not vary with the coding of the question. In other words, it appears that these students exhibit a greater propensity for a "rational" evaluation of actions and are less prone to suffer from money illusion. Since these differences emerge from the very first week of term, and do not vary later when students in fact study economics, we conclude that there is a clear selection effect, whereby people less likely to be affected by money illusion enroll into economics (or math) degrees, and there is no learning. We believe that the major implications of this study are twofold. First, economists are indeed different: our results show that they are less inclined to be affected by the representation of a problem in real or nominal terms. Second, these differences should be taken into account by the literature on experimental economics, which often makes use of economics students, because they may not be representative of the (students) population.

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Table 1: Definition of variables

Econ1	First-year Economics student
Econ3	Third-year Economics student
Law	First-year Law student
Lang	First-year Foreign Languages student
Tour	First-year Tourism student
Math	First-year Math & Computer Science student
Gender	1 if female, 0 if male
Profess HS	1 if the student attended a Professional High School, 0 otherwise
Tech. HS	1 if the student attended a Technical High School (vocational), 0 otherwise
Liceo HS	1 if the student attended a Liceo High School (Ancient Latin, Math, Philosophy, Physics), 0 otherwise
Marks60-69	if High School graduation mark is between 60 (lowest mark) and 69, 0 otherwise
Marks70-79	if High School graduation mark is between 70 and 79, 0 otherwise
Marks80-89	if High School graduation mark is between 80 and 89, 0 otherwise
Marks90-99	if High School graduation mark is between 90 and 99, 0 otherwise
Marks100	if High School graduation mark is 100 (highest mark), 0 otherwise
Family background	
Primary school	1 if highest degree is primary school (5 years of education), 0 otherwise
Junior High School	1 if highest degree is junior high school (8 years of education), 0 otherwise
High School	1 if highest degree is high school (13 years of education), 0 otherwise
College Degree	1 if highest degree is College school (17 years of education), 0 otherwise
Blue collar	1 if blue-collar worker, 0 otherwise
White collar	1 if office worker or teacher, 0 otherwise
UpperMiddleClass	1 if senior manager, member of the profession or entrepreneur, 0 otherwise
MiddleClass	1 if craftsman, 0 otherwise
Unempl	1 if unemployed, 0 otherwise
Mother not working	1 if mother housekeeper or unemployed, 0 otherwise
Siblings	1 if siblings, 0 otherwise

Table 2: Descriptive Statistics.

	Econ 1 ($n = 516$)	Econ 3 ($n = 334$)	Law ($n = 119$)	Tour ($n = 409$)	Lang ($n = 84$)	Math ($n = 149$)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Female	.503(.500)	.589(.492)	.689(.464)	.855(.351)	.916(.278)	.281(.451)
Education						
Prof HS	.056(.230)	.059(.237)	.067(.251)	.066(.248)	.095(.295)	.046(.212)
Tech.HS	.500(.500)	.601(.490)	.319(.468)	.371(.483)	.178(.385)	.463(.500)
Liceo HS	.443(.497)	.338(.473)	.613(.489)	.562(.496)	.726(.448)	.489(.501)
Marks60-69	.224(.417)	.146(.354)	.151(.359)	.215(.411)	.142(.352)	.288(.454)
Marks70-79	.279(.448)	.200(.401)	.319(.468)	.239(.427)	.309(.465)	.241(.429)
Marks80-89	.220(.415)	.227(.419)	.176(.382)	.220(.414)	.273(.448)	.208(.407)
Marks90-99	.170(.376)	.254(.436)	.168(.375)	.190(.393)	.142(.352)	.127(.334)
Marks100	.104(.306)	.170(.376)	.184(.389)	.134(.341)	.130(.339)	.134(.342)
Father background						
Primary school	.073(.261)	.101(.302)	.067(.251)	.083(.276)	.083(.278)	.073(.262)
Junior High School	.284(.451)	.299(.458)	.260(.440)	.344(.475)	.214(.412)	.281(.451)
High School	.465(.499)	.443(.497)	.453(.499)	.447(.497)	.540(.500)	.436(.497)
College Degree	.176(.381)	.155(.363)	.218(.414)	.124(.330)	.154(.363)	.208(.407)
Blue collar	.172(.378)	.203(.403)	.168(.375)	.244(.430)	.200(.404)	.221(.416)
White collar	.242(.428)	.239(.427)	.260(.440)	.237(.425)	.392(.491)	.328(.471)
UpperMiddleClass	.490(.500)	.431(.495)	.445(.499)	.400(.490)	.273(.448)	.335(.473)
MiddleClass	.094(.293)	.125(.332)	.126(.333)	.117(.322)	.130(.339)	.110(.318)
Mother background						
Primary school	.052(.222)	.119(.325)	.058(.236)	.066(.248)	.059(.238)	.067(.251)
Junior High School	.317(.466)	.380(.486)	.310(.464)	.374(.484)	.321(.469)	.416(.494)
High School	.511(.500)	.395(.489)	.436(.498)	.469(.499)	.464(.501)	.422(.495)
College Degree	.118(.323)	.104(.306)	.193(.396)	.088(.283)	.154(.363)	.093(.292)
Blue collar	.098(.298)	.128(.335)	.134(.342)	.114(.319)	.095(.295)	.120(.327)
White collar	.395(.489)	.311(.463)	.352(.479)	.339(.474)	.464(.501)	.362(.482)
UpperMiddleClass	.131(.338)	.125(.332)	.142(.351)	.129(.336)	.023(.153)	.073(.262)
MiddleClass	.029(.168)	.047(.213)	.058(.236)	.046(.210)	.035(.186)	.080(.273)
Unemployed	.025(.156)	.014(.121)	.016(.129)	.022(.146)	.011(.109)	.040(.197)
Housekeeper	.319(.466)	.371(.483)	.294(.457)	.347(.476)	.369(.485)	.322(.468)

Table 3: Money Illusion, first-year students by College

	Econ 1	Law	Tour	Lang	Math
A. No Inflation; Wage cut: 7%					
	($n = 257$)	($n = 58$)	($n = 209$)	($n = 39$)	($n = 72$)
Unfair	29.73	47.54	43.00	60.00	36.36
Fair	70.27	52.46	57.00	40.00	63.64
Pearson's $\chi^2_4 = 21.16$, p-value = 0.001					
B. Inflation rate: 12%; Wage increase: 5%					
	Econ 1	Law	Tour	Lang	Math
	($n = 259$)	($n = 61$)	($n = 200$)	($n = 45$)	($n = 77$)
Unfair	28.02	20.69	21.53	28.21	38.89
Fair	71.98	79.31	78.47	71.79	61.11
Pearson's $\chi^2_4 = 9.69$, p-value = 0.046					

Table 4: Money Illusion - Probit regressions ($n = 1611$).

	(1)	(2)	(3)
Law	0.202	0.192	0.186
	(0.205)	(0.205)	(0.207)
Lang	-0.068	-0.117	-0.111
	(0.233)	(0.235)	(0.237)
Tourism	0.146	0.125	0.127
	(0.135)	(0.136)	(0.137)
Math	-0.264	-0.292*	-0.303*
	(0.173)	(0.175)	(0.178)
Economics 3	-0.075	-0.071	-0.090
	(0.133)	(0.133)	(0.135)
Frame*Econ1	0.064	0.055	0.040
	(0.139)	(0.140)	(0.140)
Frame*Econ3	-0.064	-0.061	-0.042
	(0.165)	(0.166)	(0.167)
Frame*Law	-0.596**	-0.594**	-0.616**
	(0.266)	(0.264)	(0.267)
Frame*Lang	-0.620**	-0.596*	-0.618*
	(0.315)	(0.316)	(0.318)
Frame*Tourism	-0.412**	-0.411**	-0.405**
	(0.182)	(0.182)	(0.184)
Frame*Math	0.130	0.160	0.169
	(0.213)	(0.213)	(0.215)
Female	0.157	0.163	0.166
	(0.107)	(0.109)	(0.111)
Frame*Female	-0.234	-0.235	-0.228
	(0.147)	(0.147)	(0.148)
Tech. HS		-0.012	0.001
		(0.143)	(0.144)
Liceo HS		0.093	0.075
		(0.142)	(0.146)
Marks70-79		-0.114	-0.140
		(0.099)	(0.099)
Marks80-89		0.041	0.025
		(0.104)	(0.104)
Marks90-99		-0.063	-0.084
		(0.109)	(0.111)
Marks100		-0.078	-0.109
		(0.119	(0.121)

Table 4: Money Illusion - Probit regressions [continued]

Father HS			-0.128
			(0.081)
Father College			0.168
			(0.125)
Mother HS			-0.007
			(0.082)
Mother College			0.028
			(0.139)
Father WhiteCollar			0.099
			(0.109)
Father UpperMiddleClass			0.028
			(0.100)
Father MiddleClass			0.163
			(0.133)
Mother WhiteCollar			-0.035
			(0.121)
Mother UpperMiddleClass			-0.074
			(0.142)
Mother MiddleClass			-0.413**
			(0.190)
Mother not working			-0.011
			(0.111)
Siblings			-0.089
			(0.089)
Intercept	0.507+	0.517+	0.637+
	(0.096)	(0.171)	(0.207)
Correctly predicted	67.78%	68.16%	68.40%
Log-likelihood	-990.74	-987.83	-979.16
Wald χ^2_{23}	55.69	61.65	78.13
Pseudo R-squared	0.0278	0.0307	0.0392

Binary dependent variable: Acceptable/Fair=1, Unfair/Very unfair=0. Robust Standard Errors in parenthesis. Column (1): no conditioning for ability or family background; column (2): covariates account for ability, no family background; column (3): covariates account for ability and family background.

The reference group is given by first-year male economics students, with Professional HS degree in the lowest Mark bracket (60-69), blue collar parents with no HS diploma.

+: significant at 1%, **: significant at 5%, *: significant at 1%.