Report Empirical Economics

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1 Introduction

The main goal of this report is to study an individual's intertemporal discount rate. In other words, this analysis seeks to reveal how individuals make trade-offs between present and future benefits, providing insights into their financial decision-making processes and patience levels regarding monetary rewards. In order to study this phenomenon, we can build a probit model using the variable *SCONTO1–24* as a dependent variable from the "Survey on Italian household income and wealth (Shiw)", administered by the Bank of Italy, wave 2010 (question $C33$, is contained in the file "q10c2").
The discount rate can take value $\geq 0\%$. The question has a skip modality, meaning that based on the initial response, the sequence can either stop or proceed to a subsequent question. The procedure is as follows:

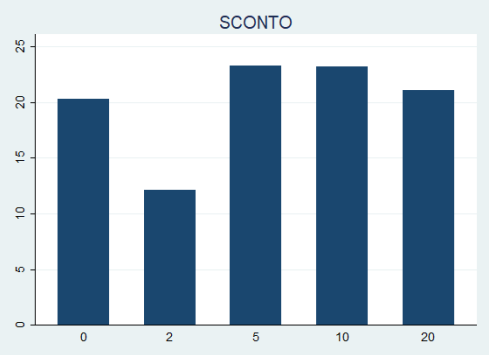
- Half of the sample is asked whether they would like to give up 10% of the won amount to collect it immediately. If the individual answers "yes", then they are asked whether they would give up 20% to collect it immediately or not. If the individual answers "no", then they are asked the same question with a lower discount rate (5%), and if they still answer "no", thye are with an even lower rate (2%). This continues until a "yes" is given as an answer.
- The other half is asked whether they would give up 20% to collect the amount immediately. If they answer "no", they are then asked if they would give up 10%, then 5% and finally 2%, in that order. The sequence ends whenever the respondent answers "yes".

So, the reasoning behind this is that if a person would give up for example to 10% or more to have the money immediately, they would also very likely give up to smaller percentages in order to have the money immediately.

2 Dependent Variable

These survey questions are designed to assess an individual's intertemporal discount rate, which indicates how much less a person values future money compared to money received immediately. In this survey, individuals are asked how much of their lottery winnings (equal to their net yearly revenue) they would be willing to give up to receive the money immediately rather than waiting a year. The answers to these questions determine the value of 'SCONTO' for each respondent. The new variable 'SCONTO' represents the discount rate at which an individual is willing to receive an immediate payout instead of waiting one year to collect the full lottery amount. The values of 'SCONTO' are:

- '**20**': The respondent is willing to give up 20% of the winnings to receive money immediately
- '**10**': The respondent is willing to give up 10% but not 20%
- '**5**': The respondent is willing to give up 5% but not 10%
- '**2**': The respondent is willing to give up 2% but not 5%
- '**0**': The respondent would prefer having the total of the money even if he/she has to wait a whole year.



SCONTO	Freq.	Percent	Cum.
0	2,844	20.32	20.32
2	1,692	12.09	32.41
5	3,257	23.27	55.68
10	3,251	23.23	78.91
20	2,952	21.09	100.00
Total	13,996	100.00	

Figure 1: On the left: Frequency percentage distribution of education leve.
On the right: Frequency Distribution of SCONTO.

This method makes it possible to determine the indifference point for each individual, i.e. the maximum percentage they are willing to give up to get the money immediately. Figure 1 shows the percentage distribution of responses in the bar graph on the left, while the table on the right displays the percentage and cumulative frequency for each level of the variable SCONTO. As we can see 20.32% of respondents would not give up any part of their winnings, indicating a strong preference for the full value of money in the future. Almost the half of the sample prefer to give up 10% and 5%, indicates that many respondents find it a reasonable trade-off to give up a small part of their premium in order to obtain immediate cash, and this behaviour reflects a balanced consideration between the immediate cash benefit and the future value of the total premium. Also the option to give up 20% is frequently selected (21.09%), showing a significant preference for immediate liquidity even at high cost. On the contrary 2% is the less chosen option (12.09%), suggesting that few individuals have a strong preference for cheap immediate liquidity (but this could also be due to the fact that those who accept the discount tend to stop sooner, opting for a higher discount).

3 Independent Variables

3.1 Socio-Demographic Variables

The following socio-demographic variables are used in the dataset to examine this phenomenon:

- **Sex**:
  - 0 if the respondent is a male
  - 1 if the respondent is a female

The analyzed survey is composed by 61% of male (indicated by 0) and 39% of female (indicated by 1).

SCONTO	SEX 0	1	Total
0	1,708	1,136	2,844
	20.51	20.05	20.32
2	1,101	591	1,692
	13.22	10.43	12.09
5	2,136	1,121	3,257
	25.65	19.78	23.27
10	1,813	1,438	3,251
	21.77	25.37	23.23
20	1,571	1,381	2,952
	18.86	24.37	21.09
Total	8,329	5,667	13,996
	100.00	100.00	100.00

Figure 2: Frequency Distribution of Discounts by Gender

As shown in Figure 2 (normalyzed by column) indicate that, in general, there is some difference in the propensity to give up part of the income between males and females. Males seem more cautious and prefer lower discounts (5%), whereas females (almost 50%) seem more willing to accept higher discounts (10% and 20%) to get the money immediately. The less given answer for both male and female is the 2%. This may reflect different attitudes towards risk.

- **Age**:

SCONTO	Freq.	Percent	Cum.
0	460	19.75	19.75
2	288	12.37	32.12
5	531	21.80	54.92
10	561	24.09	79.00
20	489	22.00	100.00
Total	2,329	100.00	

SCONTO	Freq.	Percent	Cum.
0	1,906	21.31	20.31
2	1,204	12.83	33.15
5	2,217	24.33	56.77
10	2,092	21.60	79.07
20	1,964	19.93	100.00
Total	9,383	100.00	

Figure 3: On the left: Table of frquency of SCONTO if Age is between 20 and 40.
On the right: Table of frquency of SCONTO if Age is between 40 and 60.

There is a clear majority of people between 30 and 60 years of age in the population taken into consideration. In Figure 3 the $40-60$ age group shows a slightly higher preference for the 5% and 10% discounts compared to the $20-40$ age group. This could suggest that older individuals are slightly more patient or they may have a greater degree of financial security and can afford to wait for a larger payout, willing to accept a smaller immediate discount for a potentially larger future payout.

- **Education**: which says the highest level of education of the respondent, and is divided as follows
  - 1 if the respondent's highest educational attainment is a vocational secondary school diploma;

- 2 if the respondent's highest educational attainment is upper secondary school diploma;
- 3 if the respondent's highest educational attainment is 3-year university degree/higher education diploma, and postgraduate qualification.

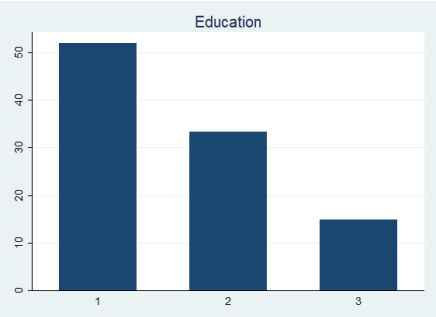


Figure 4: Frequency percentage distribution of education level

More than 50% of the sampled population has a low level of education, this can be a factor in the choice of discount rate since consideration between the immediate cash benefit and the future value of the total premium can be different from a person with an higher level of education.

- **area3**: Indicates the respondent's geographical location
  - 1 notrh;
  - 2 center;
  - 3 south and islands.

SCONTO	AREA3 1	2	3	Total
0	1,336	751	757	2,844
	22.66	24.49	15.04	20.32
2	960	267	465	1,692
	16.28	8.71	9.24	12.09
5	1,444	688	1,125	3,257
	24.49	22.44	22.35	23.27
10	1,146	702	1,403	3,251
	19.43	22.90	27.88	23.23
20	1,011	658	1,283	2,952
	17.14	21.46	25.49	21.09
Total	5,897	3,066	5,033	13,996
	100.00	100.00	100.00	100.00

Figure 5: Frequency Distribution of Discounts by geographical area

Most of the population is in the northern area, about 44%. Figure 5 reveals a distinct geographical pattern in discount preferences. Respondents in the south are more likely to accept the immediate discount offered, while those in the north tend to prefer the 5% option. This could suggest regional variations in financial needs or preferences. In the central region, there appears to be a more balanced distribution of choices.

- **Working Status**: which says if the respondent is
  - 1 employee;
  - 2 self-employed;
  - 3 not-employed.

Figure 6: Boxplot of SCONTO by Working Status

In Figure 6, employees exhibit a moderate preference for lower discounts, with a median around 5%. There is variability, with some employees accepting very low or higher discounts. The self-employed show a similar moderate preference but with a slightly higher median. The not-employed group prefers higher discounts and has a wider range of discount choices, indicating greater variability. This suggests that the unemployed might need immediate cash more urgently, leading them to accept higher discounts.

- **Marital Status**:
  - 1 married;
  - 2 single;
  - 3 separated or divorced;
  - 4 widow or or widower.

SCONTO	maritial_status 1	2	3	4	Total
0	2,352	229	118	145	2,844
	20.06	24.81	16.30	23.13	20.32
2	1,485	85	84	38	1,692
	12.67	9.21	11.60	6.06	12.09
5	2,740	194	179	144	3,257
	23.37	21.02	24.72	22.97	23.27
10	2,686	230	159	176	3,251
	22.91	24.92	21.96	28.07	23.23
20	2,459	185	184	124	2,952
	20.98	20.04	25.41	19.78	21.09
Total	11,722	923	724	627	13,996
	100.00	100.00	100.00	100.00	100.00

Figure 7: Frequency Distribution of Discounts by maritial status

About 80% of the population is married, who show a slight preference for 5%. While there is a distinct preference by separated for 20% and by widows for 10%. There is considerable diversity in how singles evaluate discounts.

3.2 Economic Variables

In this section will be reported the most significant economic variables for the analysis.

- **Risk**: This variable assesses an individual's risk tolerance or preference in financial investments. It is measured on an ordinal scale with four levels, where:
  - 1 if respondents prefers very high returns, but with a high risk of losing part of the capital;
  - 2 if respondents prefers a good return, but also a fair degree of protection for the invested capital;
  - 3 a fair return, with a good degree of protection for the invested capital;
  - 4 if respondents prefers LOW returns, WITH NO RISK of losing the invested capital.

SCONTO	risk 1	2	3	4	Total
0	28	725	836	1,255	2,844
	16.57	26.17	16.93	20.51	20.32
2	27	337	666	662	1,692
	15.98	12.17	13.48	10.82	12.09
5	21	652	1,447	1,137	3,257
	12.43	23.54	29.30	18.58	23.27
10	33	602	1,168	1,448	3,251
	19.53	21.73	23.65	23.67	23.23
20	60	454	822	1,616	2,952
	35.50	16.39	16.64	26.41	21.09
Total	169	2,770	4,939	6,118	13,996
	100.00	100.00	100.00	100.00	100.00

risk	SEX 0	1	Total
1	159	50	209
	1.44	0.69	1.14
2	2,321	1,420	3,741
	20.97	19.69	20.46
3	4,085	2,469	6,554
	36.91	34.23	35.85
4	4,503	3,274	7,777
	40.68	45.39	42.54
Total	11,068	7,213	18,281
	100.00	100.00	100.00

Figure 8: On the left: Frequency Distribution of Discounts by risk attitude.
On the right: Frequency Distribution of risk attitude by gender

Figure 8 shows individuals with a higher risk tolerance demonstrate a strong inclination to accept the initial discount offered (35.5%). Even those who prefer less risky investments predominantly choose the 20% discount (26.41%), although their acceptance rates for other discount values are higher than those with the lowest risk tolerance. Additionally, risk attitude seems to vary between genders, potentially influencing discount preferences as well. Also the table reveals a clear preference for lower-risk investments among both men and women in the sample. The majority of both genders opt for investments with minimal risk, even if it means lower potential returns. While high-risk investments are rarely chosen by either group, a notable gender difference emerges at moderate risk levels (2 and 3), where the gap in preference exceeds 15%. Overall, these findings suggest a risk-averse tendency within the sampled population.

- **Income**: This variable represents the respondent's total net earnings in 2010 as a payroll employee (in the questionnaire section B1, question 7). This includes all forms of income received from employment, excluding severance pay, taxes, social security contributions, and luncheon vouchers. This variable was codified in four levels:
  - 1: low level of incomes ($\leq$ 10000€)
  - 2: middle-low level of incomes ($>$ 10000€ and $\leq$ 20000€)
  - 3: middle-high level of incomes ($>$ 20000 € and $\leq$ 30000 €)

– 4: high level of incomes (> 30000€)

At first glance in Figure 9 people with lower incomes choose the option of discount rate = 20 and 10 (28.02 and 27.09 respectively). The most chosen option for the central incomes bands (redd= $2, 3$) is the 5%. Those with high level of incomes prefer to gain the entire amount of money at the end of the year, by the way this level could contain outliers of peoples with very high level of incomes with respect to the others. For this porpuse take in consideration the boxplot on the left of the figure.

SCONTO	risk 1	2	3	4	Total
0	28	725	836	1,255	2,844
	16.57	26.17	16.93	20.51	20.32
2	27	337	666	662	1,692
	15.98	12.17	13.48	10.82	12.09
5	21	652	1,447	1,137	3,257
	12.43	23.54	29.30	18.58	23.27
10	33	602	1,168	1,448	3,251
	19.53	21.73	23.65	23.67	23.23
20	60	454	822	1,616	2,952
	35.50	16.39	16.64	26.41	21.09
Total	169	2,770	4,939	6,118	13,996
	100.00	100.00	100.00	100.00	100.00

Figure 9: On the left: Frequency Distribution of Discounts by income's level.
On the right: Boxplot of SCONTO by income's level

See as the median discount (centre line of the box) is higher for lower incomes (level 1) and decreases progressively as the income level increases. This suggests that larger discounts are often chosen by people with lower incomes. The dispersion of discounts (represented by the height of the box) is greater for lower incomes and decreases slightly for higher income levels. This indicates that there is greater variability in the discounts applied to peoples with lower incomes. There are no obvious outliers in any of the income groups.

- **General Condition**: This variable is obtained from the question $E13$, that asks if household's income is sufficient to go through to the end of the month? This variable is choose in order to verify those with more difficult to go through to the end of the month tends to accept immediately a greater discount rate.
  - 1 if go through to the end of the month with difficulty;
  - 2 if go through to the end of the month with some difficulty;
  - 3 if go through to the end of the month fairly easily;
  - 4 if go through to the end of the month easily.

SCONTO	general_cond 1	2	3	4	Total
0	420	856	1,077	491	2,844
	10.78	19.32	26.25	31.35	20.32
2	323	628	534	207	1,692
	8.29	14.18	13.01	13.22	12.09
5	773	1,224	887	373	3,257
	19.84	27.63	21.62	23.82	23.27
10	1,139	860	986	266	3,251
	29.23	19.41	24.03	16.99	23.23
20	1,242	862	619	229	2,952
	31.87	19.46	15.09	14.62	21.09
Total	3,897	4,430	4,103	1,566	13,996
	100.00	100.00	100.00	100.00	100.00

Figure 10: Frequency Distribution of Discounts by General Conditions

As expected, 60% of individuals facing greater financial challenges opt for the immediate, discounted prize. Conversely, those in the fourth category (presumably with more financial stability) are more likely to choose either the full sum at the end of the year or a smaller discount.

- **Precautional Plan**: This variable quantifies the amount of money (in Euros) a household believes it would need to manage unexpected financial events, such as income fluctuations or emergencies like health issues (that is question $C34$). This provides insight into a household's perceived financial resilience and their approach to risk management and preparedness. Higher values for this variable may indicate greater concern about unforeseen circumstances or a desire for a larger financial safety net, and was recoded in 5 levels:
  - 1: low level of precaution (from 0€ to 20000€)
  - 2: mid-low level of precaution (from 20000€ to 50000€)
  - 3: good level of precaution (from 50000€ to 100000€)
  - 4: high level of precaution (from 100000€ to 200000€)
  - 5: very high level of precaution ($\geq$ 200000€)

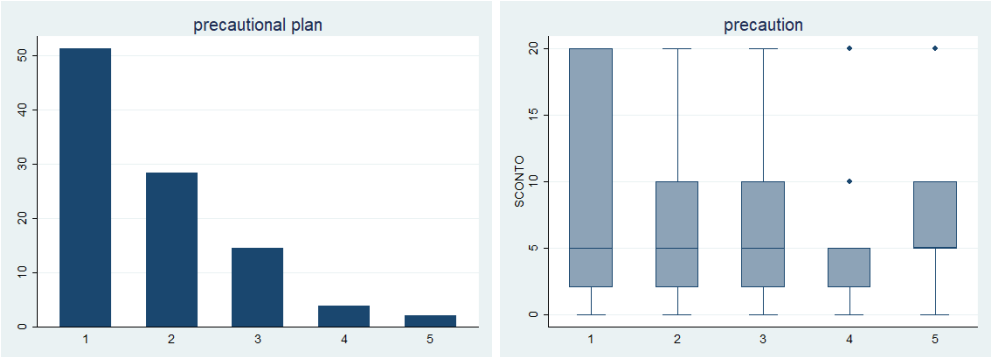


Figure 11: On the left: Percenage Distribution of Precautional Plan.
On the right: Boxplot of SCONTO by Precaution's level

Over 50% of respondents show a low level of precaution, with few having substantial savings for unexpected events. Figure 11's boxplot reveals that as precaution levels

increase, the median accepted discount generally decreases. This suggests that people with more savings for contingencies are less likely to accept high discounts, preferring to wait for the full prize. At precaution level 1, the median discount is the highest, indicating that those with few savings tend to accept higher discounts. Conversely, at level 5, the median discount is lower, but the range of values is greater, suggesting more varied behavior among those with substantial savings. Some outliers are present, particularly at precaution levels 4 and 5, showing that a few people with high precautionary savings still accepted high discounts, differing from the majority in their group.

- **Debt**: This variable take in consideration if someone has debt. In particular questions $D29$ and $D30$ asks if households has any outstanding loans from banks, financial companies or other institutions at 31 December 2010 for the purchase or renovation of its principal residence or other properties. Was build in 4 differents level:
  - 1 those who don't has debt for the principal residence and the other properties;
  - 2 indicates debt only for the principal house;
  - 3 debts for other residences;
  - 4 debt for both cases.
- **Properties** This variable represents the respondent's ownership of additional properties or land, excluding their primary residence, as of December 31, 2010. This variable provides insight into the respondent's real estate holdings and potential wealth beyond their primary residence. It's a composite measure derived from four sub-questions:
  - 1 the respondent doesn't possess any other property;
  - 2 indicates ownership of secondary residences like holiday homes, rented properties, or ownership of commercial properties like shops, offices, garages, etc.
  - 3 indicates ownership of farm land or non-farm land;
  - 4 if all of the previous are owned.

SCONTO	properties 1	2	3	4	Total
0	2,038	572	109	125	2,844
	19.74	25.00	15.08	18.91	20.32
2	1,226	326	58	82	1,692
	11.88	14.25	8.02	12.41	12.09
5	2,357	515	182	203	3,257
	22.83	22.51	25.17	30.71	23.27
10	2,436	517	188	110	3,251
	23.60	22.60	26.00	16.64	23.23
20	2,267	358	186	141	2,952
	21.96	15.65	25.73	21.33	21.09
Total	10,324	2,288	723	661	13,996
	100.00	100.00	100.00	100.00	100.00

Figure 12: Frequency Distribution of Discounts by Second Properties owned

For those in the first level of abit, the percentages are well-balanced across discount rates, with a slight preference for the 10% discount. However, those in the third level show a clear preference for higher discount rates, while those in the fourth level overwhelmingly reject the initial two offers and favor the 5% discount rate.

- **Saving Plan**: This variable indicates whether a household is currently saving for retirement using one of the forms of saving like financial savings (for example, securities, investment funds, insurance policies), or property rentals.
  - 0 indicates that they are not;
  - 1 indicates that the household is saving for retirement.

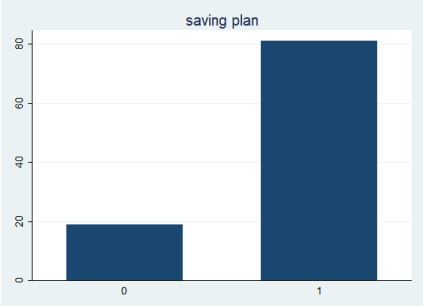


Figure 13: Frequency percentage distribution of Saving Plan

4 Oprobit Regression

After describing and commenting on the variables, an oprobit regression is performed for the variable SCONTO, which has five levels and can be seen as a measure of the propensity for liquidity. A higher value indicates a greater preference for having money available immediately, suggesting that the respondent may be in urgent need of liquidity, perceives the value of time differently, and gives more weight to the present than to the future. Subsequently, the coefficients (both significant and non-significant), test statistics, and significance of the variables will be discussed.

4.1 Results and Interpretation

Considering the structure of the dependent variable in the model, the value 0 indicates a low degree of urgency for liquidity and a higher valuation of future money, while the value 20 corresponds to a very high degree of urgency for liquidity, with the respondent prioritizing immediate access to cash over the future value. In general, this means that a positive coefficient for an independent variable indicates that as the value of this variable increases, the likelihood of the respondent choosing a higher level of SCONTO (i.e., a greater preference for immediate money) also increases. Conversely, a negative coefficient for an independent variable indicates that as the value of this variable increases, the likelihood of the respondent choosing a higher level of SCONTO decreases. In other words, they are more likely to choose lower levels of SCONTO, showing less urgency for liquidity.
Figure 14 presents the results of the ordered probit model for SCONTO, incorporating the previously discussed independent variables.

- Variable **sex**: The effect of gender difference was not significant (p-value > 0.05), indicating no notable difference between males and females regarding impatience in receiving discounted winnings.
- Variable **eta**: Age is highly significant (p-value < 0.001). The positive coefficient suggests that as age increases, so does the probability of accepting a higher discount for immediate

payout. Older individuals might have immediate financial needs, such as medical expenses, that prompt them to prefer quick access to funds. Additionally, the psychology of aging suggests that the elderly may prefer present certainty and security over future uncertainty.

```
Iteration 0:   log likelihood = -3153.3433
Iteration 1:   log likelihood = -3033.7371
Iteration 2:   log likelihood =  -3033.515
Iteration 3:   log likelihood =  -3033.515

Ordered probit regression                       Number of obs     =      2,003
                                                LR chi2(32)       =     239.66
                                                Prob > chi2       =     0.0000
Log likelihood =  -3033.515                     Pseudo R2         =     0.0380

------------------------------------------------------------------------------
      SCONTO |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         sex |   .0093819   .0579806     0.16   0.871    -.104258    .1230219
         eta |   .0221945   .0035809     6.20   0.000     .0151761     .029213
             |
   education |
           2 |   .0531186   .0612638     0.87   0.386    -.0669563    .1731935
           3 |   .1960688    .073062     2.68   0.007     .0528699    .3392677
             |
       area3 |
           2 |  -.1358915   .0560455    -2.42   0.015    -.2457386   -.0260443
           3 |   .0124328   .0785449     0.16   0.874    -.1415123     .166378
             |
        work |
           2 |  -.2984272   .0763626    -3.91   0.000     -.448095   -.1487593
           3 |    .159473   .1324394     1.20   0.229    -.1001034    .4190494
             |
     maritial |
           2 |  -.1848036    .103964    -1.78   0.075    -.3885692    .0189621
           3 |   .0160988   .1323437     0.12   0.903    -.2432901    .2754878
           4 |  -.6915552   .7447963    -0.93   0.353    -2.151329    .7682186
             |
        risk |
           2 |   .2691489   .1687248     1.60   0.111    -.0615457    .5998435
           3 |   .2044891   .1632764     1.25   0.210    -.1155268    .5245051
           4 |   .0537104   .1638504     0.33   0.743    -.2674304    .3748512
             |
      income |
           2 |  -.3902825   .0735034    -5.31   0.000    -.5343465   -.2462185
           3 |  -.4068742   .0887734    -4.58   0.000    -.5808669   -.2328816
           4 |  -.2150691   .1087069    -1.98   0.048    -.4281307   -.0020075
             |
  precaution |
           2 |  -.0804283   .0588778    -1.37   0.172    -.1958266      .03497
           3 |   .0258163   .0713535     0.36   0.717     -.114034    .1656666
           4 |  -.3086605   .1158545    -2.66   0.008    -.5357312   -.0815898
           5 |  -.4533916   .1720741    -2.63   0.008    -.7906507   -.1161325
             |
    gen_cond |
           2 |  -.0952027   .0934976    -1.02   0.309    -.2784546    .0880493
           3 |  -.1735372   .0922068    -1.88   0.060    -.3542592    .0071848
           4 |  -.2230889    .105111    -2.12   0.034    -.4291026   -.0170752
             |
        debt |
           1 |   -.298085   .0945506    -3.15   0.002    -.4834009   -.1127691
           2 |   .0907259   .0649491     1.40   0.162    -.0365719    .2180238
           3 |  -.5195549   .1362821    -3.81   0.000    -.7866629   -.2524468
           4 |   1.180902   .4404847     2.68   0.007      .317568    2.044236
             |
  properties |
           2 |   .0346111   .0775234     0.45   0.655    -.1173318    .1865541
           3 |   1.074158   .1617602     6.64   0.000     .7571141    1.391202
           4 |   .1160967    .105842     1.10   0.273    -.0913497    .3235431
             |
    pianoris |  -.2053764   .0662235    -3.10   0.002    -.3351721   -.0755808
-------------+----------------------------------------------------------------
        /cut1 |  -.2365433    .254163                     -.7346936    .261607
        /cut2 |   .2213441   .2540266                     -.2765389    .719227
        /cut3 |   .9785199   .2552636                      .4782125   1.478827
        /cut4 |   1.658845    .256674                      1.155773   2.161917
------------------------------------------------------------------------------
```

Figure 14: Output of the Oprobit Regression

- Variable **education**: Education level 2 is not significant, while education level 3 is significant (p-value < 0.05). This suggests that individuals with higher education levels tend to be more impatient than those with lower education levels. Highly educated individuals may value present opportunities and experiences more, preferring immediate liquidity for reinvestment or to accelerate professional progress.

- Variable **area3**: area3=2 is significant, indicating that those from central Italy are less likely to accept high discounts compared to those from the north. Coming from the south or the islands is not significant.

- Variable **work**: Self-employed individuals are less likely to accept a discount than employees, indicating less urgency for liquidity. The self-employed may see future money as an opportunity to invest in their business, potentially offering higher returns than the immediate discounted money.

- Variable **maritia_status**: Marital status has no significant coefficients, suggesting it does not significantly affect the probability of accepting a discount.

- Variable **risk**: Regarding risk, none of the categories are significant (all p-values > 0.05), indicating that risk appetite does not significantly influence impatience.

- Variable **income**: All income categories are significant. Negative coefficients indicate that higher income is associated with less impatience (less acceptance of high discounts). Higher income respondents are less likely to accept a discount, preferring to wait for the full payout. This is likely because they have more liquid financial resources and savings, reducing the urgency to obtain money immediately.

- Variable **precaution**: Respondents with high levels of financial precaution are less likely to accept a discount, indicating less urgency for liquidity. Those with higher contingency savings are better at long-term planning and can afford to wait for the full payout due to careful financial management and a solid future plan.

- Variable **gen_cond**: Concerning how people manage their finances towards the end of the month, those who manage very easily have less urgency for liquidity. Their stable and predictable financial management reduces the need for immediate access to funds, even with a significant discount on winnings.

- Variable **debt**: For debt, people with no debt (level 1) have a significant coefficient of -0.298085, suggesting they tend to accept smaller discounts. Conversely, those with all types of debt (level 4) have a significant coefficient of 1.180902, indicating a tendency to accept larger discounts for immediate liquidity. Debt may reduce available liquidity, making immediate funds, even if discounted, more attractive. Financial pressure from debts can also lead to more impulsive decisions favoring immediate gratification.

- Variable **properties**: Owning farm or non-farm land may be associated with a higher propensity to accept high premium discounts, which may seem counterintuitive. Income from agricultural land can be subject to seasonal fluctuations or external factors like weather and market prices, leading to periods of low liquidity and making immediate discounts more attractive.

- Variable **pianoris**: Having a savings plan is associated with greater patience. A savings plan provides financial security and stability, reducing the pressure to meet immediate needs and increasing the willingness to wait for a higher premium.

4.2 Investigating Cognitive Bias in Discount rate

If the way in which the question is posed results in a difference in the estimated discount rate, we are observing a framing effect, which is a cognitive bias. To explain this hypothesis was build a new dummy variable, called id_group, that indicates if the respondent belong to the first randomized group or the second. Adding this new variable in the actual model, the result is that the way in which is question is posed is significant, so how the question is posed does effect how people will respond.

```
Iteration 0:   log likelihood = -3153.3433
Iteration 1:   log likelihood = -2790.5273
Iteration 2:   log likelihood = -2788.1226
Iteration 3:   log likelihood = -2788.1196
Iteration 4:   log likelihood = -2788.1196

Ordered probit regression                       Number of obs     =      2,003
                                                LR chi2(33)       =     730.45
                                                Prob > chi2       =     0.0000
Log likelihood = -2788.1196                     Pseudo R2         =     0.1158

------------------------------------------------------------------------------
      SCONTO |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    id_group |  -1.248753   .0571991   -21.83   0.000    -1.360861   -1.136645
         sex |   .0110523    .058748     0.19   0.851    -.1040917    .1261963
         eta |   .0233577   .0036245     6.44   0.000     .0162537    .0304616
             |
       hstud |
           2 |  -.0367103   .0620867    -0.59   0.554     -.158398    .0849774
           3 |  -.0496578   .0748668    -0.66   0.507    -.1963939    .0970784
             |
       area3 |
           2 |  -.1373549   .0567929    -2.42   0.016     -.248667   -.0260428
           3 |   .0533487   .0794267     0.67   0.502    -.1023248    .2090222
             |
        work |
           2 |  -.2304889   .0774478    -2.98   0.003    -.3822838    -.078694
           3 |   .2606053   .1342608     1.94   0.052    -.0025411    .5237517
             |
     maritial |
           2 |  -.1450677   .1056555    -1.37   0.170    -.3521486    .0620132
           3 |  -.0141414    .134214    -0.11   0.916    -.2771961    .2489132
           4 |  -.4618719   .7398126    -0.62   0.532    -1.911878    .9881341
             |
        risk |
           2 |  -.0050811   .1704129    -0.03   0.976    -.3390843     .328922
           3 |  -.0557509   .1648737    -0.34   0.735    -.3788974    .2673955
           4 |  -.1426371   .1652623    -0.86   0.388    -.4665452    .1812711
             |
      income |
           2 |  -.3894398   .0743408    -5.24   0.000    -.5351451   -.2437344
           3 |  -.3431419   .0897673    -3.82   0.000    -.5190827   -.1672012
           4 |  -.1586581    .109891    -1.44   0.149    -.3740405    .0567242
             |
  precaution |
           2 |  -.0343031   .0596149    -0.58   0.565    -.1511461      .08254
           3 |   .0217594    .072248     0.30   0.763     -.119844    .1633628
           4 |   .0816007   .1175603     0.69   0.488    -.1488133    .3120147
           5 |  -.5568385   .1760987    -3.16   0.002    -.9019857   -.2116914
             |
    gen_cond |
           2 |  -.1156845   .0946634    -1.22   0.222    -.3012212    .0698523
           3 |  -.2227854   .0933606    -2.39   0.017    -.4057688   -.0398021
           4 |  -.3266213   .1066401    -3.06   0.002    -.5356321   -.1176105
             |
        debt |
           1 |  -.0910243    .095997    -0.95   0.343     -.279175    .0971263
           2 |   .2308411   .0659899     3.50   0.000     .1015032     .360179
           3 |  -.2694953   .1389057    -1.94   0.052    -.5417455    .0027549
           4 |   .7559533   .4425051     1.71   0.088    -.1113407    1.623247
             |
  properties |
           2 |  -.0856725   .0783984    -1.09   0.274    -.2393304    .0679855
           3 |   .2609086   .1680898     1.55   0.121    -.0685414    .5903585
           4 |  -.1015315   .1075357    -0.94   0.345    -.3122977    .1092346
             |
    pianoris |  -.2633641   .0670058    -3.93   0.000     -.394693   -.1320352
-------------+----------------------------------------------------------------
        /cut1 |  -1.485816    .263089                     -2.001461   -.9701708
        /cut2 |  -.9175109    .261788                     -1.430606   -.4044159
        /cut3 |   .0105928   .2615523                     -.5020403     .523226
        /cut4 |   .7351856   .2626289                      .2204424    1.249929
------------------------------------------------------------------------------
```

Figure 15: Output of the Oprobit Regression with idgroup